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ABSTRACT

If South Africa is to transform its educational landscape, access to higher education is crucial. However, if equity of access is not coupled with equity of success, participation, and relevance, access can become problematic.

The Information Systems Department at the University of Cape Town, South Africa, has been concerned for a number of years about both the relevance and coherence of its first year Information Systems course. In 2007, the Department re-conceptualized this course. This case study looks at the background to the problems and motivation for the change and the proposed changes and course redesign, as well as the limitations and anticipated future work.

Keywords

Information systems curriculum, foundation course, contextual curriculum, educational change issues.

INTRODUCTION

Students entering institutions of higher education in South Africa have vastly different cultural capital and come from diverse contexts and experiences. The challenges inherent therein underpin the more specific challenges facing the Information Systems discipline, which has for a long time battled to develop coherence and relevance in courses at a first-year level and to provide motivation for first year students.

The Information Systems (IS) Department at the University of Cape Town (UCT) addressed these issues by re-conceptualizing their first-year Information Systems course. This innovation is an attempt to address some of this discontent, as well as to contextualize the IS foundation course to present both challenges to the student body and relevance to the discipline. The paper focuses on the particular issues and concerns associated with the first-year introductory IS course and outlines strategies for change and the key aspects of the innovation. It also provides a theoretical construct surrounding educational change in order to reflect on and examine the key issues that have emerged. This paper is presented as a case study; an inquiry that investigates a contemporary phenomenon while focusing on understanding the

dynamics present within a single setting, especially when the boundaries between phenomenon and context are not clearly evident and multiple sources of evidence are used (Yin, 1994).

PROBLEM BACKGROUND

The Information Systems Department at the University of Cape Town is housed with the Commerce faculty and teaches 3- and 4-year programs in business computing. The curriculum includes a combination of business (accounting, economics, statistics, law) and computing (programming, systems development, technology, architecture, e-commerce, applications, project management) courses, and students typically prepare for careers as business and systems analysts, information technology architects, business developers, IS consultants, and project managers.

Over time, student assessment and attendance in the IS first-year foundation course found that fewer and fewer students were engaging with the material and, as a result, little learning was taking place. The course faced the pressures many first-year foundation courses share:

- Large student numbers (+-750 per semester)
- Large lecture venues with little opportunity for student interaction
- Difficulties in scheduling and resourcing independent learning activities such as tutorials and workshops
- Student diversity, in terms of language, culture, and educational preparedness
- A split between theory and practice, with little understanding of and motivation for the field of Information Systems

These problems are not uncommon at universities (Tolhurst and Baker, 2003), but feedback from the focus groups highlighted other, more unique problems:

- Many students did not understand what an information system was until their third year of study. Over time the foundation course had split into two modules, one focusing on teaching computer literacy (Excel and Access) and the other a typical “mile wide, inch deep” coverage of the IS body of knowledge (hardware, software, databases, the SDLC, IS applications, and management). While this compartmentalization made the course easy to teach and administer, it produced negative side effects. Students enjoyed the practical module but found the concepts module uninspiring and the context hard to assimilate. In addition, they were unable to tie the content of the two modules together and, as a result, found it more difficult to view the concepts in their technological context.
- Students from disadvantaged educational backgrounds, most of whom are second-language students, were most affected. They found the practical module challenging and struggled to develop relevance and coherence in the concepts module.
- The course textbook received poor evaluations from the class. They found the “mile wide, inch deep” coverage of IS foundation concepts tedious and difficult to read. The course used a number of different prescribed texts during the past decade, but none received favorable assessment from the class.
- Weekly tutorials were scheduled in the computer laboratories and tended to focus on computer literacy. Learning around the concepts module was limited to student “cramming” prior to tests and the final exam.

An increasing number of first-year students are being exposed to information systems content at high school. As a result, they are often bored and criticize the relevance of foundation concepts.

STRATEGIES TO INTRODUCE EDUCATIONAL CHANGE

Educators are increasingly facing greater complexity and diversity in student population, technology, the global market place, social disparities, intense compression of time and space, and so on. Change in this context means functioning in an integrated way to support and manage curriculum, pedagogy, and assessment, rather than in a piecemeal, disjointed and/or incremental way (Hall and Carter, 1995). Educational change is about making a difference in the lives of students and in their capacity to cope with, anticipate, and plan for a changing world. It involves thinking more systemically and in multivariate ways about our approaches to change, rather than seeking single-variable solutions (ibid.).

Initiating any education change initiative is always challenging. Educational change involves deciding what changes to implement and *how* to implement them. The Information Systems Department environment is particularly conducive for facilitating education initiatives in that it has developed a context of collegiality and a spirit of reflection and questioning that acknowledges, anticipates, and works well with change (Davidoff and Lazarus, 1997).

