



Higher Education Research and Development Society of Australasia, Inc

Critical Visions

Thinking, learning and researching in higher education

Proceedings of the

29th HERDSA Annual Conference

10-12 July 2006

Perth, Western Australia

Sodersten, K. & Rice, S. (2006) Learning with failing students: Putting thoughts into actions, in *Critical Visions, Proceedings of the 29th HERDSA Annual Conference, Western Australia, 10-12 July 2006: pp 347-356*.

Published 2006 by the
Higher Education Research and Development Society of Australasia, Inc
PO Box 27, Milperra, NSW 2214, Australia
www.herdsa.org.au

ISSN: 0155 6223
ISBN: 0 908557 69 8

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Learning with failing students: Putting thoughts into actions

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Abstract: Between 2003 and 2005, in teaching the third year of a new undergraduate curriculum in architecture, we noticed some surprising events. The first was that every year in semester one a significant number of previously passing students was now failing their core design course. What had gone wrong for them? To answer the problem we instituted from 2003 a short remedial 'Winter School' program for these students, held between semester one and two. This mirrored the student-centred regular subject in all ways except one – it was run as an intensive block rather than weekly. Following the successful completion of 'Winter School', these students took the same semester two program as other students. We then noticed these students' semester two results were generally higher than students who had gained pass grades in semester one. What had now gone right?

In addressing these questions, we focused on the design process as a significant factor in improving the participating students' learning in design. The 'Winter School' experience formed a lens through which we have used an interpretative auto-ethnographic and critically reflective approach to inquire into our students' learning in the design process and our teaching. We have identified as 'critical actions' key aspects of a designing model based on the reflective practice and experiential learning models underpinning our design curriculum. The outcomes of our study have implications for learning and teaching in our own discipline, may be of interest in other disciplines using similar learning models and suggest areas for further research.

Keywords: reflective practice, learning from experience, critical actions

Introduction

In 2003, at the end of semester one in the final year of a first undergraduate degree in architecture, we were faced with student results that shook us. Out of a class of eighty-four, eleven previously passing students were now failing their core subject in design. These students had failed their design project, the main assessment task. We responded by implementing a remedial program for these students, which we called Winter School, held following semester one. Students who passed Winter School could progress to the semester two design subject with the rest of the year, who had passed outright.

In 2004, and again in 2005, we were faced with similar results. A similar proportion of students each year failed the design project in semester one, potentially the full design subject, and the year. In response we continued and refined the remedial 'Winter School'.

In 2003, we noticed that all students who had successfully completed Winter School passed the design subject in semester two, and some very well. In 2004 and 2005 we noticed similar

outcomes. Having run Winter School over three consecutive years, we began to take note of these patterns. This led us to critically reflect on our own and our students' learning and teaching experiences in these three years of Winter School, to understand if it had been successful in helping students learn design, and if so, to suggest some reasons why. In this paper we tell the story of our reflection.

The curriculum context

We were shaken by these results for two key reasons. In 2003 the failing students were part of the first cohort to complete a new three-year curriculum. Being successful in the previous year's subject, we assumed they would continue similarly, as the subjects were progressive. Also, they were now failing in the core area, the heart of professional architectural practice.

The curriculum was guided by student-centred learning principles and practices (Prosser and Trigwell 1999). It was informed by studies on experiential learning (Boud 1993), evaluation and cognition (Bloom 1981), situated learning (Lave and Wenger 1991), reflective practice (Moon 1999, Schön 1983) and the experiential models of learning (Kolb 1984, Lewin 1948) that reflected models of the design process. It focused on this process in the studio, in small interactive groups of sixteen plus a studio-teacher, working actively on a design project. Our non-didactic approach aimed to encourage staff and students to actively engage in collaborative learning, and stimulate independent learning by developing challenging design projects relating the design process to their future professional life, and by assessment requirements encouraging them to use critical reflection to understand their own design processes and learning. Students also participated in assessment.

However some aspect of our learning models seemed to be ineffective for some students. Boud (Boud, Keogh and Walker 1984) suggests emotional barriers as possible causes and Jarvis (1994) proposes three useful models why people do not learn practical knowledge from experience: 'presumption', 'non-consideration' and 'rejection'. These seemed relevant, but did not show us what to do. The literature on transferable skills suggests other reasons why these students were failing to learn (Assiter 1995, 1993), however in this paper we will focus on the learning models previously described as influencing our teaching and learning approach and curriculum design.

