

ARE WE THERE YET? IT GRADUATES – BAUHAUS STYLE

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Abstract

Monash University's School of Information Management & Systems has over the last few years taken a novel approach to the teaching of its undergraduate degree program. This approach adopts and extends aspects of the Bauhaus style of teaching with the aim of developing IT graduates that are better prepared in both discipline knowledge and the non academic skills required in the IT workforce.

This paper describes the studio-based teaching model adopted, and briefly reports on evaluations that were conducted during 2001. The focus of this paper is on the staff's perceptions of the model, though student's responses are drawn upon as an insight or support. Findings highlight the acceptance of the model in principle, but also highlight deficiencies in its implementation.

The question "Are we there yet?" will not be fully answered until the student intake of 2001 graduate, as it is these students who have been immersed in the model from the commencement of their studies within the degree program.

Keywords

innovation, studio-based teaching, IT education

Introduction

The need to develop a new undergraduate degree that accommodated the disciplines of information systems and information management degree program gave rise to a new curriculum, and a radical re-thinking of the teaching approach to be used for the program's pedagogy. At the same time the opportunity was taken to 'produce' graduates that were not only well grounded in both the information systems and information management disciplines, but were also well prepared to take up positions in the professional workforce.

When addressing the curriculum of a new degree, and one that is well-suited to the 21st century, the underpinning pedagogy needs to be seriously considered. "Industry leaders have consistently said that while they value good university marks, they want graduates who can communicate clearly and effectively in the workplace" (King, 2000: 5). Statements such as this have made many tertiary institutions consider not only the discipline knowledge and skills when developing new programs but to take a pro-active approach to developing graduates with the skills of the future workforce. Monash University's School of Information Management & Systems has married the two in the development of a non-traditional approach to the teaching of its specialist undergraduate degree program.

Background

In 1998, the School of Information Management & Systems at Monash University merged two undergraduate degree programs – the Bachelor of Information Management and the Bachelor of Information Systems, to form the Bachelor of Information Management & Systems (BIMS). In addition to the discipline knowledge that is encompassed in the degree program, the program aimed to produce information technology professionals who were ‘work – savvy’, that is, have the skills that enable the graduates to be an immediate and effective team member in the IT profession. These skills have been aptly named as ‘graduate attributes’ or more specifically, ‘non-discipline skills’.

The AC Nielson report (AC Nielson, 1998) identified eleven skills that are desired by employees in their graduate staff. Of the eleven skills, only one has a direct relationship to academic achievement in a discipline. Many of the others relate to work and life skills, including time management, communication skills, inter-personal, team working, and problem solving skills.

Discipline knowledge and graduate attributes at the forefront, the BIMS development team took the opportunity to re-define curriculum and pedagogy, and looked at teaching models that were akin to the ideologies that would produce the type of graduates that were required. The Bauhaus school of design was investigated because its pedagogy advocates a strong relationship between master craftsmen and apprentices, the importance of the learning environment, and the synergy between teaching, learning and practice. All these factors had a significant influence on the re-design of the BIMS program.

The Bauhaus influence

Three of the Bauhaus’s aims that have had the greatest influence on the development and implementation of the BIMS are: the integration and encouragement by artisans / craftsmen as mentors to their students / apprentices together with the cooperative work and combination of their skills; the melding of craft and tools in a simulated workplace; and the establishment of contacts with industry (Flores, 2000). The idea of students learning from a ‘master’ in a cooperative and a simulated professional environment are at the crux of the pedagogy for the degree.

Delivery of the program is achieved through the implementation of a ‘studio model’ of teaching and learning. This model has been influenced not only by the Bauhaus teachings, but informed by research conducted by several Australian universities (Jamieson, Fisher, Gilding and Taylor, 2000).

The BIMS program has four foci; development, vocational, application and practical. The development focus within the program examines the development process itself, together with the development of products, services and systems. The vocational focus aims to produce graduates able to work in the public and private sectors. The application focus is evident in the exposure of students to a broad range and variety of services, systems and products. The practical focus emphasises learning-by-doing, rather than an emphasis on theory alone.

