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Sustainable Design Education:  
Teaching, Learning and Assessment in Collaborative Group Design Projects

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ABSTRACT: Changes in the funding of tertiary education resulting in less one-to-one staff/student contact time mean that we cannot continue to teach as we have historically been taught. If design schools are unable to implement strategies that successfully overcome resource intensive studio teaching programs, then current architectural education may for many higher education providers be based on an unsustainable course structure. Rather than spreading their time thinly over a large number of individual projects, an increasing number of lecturers are setting group projects. This allows them to co-ordinate longer and more in-depth review sessions on a smaller number of assignments. However, while the group model may reflect the realities of the design process in practice, the approach is not without shortcomings as a teaching archetype for the assessment of individual skill competencies. Hence, what is clear is the need for a readily adoptable andragogy for the teaching and assessment of group design projects.

The following describes the background, methodology and early results of a Strategic Teaching and Learning Grant currently running at the School of Architecture and Building at Deakin University. The project is evaluating two design programs at Deakin and it is envisaged that the results of the investigation may inform other project-based teaching disciplines experiencing a similar need for new knowledge and skill-based delivery due to increasing staff-student ratios.

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INTRODUCTION

Studio teaching at Deakin five years ago still followed a traditional resource intensive model. Studio occupied for most year groups during the three-year first degree one and a half days of the weekly timetable; this being one six-hour session and one three-hour afternoon session. Four tutors, comprising two full-time staff and two sessional staff sourced from professional practice, offered between eighty and a hundred students a total of thirty hours of tuition per week. This allowed all students around twenty minutes of one-to-one tuition per week. In 2000 there were only two major group design projects in the five-year architecture programme at Deakin. In 2004, due to increasing budget restrictions, studio had been reduced to five hours per week taught by one full-time unit co-ordinator partnered by one sessional tutor. This allowed each student around seven minutes of one-to-one tuition per week. In 2004 the number of group design projects at Deakin had jumped to six. The adjustments that were made to the teaching of design to the third year cohort in response to these time and staffing restrictions and to the findings of the Strategic Teaching and Learning Grant (STALG) project will be described in the body of this paper. At the time of writing, under unassailable resource restrictions and increasing pressure to conform to the demands made on students by all other one-credit units (which is all units bar second semester 5th year design, which is worth two credit points) design teaching at Deakin has finally been brought in line with the teaching of all other subjects. Thus, design units will now take up no more than ten hours per week of student time, which includes lectures, tutorials and independent study. Studio will be restricted therefore to three hours per week, meaning that students will no longer have access to one-to-one tuition. Studio will instead merely provide a forum for large groups of around fifteen to twenty students at a time to discuss with a tutor the development of design solutions evaluated and advanced in response not to specific questions relating to one particular student’s work, but rather to issues that are common to the group. This model is in distinct contrast with the traditional paradigm of the teacher-centred transmission model of knowledge (i.e., transfer of knowledge from tutor to student), opening instead the opportunity for greater dialogue between students (i.e., transfer of hypothesised knowledge from student to student). This dramatic shift against a studio tutorial-centred programme will have to be accompanied by a teaching and learning paradigm shift and by a shift too in the expectations of students. The implications of these shifts to design teaching at Deakin, and hence perhaps to schools throughout Australasia, will be considered in the conclusion to this paper.

Questionnaires received as part of the STALG funded project from unit co-ordinators of design studios taught at universities across Australasia and the United Kingdom echo the trends described above at Deakin, and underline that those now teaching design were taught in a funding climate far removed from the budget restrictions of today.
The recollections of design teachers suggest that most had access to "over-the-shoulder" one-to-one tuition for between forty-five to sixty-minutes per week, although many, especially the more senior educators, speak of access to design teachers being limited largely by the needs of students rather than the availability of design staff. Group projects were few and far between for respondents, with an average of one or two across an entire two-degree architectural programme. The data collected describes quite a different picture for present day design education, with average one-to-one contact time across more than a dozen schools of around fifteen minutes per student per week (respondents were from, in Australasia: Auckland University, Canberra University, Charles Darwin University, Newcastle University, Queensland University of Technology, University of Tasmania, and in the United Kingdom: Bath University, Leeds University, Napier University, Sheffield University, Plymouth University, University College London and the University of the West of England). Group design projects are now a widespread teaching model in these institutions, with on average about 15-20% of all projects across all year cohorts being designed collaboratively. Leonie Milliner, the RIBA Director of Education, is clear about what she sees as the causes of shrinking staff/student contact time in British architectural education (Milliner 2003:2).