While realizing that there could be a number of influences affecting our students learning, these coalesced around the process of designing and we decided to focus on this as central to learning. Successful designing in architecture is complex, requiring discovery and identification of key issues involved, implicit and explicit. It is creative physical embodiment of a 'whole', demonstrating an understanding of these issues and their relationships.

The Winter School program

This was an 'intensive', held over one five-day week following semester one. It ran for six hours per day, with one studio teacher for the group of between eight and seventeen students (see Figure 1). In overall approach to learning and teaching, in content, group size and structure, number of hours per day, and assessment, Winter School mirrored the regular design studio and the main assessment design project task. Over five consecutive days students developed a design project working with the studio teacher. This enabled us to continuously observe and interact with students as they designed. The assessment was by individual presentations by the students to their peers in the group and to us, of their design

proposals, in the form of drawings and models. The assessment grade was ‘satisfactory’, ‘not-satisfactory’. Our roles in the program were cooperative, one being the ‘coordinator’ monitoring the progress of the program, and the other being the studio teacher working continually *with* the students, as discerning coach, facilitator, and mentor.

The Winter School differed from the regular studio of the design subject in one substantive way – it was run as an intensive. The regular studio, also for six hours per day, was held weekly over the semester. While these ‘regular’ students were expected to do their design work on the studio days, and discuss it with their studio teacher and peers, we noticed that this regular structure often produced ‘outcomes’, pieces of designed work, rather than processes to work with.

Winter School students’ results indicate improved learning

Our examination of students’ results in semester two suggested that former Winter School students improved their design learning more than pass level students. The assessment identified five qualitatively different bands of understanding in design, informed by Biggs (1999, 1992): outright fail, resubmission (Winter School), pass level and two higher merit grades. A qualitative shift in learning therefore could be identified through a change in assessed grade.

Numbers of students who both passed Winter School and completed semester two were as in the following table.

Year	Number of students in class for Semester 1	Potentially failing students at end Semester 1	Students who failed outright in Semester 1	Students who passed both Winter School & design in Semester 2
2003	83	11	3 (0 failed WS)	8
2004	103	19	2 (0 failed WS)	13 (4 suspended study)
2005	110	20	6 (2 failed WS)	13 (1 suspended study)

Figure 1: Student numbers in Winter School and who passed both Winter School and the design subject in Semester 2

Comparing 2003, 2004 and 2005 results of pass level students with those who both passed Winter School and completed the semester two design subject, we found Winter School students increased grades by an average of more than 1.5 full grades, whereas the control group of pass students increased by just over 0.5 of a full grade. In the following diagrams note the increased numbers of Winter School students who improved grades in 2005 compared with 2003, our first year.

The following diagrams show the increase in grades for each of the three cohorts separately. Combining the results for the three cohorts, the increase in grades for the Winter School group (N=34) was compared with the increase in grades for the control group (N=74). Using the statistical tools included in Excel, both a t-test assuming unequal variances, and a z-test using the actual variances of the groups, indicated that the difference was highly significant ($p < .01$).

