

Implementing basic e-learning tools into an undergraduate taxation curriculum

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Abstract

Purpose – Educators in the accounting discipline are faced with the challenge of finding innovative ways to accommodate the flexible learning styles of Millennial students, using “in classroom/contact time” effectively and decreasing transactional distance between students and educators in large classes. In an attempt to address these challenges, this paper aims to describe the implementation of basic e-learning tools (podcasts, vodcasts and voice-over-PowerPoint) as supplementary and substitutional tools in an undergraduate taxation curriculum. The tools were implemented as part of a student-centred approach to the facilitation of learning, embedded in the Blended Learning Theory. The paper reports on students’ use and experience of various basic e-learning tools, as well as the impact of the use of these tools on student performance.

Design/methodology/approach – An action research methodology was followed, and data were collected by way of a voluntary, descriptive student survey and student class lists. A total of 387 students completed the survey.

Findings – Students appear to have access to devices and data to use e-learning tools. They perceive these tools as helpful study aids and prefer synchronous, substitutional tools. Use of the tools does not have a significant impact on performance; however, it does appear to have a positive impact on the learning environment and student engagement.

Originality/value – The results of the study may be of benefit to educators and curriculum designers who are responsible for reviewing and updating the content delivery methods of undergraduate taxation curricula in large classes with diverse student populations. These results add to the limited body of knowledge on the implementation of basic e-learning tools in a South African accounting education setting.

Keywords Accounting education, Millennials, Blended learning, E-learning tools, Podcasts, Student-Centred, Vodcasts, Voice-over-PowerPoint

Introduction

Understanding the learning preferences of students is an essential component in the implementation of pedagogies which will have the desired impact on student learning (Laurillard, 2002; Fink, 2003; Lai and Hong, 2015). The majority of students currently enrolled at contact higher education institutions form part of the generation referred to as the “Millennials” (Howe and Strauss, 1991). Millennials have different social characteristics, different ways of using information and constructing knowledge and

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different expectations about life and learning preferences (Bullen *et al.*, 2001; Prensky, 2001), in contrast from the needs of those for whom the current education system was designed (Spector *et al.*, 2014).

Participants in higher education and leaders in society across all disciplines see a need for institutions of higher education to provide educational programs that result in different and more significant kinds of learning (Fink, 2003). To create more significant kinds of learning, it is advocated that educators move away from the traditional teaching and learning model to a culture of facilitative learning and student-centredness that addresses the learning preferences of Millennials (McWilliam, 2008). A student-centred approach is described as progressive, where the educator acts as a guide to the education experience and students take on a more active role; and the teacher-centred approach is traditional, where the educator is the distributor of knowledge and the students are passive participants (Bennet, 1976; Leveson, 2004; Visser *et al.*, 2006).

Accounting education literature in recent years has also emphasised the need to create significant learning experiences through following a student-centred approach to the facilitation of learning (Boritz and Carnaghan, 2003; McWilliam, 2008; Miller and Woods, 2000; Apostolou *et al.*, 2013). Given that they are part of accounting educators, taxation educators have to address the expectations of different stakeholders (being professional bodies, employers and students) to equip taxation graduates for the world of work in the twenty-first century (Miller and Woods, 2000; Hesketh, 2011; Guthrie *et al.*, 2014; Bayerlein, 2015).

In a South African context, taxation educators must adhere to the requirements of professional bodies such as the South African Institute of Tax Professionals (SAIT) and the South African Institute of Chartered Accountants (SAICA). These professional bodies prescribe a large amount of technical and pervasive competencies, which higher education institutions need to incorporate into their curricula to gain accreditation or remain accredited with regard to their professional qualifications (SAICA, 2015; SAIT, 2015). Future employers also require graduates to have a high standard of technical and pervasive skills (Barac, 2009; Doman and Nienaber, 2012). Educators are responsible for accomplishing the task of meeting both groups of stakeholder requirements, as well as address the learning preferences of students, with limited “in class/contact time” to do so (Boritz and Carnaghan, 2003).

The limited “in class/contact time” has to be effectively used within the challenges of teaching large student groups, as is the case at many of the South African universities (Universum, 2014). The student group size at the university where this study was performed is in excess of 1,000 students, with an excess of 200 students per class. The number of students in a large class makes it difficult for the lecturer to communicate and interact personally with them (Gibbs and Jenkins, 1992). The amount of interaction between educators and students is referred to as transactional distance (Van Rooyen, 2010). The higher the interaction between students and educators on different communicative platforms, the less distance there would be between the students’ and educators’ pedagogical “transaction” (Bayerlein, 2014). Educators are faced with a consequent need to create a more effective platform of interaction with and among students than the traditional teacher-centred face-to-face interaction (Gibbs and Jenkins, 1992; Prinsloo and Van Rooyen, 2007; De Wet and Van Niekerk, 2001; Van Rooyen, 2010).

The challenge for taxation educators to address the changing learning preferences of Millennial students, to use “in class/contact-time” as effectively as possible to meet the demands of professional bodies and future employers, and to decrease transactional distance in large classes, is the motivation for this study. These challenges could be addressed by following a student-centred approach to the facilitation of learning embedded in the Blended Learning Theory. The Blended Learning Theory has been selected as the conceptual framework for this study and encompasses the integration of classroom face-to-face learning experiences with online learning experiences using information and communication technology (ICT) (McCarthy, 2010; Garrison and Kanuka, 2004; Prinsloo and Van Rooyen, 2007; Spector *et al.*, 2014).

Previous studies have highlighted the value of including a student-centred approach to the facilitation of learning, embedded in the Blended Learning Theory, into university curricula. However, despite higher education institutions’ awareness of the call for change, there are a number of factors influencing the implementation of such changes. The mainstream teaching and learning methods in undergraduate taxation and accounting are still very much focused on a twentieth century environment (Boritz and Carnaghan, 2003; McWilliam, 2008; Miller and Woods, 2000; Apostolou *et al.*, 2013).

The factors inhibiting change could be uncertainty as to how the Blended Learning Theory can be practically applied, how students in a South African context use and experience the tools and whether the move to a blended learning environment has an actual impact upon student performance (Spector *et al.*, 2014; Graham *et al.*, 2013). The results of this study may therefore be of benefit to educators and curriculum designers who are responsible for reviewing and updating the content delivery methods in undergraduate taxation curricula, taking into account a theoretical as well as a practical approach. The results may be specifically relevant for educators teaching large classes with a diverse student population. The study was specifically structured to be a helpful classroom tool for educators to be able to design and implement the tools in their own settings.

