Reflection on Integrated Problem Based Learning – 20 Years of continuing application to the teaching of Architecture

Lyn Alderman
30 April 2004

Abstract

In 1984 the School of Architecture and Built Environment within the University of Newcastle, Australia introduced an integrated program based on real design projects and using Integrated Problem Based Learning (IPBL) as the teaching method.

Since 1984 there have been multiple changes arising from the expectations of the architectural fraternity, enrolling students, lecturers, available facilities, accreditation authorities and many others. These challenges have been successfully accommodated whilst maintaining the original purposes and principles of IPBL.

The Architecture program has a combined two-degree structure consisting of a first degree, Bachelor of Science (Architecture), followed by a second degree, Bachelor of Architecture. The program is designed to simulate the problem-solving situations that face a working architect in every day practice.

This paper will present the degree structure where each student is enrolled in a single course per semester incorporating design integration and study areas in design studies, professional studies, historical studies, technical studies, environmental studies and communication skills. Each year the design problems increase in complexity and duration set around an annual theme.

With 20 years of successful delivery of any program there are highlights and challenges along the way and this paper will discuss some of the successes and barriers experienced within the School of Architecture and Built Environment in delivering IPBL.

In addition, the reflective process investigates the currency of IPBL as an appropriate vehicle for delivering the curriculum in 2004 and any additional administrative or staff considerations required to enhance the continuing application of IPBL.

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Introduction

In 1984 the School of Architecture and Built Environment within the University of Newcastle (UoN), Australia introduced an integrated program based on real design projects and using Integrated Problem Based Learning (IPBL) as the teaching method.

Since 1984 there have been multiple changes arising from the expectations of the architectural fraternity, enrolling students, lecturers, available facilities, accreditation authorities and many others. These challenges have been successfully accommodated whilst maintaining the original purposes and principles of IPBL.

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Structure of Architecture at UoN

In 1984 the IPBL structure at Newcastle hoped to achieve a more integrated Architecture program in three respects (Maitland 1991):

1. *Integration of discipline areas, and in particular of technical and design areas;*
2. *Integration of the successive stages of the students' design processes, from initial data collection and analysis, through conceptual design to detailed technical resolution; and*
3. *Integration of staff inputs*

The problem based course was developed by building up a sequence of design problems of increasing scale and complexity through the first four years of the course, from the design of a single simple space in Year 1 through to the design of multiple-use developments in complex urban contexts in Year 4. At the same time a theme was adopted to link the problems of each year to a range of building types so that the student would be exposed to as full a range of types – each with its particular social, economic and cultural context – as possible. For each problem a 'real' client, familiar with that context, presents the problem to the students.

The above statement (Maitland 1991), detailing the structure and inherent philosophy of the Architecture program at UoN remains as true today as it was in 1984. There are minor changes in the administration, timetable and staffing, but intrinsically the overall structure remains the same. For example, the notion of the 'real' client in the modern day can be a 'real' or 'virtual' client when it is necessary to extend the clients' needs to meet the educational needs of the curriculum (Kingsland 2004). This enhancement reinforces the continuing preparation of projects for a 'real client', familiar with that context of the problem.

In order to more clearly explain the concept of IPBL within the School, the general thrust of the course is that a more traditional form of problem based learning is used in the early years transforming to a more comprehensive integrated learning form in the later years (Kingsland 1992). At this School known as Integrated Problem Based Learning (IPBL).

The programs continue to be structured around a theme for each year (Maitland 1991) with only minor name changes as follows:

Year 1	Problems of the Workplace
Year 2	Problems of the Home and Community (now Dwelling)
Year 3	Problems of Public Buildings
Year 4	Problems of the City (now Urban Space)
Year 5	Problems of Architectural Practice

Students are faced with problems of growing complexity and during in Years 1-4. In the final year, students elect their own areas of study to encompass research, design and technical resolution of a major architectural project or their own choice with the conclusion being an end of year public exhibition (Architecture 2002a).

The current structure for Study Areas is comprised firstly, of assessable modules and secondly, integration sessions. It is the second component; the integration sessions that support the reactive component of the timetable and is negotiated between academic staff relating to the design integration project in place at the time.

