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Creating Value in an Introductory Business IS and IT Unit

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Abstract

Given the downturn in student enrolments in Information Systems (IS) and Information Technology (IT) units, and the poor performance of a first-year IS and IT common-core unit in a business school, a new unit was developed. Action and design science research methods were employed. The new unit has a unique focus on two key skills and on modern IT and information literacy. The first skill involves describing information systems, and the second, determining how to create business value with IT in specific business contexts. Modern IT tools like a Web-based productivity suite and professional networking services are introduced, together with advanced search techniques and services and an information quality evaluation framework. The evaluation of the utility and efficacy of the unit is based on the institutional standard student feedback survey and unsolicited feedback. The unit has achieved a significant improvement in evaluation results and feedback from students, as well as converting students who were previously averse to IS and IT to study further in these areas.

Keywords

Information systems, common core, unit skills, first year students, action research, design science.

INTRODUCTION

A first year introductory university unit in IS and IT can be taught from a number of different perspectives and in many different ways. The School of Information Systems, within the Curtin Business School at Curtin University, in Perth, Western Australia, offers a first year introductory unit called Business Information Systems 100 (or BIS100 for short). It is offered in each teaching period on campus to around seven hundred students, to more than one hundred online and distance education students, and more than four hundred students in partner institutions around Australia and across SE Asia. The focus of the IS and IT degree majors in the School of Information Systems is more on the applied and business aspects of IS and IT as opposed to the technology aspects that are taught more within the Computer Science and Engineering departments (this is not to say that no technological concepts are taught in the IS and IT majors). The unit also includes content on Logistics and Supply Chain Management (L/SCM). The students are mainly first-year Commerce students and are required to take this unit as a part of a first-year common-core business curriculum. Over the last decade or more the unit has struggled with poor student satisfaction rates and a mixture of content. Clearly, an introductory unit in IS and IT taught in a context like this has many challenges, some of which are common to other introductory units and some unique to IS and IT. These challenges include:

1. A wide range of perceptions of IS and IT: Although this is the focus of another ongoing research project to be reported on at a later time, it is clear that students' perceptions of the IS and IT disciplines vary widely. Firstly, the IS discipline is often a complete unknown to many students, and secondly IT is frequently associated with everything from office productivity suites to hardware, the Internet, and the World Wide Web. There is also the issue of a difference in the way the discipline is defined and taught within the high school curriculum in Western Australia, and the way it is conceptualized in BIS100. In many ways this mirrors discussions within the IS discipline itself, over what it constitutes, and how and what should be taught in such a foundational unit.

2. Issues associated with First Year Students: The majority of students enrolled in BIS100 are first year students who are transitioning from high school (although some may have already completed one semester or more at University). This presents its own set of challenges whilst students adapt, often slowly, to learning in a higher education setting and start to take responsibility for their own learning.

3. Issues associated with Common Core Students: BIS100 is a common core unit with students from all Commerce majors (for example, Accounting, Marketing, and Business Law) being required to take the unit. As

a result, many students have little or no interest (at least initially, and one of our goals is to change this) in IS or IT and some even come to the unit with a distinct dislike of anything IT-related.

4. Downturn in IS and IT Enrolments: The IS and IT disciplines (as well as Computer Science and Software Engineering) have struggled to recover from the dotcom crash at the start of the last decade. It is apparent that student numbers that plummeted then (after significant increases) have never returned to their peak, despite industry having continued and, many would say increasing, demand for such graduates. Burn et al.'s (2008) study of IS teaching and research in Western Australian universities found that all universities within the state were experiencing a severe decline in student enrolments and commensurate reduction in staff numbers.

In light of the above issues, in 2009, a decision was made to redevelop the unit, with the aim of improving outcomes generally for all stakeholders but, in particular, emphasizing improved levels of student satisfaction. Several groups of stakeholders were identified. These included, for example: 1) the students taking the unit; 2) the School offering the unit; 3) the Schools within the Faculty whose students are required to take the unit; and 4) the University, wider community, and industry. It was considered that although students undertaking the redeveloped unit would be the primary beneficiaries, other stakeholders would indirectly benefit if the objectives were achieved (e.g. the IT industry in dire need of graduates). The students, generally speaking, want the unit to help them complete their degree and, usually, to gain employment. The School wants the unit to prepare students for later units in the majors offered (IS, IT, and L/SCM) and to attract students to these majors. The other schools within the faculty want the unit to give the students' relevant knowledge and skills for their specific majors within their Commerce (and other) degrees. The University wants the unit to attract students, whilst the community and industry want students with appropriate discipline knowledge and generic professional skills for employment. For brevity, in this paper the acronym IT will be used to collectively refer to IS, IT and L/SCM.