The study aims to achieve the following two research objectives:

- (1) to determine how students use and experience basic e-learning tools implemented into the undergraduate taxation curriculum; and
- (2) to determine whether the use of basic e-learning tools has an impact on student performance.

To reach the research objectives, an action research methodology embedded in the Blended Learning Theory was followed to design and incorporate three different basic e-learning tools (podcasts, voice-over-PowerPoint and vodcasts) into an undergraduate taxation curriculum of a large student group (1,048 students) at a South African university. The tools were incorporated at different stages of the students’ learning process, some as a revision tool (supplementary) and others as class preparation tools (substitutional) (Vogele and Gard, 2006). Qualitative and quantitative data were collected by way of a voluntary, descriptive student survey and student class lists.

This paper begins with a literature review that serves as background to the need for incorporating blended learning embedded in a student-centred approach, to facilitate learning into an undergraduate taxation curriculum. This is followed by a description of the action research design to address the research objectives as stated above and an

analysis of the data obtained. The paper concludes with a summary of the findings and a discussion of limitations and directions for future research.

Literature review

The literature review commences with an explanation of the learning preferences of Millennials, followed by a discussion of implementing a student-centred approach to the facilitation of learning, to have the desired impact upon student learning. After an exploration of the challenges faced by accounting educators, the Blended Learning Theory is argued as a possible method to address the identified challenges and move to a student-centred approach. The literature review concludes with a review of the incorporation of basic e-learning tools in other settings and the outcomes of previous research on the topic.

Understanding the learning preferences of students

The average age of students currently enrolled at contact higher education institutions in South Africa is 25.1 years, born in the 1990s (Universum, 2014). According to Generational Theory, these students belong to the Millennial Generation, also referred to as the Net Generation, Digital Natives, or Generation Y (Howe and Strauss, 1991). Although there are some conflicting opinions as to the specific years, the majority of generational theorists claim that the Millennial Generation includes individuals born after 1982 and before 2004 (Bullen *et al.*, 2001; Sandeen, 2008; Howe and Strauss, 1991).

There are two schools of thought on the characteristics of the Millennial Generation, specifically in terms of their use of ICTs in education (Spector *et al.*, 2014). One school of thought claims that the learning preferences of the current students in higher education differ significantly from those of other generations, as Millennials have been using the tools of the digital age for as long as they can remember, for both leisure and educational purposes (Prensky, 2001; Laurillard, 2002; Spector *et al.*, 2014). Millennials may favour education by means of wireless devices and expect customisation, personalisation and flexibility when it comes to learning opportunities. They also expect 24/7 access to instruction and student services, and educators are advised to follow student trends and to change pedagogies, to keep up with student expectations of flexible learning (Sandeen, 2008; Prensky, 2001).

There are some studies, however, which contradict the notion that there are significant differences in the behavioural characteristics, including the use of ICT, between the Millennials and other generations. These studies warn educators not to make educational strategy decisions based upon the assumption that all learners from this specific generation have homogeneous characteristics that vary significantly from other generations (Bullen *et al.*, 2001; Gros *et al.*, 2012). Educators should not assume that students' competence in using technology in their everyday lives necessarily implies that they can transfer those same skills to learning activities. Pedagogy and teaching models will have a greater influence on the use of technology in learning than the mere fact that students are part of the Millennial Generation (Gros *et al.*, 2012; Lai and Hong, 2015; USA Department of Education, 2009).

Authors who are cautious about the widespread acceptance that Millennials have different learning preferences than other generations, however, also agree that the use of ICT by Millennials is a certainty and a reality that educators must take into consideration (Bullen *et al.*, 2001; Gros *et al.*, 2012). There is an agreement that the

Millennials live in a world which is trademarked by flexible learning, a variety of learning delivery methods and easy access to digital media and electronic resources (Lai and Hong, 2015; Spector *et al.*, 2014; USA Department of Education, 2009). Educators at higher education institutions should take cognisance of the consequent changes in learning preferences of Millennials and acknowledge the importance of ICT in enhancing the quality of teaching and learning through appropriate pedagogical methods (Lai and Hong, 2015).

A student-centred approach to the facilitation of learning

To address the changing learning preferences of students, educational researchers have advocated that educators should move away from the traditional teaching approach to a student-centred approach to facilitate learning (Slabbert *et al.*, 2009; Bennet, 1976; Leveson, 2004; Visser *et al.*, 2006). A student-centred approach to the facilitation of learning aims to move away from a traditional approach of the transfer of knowledge to an approach where the needs of students as active participants in the learning process are addressed (Fink, 2003; Slabbert *et al.*, 2009).

In line with the universal call to move to a student-centred approach to the facilitation of learning, South African taxation educators are also experiencing pressure to be innovative in their education strategies (De Wet and Van Niekerk, 2001; Barac, 2009; Hesketh, 2011). The increased pressure can be attributed to the fact that the Millennial students prefer flexible learning; different stakeholders require different sets of skills from taxation graduates and educators have limited “in class/contact time” to equip graduates, and large student classes increase transactional distance between students and educators (Doman and Nienaber, 2012; Garrison and Kanuka, 2004; Guthrie *et al.*, 2014; Bayerlein, 2014).

The undergraduate taxation curriculum at accredited universities is largely influenced by the curricula based upon competency frameworks, as prescribed by the professional bodies, articulating into professional qualifications. The main professional bodies in South Africa that impact taxation education are the SAICA, the SAIT, the South African Institute of Professional Accountants and the Association of Chartered Certified Accountants South Africa. The competency frameworks as prescribed by these major professional bodies are obtained throughout a student’s university education, as well as during post-graduation traineeships.

Accredited qualifications through the above-mentioned professional bodies cannot be obtained without meeting the prescribed competencies of the professional body. Numerous studies in accounting and taxation education however have identified and investigated an expectation gap between the competencies which employers and professional bodies seek, and the competencies which are held by university graduates. Most of these studies agree that accounting and taxation educators are mainly following a teaching approach that does not lead to developing the graduate attributes demanded by the profession (Barac, 2009; Coetzee and Oberholzer, 2009; De Lange *et al.*, 2006; Dixon *et al.*, 2010; Gammie *et al.*, 2002; Howieson, 2003; Kermis and Kermis, 2010; McCarthy and McCarthy, 2006; Steinbank, 2010; Bayerlein, 2015).

The process of accreditation can have a negative impact upon taxation academy through exerting different mechanisms of influence (De Villiers and Venter, 2010; De Wet and Van Niekerk, 2001). The effect of these mechanisms leads to teaching with a technical focus without links to the social implications, and one only has to consider the

vast body of knowledge prescribed by professional bodies, to conclude that this group of stakeholders favour technical skills (De Villiers and Venter, 2010). Within the traditional paradigm, students are trained to apply an impressive number of narrow computational rules to a given set of numbers. In their attempt to cover every computational rule that might affect taxpayers, educators often neglect to relate the tax aspects of a transaction to its accounting, financial or economic consequences (Jones and Duncan, 1995; Hite and Hasseldine, 2001; Bayerlein, 2015).