One educational change is the identification of student needs for stronger communications skill base earlier in the programs and greater emphasis on professional practice in later years (Architecture 2002b). This translates into all communications modules being delivered in Years 1-3 and all professional practice modules being delivered in Years 3-5 and integration sessions at other times to support design integration projects.

Staffing, both a success and a barrier

The delivery of IPBL is across all programs offered by the School, therefore, academic staffing is integral to this delivery. Within the School, the commitment of the academic staff to their ongoing professional development with respect to IPBL is exemplary. In a paper entitled the *Bibliography of Professional and Continuing Education Publications,* the Head of Discipline, Arthur Kingsland, lists 117 publications by members of the School over a 10 year period (Kingsland 1998) and even this list, while extensive, is not complete. This is evidence of the commitment of the academic staff to IPBL through practice, research and publications.

While the above celebrates the successful professional development of the staff, this very success leaves an enormous void when academic staff leave or retire. This was the situation over the last five years when a group of senior academic staff retired after many years of service. There is a certain period of flux that follows and while this initially can present a barrier, it can also be turned into a success when new staff arrive and begin their own professional endeavours within the School.

There is a need to develop a process of enculturation to assist staff to understand and be familiar with the ethos of the School and the delivery of IPBL. With any enculturation process there is a need to recognise the background experiences and qualifications of all new staff. An excellent model of recognition is documented in *Raising the Standards* (Commonwealth Department of Education Science & Training 2002). This model investigated the development of an ICT Competency Framework for Teachers and identified five groups. The following is an adaptation of that model to reflect the School IPBL environment:

- New academics
- Practicing academics who are new to IPBL

- Practicing academics who are experienced in IPBL
- School leaders
- Academic educators

One invaluable resource available at this School is the wealth of knowledge available to new staff through the collection of articles published from this School. This professional development process and the resulting collection is an asset in this situation and would be valuable across a range of teaching methods and disciplines.

Change in response to environment

Problem-based learning comes under scrutiny in the same way as any other teaching and learning methodology would be scrutinised (Glasgow 1997). All stakeholders, students, teachers, parents and administrators will have a scale of assessing and evaluating the program as to its validity in meeting their expectations. This is no different at UoN and the Architecture programs are formally reviewed by the university itself and by the professional body, the Royal Australian Institute of Architects, with student feedback from questionnaires and forums. It is a credit to the program, teaching method, staff and students that the number of changes over 20 years is minor and with the main components remaining in place.

The Architecture program has a combined two-degree structure consisting of a first degree, Bachelor of Science (Architecture), followed by a second degree, Bachelor of Architecture. The program is designed to simulate the problem-solving situations that face a working architect in every day practice.

There are several administrative changes in the form of Study Areas, a move to semesters and the timetable.

Across the UoN the majority of programs offer courses of 10 units. All programs within the School use IPBL as a teaching method. Within Architecture, the programs contain courses each worth 40 units. Students enrol in one course each semester, ten courses of 40 units each make up the five years of the Architecture programs, and within the 40 unit course there are 4, 10 unit components comprised of study areas and design integration.

Originally there were 12 study areas in the program in 1984. These areas were consolidated under 6 study areas for several reasons (Architecture 2002b). Firstly, to define the focus of the Architecture program here at Newcastle and secondly as a method of establishing a more identifiable internal structure more easily compared with the other programs on offer across UoN, while maintaining the original 40 unit course.

UoN moved to semester based student administration software and that required a change from offering year long course to offering semester based courses. While difficult for the self directed 5th year, where students spent a year completing a selected project, the discipline met the administrative challenge to move to semesters without compromising the learning opportunities nor the integrity of the programs and especially the culminating year of the program. This is achieved by enrolling in two courses, Part A and Part B, with student results at the end of Part B.

Historically, the timetable in Architecture could be described as fluid, flexible and reactive. It is noteworthy that the fluid timetable was proactive to opportunities in the community and reactive to needs of the students with students expected to be available at any time.

A UoN structured room timetabling, multiplicity of tasks undertaken by staff and the growing complexity of students' commitments, other than study, place real restrictions on a proactive and reactive timetable and have required a semi structured timetable to be developed. Architecture, while structuring certain components of the programs, continues to maintain certain flexibility to proactively seek opportunities from the community and the profession for the educational benefit of the students.