Embarking on educational change involves a variety of strategies. This initiative was fortunate to have several advantages. Chin and Benn's (1970) strategies for change provide a useful framework for understanding the implementation of this particular initiative:

Empirical Rational Strategy

These strategies focus on the arguments, research, and statistics regarding the benefits of a particular change. They are based on the assumption that people are guided by reason, that they are rational, will respond to rational explanations, and follow their own rational self-interest. The motivation appeals to the logical argument that people would be better off and will gain by the proposed change.

Applicable strategies used in the Information Systems overhaul include dissemination of details regarding the difference in students' theory and practical marks, lecture and tutorial attendance, examination results, and summative student evaluations.

Normative Re-educative Strategy

These strategies focus on changing attitudes and values, convincing people's 'hearts and minds' regarding the innovation. While these strategies do not deny changes in knowledge, information or intellectual rationales, they assume that effective innovation requires a change of attitudes, skills, value systems, norms, and relationships with the change group (Bishop, 1987). This may mean change of personal habits and values. It also involves change at the socio-cultural level in the form of normative structures, institutionalized roles and relationships, and cognitive and perceptual orientations (Chin and Benne, 1970).

The initiative in this study reflected a normative re-educative strategy insofar as it emerged from some general reflection, examination, and dissatisfaction with the Information Systems' ethos, norms, and direction. While this was not done as part of Information Systems' strategic reflection and planning, there was an overall acknowledgement of the general dissatisfaction and lack of enthusiasm in relation to the IS introductory course.

Power-Coercive Strategy

The first two strategies emphasize some type of influence, whereas the power-coercive strategy focuses on controls. These may be any type of regulations that are used to enforce a particular change.

This initiative was in a particularly powerful situation given that no persuasion was required to adopt the change. The head of the Information Systems Department initiated and spearheaded the initiative, and

took advantage of all three strategies: utilizing empirical data, the general need for change in the course, and possession of authority to implement the changes.

PROPOSED CHANGE

The process started at the beginning of 2006 when the head of the IS department administered a series of questionnaires to two groups of students: those who had completed the course several years ago and current students.

The results of the questionnaires were analyzed and summarized, and based on this feedback, issues raised in the current literature and concerns previously identified, the course was then redesigned.

In stage three of the process, focus groups of interested stakeholders (graduating students, current students, and academics) were asked to identify issues relating to course content and delivery and to evaluate the strengths and weakness of the proposed course. Perez and Murray (2006) used a similar approach with focus groups containing academics and industry professionals in a redesign of their IS core curricula. The focus group of graduating students consisted of 8 honors students and 4 third-year students. The current student group consisted of 14 first-year students, and the academic group consisted of 5 members.

Each group received the results of the questionnaires, the results of the student evaluations, and the proposed new course. They were asked to analyze, comment, and suggest possible changes. The graduating students provided the most insight, while the academics provided the most analysis and suggestions for change. Two academics had the most impact on the direction of the change, one of whose prime focuses was on students from disadvantaged backgrounds. The direction and outcome of the process was driven by the head of department, who assumed the role of course convener for 2007.

The redesign of the course used seven guiding principles: focus departmental teaching resources on the foundation courses: assume no prior exposure to computing; teach concepts and technology holistically, apply concepts to understand them, use continuous assessment, introduce an element of enquiry and research, and use educational technology where appropriate.

Focus departmental teaching resources on the foundation courses. Traditionally the more experienced lecturers and tutors were assigned to senior courses on the assumption that these courses require teachers with a greater depth of knowledge and experience. Looney and Akbulut (2007) investigated the impact of teaching effectiveness on student uptake and suggest that students who learn from effective teachers acquire greater confidence in their abilities and develop enduring interest in that field of study. With the current drop in IS student numbers, the foundation course becomes a key tool in attracting new IS majors. In addition, the large classes require experienced lecturers who can excite, entertain, and challenge the class.

Assume no prior exposure to computing. Until the South African schools system provides adequate exposure to information and communication technology, this requirement must stand.

Teach concepts and technology holistically. This principal addresses the situation in which students were unable to view the relevance of information systems in the context of their enabling technology. The ‘split’ between ‘theory’ and ‘practice’ did not contribute toward a meaningful sense of the course.

Apply concepts to understand them. Teaching the course holistically allows students to apply many of the IS concepts in the design and implementation of their practical solutions.

Use continuous assessment. Again, building solutions in context will ensure both concepts and their technical solutions are fore grounded.

Introduce an element of enquiry and research. This principal attempts to address the boredom and relevance issues by involving students in more challenging and innovative exercises.

Use educational technology where appropriate. Student management systems such as WebCT and Vula provide many opportunities to support the teaching process. Given their setup overhead, they provide the maximum payback with large classes. However, they need to be used with care to ensure they enrich while they mechanize the learning process.