Educators therefore have to find innovative ways to utilise “in class/contact time” as effectively as possible to address the challenges as stated above. Content and content delivery are two major components of the educational curriculum (Fink, 2003). Due to the accreditation requirements of professional bodies, taxation educators have limited control over “content”, as this component is prescribed by the professional bodies. The “content delivery” component is, however, within the educators’ realm of control. The way in which educators facilitate learning should be reconsidered. Instead of merely “imparting knowledge”, educators should, as part of their professional development, utilise learning theories in order to facilitate learning of the competencies proposed by professional bodies. Incorporating a student-centred approach entails integrating skills-based strategies of facilitating learning such as constructivist learning (Von Glasersfeld, 2001), self-regulated learning (Slabbert *et al.*, 2009), collaborative learning (Johnson and Johnson, 1990); experiential learning (Kolb and Kolb, 2005) and blended learning (Garrison and Kanuka, 2004).

For the purposes of this study, the Blended Learning Theory has been selected as a conceptual framework to create a student-centred approach to the facilitation of learning, due to the advocated advantages of this learning theory as discussed in the next section.

Blended learning (information and communication technology in curriculum) as the conceptual framework

In its simplest form, blended learning is about integrating face-to-face learning experiences with online learning experiences (Garrison and Kanuka, 2004). It is an educational strategy that effectively integrates the strengths of both components, and it is not merely adding the one component, online learning, to the already dominant other, face-to-face learning (Wong *et al.*, 2014). Each blended learning environment is fundamentally redesigned and reconceptualised in terms of the teaching and learning dynamic (e.g. discipline, developmental level and resources). Introducing technology into the curriculum can improve the quality of education (Talebian *et al.*, 2014). However, the educational effectiveness of ICT depends upon how these technologies are used and for what purposes they are used (Talebian *et al.*, 2014, Weil *et al.*, 2014; USA Department of Education, 2009).

Garrison and Kanuka (2004) reviewed a number of studies dealing with ICT integration, and they concluded that student performance either improved or remained the same after being exposed to a blended learning environment. Blended learning has been found to promote student-centred learning, decrease transactional distance between educators and students and to encourage wider student participation with the benefit of flexible learning, variety and adaptability (Aliotta *et al.*, 2008; Chan and Lee, 2005; Weil *et al.*, 2014; Dickfos *et al.*, 2014; Wong *et al.*, 2014; USA Department of Education, 2009; Bayerlein, 2015).

Graham *et al.* (2013) compiled the following framework to explain the concept of blended learning.

Although educators may be aware of the advocated benefits of including ICT in the curriculum, research has indicated that educators experience discomfort and a lack of competence for effective pedagogical use and integration of ICT in the curriculum. Educators are also not sure how students use and experience these tools, and whether going through the effort of implementing these tools will have an effect upon student performance (Lai and Hong, 2015; Spector *et al.*, 2014; Prinsloo and Van Rooyen, 2007). This paper aims to assist educators to address the above uncertainties.

The use of basic e-learning tools

There are many tools that an educator can choose from to incorporate technology into the curriculum, to create a blended learning approach. Examples of these tools include the use of podcasts, vodcasts and voice-over-PowerPoint (Graham *et al.*, 2013). The term *podcasting*, was coined in 2004 and resulted from a combination of the words “broadcasting” and “iPod” (Tynan and Colban, 2006). A podcast is an asynchronous tool, as it is a voice only with no visual presentation (Heilesen, 2010). A distinction is made between three categories of podcasts, namely, administrative podcasts (e.g. general information, guides), special lecture series (guest lectures, commencement lectures, etc.) and classroom podcasts (anything involving curriculum). Classroom podcasts can once again be divided into three sub-categories – substitutional (e.g. documenting or substituting classroom teaching), supplementary (e.g. providing summaries of classroom teaching) and creative (e.g. production by learners) (Vogele and Gard, 2006).

Vodcasts are podcasts with video content (Spector *et al.*, 2014). These tools are referred to as synchronous tools, being the simultaneous playback of audio and video data streams (Griffin *et al.*, 2009).

PowerPoint presentations are a common means of delivering lectures, and many educators have taken the option of podcasting audio recordings of their lectures, either recorded “live” or in the comfort of their offices, in addition to supplying the PowerPoint file online to their students (Griffin *et al.*, 2009). This is also a synchronous tool with video and audio elements.

Studies on the educational use of e-learning tools concluded that when measuring learner performance only, academic indicators are weak that the basic e-learning tools are efficient (USA Department of Education, 2009). No studies however have indicated that the incorporation of these tools has a negative impact upon learning. Although these studies do not specifically conclude an increase in learner performance, learners often indicate that e-learning tools have a positive impact upon their learning environment and provide a variety and meet the demand for flexible learning, even if they do not improve their performance (Heilesen, 2010; Graham *et al.*, 2013; Garrison and Kanuka, 2004).

The aforementioned studies were all conducted at higher education institutions in developed countries. There exists little research on the use, experience and impact upon performance of basic e-learning tools as a content delivery method to facilitate learning in a blended learning environment in developing countries such as South Africa (Mugwanyana *et al.*, 2011).

Synthesis of the literature

The universal call for innovation in education when training Millennials, combined with the specific circumstances created by the needs of the different stakeholders in the South African taxation education environment, challenge South African taxation educators to use “in class/contact-time” as effectively as possible. One of the ways in which educators can create a student-centred approach to the facilitation of learning is to incorporate the Blended Learning Theory into the curriculum delivery method. The advantages of the Blended Learning Theory can possibly be achieved by implementing basic e-learning supplementary and substitutional tools. The next section describes the research method to implement basic e-learning tools into the undergraduate taxation curriculum.

Research method

Action research was considered to be the most appropriate research method to be followed in this empirical study, as it is a process that promotes professional development and evaluation of innovative teaching strategies, to solve problems encountered by educators (McNiff and Whitehead, 2006; Du Toit, 2009). Educational action research is one of the mainstreams of action research as a whole, and is a well-suited methodology for educational transformation in the twenty-first century (Somekh and Zeichner, 2009). It can be defined as any systematic inquiry conducted by researchers into the teaching and learning environment, to gather information on how their particular environment operates, how they teach and how well their students learn. It is a reflective process, conducted in the natural setting in which the problem is encountered, and it allows for inquiry and discussion to be components of the research. Information is gathered with the aim of gaining insights, developing reflective practice, effecting positive change in the educational environment and improving student learning (Somekh and Zeichner, 2009).