BIS100 has gone through a number of iterations over the past decade, mostly with rather unsatisfactory results. In the past the unit has focused on many things including: 1) office productivity tools, 2) systems development, and 3) business IT with Web development laboratory sessions. In the last version there was very little connection between what was taught in the lectures (i.e. business IT) and laboratory sessions (i.e. Web development with DreamWeaver). This focus on tools appears to be a common problem in the way Information Systems has been initially presented to students in other units. Firth et al (2008) describe how their overhaul of an introductory IS unit was met with criticism from their peers at times because it did not cover databases in detail, nor office productivity tools. It was decided that the unit redevelopment should focus on the following goals. Firstly, introducing students to the business aspects of IT. Secondly, preparing students for those majors. Thirdly, attracting students to those majors, and fourthly, be of relevance to students from other disciplines that are not majoring in IT. The unit was also required to directly address the two graduate attributes (also known as professional skills) of IT literacy and information literacy.

LITERATURE REVIEW

Much of the literature on the redevelopment of information systems units in order to attract more students has derived from studies of students studying information systems in North American universities. This paper is a contribution to research in this area based on findings from an Australian university.

Downturn in IS Enrolments: The impetus for many redevelopments of introductory IT units has been "the enrolment crisis" that the discipline has faced over the past decade. Becker, Hassan & Naumann (2006) testify to the paradox of a downward spiral in IT enrolments whilst there is an increasing demand for IT professionals (Rettenmayer et al 2007). It is evident that the literature does not always address how the IT discipline is being defined and distinguished from other disciplines. This is perhaps due to the nature of the discipline itself, which is a "broad school." Firth et al (2008) make reference to this in their study of the impact of student misperceptions of the discipline and the impact this has on enrolments when they report, "beyond students, some of our more technology-focused faculty seem to struggle with the distinction between IS, IT, and CS." Many authors attribute the steady decline in student numbers to the poor image of the IS discipline as perceived by students and fellow professionals (Cloete 2011). *This led to our goal to increase the number of students studying IS and IT.*

Perceptions of IT: Courte & Bishop-Clarke's (2009) research and Ardis and Henderson's subsequent study (2011) that addressed how well students differentiate between the different computing disciplines (CS, IT, IS, CE & SE), found that there was little difference between the perceptions of majors and non-majors in these respective disciplines. Berry et al.'s (2004) research indicates that the IS discipline faces a challenge recruiting students away from other professions. Even those students who choose a major in business may not choose IS because of inaccurate perceptions of the professions by secondary school business teachers. They conclude that secondary school business teachers have the same negative perception towards the IS field as secondary school students, and that efforts to change perceptions of the profession might be more effective and efficient if initially

directed at this important group of role models (Berry et al 2004: 138). During Semester 1, 2011 an initiative was devised to encourage ICT high school teachers to audit BIS100 for their professional development. *This led to our goal to correct any incorrect perceptions of IT.*

Careers in IT: Martz & Cata's (2008) survey of IS major and non-major students revealed that non-major students were not well informed about the career prospects, job environment, and reputation of the IS profession and did not recognize the difference between a Computer Science professional and an Information Systems professional. There is also a "perception gap" between what IS academics think an IS degree should contain (fundamental concepts and frameworks to build deep knowledge) and what IS practitioners seek from graduates (knowledge of current technologies and ability to solve business problems) (Lee & Reichgelt 2005). Both Choudhury et al (2010) and Martz & Cata (2008) refer to the strong perception among students and their parents that most IT jobs are being off-shored, despite evidence that the market for IT jobs being strong even when off-shoring is taking place. Rettenmayer, Berry & Ellis (2007) indicate that male and female students have different perceptions of the IS profession with females comparing IS careers to traditional clerical-type positions, traditionally undertaken by women. *This led to our goal to explain clearly career opportunities in IT.*