COURSE REDESIGN

In the two weeks prior to the start of the IS course, all students were required to complete a computer literacy test. Those who failed to attain a basic level of computer literacy or competency similar that described by Perez and Murray (2006) were required to complete a computer literacy course (CLC). The CLC is for students with little or no prior exposure to computers, and it provided students with Computer Aided Instruction CAI courseware and tutor support if needed. During the literacy course, all practical computing skills were introduced in lectures and practiced in hands-on tutorials. An MS/Office text was recommended for students with limited prior exposure to the relevant productivity tools covered on the course. In order to continue with the program students were required to pass a computer literacy test (Windows, Word, Excel, Outlook, and Internet).

The IS foundation course at UCT was restructured as follows.

UCT implemented PeopleSoft's Enterprise Resource Planning (ERP) software to support student administration. In the first and second week of the semester, students are required to access the system to check and update their personal information. The PeopleSoft system has a web-based front end and this exercise allows students to navigate the various menus, maintain their standing information, and enquire on aspects of their student record and enrollment. For many students, this was their first hands-on exposure to a real world information system.

The course was restructured to combine the two modules (theory and practical sections) into a single teaching thread in order to teach IS concepts in their technology context as in Association for Computing Machinery (ACM) IS curricula (2005 and 2007). An overarching case study was developed to run through the entire teaching program. In the past, many students found that the case studies used were difficult to relate to as they often related to large organizations far beyond the experience and understanding of the students. The case study is fundamental to the student learning process and was re-designed to meet several criteria. The case study needed to run as a thread throughout the course, binding concepts and technology together. The case begins as a simple business problem that students may have experienced and can easily understand. It focuses on a small business, a corner store with a limited inventory. Initially the store has only four items for sale (bread, milk, cola, and cigarettes). Some of the items need refrigeration, some are seasonal and some attract VAT (value added tax). The initial problem for the store keeper is analyzing sales and calculating profitability. Students are given some raw data and design a spreadsheet to develop a solution. During this period, students cover the basics of hardware, software, and networks in lectures. The second assignment is to recommend a hardware and software solution to support the store's requirements. As the course progresses, the case study evolves from a simple "personal computing" solution to a more conventional information system. The business grows, supporting a larger product range with more customers and multiple stores. Students are introduced to simple database design and use MS/Access to develop the database and process enquiries on sales analysis and seasonal trends. The course includes an overview of the Internet and e-Commerce applications, and the students are required to browse retail sites for ideas and inspiration to design a web site for the now-national business using Front Page.

A new text book was identified for the course (Benson and Standing, 2005). Criteria used to select the book stated that it must be written in simple English and be easy to understand, it must cover the required body of knowledge at a level of detail appropriate for first-year information systems students, and it must contain mini cases and examples for students to practice and apply concepts. The book was developed for students requiring a foundation in information systems after 'an extensive review of information systems curricula' (Benson and Standing, 2005).

The course follows a set weekly schedule with four lectures per week (Monday to Thursday), one practical session in the computer laboratory (Tuesday), and one group tutorial (4-5 students per group) per week (Friday), run by the lecturer to discuss course progress and deliverables. The hands-on sessions in the computer laboratory were of two distinct types. The first is a 'learning and developing session' in which students complete pop quizzes and work on exercises and current assignments. Tutors are available to assist when required. The second type is an 'assessment session' in which deliverables are presented and marked by the tutors.

Students groups are required to write a short literature review of a particular section of the course. This requires the group to research the topic, cite sources, and provide a bibliography. Each review is marked and edited by graduate students. The final products are used to compile a "newspaper" (news items and job advertisements are included). The final document, more than 50 pages, provides a summary of the course and a learning aid to students.

An open source student management system (Vula) is introduced to support student evaluation and communication. Vula replaced WebCT at UCT and is used to support continuous assessment through the use of pop quizzes; provide a communication platform for staff and students though a chat room facility; provide access to course materials including the course outline, assignment guidelines, slides, and other course materials; and provide upload facilities for student hand-ins. E-mail and SMS channels also provide direct access to academic and administrative staff.

The redesigned course was then presented to the three focus groups (graduating students, current students, and academics). The focus groups identified issues, analyzed the revisions, made comments, and suggest possible changes.