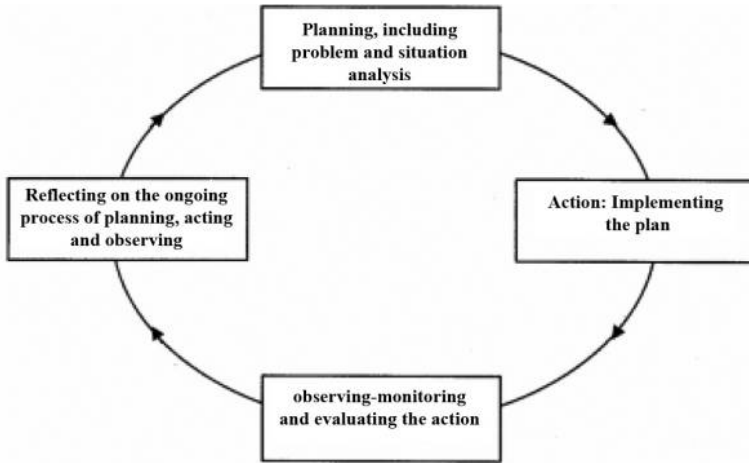
Action research is an overarching design that incorporates a cyclical process consisting of several iterations of action research cycles (McNiff and Whitehead, 2006). Two cycles were executed in this research project. The action research process is illustrated in Figure 1.

For the current study, a pilot study (first cycle) was performed in specific topics presented in 2014, which informed the design of the second action research cycle. The research process and data reported on in this study will mainly focus upon the second action research cycle.

Phase 1: Planning, including problem and situation analysis

In following, the action research methodology, a student-centred approach to facilitate learning, embedded in the Blended Learning Theory, was incorporated through the implementation of various basic e-learning tools into the curriculum of an undergraduate, introductory taxation course. This course is attended by 1,048 students majoring in accounting (towards the CA (SA) professional qualification) or financial sciences (towards other professional qualifications in the financial sciences). This is a year course, taken in the second year of a three-year degree programme, and focuses upon the basic principles of the tax framework, the taxation of individuals, estate duty and donations tax.

The researchers wanted to focus upon some of the challenges which they experienced within their environment, specifically to address the students’ needs for flexible learning



Source: McNiff and Whitehead (2006)

Figure 1.

(Lai and Hong, 2015; Spector *et al.*, 2014), the effective use of “in class/contact time” (Hesketh, 2011; Howieson, 2003), as well decreasing the transactional distance between the students and the researchers (Prinsloo and Van Rooyen, 2007; Bayerlein, 2014). During the planning phase, the researchers made decisions regarding the tool type, length and timing of implementation as well as content.

Tool type

In the second cycle, three different e-learning tools were designed, namely, podcasts, vodcasts and voice-over-PowerPoint. The researchers aimed to follow a pedagogical approach to content delivery in creating tools which were basic enough to be created by educators with time, technological and budget constraints. The researchers considered these factors to have an influence upon the sustainability of the project, i.e. the ease of the design would impact implementation by other educators and across various different topics. The researchers investigated numerous programmes and acknowledge that there are various different applications available to create e-learning tools. However, the specific applications were selected as other programmes were found to be either too complex to master in the given time, too time-consuming in creating the tools or too expensive to set up with no available funding for the initiative. All tools created were made available as MP3 or MP4 files, to increase compatibility with as many devices as possible, in an attempt to increase student access.

Length

During the first cycle, students were asked what they considered to be the ideal length of a podcast (the tool implemented for revision). Their responses guided the design of the basic e-learning tools in the second cycle. In all, 9 per cent of the students indicated that the ideal podcast should be shorter than three minutes, 54 per cent indicated that it should be 3-6 min in length and 37 per cent indicated that it should be between 6 and 10 min in length. This is a response of 83 per cent of the students as the question was asked as part of the normal annual course feedback.

Language

At the researchers' institution, training is presented in both English and Afrikaans. All basic e-learning tools were made available in English only. Feedback collected from the first cycle gave no indication that the Afrikaans students experienced difficulty in using the revision podcasts in a language other than the language of instruction (being Afrikaans); therefore, no adjustment was made to the language of e-learning tools in the second cycle.

Timing of implementation

Some of the tools were designed to be supplementary (pre-class preparation), and some were designed to be substitutional (revision tools) (Vogele and Gard, 2006). The researchers were keen to obtain student perceptions as to whether they use supplementary tools differently as opposed to the substitutional tools, and whether they experienced the one to be more beneficial for learning than the other.

The substitutional (revision) tools were made available to students after the content of a topic had been dealt with during "in class/contact time", but before an annual assessment was written. Students prepared for "in class/contact time" by means of reading the textbook and writing an online pre-test. "In class/contact time" focused upon covering the content theory and did not allow much time for application.

The supplementary tools were made available to students a week before the content of the topic was dealt with during "in class/contact time", as a means of preparing for the "in class/contact time". In line with the Blended Learning Theory (Figure 2), the face-to-face contact time was reduced by 25 per cent (students were relieved of the first of four weekly contact sessions), to allow students time to prepare for class by using the supplementary tools (Graham *et al.*, 2013). Students were not required to write an online pre-test before attending the contact sessions. The reduced contact sessions were used in a different manner with a stronger focus upon practical application and less focus upon theory, due to the assumption that students had obtained a certain level of knowledge by using the tools. The researchers did not follow a complete flipped classroom approach, as some of the theory covered in the supplementary tools were revised during the contact sessions, but the focus had shifted. Students wrote a class test on the principles of the content theory, which was dealt with in the supplementary tools during the first contact session of the week. They were also free to use the supplementary tools for revision purposes during the following annual assessment.

Content

From the researchers' experience and from consultation with colleagues, topics were selected based upon their relevance within the curriculum and the level of difficulty

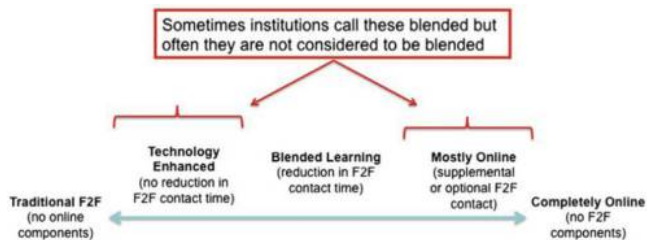


Figure 2. A framework for institutional adoption and implementation of blended learning in higher education

students experienced with these topics. Due to the changing nature of taxation as a discipline, the researchers' main focus was not on specific rules or exceptions, but rather on the application of the general principle, to ensure re-use within the taxation curriculum.