Use Effective Instructors to promote the IT Profession: Research indicates that effective lecturers promote student learning. (Firth et al (2008) state that assigning the most effective instructors to introductory IS units should be a highest priority. Looney and Akbulut's (2007) survey of students enrolled in an introductory IS unit empirically confirmed that students who were taught by effective lecturers were more likely to be attracted to the IS discipline. They found that teaching effectiveness bolsters students' confidence in their ability to successfully perform as IS majors (by which they mean self-efficacy), raises students' expectations that valued rewards will be received by majoring in IS (which they refer to as outcome expectations), and helps students develop enduring interest in the IS field. They report that in addition to teaching effectiveness, students with high self-efficacy and robust outcome expectations become more interested in IS as a discipline. *This led to our goal to use effective instructors to promote IT professions.*

RESEARCH METHODS

This research is the first step in a larger program that aims to investigate the efficacy of a new introductory IT unit. The approach taken to redeveloping the unit was a combination of action research and design science methods. Academics regularly plan their units, deliver their units, assess and survey their students, reflect on the outcomes and plan for the next delivery of the unit. This is a natural fit with the action research method (Brydon-Miller 2003, Kemmis 2000, Mills 2000), which is built around a process of 1) planning what to do, 2) doing it (i.e. acting), 3) observing what happens, 4) reflecting on what worked and what did not, and then 5) planning again. Action research is an emergent and iterative method that aims to solve an immediate problem and to create practical knowledge that is useful to others. This research aims to solve the problems associated with a first year introductory IT unit and in doing so create practical knowledge that is useful for others delivering similar units. This research also embraces the design science research method that has its roots in (Simon 1996, Checkland & Scholes 1999) and is now a popular IS research method (Walls et al 1992; Hevner et al 2004). Design science research aims to solve a particular type or kind of problem (e.g. problems in introductory IT units) by developing a new or improved solution artifact(s) (e.g. a new approach to introductory IT units and unit design). Whereas traditional science aims to build models and theories of the environment and judges them by their explanatory powers, design science aims to build artifacts (including models, theories, systems, units) and judges them by their utility. Whilst the utility of the approach to introductory IT units that is reported in this paper is evaluated and compared to the previous unit, further work needs to be done to confirm its utility in a more general context, e.g. in relation to different units in different contexts.

The unit review and redevelopment process was undertaken by a small team of academics (see acknowledgements), and was completed in a very short and demanding time frame over the course of Semester 1, 2009. A wiki (with blog, email archive and calendar) was set up for use by the redevelopment team (and associated parties) as a central repository for the development work and a way to communicate with all involved. Once the formal review team was set up and meeting regularly, the official review process commenced. Initial discussions included a review of the current status of BIS100, benchmarking against other similar units around Australia and internationally, a focus group with students enrolled in BIS100 during Semester 1, 2009 (the last semester of the previous version of the unit), and discussions about how to approach the unit (particularly with regards to the practical components). One key question was whether to do minimal redevelopment of the unit or a major redevelopment. It was decided that the practical workshops needed to align with the unit content (and thus move away from teaching web site development), and that we wanted to develop some core skills related to IS and the business side of IT, so a major redevelopment would need to be undertaken.

We decided to evaluate the change from the previous version of the unit to the new version in the following ways. Firstly, the overall satisfaction rates reported by students with the new unit through eVALUate survey

data and a number of other more specific measures related to the unit. Curtin University administers a student feedback survey instrument called eVALUate for every unit offered. It includes ten questions, eight of which directly reflect the quality of the unit content and its presentation. Students select from a (modified) five-point Likert-like scale: very satisfied, satisfied, unsatisfied, very unsatisfied, and unable to judge. This unit evaluation is separate from the teaching evaluation of the instructors. However, there is clearly an overlap, with students often referring to the instructors in the qualitative unit evaluation, and the unit no doubt influencing the evaluation of the teaching. The eVALUate survey results are used as an instrument to judge the effectiveness of the previous and new versions of the unit in this paper. The second way of evaluating the effectiveness of the unit was to look at students' understanding of IT before and after the unit. Thirdly, the change the unit has on students' perceptions of IT (including interest in pursuing IT majors, or careers in IT) before and after taking the unit. The first item will be reported in this paper, whereas the latter two means of evaluating the impact of the new unit will be reported in subsequent papers.

ANALYSIS OF PREVIOUS VERSIONS OF BIS100

Previous versions of BIS100 had a focus on IT but also training in office productivity tools, the IS development lifecycle, and web development. There were a number of issues with the previous version of the unit. It was apparent, for example, that there was little connection between the content of lectures and laboratory or practical classes. This was not enabling students to clarify concepts that may not have been understood in the lecture. There were also no key skills that were being taught to the students and a lot of the focus was on technology, not the successful application of technology in business.