GENERAL FEEDBACK

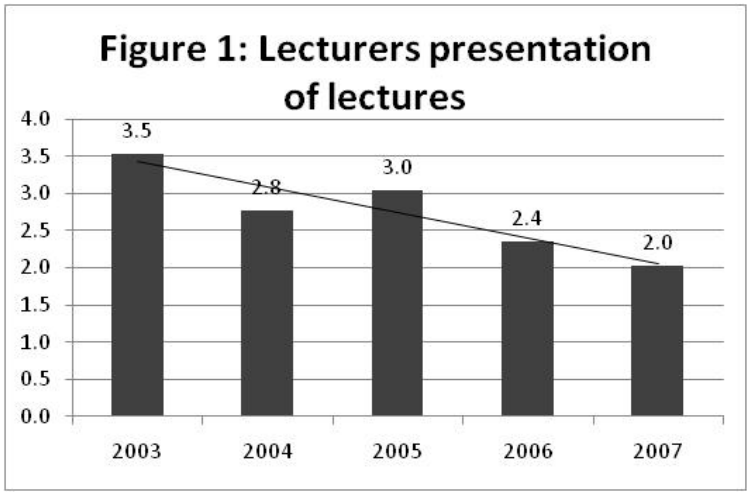

Figure 1. Lecturers Presentation of Lectures

The new course design was implemented for the first time in the first semester 2007. Student evaluations highlight both positive and negative feedback.

On the positive side, students found the lectures more interesting and lecture attendance improved (see Figure 1: year on year comparison statistics where issues are ranked from 1 – excellent, 3 – good to 6 - inadequate). The majority of the lectures were delivered by a senior member of staff with strong communication and motivational skills, as opposed to previous years where junior members of staff did most of the lecturing at first-year level. The trend line shows that the number of lecture presentations improved steadily (declined) during the past 5 years.

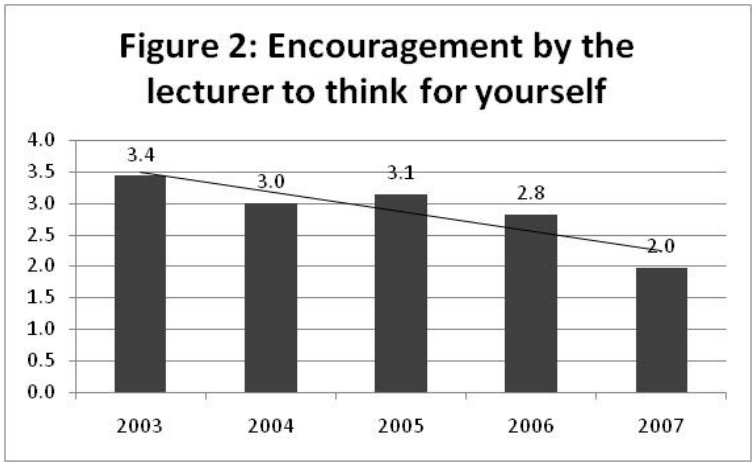

Figure 2. Encouragement by the Lecturer to Think for Yourself

Students found the course more challenging (Figure 2). In the past, students questioned the relevance of lectures and the need to attend and participate. The lecturer encourages questioning and discussion in lectures, requiring students to focus on the issues and think for themselves. An average rating of 2 means an average of 'very good.' The trend is moving in the right direction.

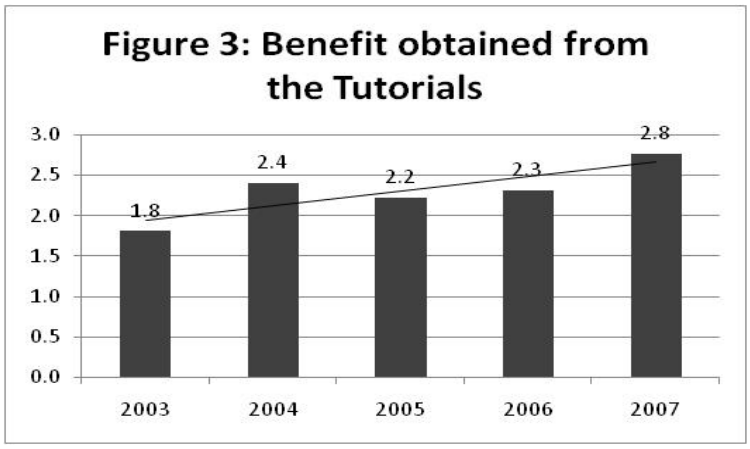

Figure 3. Benefit Obtained from the Tutorials

While the lecture evaluations have improved, tutorial ratings have not (Figure 3). In the past, the practical side of the course was run independently from the theoretical concepts. This allowed the lecturers the freedom to build exercises and tests and to focus on the technology regardless of context. This may have provided a more structured learning environment for the hands-on aspects of the course. Secondly, problem-driven examples appear to be more "open ended," and therefore it is difficult to find standard solution templates. This makes tutoring and marking more difficult. Probably the biggest factor was that in

previous years students had worked on practical aspects individually, whereas in 2007 they worked in groups, and this lessened their learning benefits. Generally, students tend to rate practical sessions in computer laboratories high, and although the trend is moving in the wrong direction, it is worth noting that the ratings are still good (1 being excellent, 2 very good, 3 good) with an average of 2.8 in 2007.