Table I is a summary of the tools which were designed and implemented.

Phase 2: Implementing the plan

The e-learning tools were implemented at specific times as described above. The tools were reviewed by colleagues for technical accuracy as well as ease of use, before making the files available to the students on the learning management system. Students could download and save the files for repeated future use.

Phase 3: Observing, monitoring and evaluating the action

Student feedback and lecturer reflection were obtained after the pilot study/first action research cycle. The results were used to inform the design of the second action research cycle, which will be reported on in the next section.

An electronic, descriptive survey was chosen as the method of data collection, as it was the most cost-effective and easiest way of reaching the large number of students in the time available (Kelley *et al.*, 2003). The university learning management system was used as the medium through which the survey was distributed. The survey consisted of both qualitative and quantitative questions. The data collected were from a sample of undergraduate taxation students who were exposed to the use of the basic e-learning tools as part of a blended learning environment. The survey was developed through a review of literature and refined after implementation in the first action research cycle, taking the responses into consideration. The survey was also internally validated through a peer review process. Completion of the survey was voluntary, and students were informed that their responses would be used anonymously. Data contained in student class lists (like demographics and marks) were also used.

The following section provides a descriptive analysis of the data obtained from the student sample, to determine the students' use and experience of the basic e-learning tools, as well as a hierarchical regression analysis to ascertain whether the use of the various basic e-learning tools had an impact upon student performance. The quantitative data were analysed using SPSS, and the qualitative data were analysed using Atlas Ti.

Analysis of data

The data analysis is shown in Tables II-VII. For ease of reference, these tables contain the following data:

- **Table II:** An analysis of the participant and group demographics. This analysis was used to address non-response bias, and the participant demographics were used as part of the regression analysis in Tables VI and VII.
- **Table III:** A description of the primary internet connections and devices used by participants to access e-learning tools.
- **Table IV:** A description of the participant's use, experience and preferences relating to e-learning tools.

Table I.

Tool	Revision podcasts	Preparation podcasts	Voice-over-p	Vodcasts
File format	MP3 file format ^a	MP3 file format	PowerPoint file format	MP4 file format
Number of tools	Seven	Three	One	One
Average length	5.39 min	4.6 min	7.19 min	11.03 min
Average size	7.96 MB	5.59 MB	17.9 MB	68.2 MB
Topic (one topic per file)	Sections in the Income Tax Act: 8(4)(a) and 11(0); 11(a); 11(c); 11(e) and 12C; 13, 13quin, 13sex; 20 and 20A; 23H	Capital Gains Tax: Proceeds, base cost, deceased and deceased estates	Capital Gains Tax: Exclusions and rollovers	Capital Gains Tax: Framework and practical example calculation
Design	Windows sound recorder on standard Microsoft software. Output is a VMA file converted to MP3 using a free programme–Freemake Audio Converter	Windows sound recorder on standard Microsoft software. Output is a VMA file converted to MP3 using a free programme–Freemake Audio Converter	PowerPoint slide show, using a normal laptop/desktop with a microphone to record over each slide	Making use of the standard Apple I-phone camera the Vodcast was recorded and saved as file type WMV. Using freeware downloaded from the internet (Free WMV to MP4 Converter) the file was converted to MP4 and the size was reduced
Timing	Made available to students after they dealt with the topic in class, before a test on the specific topic. The test counted towards the year mark of the students - Revision	Made available to students a week before they dealt with the topic in class. Class test written on topic in class. The test counted towards the year mark of the students Preparation		

Note: ^a Note that the revision podcasts were the only tool which formed part of the pilot project/first cycle. The implementation of podcasts as preparation tools as well as the development of the voice-over-PowerPoint and vodcasts were implemented in the second cycle, based upon the feedback received from students in the first cycle

Table II.

Variable	Variable explanation	Variable option	Respondents <i>n</i>	Group <i>n</i>
Number			387 (37%)	1,048
Language	Language of instruction at researchers' institution	Afrikaans	90 (23.3%)	244 (23.3%)
		English	297 (76.7%)	804 (76.7%)
Degree enrolment	As discussed in Phase 1 of the research method, these are the two major programmes that students who take this module, are enrolled for	Accounting Sciences	250 (64.6%)	565 (54%)
		Financial Sciences	137 (35.4%)	483 (46%)
Age	Represents Millennial generation (Universum, 2014; Howe and Strauss, 1991)	Mean	20.464	20.629
		% of students	99.7%	99.9%
		meeting definition of Millennials		
Repeat/First time	Represents students who are either doing the module for the first time or who are repeating the module	First time	371 (95.9%)	942 (90%)
		Repeat	16 (4.1%)	106 (10%)
Race		African	167 (43.1%)	482 (46.0%)
		Coloured	5 (1.3%)	23 (2.2%)
		Indian	34 (8.8%)	83 (7.9%)
		White	181 (46.8%)	460 (43.9%)
Gender		Female	271 (70.0%)	601 (57.3%)
		Male	116 (30.0%)	447 (42.6%)

Table III. Primary internet connections and primary devices used by students to access basic e-learning tools

Which internet connection did you primarily use to download/access the e-learning tools?	(%)	Which device did you primarily use to download/access the e-learning tools?	(%)
Campus network (using the on-campus computers in labs/library)	17.1	On-campus computers in labs/library	16.3
<i>Private network (for example using a secure line at your place of residence)</i>	41.3	Home computer/personal laptop	54.0
<i>University of Pretoria Wi-Fi</i>	28.9	Mobile device/cell phone	8.0
<i>Tshwane Wi-Fi</i>	0.5	<i>Tablet</i>	19.6
Mobile data	10.1	I listened to/watched on someone else's device	0.5
Not applicable as I did not download the e-learning tools	0.5	Not applicable as I did not download the e-learning tools	0.5
Other	1.6	Other	1.1

- **Table V:** Description of dependent and independent variables used as part of the regression analysis.
- **Table VI:** The results of the regression analysis for the revision (supplementary) e-learning tools using the variables as described in **Table V**.
- **Table VII:** The results of the regression analysis for the preparation (substitutional) e-learning tools using the variables as described in **Table V**.

A total of 1,048 students are enrolled for the course and were exposed to the e-learning tools. The survey was completed by 387 students, representing a response rate of 37 per cent. This was the response rate after several announcement reminders made by the researchers via the learning management system. Completion of the survey was entirely voluntary. According to [Kelley et al. \(2003\)](#), a response rate of 30 per cent is acceptable as an average response rate when compiling online surveys. The researchers acknowledge that the results of this study might not be used to make general assumptions of the whole study population, due to a risk of a non-response bias. In an attempt to address the non-response bias, **Table II** illustrates the demographics of the total group of students compared to that of the respondents.