With the current pressure on resources, (our statistics show that the number of staff in schools has declined by 30% since 1998, and those remaining are under increased pressure to undertake research and a greater share of administration), nothing is left unchallenged. Hot desking, decreasing space, working from home, increased use of IT, diminishing staff contact, the consequences of student debt in terms of time available for study, all eat away at our preconceived notions of what a studio is, and require those on the ground to be ever more creative about how, where and when to teach design.

Thus it would seem that the atelier studio system, underpinned by an apprentice/master transmission model of knowledge, is not sustainable for a large number of lecturers who can clearly no longer teach design as they themselves have been taught it. Let us examine now how two programmes at Deakin are adapting to these dramatic changes in the resources allocated to design teaching by developing innovative assessment and student-centred teaching models for group design projects.

1. STRATEGIC TEACHING AND LEARNING

Members of Deakin School of Architecture and Building were named in late 2004 as recipients of a Strategic Teaching and Learning Grant aimed at "Establishing Best-Practice Principles for the Teaching of Group Design Projects." The STALG funded project is evaluating the third-year Atelier Geelong studio and the fourth-year Urbanheart Design Research Forum - and it is hoped that the findings will inform an andragogical framework that at present does not exist for design teaching. It is envisaged that the results of the investigation may also inform other project-based teaching disciplines experiencing a similar need for new knowledge and skill-based delivery due to increasing staff-student ratios. The STALG project addresses its principal research questions through three forms of evaluation: formative evaluation through questionnaires, summative evaluation through reflective folio assessment and analysis, and illuminative evaluation through focus group discussions, observation of tutorials and analysis of student work. The outcome of the research primarily focuses on results that can be measured in student achievement as reflected in four indicators including grades and graduate outcomes, satisfaction as reflected in student evaluations, knowledge and skills gained through the measure of student design projects, and the effect of the make-up and selection of groups on the decision making processes as assessed by studio observation and informed by the results of Myers-Briggs based personality type-testing. An additional focus of the Deakin research addresses the largely overlooked question of assessment. In the experience of design teachers at Deakin, the issue of 'fair' assessment is one of great concern to academics and students alike in team design projects – the success of which often hinges on students' perceptions of assessment reflecting their comparative performance within a team. The project, therefore, is implementing and evaluating on-line peer-assessment methods - the process by which groups of individuals rate their peers (Falchikov 1995) - that are being developed to allow students to assess one another's performance in a group within the secure and anonymous environment of a web portal.

Two cohorts were closely observed in group design projects with highly contrasting programs and structures. In the 2005 third-year studio Atelier Geelong, teams of five were observed, compared to teams of three in 2003 and in teams of six and seven in 2004. The 2005 fourth-year Urbanheart studio forms a comparable cohort that operated a number of two, three, and four-person group projects. Nine teams in Atelier Geelong and Urbanheart were observed to evaluate communication between students in the studio using an observation template that recorded contribution. Sections 2 and 3 of this paper will précis the evolution of these two group design projects, and section 4 will focus on an analysis of the early data collected – which at the time of writing is restricted to the Atelier project.

2. URBANHEART DESIGN RESEARCH FORUM

2.1 Background

Recognizing the pressure of current UK government policy "to make the two final years of the five year course more definitively post graduate,... Peter Blundell Jones, Alan Williams and Jo Lintonbon at the School of Architectural Studies, Sheffield University, followed the lead of John Tuomey and Shelley McNamara from University College, Dublin, to incorporate "studio teaching with real research on the city and its history" (Jones et al 1999; p.235). Around the same time that Sheffield commenced its history studio program, the School of Architecture and Building at Deakin University began developing an integrated design research forum. Referred to as the 'Urban Heart Surgery' (Rollo 2002), the program borrowed from Professor Dean Hawkes's notion of "speculative teaching... where studio work is collected over a period of time and then represented in a way that it contributes to the development of a discourse" (Hawkes 1995, p11). Rather than constituting a post rationalisation of a given body of work, the unit chair of Urbanheart believed that if the student cohort were deployed as a single collaborative body, and rigor was applied
to coordinating the design program, the studio system could offer an excellent means for explorative and innovative grouped-based thinking. Hence students would be empowered with a collective sense of purpose and identity driven by a need to produce tangible design research outcomes for local governments in both metropolitan and regional centres.