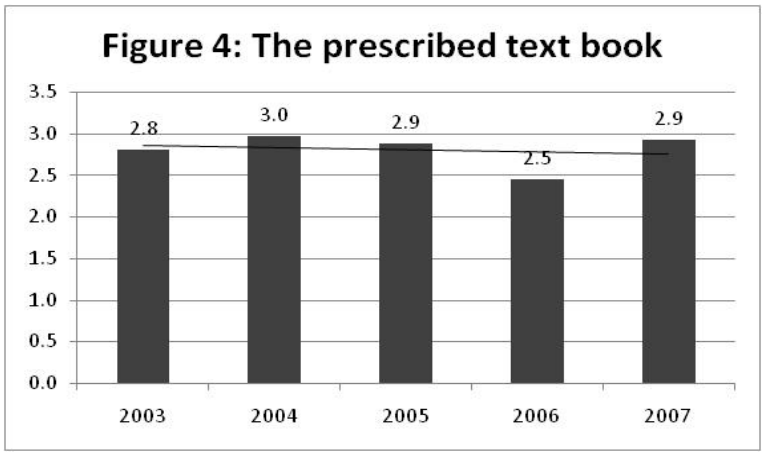

Figure 4. The Prescribed Text Book

There were few specific complaints about the prescribed text book and the student evaluations rated the text as good (Figure 4). Although the book was selected because it supported the "technology in context" theme, it was rated similarly to text books in previous years.

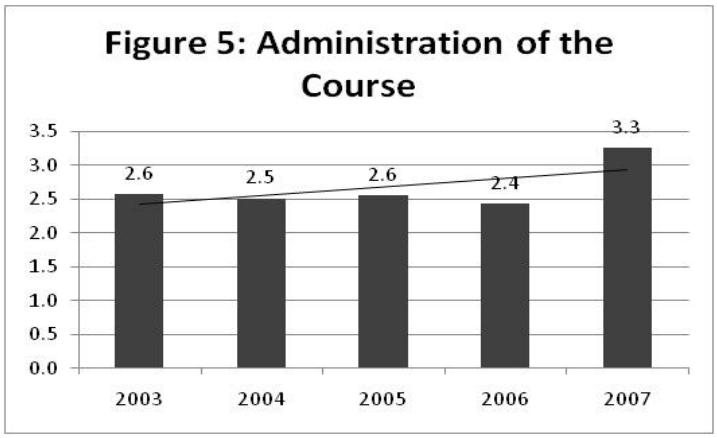

Figure 5. Administration of the Course

The administration of the course was rated as poor (above 3) by the students (see Figure 5) for the first time. Large classes are always difficult to manage and need tight administration. Unfortunately, changes of this magnitude also have problems as the material is new to both lecturers and support staff. Previous courses had few deliverables and needed less administrative support.

Students were asked to rate the course relative to other courses they were attending (Figure 6). It should be borne in mind that the majority of students attending this course are not intending to major in Information Systems, and many students view IS as an unnecessary burden. This rating was worse than prior years, a disappointment primarily due to poor administration.

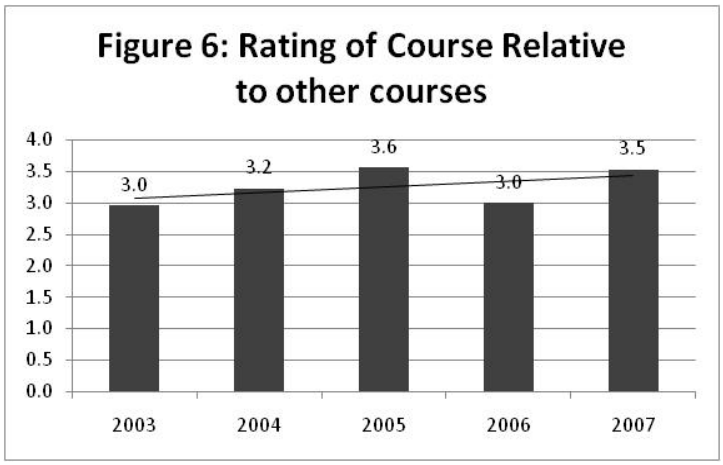

Figure 6. Rating of Course Relative to Other Courses

Finally, teaching technology interwoven with concepts can make lectures more difficult to plan and deliver. Applications such as Excel must be taught using the product and not as static PowerPoint images. However, switching from business problem to application solution is often difficult to achieve in a smooth and seamless manner. While the basics are easy to introduce, complex Excel and Access functionality often interrupted the thread of the lecture and, in many cases, confused the weaker students.

