
The implementation of an innovative continuous assessment model for an Information Science undergraduate class: possible information ethical considerations

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Abstract

In order to stay relevant in the current technological environment together with the associated changing expectations and demands of students, new approaches in teaching, learning and assessment are needed. Traditional systems are increasingly seen as being too rigid, which has resulted in a growing focus on the idea of blended learning, a term that describes learning activities that combine face-to-face teaching with technology. As new information specialists prepare to enter the work force they must be taught not only the relevant information skills, but they also need to develop and refine their own individual sense of ethics, especially with regard to the ethical use of information and technology. This article discusses the development of a new blended model for a first year Information Science module comprising a variety of theory and practical activities, using various technologies, and underpinned by basic

information ethical considerations. The article provides an overview of the rationale for undertaking the project, discusses the blended learning approach, and concludes by highlighting some of the positive outcomes experienced.

Introduction

The evolution and growth in Information Communication Technology (ICT) together with the exponential growth in data and information has led to the merging of traditional and modern communication media. As a result of this amalgamation of print and electronic information sources in a variety of formats, new information related opportunities and careers have been created. In this ever-changing electronic environment the expectations and demands of students with regard to learning experiences and outcomes are also increasingly changing. Taking all of this into consideration it is clear that the use of original/inventive approaches to the teaching and training of a new generation of information intermediaries and content producers has become essential.

Innovative learner-centred teaching strategies incorporating participation and active learning lie at the heart of students' success in their studies (Shear Novais & Moorthy 2010). Such innovative practices enable teachers to adapt tools and practices which will result in improving the educational opportunities provided to students and connect with their 21st century skills. The use of ICT forms an important part of the process towards meaningful and enjoyable learning.

When embarking on any new teaching and learning venture it is also necessary to consider the role of ethics in the educational process. As new information specialists enter the work force they must learn to develop and refine their own individual sense of ethics, be educated about ethical issues in their professional life and overall be made aware of the importance of the ethical use of information and Information and Communication Technologies.

It is within this context that the Department of Information Science at the University of Pretoria embarked on a project with the aim of creating a new continuous assessment model for improved teaching and learning in an undergraduate Information Science module. This article provides an overview of the rationale for undertaking the project, discusses the blended learning approach followed by the employment of ICT in the practical implementation of the model, as well as the underlying ethical principles taken into consideration in the process. The article concludes by highlighting

some of the challenges encountered with this approach as well as plans for the next phase of implementation of the model.

Background to the development of the course

The Department of Information Science at the University of Pretoria offers an introductory module in Information Science in the first semester on first year level. The module comprises theoretical as well as practical components and is presented over a period of 14 weeks. This introductory module is regarded as a very important component within the Information Science degree. To be able to successfully live and work within this information era, students need to be transliterate and have efficient skills to benefit from and participate in the Information Society (De Beer & Holmner 2013). These skills not only include traditionally viewed information and computer literacy skills but also the skills needed to manage the abundance of information (images, text and audio-visual) that flood the worldwide networks. To help achieve this, the introductory module in Information Science addresses a number of important aspects. These include, for example, important threshold concepts, the human as information processor and user, the communication of information and its various contexts, the socio-ethical implications of information and information utilisation, and so forth.

The module is compulsory for first year students in die Department of Information Science, but is also available to anyone from other departments at the University. Over the years it has become a popular module attracting a wide range of students from a variety of disciplines such as Information Technology, Visual Studies, Education, Law, and so forth. In accordance with the overall policy at the University, appropriate regular assessment incorporating one or two (paper-based) assessment opportunities per week formed an integral part of this first year module. However, the resulting number of assignments to be marked on a regular basis proved to be overwhelming. This numbers-situation also gave rise to the problem experienced in many traditional courses (Wood 2009) namely that feedback on graded work was often returned to students too late to be of optimal use because the class would have already progressed to new topics.