Taking into consideration the writings of authors on studio teaching such as Thomas Dutton (1991), and attempting to address conventional studio organisational issues such as: ‘hierarchy’; ‘competition’; ‘teacher-centred experience’; and a reluctance to question ‘assumptions’ or critically analyse (Dutton 1991:171-174), the decision was taken to blend an atelier model with a laboratory oriented culture. Hence, drawing on professional models such as ‘clinical research’, from Medicine and the Health Sciences - where the processes of observation, investigation and exploration are conducted in-situ by the ‘practitioner-as-researcher’ (Chenail and Maione 1997) - a more directed approach was adopted. Working with contemporary regional and metropolitan issues within a collaborative working environment the aim of the program is for each student team, or design/research collaborative, to identify and analyse various factors that make up a precinct’s existing conditions, and to develop a range of generic planning strategies and design proposals that address predetermined issues and parameters. Developed with local planning authorities prior to the commencement of the semester, these issues often involve the consolidation of suburban sprawl, the resolution of areas of discontinuity, or the development of options for stimulating urban renewal, with constraints involving demographic and socio-economic issues such as significant versus limited population growth, or diverse versus narrow socio-economic profile.

The student teams are first introduced to urban design as a multi-disciplinary process involving a wide range of stakeholders both within a municipality and across adjacent precincts. They are also made aware that urban design not only involves thinking about opportunities and visions at all scales, but in particular that their decisions have implications and consequences both now and long term. By treating study areas with varying levels of objectivity the aim of the forum is not to resolve a ‘finite’, ‘optimum’ or ‘ideal’ solution, but to identify collectively a broad range of opportunities.

2.2 Teaching and delivery of the unit

The design research forum differs from a conventional studio in both programme structure and method of tutoring. Many conventional studios operate largely on an ad-hoc principle. While students are allowed to pursue individual initiatives irrespective of their peers, convergence of thought (Guilford 1967) and ‘design fixation’ (Jansson, Smith, 1991, Purcell, Gero, Edwards, Matka 1994), often leave significant gaps in complementary design solutions. The forum attempts to counter this deficiency by introducing students to the notion of generating ideas by exploring different generic options or families of alternative design scenarios. This is loosely akin, but not as rigorous, with computational design theory (see Knight 1994, Stiny 1980). By investigating a range of ideas and understanding their implications and consequences, students become familiar with a more extensive set of problem solving abilities. As the forum operates within an inclusive environment - i.e. the more minds actively pursuing and pooling thoughts on a common problem, the greater the range of possible outcomes and depth of inquiry – learning becomes accelerated. The forum operates within an inclusive environment - i.e. the more minds actively pursuing and pooling thoughts on a common problem, the greater the range of possible outcomes and depth of inquiry – learning becomes accelerated. When challenged by a series of immediate issues presented by community groups, design professionals and government representatives, students switch from being self-focused to societal-focused and believe that, collectively, they are able to make a contribution by advancing a body of applied design research. Performance is assessed within the forum, and is based on how well ideas are advanced, executed and critically assessed with respect to both an existing context and to a culturally sustainable future. The design matrix and generic strategies are disseminated through public exhibitions across the State of Victoria, and the results of the forum often become vehicles for informing communities and councils regarding future planning/design considerations and policy issues.

3. ATELIER GEELONG – THE ASSESSMENT OF A GROUP DESIGN PROJECT

3.1 Background

“Atelier Geelong” is a group design project that has been running for three years and has been a prime focus of our teaching and learning research at Deakin. An examination follows of the progression of this programme over this period and the teaching and assessment models that have been developed to assess the participating design teams.

The Atelier is designed by students to provide living accommodation and studio schemes for Geelong graduates mastered by a tutor, with a split tenancy arrangement that allowed for a schema that could readily be subdivided into three distinct elements. The brief concluded by asking design teams to break their submission and presentation into three separately appraisable elements for the final review. This requirement highlights the problem of many a taught team design project, for what is commonly desired is one design solution that reads as consistent and ‘seamless’, but one that allows for the separate appraisal of those who devised it. And of course this – the best of both worlds – is difficult to achieve and, moreover, it is fundamentally conflicting. In 2003, the solution to this problem was to assess the product of team design - this being an overall building scheme for the Atelier - and also a product of individual design in the form of the detailed design of an element of the building chosen by each team-mate. For the team design element each team member would be awarded the same grade, whereas the detailed design element was graded individually.
This solution gave rise to a number of problems. Firstly, the requirement for separately appraisable elements proved difficult for students to satisfactorily fulfill, for many who had to compensate in the team-design submission for poor performing team-mates had little time to spend on the individual submission. Even when teams where collaborating well, students tended to 'detail' a building element in isolation from their team-mates. The requirement for students to focus on an individual submission tended therefore to undermine team-work, which commonly led in the final stages of the project to piecemeal design with little cohesion. Yet if the Atelier designs were assessed entirely as team submissions by awarding everyone in the team the same grade, experience suggested that the more conscientious students would be aggrieved by what they often saw in past group projects as an inequality in their workload. Free-riding, for instance, had in 2003 commonly led to resentment that in some cases led to conflict within the teams undermining the collaborative process. Dissatisfaction with the assessment of the product of team-design was reflected in an end of semester questionnaire, for when asked "do you think that everyone in your team contributed evenly?" 82% of the 2003 students who completed the questionnaire answered "no."