A focus group was conducted during Semester 1, 2009 and it involved 11 students who were enrolled in BIS100 that semester. The objective of the focus group was to attain more information about what students liked or disliked about BIS100 (as it was then), and more detailed answers to their responses in two informal surveys (a survey at the beginning of the semester regarding their perceptions and expectations of IT and the unit, and another survey administered in week four of the semester where they are given the opportunity to raise any issues they may have with the unit). They were also asked about their thoughts on a draft sketch of a new version of the unit. As compensation for their time and effort, participants were given lunch and an iTunes gift voucher (donated by Apple Computer (Australia) Pty Ltd). Invitations were sent to sixty students who were selected in the following way: A random selection of students from the entire Bentley campus cohort (20 students were invited), students were invited to volunteer (20 students were invited), and students recommended by BIS100 staff (20 students were invited). Before the focus group commenced participants were given an information sheet about the research, and it was made clear that their participation was optional and anonymous, and in no way related to their results for BIS100 and that the teaching staff would not see the results from the focus group until after the final results had been submitted. Feedback from the focus group indicated that generally, students thought that BIS100 was a good unit, but that it needed to be "more fun" and move away from the focus on acronyms. Participants reported that they mostly enjoyed the lectures and DreamWeaver laboratory sessions, but felt that the unit could be improved in a number of ways. They were in general agreement that the labs should relate to, discuss further, and develop knowledge and skills based on the lecture topics. They liked the idea of a mid-semester test since it motivated them to learn the unit material before the end of the semester. Many felt that the overall structure of the unit needed to be clearer, so that students could see how the topics related to one another. There were also very mixed opinions about the use of guest lecturers.

An evaluation of the other common core units in the Curtin Business School was also undertaken, to understand how the new version of the unit could complement the style and format of these other large units. The leader of the BIS100 redevelopment team met with all common core Unit Coordinators, attended one of their lectures, and investigated their unit outline and unit materials. The units could be broadly classified into two different types namely, those that used a more traditional lecture / tutorial structure and approach, and those that used a new workshop-based lecture approach (combining aspects of lectures and tutorials but held within a large lecture theatre). Research indicated that the most successful common core units (with regards to eVALUate results) were the units that employed a workshop-based approach.

When the new content and general approach of the revised unit was established it was disseminated to key stakeholders for comment and feedback. These included current and past students, the School of Information Systems Advisory Board, other industry representatives, the Curtin Business School Librarian, Director of the Communication Skills Unit, as well as the School of Information Systems staff. Presentations were also given to the IS Advisory Board, the PVC of the Curtin Business School, and the School of Information Systems staff. Feedback, comments and suggestions were sought about the direction of the proposed curriculum. In addition, pointers to any useful resources (e.g. documents, video, case studies, news items, simulations, products) relevant to the unit and curriculum topics were welcomed. Some useful feedback was received from these consultations. For example, it was suggested that not all case studies should have a focus on fixing problems / attending to crises. The School of Information Systems Advisory Board comprises representatives from industry and

professional organizations (such as the Australian Computer Society). The feedback from the Advisory Board indicated that the proposed content was excellent and reinforced the core issues surrounding the business relevance of IT, and the very broad application of IT to deliver business value. It was stated that the proposed unit content was comprehensive, well thought out and well presented. The Board also felt that it offered a balance between “showing off” IT as a discipline, whilst at the same time providing students with some relevant (and very up to date) IT knowledge and skills that they could apply regardless of their business major. They also liked the use of modern information technologies (e.g. blogs, Twitter, and Web-based productivity tools and applications) as an engagement strategy.

THE NEW VERSION OF BIS100

On the basis of the analysis of the previous version of BIS100, and taking into consideration feedback from key stakeholders, a number of recommendations were made. It was decided that the unit should be logical and well structured, challenging but achievable, interesting and engaging, as well as fun and exciting, and should not assume that students have any technical IT knowledge or skills. Whilst the unit could aspire to be a showcase for IT, it should also develop some foundational knowledge and skills (hopefully authentic skills) that students could develop in further IT units, whilst at the same time being useful to non-IT majors.