With the aim of solving these and other practical problems and to teach such a large and diverse group of students in a more efficient and meaningful manner, the lecturers looked to moving away from the traditional teaching model

towards a new and innovative approach to present this crucial first year module. The overall objective was to develop a course that is more flexible, to make teaching and learning interesting and creative as well as achieving standard academic goals.

Based on the popular television programme with a similar title, the idea of an *Amazing Information Race* for remodelling the course was born. Central to this new model was the idea of following a blended approach to teaching and learning incorporating electronic means of teaching and continuous assessment.

Blended learning

Educators find it increasingly difficult to adapt to the changing needs of students and to ensure that their teaching stays meaningful and relevant (Fleck 2012; Garrison & Kanuka 2004). Students today think and process information differently than previous generations. They use digital tools and enquiry, are able to multitask, and have a preference for interactive and non-linear learning activities (Mason & Rennie 2008). Traditional face-to-face teaching and learning systems are therefore often regarded as being too rigid, and results in a need to move towards a more flexible, participatory and collaborative learning environment (Fearon, Star & McLaughlan 2012; Poutanen, Parviainen & Aberg 2010).

Consequently, this has resulted in increased interest in and focus on the idea of blended learning. Blended learning normally starts from the premise of mixing different ways of teaching and learning, media, or tools (Oliver & Trigwell 2005) but essentially the term describes learning activities that combine face-to-face teaching with technology (Fleck 2012; Harris, Connolly & Feeney 2006). A blended approach to teaching and learning provides a number of advantages. The combination of traditional methods and the use of technology firstly provide a flexible and responsive way of learning and working as required by the current generation of students/learners (Fleck 2012; Harris, Connolly & Feeney 2009; Morrison 2013). Blended learning that includes practice-based elements also helps in providing students with a skills set that may otherwise not be possible in face-to-face instruction which could therefore be more relevant to what is being learnt (Fleck 2012; Morrison 2013). The approach thus offers the potential for more effective teaching as well as providing a meaningful and enhanced learning experience (Fleck 2012; Garrison & Kanuka 2004; Harris, Connolly & Feeney 2009). From a practical point of view a blended approach often means that resources can be used more efficiently, and

perhaps even teaching more students within a certain space of time (Harris, Connolly & Feeney 2009; Morrison 2013).

Collaboration and blended learning

One of the core issues underlying a blended learning approach is that of interaction and the sense of engagement/collaboration, bringing students together in learning communities (Fleck 2012; Garrison & Kanuka 2004). Collaboration and interactive dialogue facilitates critical thinking and higher-order learning and therefore encourages and improves the overall learning experience (Garrison & Kanuka 2004; Sun *et al.* 2008). Working with others to solve problems is not only an important factor in academic achievement and personal development but can also increase the student's success in eventually applying these new skills within the work place (Baldwin-Evans 2006). Collaboration is evident not only in the blended learning environment, but also in face-to-face learning. There is often an implicit aspect of 'community'; students report that they learn more from peers than from the lecturer and educators frequently use various means of engaging interactively with students in the class. The added use of technology can thus be seen as a logical enhancement in order to encourage and strengthen these "natural" communities and gain further support for the overall learning process (Adam & Nel 2009; Fleck 2012).

Information technology and blended learning

Information and communication technology (ICT) has become an essential part of a university education; much of the current interest in blended learning has subsequently been stimulated by recent developments in technology (Fleck 2012; Poutanen, Parviainen & Arberg 2011). It is generally acknowledged that the use of ICT is significantly associated with innovative teaching practices in general, as well as in higher education (Garrison & Kanuka 2004). In addition, the appropriate use of ICT is considered an important enabler of a learner centred environment (Shear, Novais & Moorthy 2010).

The implementation of technology alone, however, has no intrinsic value; the tools must fit the tasks and the context of the specific learning situation if a programme is to be efficient and accepted by the students (Harris, Connolly & Feeney 2009; Poutanen, Parviainen & Arberg 2011). In this module, apart from the mixing of online with face-to-face learning, the mixing of different media

such as social media in the form of Twitter and Facebook, and the use of the various Blackboard applications, were the main types of ICT mixing/blending that were utilised.