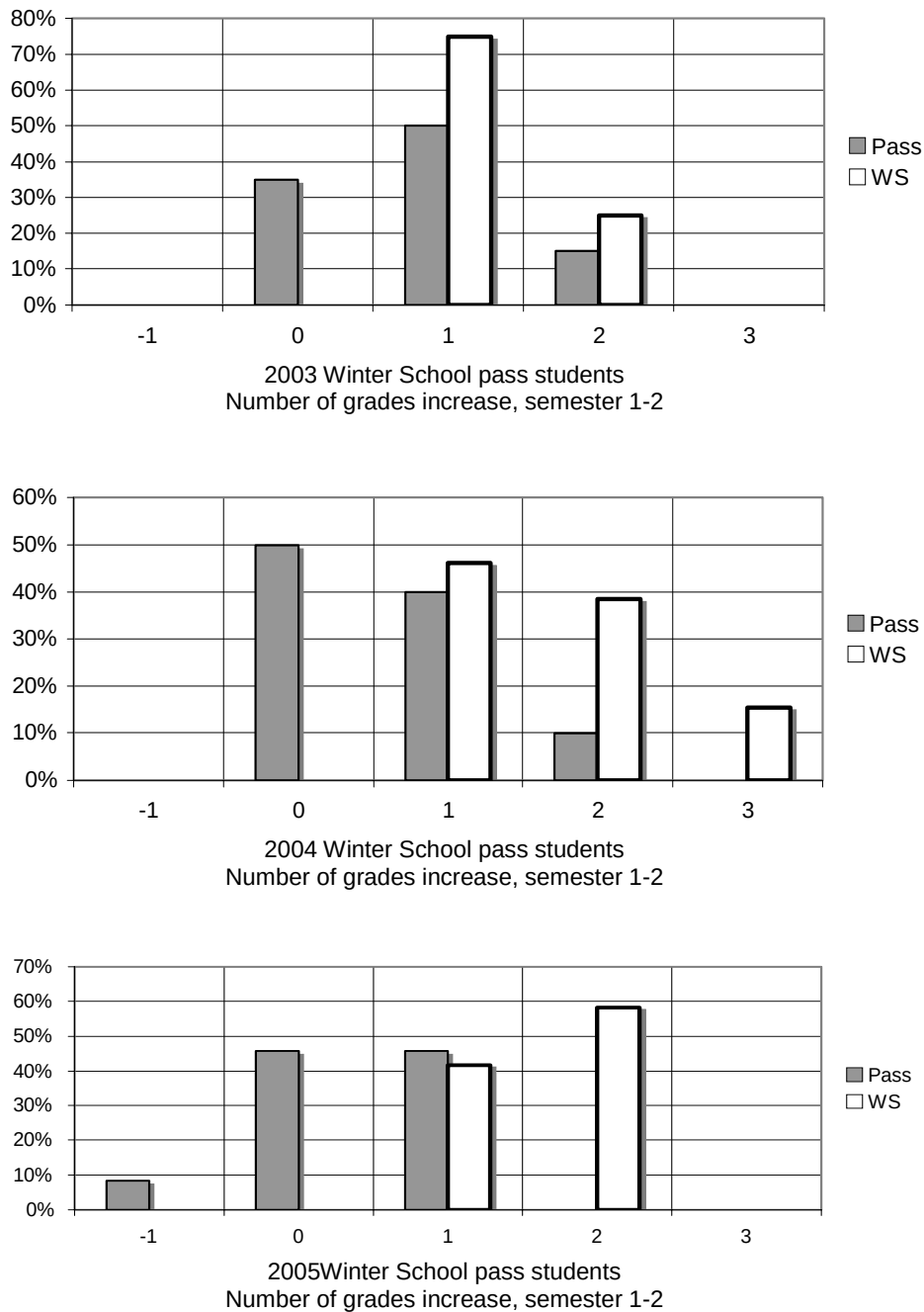


Figure 2: Changes in grades for Winter School students who completed design in Semester 2

Methodology used in our inquiry

In inquiring into the reasons why the Winter School seemed to be more effective for design learning than the regular studio, we have used a qualitative, interpretative, auto-ethnographic approach, and critical reflection. There are several problems generally associated with these approaches to educational research, including issues of validity and reliability, missing tacit aspects, comparability and translatability ('generalisability') (Cohen, Manion and Morrison 2000). We have aimed to address some of these by examining repeated Winter School experience over three years, using student comments on their experiences (written) as well as our own records and observations as data, and peer discussion. The lenses that we have used for our critical reflection, mirror those identified by Brookfield (1995): individual

autobiographical experience, our students written experiences, peer discussion, and theoretical literature.

Problems with the reflective practice and the experiential learning cycle as models for design learning

A number of educational theories and approaches refer to reflection but may all be viewed as cyclic models of reflection on experience (Bright 1996). The phenomenographic perspective on learning (Marton and Booth 1997) and Kolb's (1984) approach explicitly refer to the importance of experience in learning. However all these approaches can be seen as variations on Kurt Lewin's (1948) model. In this four stage reflective cycle or experiential learning model, Lewin proposed *concrete experience* was followed by *observations* and reflections, followed by formation of *abstract concepts and generalizations* then testing *new understandings*. This informed Schön's suggested designing model (1983): *activity*, followed by *recognition*, followed by *decision*, followed by *adjustment*. What is interesting is that while action is implied as essential (a 'process'), the nature of the actions that move the 'experiencer' through these cycles is not made explicit.