In the new version of the unit the importance of clarifying some basic terminology at the outset is emphasized. The terms Information Systems (IS) and Information (and Communications) Technology Infrastructure (TI) are introduced. After explaining what systems are, information systems are characterised as systems that process and/or store information. Technology Infrastructure (for short) or TI is introduced as the information and communication technology infrastructure that supports or “runs” the information systems. This is an attempt to focus on the ICT that plays an infrastructure role in organisations as opposed to just any form of ICT. It also attempts to be more precise than the popular use of the terms IT and ICT, which have become so general and all encompassing. That the acronym is just IT spelt backwards makes it easy for students to remember. Students are then presented with a pseudo equation stating that “IT (or ICT) = IS + TI,” which explains that IT or (ICT) (as it is commonly used by non-technical people) involves both the information systems and the technology infrastructure that supports or “runs” them. It is also made clear, through examples, that the TI can involve human information processors and other non-computerised information processors as well non-computerised information stores (like people, paper, and filing cabinets) and computerised information processors and stores (like computers running software and databases). The first skill that is learnt and assessed revolves around the students learning to describe information systems from an external and an internal perspective.

Learning Outcomes

The learning outcomes for the revised unit were that students should be able to: 1) explain the roles of IT in organizations, 2) describe and assess different types of IT, 3) define basic terminology of the IT field as used in businesses and other organizations, 4) identify and recommend types of IT for a particular organizational situation, and 5) explain the fundamental activities, techniques and tools used in developing and implementing IT in organisations. Sub learning outcomes related to these were also defined for each lecture, workshop, worksheet and piece of assessment. Whereas these learning outcomes in the past may have referred more to low-level IT (e.g. software development), they now related to high-level application of IT within an organisation to create business value and obtain (and keep) competitive advantage.

Content

A custom textbook was developed for the new version of the unit that is based loosely on chapters chosen from two IT textbooks sequenced to match the order of topics presented. Two key skills are introduced, which make the unit unique in its focus, whilst at the same time contributing to students learning real practical skills and obtaining a real understanding of what IT is about. The skills are supported by a number of fictitious case studies. These skills are 1) Producing an Information Systems Description, and 2) Creating Business Value with IT. We assert that these skills add great value to student learning and provide a foundation and framework for the other material. In fact, these skills could almost be applied almost immediately by students (e.g. over their summer break) to help small to medium organisations increase the value they obtain from IT and keep up with the changes other organisations are making, and benefits they are receiving as a result of the way they use IT.

Information Systems Description (IS Description): The information systems description skill is taught within the lectures, discussed and practised in a workshop and worksheet, and then assessed in the assignment and final examination. The term “description” is used rather than “modeling” as it is considered to be more easily understandable by students, particularly at a first year level and with a non-technical focus. The IS Description process involves the following five steps: 1) Providing a General Description, 2) Providing an External Description, 3) Providing an External View Diagram, 4) Providing an Internal Description, and 5) Providing an Internal View Diagram of the information system. The students are also provided with a structure for a

deliverable to accompany this process that matches the process but includes some additional sections. The unit also employs a number of fictitious case studies for the IS Description Framework. There is a Video Store Information System, a Library Information System, and an Election Voting Information System. A number of smaller case studies are also used, including a Hotel Information System.

Creating Business Value with IT (CBV with IT): The “CBV with IT” skill is taught and practised within a number of the lectures, discussed and practiced in a number of workshops and worksheets, and then assessed in the semester test and final examination. The CBV with IT process is also used to introduce a number of key information systems, e.g. customer relationship management information systems and supply chain management information systems, and to distinguish between operational and analytic information systems. The CBV with IT process involves the following four steps: 1) Performing Value Chain Analysis, 2) Determining Business Strategy and Business Processes, 3) Determining Information System Needs, and 4) Determining Information and Communication Technology Infrastructure Requirements. Students are also provided with a structure for a deliverable to accompany this process that matches the process but also includes some additional sections. The unit uses a number of fictitious case studies to demonstrate to students how to apply the CBV with IT Framework. These are aligned with the learning outcomes and are written using two fictitious companies – the “Big Aussie Steakhouse” and the “Toyondai Automobile Manufacturer”, as well as a smaller case study entitled the “Aussie Bicycle Shop.”

As well as addressing the discipline specific content of IT, the unit also focuses on two graduate attributes (also known as professional skills). These are information literacy (or information skills) and information technology literacy (or computer skills). As previously mentioned, rather than focusing on traditional IT literacy (e.g. traditional productivity suites) the unit chose to focus on contemporary IT literacy including Web-based productivity suites, professional network tools like LinkedIn, and social media tools like blogs and Twitter.