Social media tools, as applied in this module, offer a variety of powerful information sharing and collaborative features involving students in new ways of creating and learning and can thus be seen as a unique enhancement in an innovative teaching and learning environment (Mason & Rennie 2008). Students welcome the flexibility that the connected world provides and educators are becoming increasingly interested in the use of various social media tools for teaching (Fleck 2012; Morrison 2013).

The advanced version of the Blackboard course management system was used as the vehicle for providing information on class assignments, lecture notes and so forth. Blackboard's interactive and sharing features, such as online and email announcements, discussion boards, and social media applications such as Twitter and Facebook, were employed to create this innovative teaching and learning model.

The combination of these electronic platforms for communication presented a number of advantages, for example:

- Information could be relayed to students in a timely manner (Soon & Fraser 2011);
- Information could be accessed online in the computer labs, on their own computers, or *via* their mobile phones; this meant that resources and information were available to students any time and any place (Peat *et al.* 2004);
- Technology kept the content current and provided an overall streamlining of the course (Mitchell & Honore 2007);
- It had the further advantage of getting students to work together as part of a 'community' moving away from the passive classroom situation to an environment where the students were active participants, setting goals and taking ownership of their own learning (Garrison & Kanuka 2004).

In addition to these advantages experienced by students, there were also ethical issues to be considered in the employment of such a teaching and learning model. These issues are addressed in the following section.

Ethical issues

According to Britz the “ethical actions of a person can be described in general terms as those actions which fall within the range of those activities that would be regarded as ‘good’. It relates thus to the question of what is good and bad in terms of human actions” (Britz 1996:175). Ethics is therefore concerned with the ideas of right or wrong, duties or obligations, and rights or responsibilities. A discussion of ethics in an educational context, however, cannot just be a one-sided discussion as various aspects need to be taken into consideration. Some of the issues relating to the ethical use of information that were meaningful and of significance for this Information Science module were the following:

- Mutula (2013) provides an interesting point of departure when he posits that ‘Information’ as a term in the sense of communicating something (providing information) to somebody, connotes *good behaviour*, implying *something of public good*. The concept of information ethics therefore forms the basis of teaching information-related subjects;
- Within the Information and Knowledge Society the awareness of the ethical use of information and specifically ICTs is crucial, and is addressed by the WSIS Action line no 10 which deals with the ethical dimensions of the Information Society. According to this action line it is imperative to prevent the abusive use of ICTS. Furthermore, human rights and values need to be taken into consideration when using ICTs within the Information and Knowledge Society (ITU 2003).
- It is necessary to build confidence and security in the use of ICTS by the new information professional, as addressed in WSIS Action line no 5 (ITU 2003). The information professional must learn to understand the possible and real consequences of their actions, reflect on alternative choices they may make, and determine how best to use their power and act responsibly.
- Apart from the need to look at students being ethical and teaching them the basics of general ethical behaviour, teachers have to base their teaching on ethical principles and guidelines as well. Some good examples of such ethical guidelines can be found in the Code of Ethics of the Australian Catholic University who demand the highest professional standards of rigour and academic excellence from their staff (ACU 2006). There are also many other professional codes of ethics that can serve as guideline for professional conduct such as the IFLA Code of Ethics for librarians and Information Workers (IFLA 2012).

- In addition to these general ethical considerations attention was also given to the ethical issues of the information age as identified by Mason (1986) and Freeman & Pearce (2005) namely privacy, accuracy, property, access, and security.