Based upon the demographic information, the respondents appear to be representative of the total group of students. The response rate has been accepted by the researchers, as it appears as if the non-response bias risk is low.

Tables III and **IV** indicate a descriptive analysis of the data obtained towards meeting the first research objective:

To determine how students use and experience basic e-learning tools implemented into the undergraduate taxation curriculum.

The researchers have selected to report on the major themes for each qualitative response as analysed in Atlas Ti. **Table III** illustrates which primary internet connections and devices were used by students to access the basic e-learning tools:

It appears as if most of the students have access to data and devices. This is relevant in the South African context where technology availability is sometimes seen as a barrier for incorporation of ICT in the curriculum ([Mugwanya et al., 2011](#)).

Table IV.

Options	Revision podcast (%)	Preparation podcast (%)	Preparation vodcast (%)	Preparation VOP (%)
<i>Amount of times that the students listened to/looked at the various e-learning tools (used as independent variables of interest–refer Table V)</i>				
Not once	15.6	6.0	8.0	10.3
Once	30.8	36.0	39.0	39.5
Twice	29.8	33.0	28.9	30.8
Three times	11.5	12.0	10.4	10.4
More than three times	12.3	13.0	13.7	9.0
<i>If you did not listen to the specific e-learning tool, please tell us why not? (Students were allowed to select more than one option)</i>				
No response	6.2		7.5	
Not applicable as I listened to all of the specific e-learning tools	64.6		77.9	
I did not have internet access/access to data	1.7		1.5	
I experienced difficulty downloading/opening the files	5.0		5.0	
<i>I had time constraints before the test (revision) or class (pre-work)</i>	11.9		6.2	
I did not want to/did not think it was necessary	4.0		0.7	
Other: The quantitative data were analysed, and the top themes identified are reported here	6.6		1.2	
	Not aware of its existence	Data constraints		
		Tools not compatible with I-pad		
		Files were too large		
<i>I experienced the tools as a helpful study aid</i>				
<i>I strongly agree</i>	46.8		59.4	
<i>I agree to an extent</i>	33.3		27.1	
I do not agree/disagree	4.4		3.1	
I disagree to an extent	2.6		2.1	
I strongly disagree	4.4		5.2	
N/A as I did not listen to the e-learning tools	8.5		3.1	

Options	Revision podcast (%)	Preparation podcast (%)	Preparation vodcast (%)	Preparation VOP (%)
<i>Preparation e-learning tools are better than preparations by means of textbook reading</i>				
<i>I strongly agree</i>	N/A		57.6	
<i>I agree to an extent</i>			23.0	
<i>I do not agree/disagree</i>			5.9	
<i>I disagree to an extent</i>			5.2	
<i>I strongly disagree</i>			5.9	
<i>N/A as I did not listen to the e-learning tools</i>			2.3	
<i>In an ideal world, all my classes will be presented making use of preparation e-learning tools</i>				
<i>I strongly agree</i>	N/A		28.2	
<i>I agree to an extent</i>			38.0	
<i>I do not agree/disagree</i>			8.8	
<i>I disagree to an extent</i>			12.7	
<i>I strongly disagree</i>			10.6	
<i>N/A as I did not listen to the e-learning tools</i>			1.8	
<i>Type of basic e-learning tool, preference</i>				
Vodcast	41.9% first choice, 30.5% second choice, 26.4% third choice, 1.2% no response			
Voice Over PowerPoint	34.6% first choice, 35.4% second choice, 28.8% third choice, 1.2% no response			
Podcasts	22.2% first choice, 32.8% second choice, 43.8% third choice, 1.2% no response			
<i>Timing of implementation preference</i>				
<i>After a Learning Area, as revision</i>		25.8		
<i>Before a Learning Area, as preparation</i>		73.1		

Table V.

Variable	Variable explanation	Variable option	Respondents <i>N</i>	Group <i>N</i>
<i>Dependent variables</i>				
T_Q1	Topic covered: Section 11(a) of the Income Tax Act	Mean	62.3%	60.0%
Student mark for Question 1 of Test	Independent variable of interest: RevisionPodcast_11(a)	Standard deviation	19.5	17.5
T_Q2	Topic covered: Section 20A of the Income Tax Act	Mean	65.3%	58.0%
Student mark for Question 2 of Test	Independent variable of interest:RevisionPodcast_20A	Standard deviation	29.7	32.8
T_Q3	Topics covered: Capital allowances, Sections 11(o) and 8(4)(a) and Section 23H of the Income Tax Act	Mean	58.7%	57.0%
Student mark for Question 3 of Test	Independent variable of interest:RevisionPodcast_CA	Standard deviation	19.1	17.3
CT_PreTools	The class test was written at the beginning of the session after students were exposed to the preparation e-learning tools	Mean	61.64%	59.0%
Student mark for Class Test	Independent variable of interest:PreTools_Combined	Standard deviation	21.2	25.9
<i>Independent variables of interest</i>				
RevisionPodcast_11(a)	A podcast relating to Section 11(a) was created (Table I). Students were asked whether and how many times they listened to the specific podcast (Table IV)			
RevisionPodcast_20A	A podcast relating to Section 20A was created (Table I). Students were asked whether and how many times they listened to the specific podcast (Table IV)			
RevisionPodcast_CA	Podcasts relating to capital allowances and Section 23H was created (Table I). Students were asked whether and how many times they listened to the specific podcast (Table IV)			
PreTools_Combined	Students were asked whether and how many times they listened to the specific e-learning tools (Table IV)			
<i>Control variables</i>				
Aptitude	Mark of previous test used as proxy	Mean	55.3%	49.3%
		Standard deviation	15.6	17.2
Engagement	Continuous assessment mark (for example homework, class work etc.) used as proxy for student engagement	Mean	70.7%	59.9%
		Standard deviation	15.2	22.1

Variable	Variable explanation	Variable option	Respondents <i>N</i>	Group <i>N</i>
Interest in taxation discipline	I find taxation as a discipline interesting	I strongly agree	39.8%	N/A
		I agree to an extent	49.1%	
		I do not agree/disagree	4.1%	
		I disagree to an extent	3.4%	
		I strongly disagree	3.5%	
Value of subject	I am of the opinion that this subject will make a significant contribution towards my future	I strongly agree	66.9%	N/A
		I agree to an extent	25.1%	
		I do not agree/disagree	1.3%	
		I disagree to an extent	1.3%	
		I strongly disagree	4.4%	
Level of attention	On average, with what level of attention/concentration did you listen to the e-learning tools	N/A as I did not download the e-learning tools	1.0%	N/A
		Limited attention/concentration	8.5%	
		Attention/concentration to some extent	21.7%	
		Full Attention/concentration	68.7%	

Table VI.