DISCUSSION

The first-year IS foundation course has changed considerably from prior years and early feedback indicates that students are positive about the lecture component of the course. However, many students indicate that the course still lacks relevance. As students had not experienced the previous modular paradigm, there was little feedback to support the "technology in context" approach.

Students found the course more challenging. This could be a consequence of a more interactive and engaging lecturing approach or the inclusion of more individual and investigative deliverables such as the concepts reviews.

The learning space where students can apply their knowledge is centered on the group tutorials. In this regard, there is little change in student evaluations from prior years.

Course administration was overwhelmed by course changes and student numbers, and this had a negative impact on student perceptions of the course.

Student rating of the IS foundation course relevant to other courses has declined from previous years, mainly due to poor administration.

The course is now in its second iteration and the course coordinator has made minor modifications to the program content and strengthened the administrative support.

However, there are still some issues to confront and these may encourage further changes in the future.

In 2009, students who have followed the new South African National school syllabus will be applying for university entrance. There are two new computer subjects within this syllabus and schools with the necessary teachers and resources will include these in their teaching programs. Initially, only a small percentage of school students will write these subjects, further diversifying the first year intake.

UCT has tackled the problem of large classes by committing more resources to the problem, both in terms of quality and quantity. This focus on lectures as the main form of teaching will always reduce the

impact of the learning experience and minimize interaction between staff and students. While small group teaching is not sustainable given the size of the class, there are mixed models using lectures, workshops, and web-based tools that could provide a more student-centered environment.

GENERAL LESSONS LEARNED

Focus groups provide invaluable insights and discussions of raw statistics; they tell the story of the data. Once it was agreed that the course was to be changed, a 'champion' was appointed to drive the change. The champion was a senior member of the academic staff and had full support from the management of the department. The new course was documented and notices were put up advising students of the changes – most notably that the two-module approach was being discontinued.

The administration of the course was weak, and it was improved for the 2008 course by adding a course manager. The tutorials were changed in order to be made more distinct and practical in an attempt to turn the trend line. The tutorials (and literature reviews) were no longer performed in groups but as individual exercises to improve relevance.

SOME SPECIFIC REFLECTIONS REGARDING THIS CURRICULUM INNOVATION

This innovation provides the opportunity to reflect on how to plan and anticipate for in an educational innovation. While this is not comprehensive, the case study provides us with a context in which to understand, plan for, and pre-empt some aspects that can be involved in any educational change initiative. Although the case study is based in South Africa, with our unique history, large disparities in students' experiences, race, language, and schooling experience still remain, creating divides. There are important lessons in understanding the nature of education change that could have value in any education context.

A longer time period is clearly needed to more effectively assess and evaluate this innovation. While student responses indicate that the lectures have been enhanced: "I love the way the lecturer explains"; "KJ tries to make the lecture fun"; "The lecturer is very entertaining and he is passionate about what he teaches" (Commerce Academic Development Program (CADP) student formative evaluations, 13 August 2007), the overall response to the course has not improved (students rated IS lower than other courses and lower than previous years). In addition, there is no clear evidence of improved results and the previous divide between the theory and practical components has not been unified in a way that adds value to the course. Student comments reflect this: "Trying to get it in context"; "Nothing is difficult really, but some things that we should be taught in the computer labs are taught in lectures, which makes them more difficult to grasp"; "I am finding the application difficult"; "There is too much theory and not so much lab (practical) time"; "The work seems out of context making it difficult to understand"; "The fact that they explain practical questions in class, that is hard to understand when you're not sitting at a computer"; "I don't think I've come to grips with what I'm supposed to achieve at the end of the course" (CADP formative evaluation, 13 August, 2007).

There are some critical facets regarding enhancing educational change that must be reflected on in relation to this particular IS curriculum innovation; namely, a *multidimensional* approach, the *complexity* of change, weighing up *costs and benefits of change*, inherent *conflict* within change processes, and *unevenness* in embracing change.

Multidimensional Approach

While assigning effective teachers to courses can bolster students' confidence in their ability to successfully perform in IS, as well as enhance their interest in the course (Looney and Akbulut, 2007), it appears that a multipronged and multidimensional view of innovation is necessary in order for effective and enduring change to occur.

The initiation, implementation, and institutionalization of change interact, and many characteristics of change become visible at different phases. Fullan (1991:42) states that educational change is *multidimensional* and involves at least the use of new or revised materials, new teaching approaches, and the possible alteration of beliefs (about what is valued, fore grounded and so on):

> "The use of new materials by themselves may accomplish certain educational objectives, but it seems obvious that developing new teaching skills and approaches and understanding conceptually what and why something should be done, and to what end, represents much more fundamental change, and as such will take longer to achieve but will have a great impact once accomplished."