Learning Units

The Learning Units for BIS100 constitute the key areas of focus for the unit. They can be thought of as a small related collection of topics. They are presented over a number of weeks in a lecture, the subsequent workshop, and in an electronic worksheet that is started in the workshop and due the week after. This enables the students to prepare and absorb the concepts and skills in each learning unit but it does also mean that the learning units are overlapping (i.e. when one learning unit is at the workshop stage another learning unit is starting in the lecture).

The twelve learning units in BIS100 are: 1) The Value of IT, 2) What are IS and TI? 3) Creating Business Value with IT, 4) Creating Business Value with Information Systems, 5) Creating Business Value with Information, 6) Creating Business Value on the Demand Side, 7) Creating Business Value on the Supply Side, 8) Creating Business Value with ERP, 9) Creating Business Value across the Value Chain: A Dell Case Study, 10) Creating Business Value with Technology Infrastructure, 11) Creating Business Value with Outsourced Technology Infrastructure, and 12) Future Trends in IT. The first learning unit also introduces the unit itself (e.g. the assessment) and the final learning unit reviews the unit and discusses the format for the final examination.

Assessment, Feedback, and Student Awards

The unit includes formative assessment consisting of weekly electronic worksheets (worth 20 percent of the final mark for the unit) of which there are ten (and an optional 11th) and students are awarded 0, 1, or 2 percent towards their final mark based primarily on their effort at completion of the worksheet. The summative assessments include an assignment involving the development of an IS description (worth 15 percent of the final mark for the unit), a semester test involving closed and open answered questions on the first eight learning units as well as a CBV with IT question (worth 15 percent of the final mark for the unit), and a final examination (worth 50 percent of the final mark for the unit) that includes closed answer questions, open answer questions about all learning units and graduate attributes, as well as an IS description question and a CBV with IT case study question (like those they have seen in case studies during the unit).

Added to the online worksheets completed each week is a short survey (with optional quantitative and qualitative questions). This gives an unprecedented amount of information to the Unit Coordinator (and other staff) with regard to how the workshops and worksheets are perceived, what is working well, what can be improved, and an opportunity to provide other comments, as well as clear quantitative feedback on satisfaction rates. Although this feedback is primarily about the workshops and worksheets, since these relate directly to the lecture content, the feedback is also useful in gauging the interest in and level of difficulty of each of the topics covered. An early semester feedback (anonymous) survey is also given early in the semester, as is a survey of the learning resources towards the end of the semester. The worksheets and the semester test are both offered as tests in the Blackboard Learning Management System. Although this technology is not the best fit for worksheets, it does enable students to save their work and continue at a later time and allows electronic

submission and marking (without the need for uploading and downloading of files etc). Running the semester test online has also generally been very effective, except for one presentation when the students' Web browsers crashed frequently during the test. It was caused by an infrastructure misconfiguration but this was not diagnosed until after the test.

The assignment which involves developing an IS description is completed within Google Docs (now also known as Google Drive), and students share their assignment with their workshop leader (tutor) and the unit coordinator. Accompanying the shared assignment document is an Assignment Cover sheet and Marks Sheet (ACMSheet) that is submitted by the students in Blackboard (again using a "test" for something that it was not designed for but which it works adequately). Staff mark the Google Docs document by proxy using dummy questions in the ACMSheet (i.e. they provide their comments and marks in the ACMSheet). This enables the marks to be integrated within Blackboard reducing administration time, which is considerable in such a large unit, and saves staff having to download and upload a large number of electronic documents.

Students who achieve outstanding results after participating in the unit are also rewarded. Each semester there is a "Best Assignment Award", as well as a "Best Semester Test Award", consisting of book vouchers donated by the publisher of the custom textbook used in the unit. Students who achieve a High Distinction (HD) for the unit are also given a very positive recommendation from the School of Information Systems at Curtin University on LinkedIn (which they have learnt about and joined in an earlier workshop).

Presentation

The unit is presented on campus in a blended learning mode (i.e. including both face-to-face and online learning activities and resources) as well as fully online to online and distance education students. BIS100 has a significant Blackboard (v9.x) presence with pages for each of the learning units containing all materials relevant to that learning unit, such as learning outcomes, the lecture slides in various formats, videos of the lectures, workshop slides in various formats, videos of the workshops, the online worksheet, a graphic novel, a discussion forum, as well as required resources and further optional resources. Each learning unit in BIS100 is introduced in a one and a half hour lecture. The content is then discussed and skills practiced in a workshop (combining tutorial and guided and independent practical work and held in a computer laboratory). Students are then required to complete in their own time a formative assessment electronic worksheet started in the workshop, which is based on the lecture and workshop material and due before the next workshop.