The IT studio model

The studio model encompasses both an approach to teaching and learning, and a physical presence. The model integrates the core intellectual content of the program through a practical application of the knowledge and skills in the development projects conducted within a studio teaching unit. This occurs within an environment that simulates professional practice and enables the students to develop many of the non-discipline skills identified in the AC Nielson report.

At each year level of the degree the respective studio unit has an emphasis on a broad theme that underpins the aims of the degree. The experience across the three studio year levels is quite distinct and is a reflection of the studio design at each of these year levels. During first year the emphasis of the studio is on ‘Tools and Technology’. Students explore the technology made available to them in the studio, they investigate ways in which data is managed, classified and controlled, study the Visual Basic programming language, and are introduced to the fundamental concepts of information systems.

By second year the emphasis is on 'Systems Development'. At this level students undertake the development of an information system within a project team environment, as the vehicle for practising, integrating and enhancing the skills they have learned from core discipline units and from the first year studio unit.

In third year, the emphasis is on 'Practice'. Students work in groups within a project team to develop an information artefact for a client organisation, usually external to the University. The students manage themselves and 'consult' with the studio academic staff on problem situations.

The teaching and learning within the core studio units are focused on on-going, self-reflective and self-forwarding growth of the student. This is catalysed through students having control, and actively engaging in their own learning. This learning is further strengthened through the students' engagement with the content and processes of learning and assessment, sharing their learning with faculty, becoming aware of the relevance of the unit content outside the domain of an educational setting (thus applied to 'real-life' situations), learning-by-doing, exposure to a variety of experts to mentor the students within the studio unit, and the development of a professional relationship with academics and tutors (Lynch and Penna, 2002).

Discipline knowledge and skills

The acquisition of discipline knowledge and skills is obtained in the BIMS through the integration of curriculum between the core units of the degree.

Twenty-five percent of the course is devoted to teaching in the studio space, therefore the effective educational use of studio time is critical. The year long studio unit at each year level of the program draws on content, concepts and skills learnt in the other core units, and their integration in studio practice is intended to develop sound and diverse IT capabilities. The value of integrating the curriculum is through the removal of the artificial boundaries that are commonly created for the convenience of segmenting a program into units common in duration and level of complexity, it gives the students an opportunity to master the discipline and non-discipline skills, as well as consolidating and supporting the students' learning (Lake, 1994).

The studio curriculum aim to provide an integrative function in two ways: Firstly, it offers a teaching/learning framework that integrates the knowledge and skills of the other core units in the BIMS in fairly broad project-type activities. Secondly, the studio teaching/learning environment (known as the studio precinct) encourages a holistic approach to IT practice through an alliance between the teaching methods and the supportive IT infrastructure.

Non-discipline skills

Work skills or non-discipline skills have been identified as lacking in current graduates (King, 2000 and AC Nielson, 1998), even though they are critical to graduates of the future. Within the IT studio model the acquisition of these skills, such as effective team membership, collaboration, problem solving, IT literacy, oral and written communication, leadership, and time management, are acquired in context.

The studio units revolve around working in small heterogeneous teams to solve a problem, devise a solution or to analyse a situation. The composition of these teams is varied and changes depending on the problem and situation. At times the groups are self-forming, and at other times faculty dictate the composition of the groups. To be an effective worker in the IT workforce, graduates need to be fully conversant and proficient in the skills required to work within a team. Embedded in the studio units are the skills required to work effectively as a team member, including the use of information and communication technologies.

Studio team members collaborate together as one, drawing upon each other's expertise, skills and an understanding of each team member's strengths and weaknesses to conquer the goal (Schrage, 1990). Collaboration between the students is nurtured and supported by staff, expert advisors and the more experienced members of the group. Through the development of effective team membership skills, team leadership and time management skills subtly evolve and become second nature to the students.