Fullan (1991:38) goes on to say that "real change involves changes in conceptions and role behavior, which is why it is so difficult to achieve." This means that real change will go beyond changing certain practices, methods or beliefs, but will involve changes in skills, paradigms, and theory.

There has often been a focus on the content of change – what a particular innovation will look like – but increasingly there is a need to focus on the *process* regarding how the innovation will be implemented. "Reforms tend to concentrate on goals, but their operationalized schemes seldom show a clear understanding of the change process" (Dalin, 1978: 9). Fullan (1989) reinforces this by stating that it is not enough to know what should be changed, because the challenge lies in strategizing on *how to embark on the process of changing.*

Changing the delivery of a course involves a multilayered approach, as well as methodological tools to review and evaluate this as an on-going process. This involves testing out and reflecting on a variety of teaching structures, pedagogies, and resources that most adequately support the innovation.

Complexity

The change process inherently involves complexity and unknowns which involve a continuous mindset of problem solving and investigation. Change is a process not an event (Fullan, 1991). This innovation in Information Systems with a focus on effective teaching and a more integrated approach gave rise to many unexpected issues. The extent to which assessment is driving pedagogy, congruency between lecture content and style and the textbook, the link between tutorial and lectures, the link between practical work and the lectures, the effectiveness of the administration support system and so on.

Sarason (1990:16) describes this rippling effect: "…what you seek to change is so embedded in a system of interacting parts that if it is changed, then changes elsewhere are likely to occur." Although the choice of textbook supported a 'technology in context' theme and students generally found that the lectures linked with the textbook, many students found it hard to follow: "I need something simple that's explaining things in a more relevant way"; "The textbook is very wordy with lots of jargon"; "The lectures do link up with the textbook even though the textbook is quite difficult to follow" (First Year CADP students formative evaluation, 13 August 2007). Although a new textbook was prescribed, which supported the intended aims of the new curriculum, the language and general discourse in the textbook made it inaccessible for some students.

The challenge vis-à-vis the IS Foundation course is to broaden the focus. Thus, not only focusing on the varying aspects of the course: the quality of the lecture, the tutorial, the textbook, the administrative support, the use of education technology and continuous assessment but including the congruency, the interrelationships and scaffolding between the varying facets that contribute toward a changed course direction and curriculum.

Unexpected consequences mean that there is a lack of predictability in educational change. More demanding generative capacities are needed that can anticipate, pre-empt, and be proactive to the

process of change. Davidoff (1997:46) adds support for the notion of the multilayered and unpredictable nature of change:

> "…. much of current planning focuses on the now, the visible. Implicit in much work in education is the belief that once issues have been "addressed," once plans have been made, once structures have been put in place, the problems will have been solved. However, what is not always fully understood is that these rational and practical steps, while necessary and important, do not tap into the deeper underlying and often invisible layers of reality which fundamentally shape daily practice. While planning itself needs to be a rational process, it needs to take into account the essentially unpredictable nature of change."

The lack of predictability in introducing and implementing educational change suggests that the details of the plan regarding the process of an innovation need to be flexible. There is a need both to acknowledge the unpredictability of any change process, as well as hold certain frameworks in place, with flexibility in appropriate areas. For example, the new textbook addressed the problem of contextualizing the discipline, but linguistic and academic discourse problems emerged. In such a case a scaffold approach using 'hint boxes' for particular topics in the textbook could have provided greater access. Given the unpredictable nature of change, ongoing reflection and planning are essential.

Cost or Benefit?

Innovations require far more energy and time than is often anticipated. Time is related to the potential benefit insofar as one must have a clear sense of benefit in relationship to the time costs involved. Change may not bring about any immediate advantage or personal benefit. The process can invalidate lecturers' experiences and make them feel disempowered and unable to cope with the changes. Thinking about one's own practice, in terms of values, direction, and pedagogy can be threatening because it calls into question existing practices. Equally, the innovation involves increased time demands and a general decrease in the tolerance level for coping with the uncertainty and fluidity of the change process.

It is therefore necessary to keep small, clear, and realizable foci to minimize the overwhelming factors of complexity. It is better to think big, but start small (Fullan, 1988). Realizable goals can provide a sense of achievement and possibility, which can provide the necessary impetus to continue with the challenge.

While holding the overall impetus for the innovation, it would be helpful to set specific, realizable goals for a particular semester. This would help affirm some aspect of the change process.

Conflict

Given the ambiguities surrounding change, conflict is "inevitable and fundamental" (Stoll and Fink, 1996: 45) and a necessary part of change (Lieberman, Darling-Hammond, and Zukerman, 1991). It can be used creatively as points of growth in the change process and can be a particularly rich source of ascertaining what the conflict underscores and how it can be resolved (Mathison, 1988). Conflict is then anticipated, viewed as a natural part of change, and recognized as "largely functional in 'unfreezing' old patterns of behavior," rather than as a stumbling block to implementation. Inherent within critical social theory and critical action research is the importance of the dynamic of conflict.