The Information Science module

The new blended model comprised a variety of theory classes, practical activities and assessment opportunities:

- Regular face-to-face classes provided the basic theory for the course. Topics that were included in the theory were: important threshold concepts, the human as information processor and user, information and the information community as concepts, information as utilised in its various contexts, the communication of information and its various contexts, the socio-ethical implications of information and information utilisation, the information lifecycle as a process that results in an information product, and the role players involved in the information life cycle.
- Classes were enriched by inviting specialised guest lecturers to address the class on topics relevant to the course. An expert in computer security addressed the class on issues relating to computer ethics and a specialist on plagiarism and referencing addressed the class on issues relating to Intellectual Property Rights, Copyright and the dangers of Plagiarism.
- The theory was enhanced by practical exercises and associated assessment opportunities – the section comprising the core of *The Amazing Information Race*. Problems had to be solved by searching for information in the library, and physically looking for various items such as museum artefacts, paintings, buildings, and other similar information objects all over campus.
- Assessment within the module consisted of tests, tasks and assignments in various formats. Tests were traditional paper based as well as weekly computer based quizzes. Tasks and assignments were packaged, for example, as crossword puzzles, word grids, comprehension test etc., and were provided in electronic and/or paper format.
- To solve the problems contained in the quizzes, ‘clues’ were provided on a regular basis and in a variety of ways:
 - Physical clues were supplied to students in class (thus encouraging class attendance).
 - Electronic clues were selectively released using the Blackboard System’s time and date criteria.

- Instructions on how to find the clues were given in class, provided on Blackboard, and posted on Twitter and Facebook.
- Many of the clues were based on information that had to be garnered from previous assignments.
- Completion of one assignment also provided the students with the clue for the next assignment.
- After completion of half of the number of assignments and tasks set for the semester, a compulsory ‘rest’ phase was introduced, mainly with the aim of allowing stragglers the chance to catch up with the work before starting on the next assessment phase.

Practical implementation of the module

Although the implementation of a blended learning model provides limitless design possibilities and applications (Garrison & Kanuka 2004), it does, however, also present us with some complexities in the practical application. For the purposes of developing this Information Science module, a number of pre-requisites for and functions of a blended course as expounded on in the literature, were considered.ⁱ Principles underlying an ethical approach to teaching and learning were also taken into account.ⁱⁱ

Following are some of the main principles and issues that directed the practical implementation of the course.

- *The key to a successful blended learning experience is to ensure that the student is ready to experience this new way of learning.*
From an ethical perspective the principles of fairness and equity apply. The diversity of backgrounds and abilities of students have to be considered so as to provide them access to this new teaching and learning model. During the first few classes of the module the lecturers spent a lot of time ensuring that all students knew how to access the Blackboard Learning Management System. Students were furthermore assisted in opening Twitter and Facebook accounts so that they would not miss out on the “clues” provided by means of these social media platforms.
- *Learning outcomes and goals have to be clearly presented to the students. A demonstration and dissemination of information relating to the content of the course, introducing new topics and where necessary a*

demonstration explaining more complicated tasks to clearly illustrate ideas and procedures to the students may be needed.

From an ethical perspective it is necessary to engage students in material that is current, accurate and appropriate to the course of study. This also addresses the information ethical issue of accuracy. In the module care was given not to introduce students to any “new” technology without first demonstrating and explaining to them how it works, for example, the use of Twitter to novice Twitter users.

- *Students’ learning styles and expectations should be considered in order to get optimal buy-in and motivation.*

From an ethical perspective this principle relates to the need for students to understand the variety of teaching and learning approaches and strategies. It is furthermore necessary to respect the right of students to hold a particular and different point of view. In this module the lecturers made sure that the advantages of using a blended teaching and learning approach were explained to the students. In addition, when some students had privacy concerns relating to the use of Facebook their point of view was respected and they were assisted in opening an anonymous account, therefore protecting their privacy and laying their concerns to rest.

- *A blended learning course should have a common platform where information, links, general issues etc. can be shared and that provides a “one-stop” learning environment.*

From an ethical perspective the information ethical issue of access comes into play. It is necessary to ensure that all people have equal access to this new learning environment. As this is a first year module, all students were encouraged to attend the campus-wide Blackboard information sessions during first year orientation at the beginning of the year. In addition, to ensure that all students would have access to this common platform, an additional compulsory class was scheduled to ensure that students were familiar with this new environment.