An ability to evaluate (Bloom, Madaus and Hastings 1981) would seem to be important to effectively move through the 'stages' of the reflective cycle and of experiential learning. The development of effective evaluative skills is rarely discussed in the literature. While various proposals have been put forward to develop reflective design skills in architectural education, particularly in the design studio (Schön 1983), the actions and evaluative skills they require are *implicit*, with Schön stating that such skills cannot be taught. Educational literature strongly suggests however that such skills may be developed explicitly, without stating what they are. Jarvis (1994) develops interesting learning models addressing the learning of 'practical knowledge' through experience.

Why the Winter School worked so well

On completion of the Winter School in 2004 and 2005 we asked students for written feedback on what it was about the program that helped them in their design learning and why, and what could be improved and why, for our own reflection. These were the only two questions asked. All students in 2004 responded (100%) and 70% of the group in 2005 responded. Their responses uncovered a wide range of contributing factors such as conscious focus on developing confidence, supportive nature of their participating peers, peer discussion, studio teacher actively working alongside the students, compressed time-frame, focusing on developing the ability to judge, emphasis on being productive and not wasting time, being offered encouragement and space to reflect on their decisions, making explicit issues of work and time management, having their opinions sought and valued, working extensively with small expressive models, timely and appropriate demonstrations of drawing techniques. Improvements were minor and focused on developing these same points.

Focus on doing

Critically reflecting on our experiences in architectural design teaching has led us to the opinion that it was the deliberate focusing of the design studio on the 'actions' associated with or 'doing' of design which was a key contributor to the studio's success in improving students' learning. The students supported this view as they frequently referred in their

comments to the design process, designing, progressing or developing a design, all terms associated with various forms of 'doing'.

Looking at the process, progress not just final outcome was helpful.

Pursuing and developing an idea to its full extent

Was able to learn how to approach things differently when designing, how to relax things more during design – able to get more insight into aspects of the design.

Suggestions of good architectural practice and progress were helpful.

The round table meeting at the end of each day was very useful as the group was able to show their progress ..

Both Sue and Kristines's input and gentle prodding was successful and helped me progress both my design and my entire designing process.

The emphasis on drawing and model making was excellent – it helped me to put all my thoughts into actions and develop the scheme in more detail.

Student comments (anon) Winter School 2004, 2005)

The how and the what of designing

Considerable emphasis is given to teaching students about *what* they are designing, that is the architectural content, the character and components of their schemes. In contrast teaching and learning about *how* to design, that is the process or the way a designer progresses their architectural thinking from one thought to the next is much less clear yet obviously of no less importance and there is an observed need for improvement in teaching in this area. (Rice 2004). It seemed that if we could make explicit and teachable the sorts of activities or actions associated with progressing a design then this would be of benefit to architectural students. (Sodersten 2003)

The window of the Winter School, with both the students and ourselves there for the whole project, provided us with valuable insights on the way students worked through all of the stages and the activities of their designing. We were able to gain insights on two further questions raised through the Winter School: what are these actions that seem to be critical for students to grasp, and how can we teach the actions associated with designing and at a more fundamental level?

Cycles of the experiences of design learning

Attempting to address these questions led us to suggest a general model of the cycles of experiencing design learning which gives due recognition to both the *how* and the *what* of the experience of learning to design. This model is loosely based on Kolb (1984), Schon (1983) and Lewin's (1948) experiential learning model and also draws on the phenomenographic perspective on learning. (Marton and Booth 1997)

The overall model form suggests that the experience of learning to design is an unending cyclical process, looping back on itself in order to progress. Interestingly one of the Winter School students has picked up on this, unaware of our model, and has identified this insight into the nature of designing to be one of the helpful aspects to come out of the Winter School experience.

Suggestion of good architectural practice → idea *lll* final instead of...
 and progress. idea (linear) → final.

Figure 3: Extract from student feedback sheet (anon), Winter School 2004

The following diagram represents the cyclical nature of the model with the ovals used to indicate the stages of designing, the *what*, and the arrows indicating the *how*, that is the actions critical in progressing from one stage to the next. The model is not intended as a design recipe or methodology but rather a way of representing the interconnected relationship between what is being designed and how it can be brought into action. A more detailed description of the stages is included under the next heading.