Assessment

Assessment for the studio units is conducted using portfolios (80%) and examination (20%). The use of portfolio assessment provides students with an element of creative freedom and instigates student control over their own learning (Federico, 1999). The portfolios have been used differently at each year level, with first year having portfolios with two distinct sections; self-selected items, and mandatory items. The self-selected section contains items the students have chosen to demonstrate their progress, effort and achievements. These items could be set exercises, additional exercises, or pieces of work from other subjects that have benefited from skills/attitudes accomplished in the studio classes. The second and third year portfolios included reflective diaries and a range of mandatory system development artifacts and deliverables where the form and content was decided by the groups. As the student progresses through the course the portfolio should exhibit substantial reflection on the student's academic progress, career decisions and directions, and an understanding of the discipline and skills required of an IT graduate.

The examination component of the assessment at first and second year levels is a formal written examination designed around a case study with questions that are designed to integrate the core content. The examination in the third year of the program is in the form of a formal interview.

Professional practice

Professional practice is encouraged throughout the studio units – not only by the students, but is also modelled by the faculty and technical support personnel. The physical environment, or precinct, resembles a modern IT workplace with supportive computing infrastructure and facilities. The 'attitude' of staff delivering the studio units is one of a mentor/expert working alongside a neophyte to assist them in mastering skills and techniques.

The studio precinct

The studio precinct encourages the development of a professional relationship between staff (mentor) and students. It employs an alternative space configuration to the traditional tutorial room. Currently the precinct is comprised of two studios, a studio cafe, and a meeting room (Diagram 1).

The studio teaching space varies between the two studios. One studio was designed to support didactic teaching, the other was designed to support groups of varying sizes. The studio cafe is an informal meeting place and social centre of the BIMS studio precinct. As the studio precinct is accessible twenty-four hours a day, seven days a week, the cafe is equipped with a kitchenette. The meeting room is designed as a professional space with high quality furniture and facilities. It is used for consultations, studio group meetings, student meetings, presentations, and ad hoc purposes.



Studio1



Stduio2



Studio Café



Studio Meeting Room

Diagram 1: The studio precinct

The studio IT infrastructure

The studio precinct heavily relies on a supportive information technology infrastructure. Students are encouraged and educated in using these technologies. The network, computer configurations, software and peripherals have been designed to replicate or simulate what the student may come across in the IT workplace.

The studio timetable

The number of scheduled hours and the ratio of seminar to studio may differ between year levels, and over a period of time. For example, each week the first year studio unit may have one hour seminar and a three hour studio class, second year may have a seminar every second week and a three hour studio class every week, and the third year studio unit may have four hours of studio class each week and seminars as required. In comparison, the traditional IT undergraduate units scheduled classes nominally run for between one and two hours. The longer class times in the BIMS were set to prepare students for the normal working hours of an IT professional.

In 2002 a professional development stream was offered to the final year students of the degree. Attendance at the program was voluntary, and scheduled according to the presenter's availability rather than during a timetabled studio class. Topics were selected by the students or the studio staff.

Research

Over the past eighteen months numerous evaluations of the model have been conducted by the BIMS studio teaching team. A summary of the findings are below, details can be found in articles referenced at the end of this paper. (Omitted to retained anonymous standing)

The research

A common thread used in all the evaluations have been to investigate staff and students preference of teaching and learning using the IT studio model as compared to the traditional model that has been commonly and widely used for centuries. The specific areas of focus have been, the teaching and learning philosophy, the teaching and learning environment, satisfaction and workload.

The data collected has contained both scaled response items (using a five-point Likert scale) and open-ended questions. Responses were analysed according to means, standard deviation and percentages. Student responses were also analysed using two statistical tests (Krusal-Wallis, and t-test) using the software package SPSS.

The findings

The results of the research have been organised for this paper in accordance to four focus areas: Discipline knowledge and skills, work skills, professional practice, and satisfaction with the studio model. The student and staff response rate is shown in Table 1.