Therefore, over the course of one week students complete an online worksheet started in the previous weeks workshop, attend a workshop and begin work on a new worksheet based on the previous weeks lecture, whilst starting a new learning unit in the weeks lecture. Although this may sound complex, basing the workshop and worksheet on the previous weeks lecture is necessary because some workshops are scheduled before the lectures. The weekly worksheets are also intended to encourage personal reflection by students on their progress and effort, and also help them work through the unit content incrementally each week. The rolling nature of the teaching and learning has many positives, including the extended time for the students to digest and work on the material (over three weeks), but also some negatives, including the need for students to work on different topics at the same time, and to identify the right focus at any particular time.

In the new version of BIS100 a range of educational technologies are used to facilitate, engage, and enhance student learning. These include for example, Google Docs (Web-based productivity suite) to complete and "submit" their assignments; Blackboard "tests" for engaging students through weekly online worksheets; submitting assignment cover and mark sheets online; getting students to give feedback on worksheets and workshops; getting students to give feedback on assessment items. Blackboard's Discussion Board feature is also used to encourage discussions and group interactions. Video recordings of lectures are also included to enable students to revise or catch-up on missed lectures. Video recordings of the workshops are also available to enable students to revise or catch-up on missed workshops. Since the lectures for BIS100 are generally to a very large group of students Votapedia (<http://www.urvoting.com>) is used in lectures to allow students to answer multiple-choice questions and interact using basic mobile phones (for free). Different student response systems were investigated, and it was considered that this technology worked well, didn't involve the need for custom "clickers" and was a good example of an information system using modern ICT infrastructure. Twitter is also employed as another means of interaction between students and the lecturer during and outside of the lectures. RSS feed readers (like Google Reader) are also used for following and publishing relevant blogs.

In BIS100 the academic staff are characterized as "personal knowledge trainers" to help guide and encourage students in their learning, i.e. as a "guide on the side" as opposed to a "sage on the stage." Educational technology is used to provide regular feedback to address student issues (through many feedback channels) each week throughout the teaching period. Care is taken to provide an explanation of the learning processes, and what students should be doing to consolidate their learning as mature, independent, and responsible learners. Students' participation (e.g. attendance at workshops and completion of work) is monitored and if it is apparent

that some students are not attending and not progressing their work in the unit they are contacted to make sure that everything is okay. Students' use of Blackboard and online facilities is also monitored, and again they are contacted if they are not progressing their work. During the first lecture of the unit students undertake a "learning pledge" to take responsibility for their own learning. THINK – the IT student group within the Curtin Business School, is also involved with the unit, e.g. selling units notes and organizing social functions. Contemporary music is played whilst students are coming into the lecture theatre and during breaks to create an upbeat mood. To mark the completion of the unit, a mini-celebration is held after the last lectures.

RESULTS AND DISCUSSION

Table 1 shows the general agreement of students who were enrolled in BIS100 with the following statements items: 1) The learning outcomes in this unit are clearly identified (LO), 2) The learning experiences in this unit help me to achieve the learning outcomes (LE), 3) The learning resources in this unit help me to achieve the learning outcomes (LR), 4) The assessment tasks in this unit evaluate my achievement of the learning outcomes (AS), 5) Feedback on my work in this unit helps me to achieve the learning outcomes (FB), 6) The workload in this unit is appropriate to the achievement of the learning outcomes (WL), 7) The quality of teaching in this unit helps me to achieve the learning outcomes (TQ), and 8) Overall, I am satisfied with this unit (OS). As discussed, Curtin University administers a student feedback survey instrument (called eVALUate) for every unit offered to measure these. eVALUate data was not available for BIS100 for both semester 1 and semester 2 in 2008.