The formative student evaluations (13 August, 2007) evidence a great deal of disease and conflict : "I don't understand how the slides are related to the textbook we have"; "The work seems out of context making it difficult to understand"; "I just don't get the course"; "The theory is very difficult and some concepts are very difficult to grasp"; "Not understanding its purpose and objectives"; "The confusion with administration and sometimes the tasks that have to be done"; "The fact that they explain practical questions in class, that is hard to understand when you're not sitting at a computer"; "I don't understand

anything and I feel very lost"; "Systems Integration – I don't have the foggiest idea how it works or how to apply it to problems"; "Lecture slides are not in terms with the textbook and a lot of detail is left out"; "I wish we could have lab sessions with the lecture and not be taught practical in theory"; "I don't understand anything in INF".

All these aspects provide the space and opportunity to engage the impact on the learning environment, to engage with the students about these aspects, and to re-plan and redesign where appropriate.

Unevenness

Educational change means unevenness in relation to participants' responses and participation. "… there are individual differences and individual rates of change" (Hall and Carter, 1995: 182). "It is an accepted fact that participation is never a hundred percent: not everybody entitled to participation does in actual fact actively participate" (Rambiyana, Kok and Myburgh, 1996: 191). Whatever the type of change, there will be an element of personal or collective rejection and ambivalence that will occur (Fullan, 1991). Again, the student evaluations strongly reflect unevenness in students' engagement, sense of meaning, and motivation in this course.

LIMITATIONS

This study is limited insofar as it is focused on the issues emerging over the period of one year with a particular innovation. Clearly, a longer time period is needed to assess the impact of any change, particularly the contribution (or lack thereof) to the general direction, focus, and assessment of the course.

CONCLUSION

The IS foundation course was redesigned after a series of questionnaires answered by past and present students of the course indicated that the course lacked coherence and relevance. Three focus groups then identified issues relating to the course. The course was then redesigned and the focus groups evaluated the proposed course and made suggestions. The most significant change made was to combine the two disjointed modules into a single module with a simple case study. Other changes included inclusion of more relevant and challenging course deliverables and adoption of an open source student management system.

A comparison of the general formative evaluation comments from students who completed the 'old' IS foundation course and the 'new' IS foundation course reveals definite shifts. There is clearly an overall shift toward more meaning and possibility within the course. Comments from students who completed the IS foundation course in 2006 include: "The lecturers couldn't convey their knowledge too well so it was difficult to stay interested"; "There's plenty of facts to learn off by heart rather than understanding"; "The most difficult part was theory. I used to read the whole chapter and understand nothing or 25 percent of what I read"; "The theory part was difficult to understand and lecturers did not always make lectures clear"; "Having to read all that information that didn't make much sense to me"; "It didn't make sense and it felt unreal"; "I felt that the things I'm leaving, I'll never use".

The current first year CADP students' comments include: "At the moment, I'm still confused but hope to get there"; "The challenging new content about the business world"; "The interesting concepts we learn. The matter of the subject is interesting"; "Being lectured by different people and getting more people to ask help from"; "I can't really say IS is what I like but the fact that it gives us an open-mind in business makes me want to do it"; "The lecturer is funny but I don't find it interesting at all. I don't really understand it"; I don't enjoy it because it's not interesting"; "The theoretical aspect of it does not seem to be that bad. I am looking forward to learning more"; "It requires a different approach, so I am learning to think differently – literally"; "I just think the lecturer is very entertaining, although I'm

struggling to group (sic) what he is teaching"; "Looking at business problems and solving them, e.g. the Joe tasks we have been doing. I'm particularly interested in Database Management and Systems Development Management"; "Kevin is trying his best, but I still just don't get it".

Despite the overall shift, there is unevenness and certain areas need much more work and interrogation. The overriding questions regarding assessment of what learning has taken place, whether motivation and interest have been enhanced, whether assessment drives teaching pedagogy, and whether results have improved, still needs further work and investigation.

Change initiatives need time, and it is not possible to fairly evaluate educational change without a series of spirals of planning, acting, observing, reflecting, and re-planning. These spirals are retrospective and prospective; retrospective in making meaning from the past and prospective in planning future action. Carson (1990) proposes that this spiral of planning, acting, observing, and reflection sets critical action research apart from problem solving, insofar as it is ongoing and not focused at a particular 'end point'.

It also means moving beyond a checklist approach regarding 'successful' change. Because change is understood as complex, multifaceted, and dynamic, it is more likely to take root and succeed when a change initiative does not remain isolated.

One needs change at multiple levels, different levels of activities, and competencies that lead to simultaneous learning and change at the student, lecturer, and departmental levels.

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