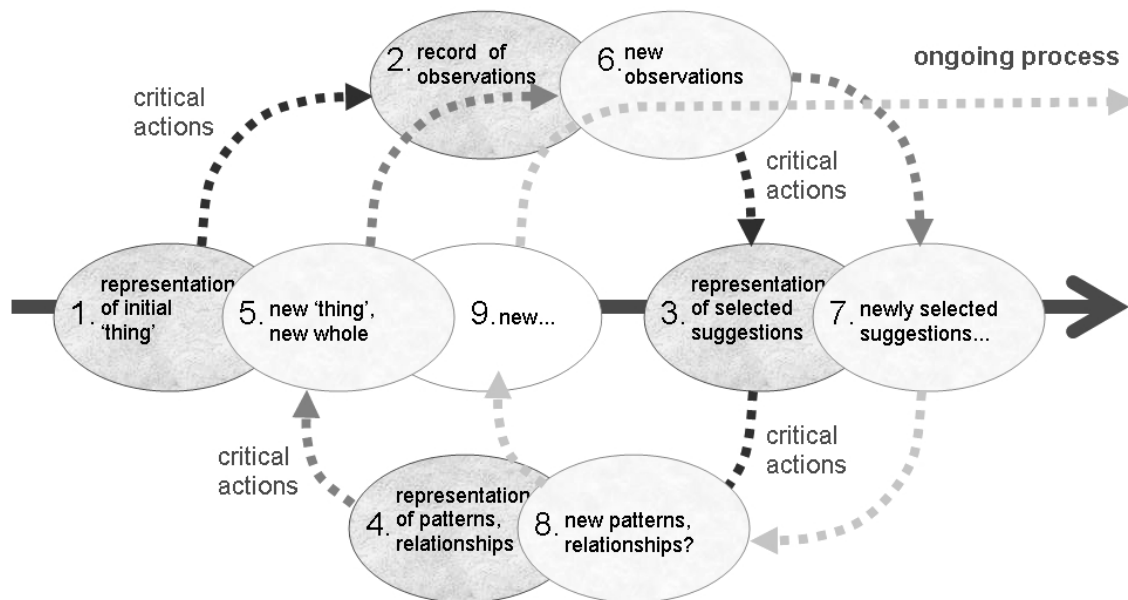


Figure 4: Cycles of designing
 (Source – Authors)

Identifying critical actions

We have been able to develop the general model in our example so we can suggest each of the ‘critical actions’ that are associated with progressing from one stage to the next. We have also gained a clearer understanding of each stage, as set out in the diagram below

The following sets out what we have identified as forming the designing stages in our example. It outlines the critical actions leading from one stage to another, including any techniques supporting learning, its associated learning aim, and who is involved.

Design stage 1 – Initial representation: Model of initial ‘thing’ (a whole).

The students made a quick response, in a short time frame. Students made small physical models to represent this ‘whole’ response to themselves and to others.

The models became crucial devices in reflecting the designs' pros and cons and where we could improve on. (anon WS student 2004)

Critical actions between design stages 1 and 2: How to observe

Students were asked what a particular student's model suggested to them, commenting on what they noticed. All were encouraged to comment. Observations were to be non-judgmental. As students commented on another's work, both 'author' and teacher remained silent, listening to what others observed.

Letting the students and tutors do the talking and interpreting of my scheme by looking at the model, so certain aspects become apparent to me. (anon WS student 2005)

Design stage 2 – Record of observations

The students recorded the observations of others and then included their own.

Other students in the winter school were really helpful. They gave good feedback. (anon WS student 2004)