- *Resources required to implement and sustain an effective blended environment is essential.*

From an information ethical perspective this relates to the issues of access and accuracy. It is essential to use material that is current, accurate and appropriate to the course of study. As this Information Science module lies within the School of Information Technology, all students enrolled for the module have access to all the necessary resources in the computer

laboratories. This ensures a sustained and effective blended environment even if the students personally do not have adequate resources. Attention was given to ensure that all information provided to the students were current, accurate and appropriate to the module.

- *Assessment is critical in the blended and e-learning environment. It is necessary to provide the student with prompt and accurate feedback on assignments, and about their understanding of the content and instructions given.*

From an ethical perspective prompt and accurate feedback relates to the information ethical issue of accuracy. According to Mason (1986) guidelines and standards need to be in place to protect the individual against possible inaccurate information. Within the Information Science module itself, one of the advantages of using a Learning Management System such as Blackboard, is that some assessment opportunities in the form of either tests or assignments can be marked automatically and feedback is provided to the student practically immediately. As part of the general continuous assessment model followed by the Department, some assessment opportunities could also be taken repeatedly by students in order for them to assess and improve their performance. Furthermore, guidelines were put in place for the students to be able to verify the accuracy of their marks generated by electronic assessment tools by making the memorandums of the assessment opportunities available to students.

- *Providing support and assistance to students is another important component of blended learning.*

From an ethical perspective support and assistance is necessary to ensure that all students have equal access to the new teaching and learning module. As mentioned above, students were given two formal training opportunities in order to become acquainted with the new learning and teaching model introduced in the module and the Learning Management System used as its platform. Continuous skills training was also provided to the students whenever new technologies were introduced during the course of the semester. In addition to this training, lecturers were also available *via* email and face-to-face sessions for the students who experienced problems.

- *No new venture should be undertaken without it being aligned with (and thus indirectly validated by) the academic vision and plans of the parent institution.*

From an ethical perspective all academic staff members should be aware of the mission, goals, policies, expectation and procedures of the University and support these in dealings with students and colleagues. Within the University of Pretoria a *Draft Framework Towards an E-Learning Plan* was drawn up to supplement the current traditional teaching model and to help manage the yearly increase in student numbers (Kilfoil 2012). In this Framework document it is clearly stated that the University has a strategic directive to (continue) to improve a learning and teaching model that includes various approaches/ methods such as face-to-face, multimedia and online learning (Kilfoil 2012). This Information Science module is therefore aligned with the academic vision and plan of the University of Pretoria as a whole.

Evaluation of the model

For a blended-learning model to be successful it is necessary to get optimal buy-in from the students. To achieve this, students must be motivated to participate. Harris, Connolly & Feeney (2006) state that if students' expectations are met (or exceeded) it will result in a positive effect on their experience and motivation to engage further in the blended learning experience. It is often challenging to introduce new learning approaches to students who are at ease with the traditional face-to-face classes (Janisch, Liu & Akrofi 2007; Wood 2009). Various methods and strategies were therefore employed in this module to get cooperation from the students, and to provide the necessary encouragement and motivation to make this a successful blended-learning intervention. Academic as well as real-life incentives were provided:

- The main academic incentive aimed at motivating students to participate and complete all the assessment opportunities, as the combined package of assessments within this new learning and teaching module accounted for a total of 30% of the semester mark, the same percentage of a formal (large) semester test.
- The second, "real-world" incentive to spark the students' interest and active participation in the various activities, was the utilisation of an iPod Shuffle which was given as a prize for the student who finished the *Amazing Information Race* the fastest and with the highest cumulative average for the assessments.