Dependent variable Independent/Control variable	T_Q1			T_Q2		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
RevisionPodcast_11(a)	0.067* (-1.837)	0.248 (-1.156)	0.457 (-0.744)			
RevisionPodcast_20A				0.462 (0.737)	0.094* (1.678)	0.062* (1.873)
Tax interesting	0.002** (3.149)	0.020** (2.336)	0.022** (2.297)	0.219 (1.232)	0.942 (0.072)	0.985 (-0.018)
Tax valuable	0.539 (0.615)	0.473 (-0.718)	0.445 (-0.765)	0.178 (1.350)	0.724 (0.354)	0.666 (0.433)
Attention		0.357 (0.922)	0.509 (0.661)		0.010* (2.601)	0.005*** (2.793)
Student engagement		0.000*** (4.671)	0.000*** (4.607)		0.010* (2.579)	0.060* (1.890)
Aptitude		0.000*** (6.334)	0.000*** (5.756)		0.000*** (7.035)	0.000*** (5.991)
Gender			0.736 (0.338)			0.098* (-1.661)
Language			0.385 (0.870)			0.743 (0.328)
Repeat/First Time			0.729 (0.346)			0.244 (-1.166)
Degree enrolment			0.920 (0.100)			0.075* (-1.783)
Age			0.833 (-0.211)			0.038** (-2.081)
Race_African			0.005*** (2.794)			0.062* (1.874)
Race_Indian			0.064* (1.859)			0.323 (0.990)
Race_White			0.007*** (2.711)			0.076* (1.782)

Notes: *Race_Coloured* was used as the reference dummy variable; *, ** and *** denote significance at a 10, 5 and 1% level, respectively, based on a two-tailed test. *T*-statistics are indicated in parentheses. All of the variables are defined in [Tables II](#) and [V](#)

Table VII. Preparation e-learning tools regression analysis

Dependent variable Independent/control variable	Model 1	CT_PreTools Model 2	Model 3
PreparationTools_Combined	0.138 (1.485)	0.840 (-0.202)	0.996 (-0.005)
Tax interesting	0.706 (0.377)	0.384 (-0.871)	0.355 (-0.927)
Tax valuable	0.056* (1.918)	0.378 (0.883)	0.329 (0.977)
Attention		0.162 (1.402)	0.161 (1.404)
Student engagement		0.000*** (7.348)	0.000*** (6.717)
Aptitude		0.040** (2.061)	0.103 (1.636)
Gender			0.700 (-0.386)
Language			0.079* (-1.760)
Repeat/First Time			0.467 (-0.728)
Degree enrolment			0.469 (-0.724)
Age			0.949 (-0.064)
Race_African			0.209 (-1.257)
Race_Indian			0.871 (-0.162)
Race_White			0.514 (-0.653)

Notes: *Race_Coloured* was used as the reference dummy variable; *, ** and *** denote significance at a 10, 5 and 1% level, respectively, based on a two-tailed test. *T*-statistics are indicated in parentheses. All of the variables are defined in [Tables II](#) and [V](#)

[Table IV](#) illustrates the number of times that the students listened to the various e-learning tools, their experiences as well as preferences relating to type and timing of tool.

Students were asked to provide additional comments relating to the revision podcasts and pre-tools. The top themes identified, relating to the revision podcasts were as follows:

- it's easier to prepare by means of the revision podcasts, than making use of the textbook;
- it assists students with identifying problem areas; and
- students experienced the tools to be very helpful.

The top themes relating to the preparation tools were as follows:

- students prefer the tools to be made available as preparation tools, rather than revision tools;
- the preparation tools increased students' overall understanding of the topic; and
- students experienced the tools to be very helpful.

Regarding the language in which the e-learning tools were made available, 75 per cent of Afrikaans students agreed that they would prefer the tools to be made available in their language of instruction. This preference was also strongly indicated in the qualitative feedback. Educators at universities with more than one language of instruction should take note of this preference.

The data indicate that students experienced the e-learning tools to be helpful study aids and that approximately two-thirds of the students listened to the various tools once or twice. The small amount of students who did not listen to the tools indicated that it

was mostly due to time constraints. However, the themes identified in the qualitative feedback should be indicators to educators to focus upon explaining the tool availability, the download process (including file sizes), data availability as well as device compatibility. Students indicated a preference for the tools to have a visual component (synchronous), to include examples and to be made available as preparation (supplementary) rather than revision (substitutional) tools. Students prefer e-learning tools for class preparation, rather than reading through the textbook.

Table V illustrates the descriptive statistics of the dependent, independent and control variables which were used in the hierarchical regression analysis towards meeting the second research objective:

- to determine whether the use of basic e-learning tools has an impact on student performance.

The demographics as per Table II were also used as control variables. The researchers used proxys for factors that have an impact upon test performance. Where applicable, the factors for the group have also been included to address non-response bias.

Table VI describes the results of two of the regression analyses performed with the test marks as dependent variables (Table V) and the amount of times which student listened to the supplementary asynchronous e-learning tools (revision podcasts) as the variable of interest. Three models for each regression analysis are reported on, using an increased number of control variables in each subsequent model.

The regression analysis using the dependent variable “T_Q3” and the variable of interest “RevisionPodcast_CA” (Table V) is not reported, as the inferences are the same as those of the two regression analyses reported in Table VI. The student demographics as per Table II were included as Model 3 in the regression analyses.

Table VII describes the results of the regression analysis performed with the class test mark as the dependent variable (refer CT_PreTools in Table V) and the amount of times which students listened to the substitutional synchronous and asynchronous e-learning tools (preparation podcasts, vodcasts and voice-over-PowerPoint) as the variable of interest. An exploratory factor analysis was conducted on the independent variables of the different preparation e-learning tools, using principal axis factoring and promax rotation. The factor analysis was conducted to determine whether the five variables of interest comprising preparation e-learning tools (being three preparation podcasts, one preparation vodcast and one preparation voice-over-PowerPoint, refer Table I) form a unidimensional construct that is reliable so that a valid composite variable could be constructed. Using Cronbach alpha, the internal consistency (reliability) for the construct PreTools_Combined was found to be 0.913. As this value is above the acknowledged threshold of 0.7, it was deemed satisfactory.