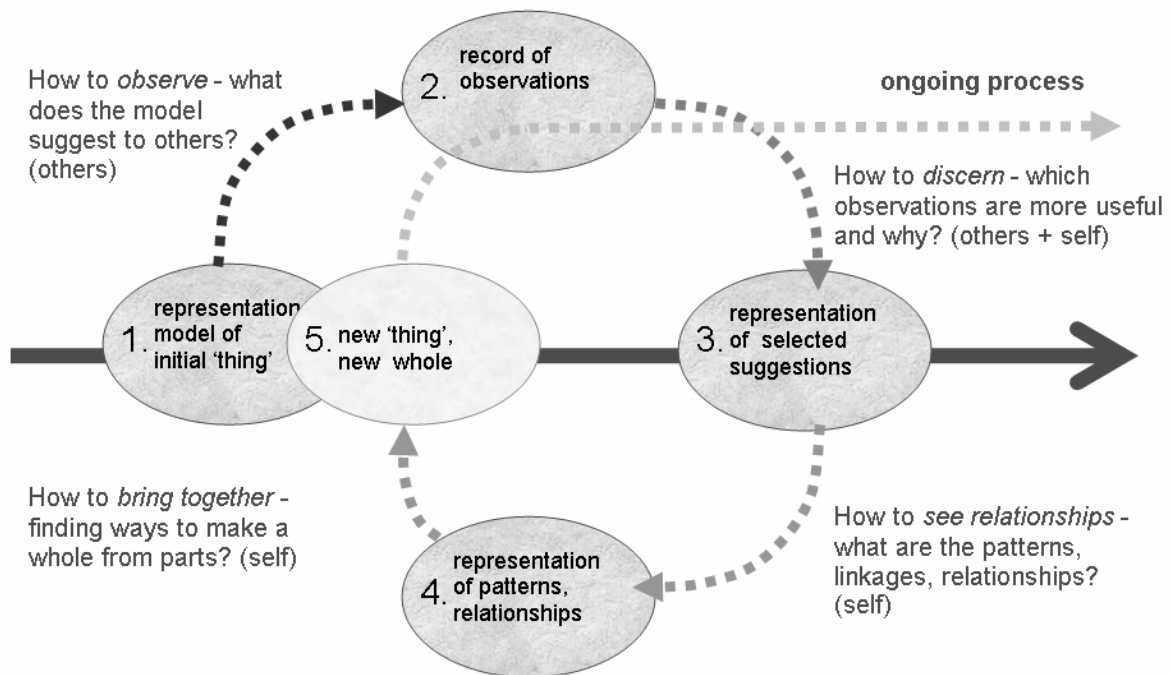


Figure 5: Critical actions in a designing cycle – an example
(Source – Authors)

Critical actions between design stages 2 and 3: How to

Students tried to discern which observations were more useful in their work than others, and why. The studio teacher responded to the discernment of what it was he/she was trying to do.

Design stage 3 – Representation of selected suggestions

The students gave an expression to the suggestions they had selected as being useful through either drawings or physical models. Students now had a palette of inputs, reinterpreted in their own way

Critical actions between design stages 2 and 3: How to see relationships

Students looked for any patterns or linkages between the suggestions they had selected as being useful. This developed their ability to see relationships or make connections. The studio teacher sometimes needed to demonstrate ways of doing this.

Design stage 4 – Representation of patterns, relationships

Students needed to give a physical form to insights or abstract understandings of patterns or connections. This helped students to start to generate alternative physical forms, leading into the issues of ordering and organizing.

Critical actions between stages 4 and 5: how to bring together

Students found ways to make a new whole from the parts, applying a sense of ordering and organization. Many needed to develop strategies to do this. This was the hardest time for the studio teacher as we needed to be focused on what the student was trying to do as opposed to what we thought should be done.

Design stage 5 – A new whole is represented

Students made a new whole ‘thing’ based on their changed understanding arising from their own and others’ observations of their initial responses.

Progress was demonstrated by the difference between this representation and the first. The teaching emphasis was on the whole, not parts and the students needed to be made aware that the process continued.

Conclusion

Our reflection on the outcomes of the Winter School program has brought to light significant insights into the experience of learning and teaching about designing. We have suggested that identifying the implications of ‘critical actions’, not only key stages in designing, explicitly facilitates learning in design through experiential learning and reflective models. This has implications for our own face-to-face teaching and curriculum design, for our discipline area of architecture, and may be significant for other disciplines that use reflective practice and experiential models of learning. Further studies on the issues associated with transferable skills may provide us with additional ways of understanding why Winter School was successful in improving our students’ learning in design, and our own.



Figure 6: Design students in discussion, 2004
(Source – Author)

Acknowledgements

This paper was prepared with the support of Simon Barrie, Institute for Teaching and Learning, University of Sydney and Terry Purcell, Faculty of Architecture, University of Sydney. We would like to thank Peter Smith for his excellent assistance with the statistical data. We would also like to thank our reviewers for their suggestions.

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