2001	STUDENT Responses - % (enrolled)	STAFF Responses - % (allocated)
Ist year (IMS1000)	61 (115) - 53.04%	5 (7) - 71.42%
2 nd year (IMS2000)	29 (109) - 26.60%	5 (7) - 71.42%
3 rd year (IMS3000)	8 (63) - 12.69%	5 (5) - 100 %

Table 1 Response rate

Discipline knowledge and skills

Students were asked to rate and comment on the content of the unit and its integration with the other core units within the degree, faculty were not asked to rate, but only comment on the integration of the content with other core units.

In general, first year students and faculty were satisfied with the studio unit's content and its integration with the other core units. Not so positive were the responses from the other two year levels. The students reported that they found the studio units' curriculum unstructured, lacked focus and was disorganised. Though disheartening, this finding was not a great surprise as the academics themselves had made negative comments regarding the curriculum of the studio units. In so much that the 'integration' was superficial due to the fact that not all the staff had comprehensive knowledge of what was taught, and when it was taught in the other core unit running in conjunction with their studio unit. In defense of these comments, the second year unit suffered a change in staff, both in the teaching of the content, and in leadership, both of which contributed to the loss of knowledge, thus integration.

Work skills

Overwhelmingly students felt that they actively gained experience and confidence in team work and collaboration – even if, as some students commented, they didn't really like it. Staff agreed that the studio model gave students the opportunity to manage their own learning, but at the same time staff perceived that the students required continual guidance, particularly in the first two years of the degree.

Professional practice

It was evident from the results that students and staff viewed the studio units as a pre-cursor to the IT profession. This was not only through the occupation of a professional space, but through the attitude of staff, which over time permeated through to the students. A comment by a third year student exemplified that this was being achieved, *"It was great to have staff there to answer our questions but keep in the background and let us learn from our mistakes. They always knew when to step in if things were getting too tough or difficult for us."* As a large amount of time and effort is given by the staff to simulate professional practice, it was rewarding to see that this was not in vain as the following comment alludes to, *"I preferred the learning environment of the studio as it promotes interactivity amongst students which mimics the workforce environment."*

Overwhelmingly students and staff reported that the studio precinct was a preferred space in which to acquire the knowledge and skills of the profession. They preferred the layout of one studio to the other, preferred to have identical technologies available in both studios, and highly regarded the inclusion of a café and meeting room into the precinct.

Satisfaction

Staff rated their satisfaction with the academic content around the moderate indicator. This was disappointing, but due to the change in staffing and review of the degree itself it was not unexpected. Workload was an issue for staff, as team teaching and in particular within a new approach, the workload was higher than in teaching in a traditional unit. This did not deter those staff that were committed to the studio-model, where the frequent comment has been made that the work is heavy but satisfying.

There was much agreement amongst the first year students with respect to their satisfaction with the course, and preference to learning in this type of environment as compared to the standard lecture tutorial, though it needs to be pointed out that this style of teaching and learning did not suit all students. Some students still preferred the traditional approach. The second and third year students generally were satisfied with the approach, but comments showed that their satisfaction was hindered by frustration. This frustration was related to confusion of assessment requirements, and what seemed to them to be an unstructured curriculum, both of which were done on purpose, though not to the final extent. Ambiguity and change is common in the IT profession.

Conclusion

The IT studio-model, though based on long standing educational practices, is in its infancy and as such succumbs to teething problems. Staff and students alike have shown that the model is a preferred method

of teaching and learning, not only for the acquisition of discipline knowledge and skills, but the acquisition of the non-discipline or graduate skills that are required to be a success as an IT professional.

The difficulties of integrating curriculum across several core subjects in any one year were highlighted throughout the research. Staff need training in how to integrate the curriculum as much as students need to understand and map the links within the curriculum. Nevertheless, the curriculum was too 'loose', and requires more structure. This has been addressed not only at studio level, but at the degree level as the program is undergoing a full review in 2002.

Research into the model is on-going, the first cohort of students who have been involved since the beginning of their enrolment in the degree will graduate at the end of 2002. These students, and the ones before them who have been the 'lab rats' or 'guinea pigs', together with the teaching team are continually moulding the model into one that is more rigid, but flexible and innovative at the same time.

The answer to the question "Are we there yet?" is no, but we are nearly there – it is just round the corner.

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