- In addition, the *Amazing Information Race* was intended to be different and entertaining. Although the overall assessment still conformed to the needed academic standards, tasks such as crossword puzzles and word grids provided students with fun exercises that tested them on the theory content, rather than expecting rote learning of facts only. The clues provided were a guided discovery approach by means of crucial hints and just-in-time presentation of information, which afforded students an exciting and intellectually challenging hands-on activity.

With regard to effectiveness of the blended learning approach, both the students and the overall Information Science programme benefitted on various levels:

- Owing to the fact that physical clues were provided in class, class attendance increased drastically. An added advantage was that it was also possible to employ this new model to improve the discipline in the classroom. For example, if a class was undisciplined, the class would receive a “*road block*” in the form of an additional assignment that had to be completed before the next clue was released. However, this was also employed for positive motivation. Classes could receive a “*fast forward*” if they were particularly well-behaved or if they attended, for example, a guest lecture or specific event.
- Although it is difficult to measure the impact or benefits of the ethical practices employed in the implementation of the new assessment model, one of the noticeable positive outcomes was a decline in plagiarism. All electronic assignments were run against the Turnitin plagiarism detection programme which meant that similarity index reports were generated on a continuous basis. By monitoring these reports throughout the semester it was seen that the similarity matches became less and less as the semester progressed and as students became more aware of the ethical issues involved and thus more informed on how not to plagiarise.
- From a purely academic perspective the new learning and teaching approach was also deemed successful. This can be seen by comparing the overall performance of the students in their final examinations in June. In 2009, before the new learning and teaching model was employed, the overall pass rate was approximately 72%. In 2012, after the new learning and teaching model had been in practice for a number of years the pass rate increased to 80.3%; an overall improvement of more than 8%. The

authors believe that this improvement can be ascribed to the new learning and teaching approach and the various aspects relating to the new model.

Conclusion

When adopting a blended learning approach it means rethinking and redesigning the teaching and learning relationship (Garrison & Kanuka 2004), and a shift to such a new model requires the development of new skills by both students and teachers (Poutanen, Parviainen & Aberg 2011). The shift to this new blended model in 2010 involved a great deal of redesigning and extra work as all paper-based assessments had to be re-packaged electronically. It also required learning new skills pertaining to new technologies introduced within the module for both the students and the lecturers involved. The value of this hard work, effort and re-design was experienced in later years as it became less time-consuming to simply add new electronic assessment opportunities, than to design them from scratch.

Continuous re-design and development will, however, be necessary to keep the model “new” and exciting for the students. Plans for the next phase of the model include, *inter alia*, using the new communication facilities featured in the latest version of Blackboard more extensively. This would, for example, entail using tools such as graded wikis. Such open-ended assignments would provide meaningful ways in which students can think and create own content. It is also envisaged that peer assessment will be introduced as self and peer evaluation is a valuable and effective tool for assessing creativity and participation.

There is no doubt that blended learning and teaching will become even more prevalent in future (Fleck 2012). Addressing the associated challenges requires a shift in thinking in the way we conduct the educational enterprise resulting in creative and innovative action (Garrison & Kanuka 2004). Innovation in general means that people learn to do things differently in order to do them better (Hargreaves 2003 as cited by Microsoft Corporation 2008). This was clearly demonstrated by the introduction of the *Amazing Information Race* at the Department of Information Science. The success of the new assessment model was confirmed by increased class attendance, enthusiastic and active participation in activities, improved overall pass rates, improved ethical behaviour through the lessening of plagiarism, and most importantly by the overall positive feedback received from the students.

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Endnotes

ⁱ Sources for Blended Learning included the work of Baldwin-Evans (2006), Garrison & Kanuka (2004), Harris, Connolly & Feeney (2006), Mitchell & Honore (2006), Poutanen, Parviainen, & Aberg (2011) and Sun *et al.* (2008).

ⁱⁱ Some of the sources used for application of Ethics and Information Ethics were ACU (2006), ACM (2013), IFLA (2012), Mason (1986), and University of Leeds (2004).