In preparing for review later this year, the School will undergo a process of reflection, mapping assessment items against course objectives and then against program objects and upwards to the level of accreditation authorities skills and attributes. This process can question, reinforce or highlight the need for change, however, it can be healthy and cathartic and is necessary in order to retain credibility with stakeholders and meet the quality assurance aspect required by this institution.

PBL as a method of delivery

The reflective process of this paper investigates the currency of IPBL as an appropriate vehicle for delivering the curriculum in 2004 and any additional administrative or staff considerations required to enhance the continuing application of IPBL.

As stated by Biggs, delivery of a teaching program by PBL is *"predicting, diagnosing, explaining, and/or problem solving in novel or nontextbook situations is precisely what professional persons have to do, and is therefore what professional educators should aim to get their students to do* (Biggs 1995). This statement symbolises the programs delivered within this School. When writing a course, module or assessment task, the purpose is to "*build on such performances of understanding"* and it is incumbent upon the educator to facilitate this.

The current delivery style for Study Areas is comprised firstly, of assessable modules and secondly, integration sessions. It is the second component; the integration sessions that provides the reactive component of the timetable and is negotiated between Course Coordinators and Study Area Consultants relating to the design integration project.

One educational change is the identification of student needs for stronger communications skill base earlier in the programs and greater emphasis on professional practice in later years (Architecture 2002b). This translates into all communications modules being delivered in Years 1-3 and all professional practice modules being delivered in Years 3-5 and integration sessions at other times to support design integration projects.

Facilities – the Design Studio

At UoN, in an era where facilities are stretched, there is a waiting list for student places and the *Teaching and Learning Management Action Plan* (Newcastle 2004) is to "*promote multi-disciplinary approaches to teaching and learning*", the School continues to provide students within the Architecture programs with individually designated studio space. The Design Studio is a major component of the program and continues to offer students 24 hour a day access, 7 days a week, with the provision of drawing boards, desk space and ergonomic drafting chairs for each student. Through new building works the School will extend the Design Studio to incorporate space for Industrial Design and Architecture students in 2005.

As reinforced by Heylighen, the Design Studio completes the educational gap that exists between traditional education and professional practice (Heylighen 2002). The Design Studio

further supports the notion that from day one, a student is, in effect, working as an architect within a design environment supported by experienced and professional architects (design tutors). Further, Heilighen, in quoting Winnicot (1971) extends the idea that the Design Studio is "*rooted within the craft system of the medieval guilds"* and that it offers students a transitory space on their way to real practice.

Reflecting over the 20 year period and projecting into the near future, the Design Studio will remain a strong feature of the Architectural programs at UoN.

Assessment

Assessment within IPBL is of itself problematic. There are three aspects of assessment being discussed at the School today.

The first aspect is that the stakeholders comfortable with assessment as a traditional component of education. It is a requirement of accreditation, evaluation of the performance of the program and to measure the progress of students. This also involves the mechanisms for students to appeal grades and the need to continue to maintain high academic rigour throughout the programs.

The second aspect is the concern by academic staff that the level of documentation involved and scrutiny placed upon the process of assessment may stifle or even deter the creative achievement inherent within IPBL. Further that assessment as an extrinsic motivator will inhibit the generative stages of the creative process and interfere with the problem solving and may restrict and individual to do what is required, and no more (Wynder 2001; Heylighen 2002). And, another cautionary note is that "*there is a tendency to focus on achievement of a solution at the expense of other parts of the creative problem solving process"* and that this focus may reflect poorly on student grades.

The third aspect is the concept of "unintended outcomes". Biggs talks about "missing the jade" (Biggs 1995). In other words when assessment is exclusively tied to objectives then who will assess the unintended outcomes and or will they be ignored because the right questions, in the form of objectives, were not asked.

Investigation of assessment and the above questions will inform and be part of a pilot assessment project in Semester 2, 2005.

Conclusion

In reflection, the initial program structure and philosophy for the Architectural programs designed in 1984 remain strongly evident in the School and program structure 2004. The incredible collection of publications by the School is a credit to the environment and leadership that supports these endeavours and is a stimulus to the production of this paper as a professional development for the author and an historical record of a 20 year period. Finally, the reflective process continues the evolution of a program as it can reinforce best practice and worthwhile components as well as identify areas at risk or in need of further development.

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