Table 1. Curtin University eVALUate Student Feedback Survey Results for BIS100 (All locations)

	LO	LE	LR	AS	FB	WL	TQ	OS
2007-01*	69%	59%	68%	67%	65%	76%	59%	55%
2007-02*	75%	64%	74%	74%	76%	74%	67%	63%
2009-01	82%	74%	79%	77%	67%	75%	75%	73%
2009-02*	84%	83%	81%	83%	75%	78%	79%	78%
2010-S1	85%	80%	85%	84%	74%	84%	81%	77%
2010-S2	88%	82%	86%	87%	82%	79%	84%	82%
2011-S1	89%	82%	84%	87%	84%	83%	80%	82%
2011-S2	91%	84%	89%	85%	84%	85%	81%	79%
2012-S1	93%	88%	87%	89%	86%	88%	80%	84%

* Data for Bentley Campus only

It is apparent that there has been a marked increase in students' general agreement with all of the eVALUate survey items since the inception of the new version of the unit in Semester 2, 2009. There has been a substantial increase in students overall satisfaction with the unit, which is very important for the School. It is also clear that students feel that the learning outcomes for the unit are clearly identified. Finally, there have been a number of cases of students reporting that they have changed their major based on this unit and their new understanding of IT. It is also apparent that the unit (and its workload) motivates students to study the subject matter, with 53 percent of students commenting that they spend 3 hours or more per week on BIS100 outside of the classroom. Qualitative feedback that we have received from students has also been extremely positive:

"I must give a lot of credit to the BIS 100 team - you guys have been working extremely hard. All assessments, worksheets, emails, feedback... I felt that I had a lot of support and study resources. Great job! Well done!!! I am still not as good as I should be with IT but now have a good idea of what I should be looking at - really opened my eyes. Thank you very much!!!!!"

"I enjoy everything" and "I love BIS"

“Through doing this unit I realised the importance of doing an information technology based unit. I will now add accounting technologies into my major because of BIS100.”

“Studying BIS100 has made me more aware and given me a better understanding of the information systems currently used in my workplace. The units detailing how to create business value using Porter’s Five Forces and the Value Chain Analysis is highly relevant to my current position and will definitely benefit my career opportunities.”

During Semester 1, 2011 in an effort to correct misperceptions about IT an initiative was devised to encourage ICT high school teachers to participate in BIS100 for their professional development. This arose from the observation that there was a discrepancy between how IT is defined as a subject in the Western Australian high school curriculum, and how it is conceptualized in BIS100. High schools were proactively approached to enroll staff in an attempt to influence and improve teachers understanding of business IT. Another objective was to improve teachers’ knowledge of the School of Information Systems at Curtin University. The initiative was well received. One participant (who has a background in curriculum development, educational resource production, educational measurement and assessment and educational consultancy work) commented:

“Congratulations to CBS for this initiative - The unit is both professionally prepared and presented and is a credit to the School and its leadership.”

Some of the initiatives that have been trialed in the new version of the unit have had a rather unexpected reception from students. For example, the series of graphic novels summarizing the weekly topics, which were produced by the unit review and redevelopment team in collaboration with the Online Teaching and Learning Facility (OTLF) in the Curtin Business School, have not had the impact on students that we thought and hoped they might have had (Aitken & Hatt 2012a). Two trial projects that also sought to facilitate online collaborative behaviour amongst students enrolled in the unit, namely a collaborative lecture note annotation project, and a collaborative learning unit summary project, had a poor uptake (Aitken & Hatt 2012b).

CONCLUSION AND FUTURE DIRECTIONS

The new version of the unit has a clear focus on the business aspects of IT, rather than the technical aspects of IT. We think that this shift in focus is also more beneficial to students undertaking the unit from the other majors in the Curtin Business School. The new unit also has a strong emphasis on practical and achievable skills that are authentic and tie together the content across the unit. Much attention is paid to presenting, discussing, practicing and assessing the educational content over an extended period of time (three to four weeks). Students are exposed to and use modern IT tools, rather than traditional tools. Finally, there is a coherent narrative throughout the unit that was perhaps missing in some earlier versions of the unit.

With regards to the goals identified earlier: 1) To increase the number of students studying IT, 2) To correct any misperceptions of IT, 3) To explain clearly career opportunities in IT, and 4) To use positive role models to promote the IT profession, it is clear that all have been achieved to some degree, as illustrated in eVALUate survey results and from qualitative feedback over a number of semesters. There is, however, still much that can be done to further improve BIS100, which is very much a work in progress as all units (and especially those in the rapidly changing area of IT) should be. In conclusion, this paper is a contribution to the literature on effective teaching strategies for a first year IS, IT, and L/SCM unit. It is also a contribution to the design science literature by developing a new or improved solution; in this case, an approach to introductory IT unit design. Finally, since much of the literature on the redevelopment of information systems units in order to attract more students has derived from studies of students in North American universities, it is a contribution to research in this area based on research undertaken at an Australian university.

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