From a review of Tables VI and VII, it is clear that the listening to the e-learning tools does not have a significant impact on test results (student performance) and may in fact even have a negative correlation with student performance, depending on the specific topic. However, if student engagement and aptitude is taken into account, the fact that students listened to the podcasts moves towards a more significant impact on student performance. Student demographics do also not appear to have a significant impact on student performance, with the exception of race that appears to have a significant impact in Table VI, relating to revision e-learning tools. However, the impact of race is not consistently significant.

When interpreting the results of Tables VI and VII, it should be noted that it is difficult to isolate all factors that may have an effect on student performance in an uncontrolled environment. The finding that student engagement and aptitude has a more significant impact on student performance than whether students used the e-learning tools, is consistent with previous findings in literature (using experimental or quasi-experimental research) indicating that e-learning tools is not necessarily a superior *medium* to face-to-face instruction (USA Department of Education, 2009). Studies that show that blended learning is more effective than pure face-to-face learning indicate that the factors impacting student performance is a combination of the utilisation of blended learning as well as pedagogical changes to increase student engagement by meeting student demands for flexible learning (i.e. creating a student-centred learning environment) (USA Department of Education, 2009; Bayerlein, 2015). Therefore, although the utilisation of e-learning tools in itself does not always have a direct measurable impact on student performance (as was the case in this study), the environment created, if based on sound pedagogical principles, contributes on average to higher student performance than in the traditional face-to-face classroom (USA Department of Education, 2009; Garrison and Kanuka, 2004; Graham *et al.*, 2013).

Conclusion

Educators in the broad accounting discipline, including taxation educators, are faced with the challenges to address the flexible learning needs of Millennial students (Howe and Strauss, 1991; Lai and Hong, 2015; Sandeen, 2008), to use “in class/contact time” effectively to meet the demands of professional bodies and future employers (SAICA, 2015; SAIT, 2015; Apostolou *et al.*, 2013; Barac, 2009; Steinbank, 2010) and to decrease the transactional distance between educators and students in large classes (Gibbs and Jenkins, 1992; Van Rooyen, 2010; Bayerlein, 2014).

To address these challenges, educators should move to a student-centred approach to the facilitation of learning (Fink, 2003; Hesketh, 2011; Leveson, 2004). Educators should embed their pedagogical decision making in learning theories to create significant learning experiences for students (Slabbert *et al.*, 2009). The accreditation requirements at South African Universities limit taxation educators to mostly make pedagogical decisions only about content delivery as a component of undergraduate taxation curricula (De Villiers and Venter, 2010).

The Blended Learning Theory has been advocated as a learning theory that can assist taxation educators to move to a student-centred approach to the facilitation of learning, to address the challenges they are confronted with (Garrison and Kanuka, 2004; Graham *et al.*, 2013). Some of the advantages of the Blended Learning Theory are that it complies with the flexible learning needs of Millennial students (Aliotta *et al.*, 2008; Dickfos *et al.*, 2014); it opens up “in class/contact time” for effective facilitation of learning (Weil *et al.*, 2014; Wong *et al.*, 2014), and it assists to decrease the transactional distance between students and educators in large student groups (Chan and Lee, 2005).

The Blended Learning Theory can be implemented through the inclusion of basic e-learning tools into the undergraduate taxation curricula (Heilesen, 2010; Mugwanya *et al.*, 2011). The development of basic e-learning tools such as podcasts, vodcasts and voice-over-PowerPoint as either substitutional or supplementary tools can assist educators with time, technological and budget constraints with a sustainable solution to

the implementation of the Blended Learning Theory (Vogele and Gard, 2007; Weil *et al.*, 2014).

This article describes the implementation of such basic e-learning tools using an action research methodology and aims to determine students' use and experience of the implemented tools, as well as whether the use of such tools have an impact upon student performance.

It appears as if most students have access to data and devices to support the implementation of e-learning tools into the curriculum. Students experience the tools to be helpful study aids that they would prefer as a constant addition to their learning material. Students prefer short, visual tools containing examples, in their language of instruction. Students prefer substitutional tools to supplementary tools, as having access to the tools before class assists them with an overview of the work and to identify problem areas. Students experience e-learning tools to be better for class preparation purposes than working through the textbook. When students did not listen to the tools, it was due to the fact that they experienced time constraints, were not aware of the tools or had trouble downloading the tools. It is suggested that educators include download instructions when making tools available. From the regression analysis, it appears as if the utilisation of the e-learning tools did not have an impact upon student performance. Student aptitude and student engagement are more significant predictors of student success. However, although there was no impact on performance, it does appear as if the students perceived an improvement in the learning environment. Previous studies have indicated that an increase in student engagement, where students take control for their own learning, may lead to an increase in student performance (USA Department of Education, 2009).

The need for flexible learning of the Millennial generation sitting in our classes today is a reality that educators should accept (Lai and Hong, 2015). Educators in the accounting and taxation discipline have been made aware of the need for changes in their curricula to meet various stakeholder demands (Boritz and Carnaghan, 2003; McWilliam, 2008; Miller and Woods, 2000; Apostolou *et al.*, 2013). However, due to a limited amount of studies incorporating effective classroom tools to address educator challenges, and determining students' use and experience of various tools as well as whether such use has an impact on student performance, change has been slow. This article provides an example of how basic e-learning tools can be created and included in the taxation curriculum by educators with time, technological and budget constraints. It provides a sustainable way of moving towards a student-centred approach to the facilitation of learning, embedded in the pedagogical Theory of Blended Learning. The inclusion of e-learning tools into the curriculum may not have shown an effect upon student performance in this study, but it does create a learning environment that assists educators to use "in class/contact time" effectively, decrease transactional distance and address the flexible learning needs of the Millennial students. These benefits may assist educators, specifically those dealing with large classes and diverse student populations, to meet the demands of the various stakeholders more effectively.

The researchers acknowledge that there are various limitations to the study, due to the narrow scope of the research. There are many other possible learning theories that may address the challenges faced by accounting and taxation educators. The researchers mentioned some of these learning theories, but an investigation into all of the learning theories was not part of the scope of the study. There are also many possible

e-learning tools which can be incorporated into a student-centred approach to the facilitation of learning embedded in Blended Learning Theory. The researchers chose to only implement podcasts, vodcasts's and voice-over-PowerPoint, but an area for future research may be to investigate other tools as well. The researchers also did not measure the effect of the incorporation of the e-learning tools upon the generic or soft skill development of the students. This may also be a valuable area for future research. To truly isolate the effect of the incorporation of e-learning tools into a curriculum, an experimental research design should be followed to control for elements that have an impact on student learning. This approach was not followed in this study, but it would be a valuable contribution to this field of research.

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