Clearly a mechanism would have to be built into assessment rewarding those working hard whilst penalising those who were not. Students in other group-projects at Deakin had commonly peer-assessed each other's contribution at the conclusion of a project. This model appealed those aggrieved with under-performing team-mates, but suffered from one major problem, namely that the adjustment in grades from only one peer-assessment could be inaccurate. As Wilkins and Lawhead predict (2000), if a number of students were feeling particularly vindictive, their exaggerated misallocation of marks could unfairly penalise team-mates. Peer-assessment grades proved therefore unreliable, and this required assessors to readjust grades in line with their knowledge of students in the studio – a knowledge which was often a misleading indication of an individual's contribution to the process of design. In end of year evaluations, and in line with the findings of Rushton et al (Rushton, Ramsey & Rada 1993), many students questioned the fairness of the one-off peer-assessment and expressed a clear preference for tutor-based assessment.

In 2004 therefore peer-assessment was continuous throughout the project to evaluate individual contribution to the process of design rather than its end product - where contribution was defined in terms wider than merely time and effort to acknowledge imagination, creativity and team-working skills throughout the duration of the project. This system might have appeased those who felt aggrieved at free-riding was it not for the choice of peer-assessment that was offered to the teams. The students were to choose one of three options of mark allocation to be agreed upon in a team contract that they signed at the beginning of the project: these were by either round the table 'bargaining', by secret ballot, or by simply allocating marks evenly. Most complaints about unfairness in marking arose with the somewhat idealistic teams that perhaps rather naively chose the third option, and this was the majority, for many students abused the security of a team grade to exploit their more conscientious team mates. In contrast, the teams that adopted the assessment methods that allowed for penalty and reward saw the allocation of marks as less unfair. The vast majority of students in these teams described in their reflective portfolios the group project as a positive experience. The process of round the table ‘bargaining’, however, proved understandably stressful for all but the most harmonious of teams, for the conflict of ‘bargaining’ was poorly resolved and this undermined subsequent team-working. Anonymous peer-assessment avoided these problems and was therefore further developed for the next cohort required to take part in Atelier. The problems faced by the teams who had not opted for anonymous peer review was reflected in a general dissatisfaction with the assessment process, for when asked "do you think that everyone in your team contributed evenly?" in the end-of-semester questionnaire, 67% of the seventy-two students who completed the questionnaire in 2004 answered "no."

In 2005 a compulsory online peer and self-assessment template was developed that allowed students to assess each others’ contribution during the course of the collaborative exercise on a weekly “real-time” basis within the secure and anonymous environment of the school intranet portal. As Clark et al suggest (Clark, Davies & Skeers 2005); this model also gives students the motivation to modify their performance and to receive feedback on the effect of their modification. Students logged in at the end of each of the six weeks of the project to complete a chart that asked them to rate their team-mates using two quantitative measures and one qualitative measure. The first asked students to award their four peers a percentage of the team grade such that any figure over a total of 400% was subtracted from their own percentage to make a total of 500% for the five team-members. This built self-assessment into peer assessment. As students often awarded each other unrealistic multipliers of the team mark that are far higher than tutors would give, a problem known as peer over-marking (Falchikov 2002; Freeman et al 2000; Roach 1999), this first measure was backed up by a second that asked students to rate each other on a five point multiple-response Likert scale. The Likert evaluation, which is commonly used to rate aspects of the group experience (Ellis et al 2005), also allows for the coding of responses and the subsequent statistical analysis of possible patterns of bias in student assessments. The purpose of the third qualitative measure, which asked students to comment on the performance of their peers, was to elucidate upon any anomalies or unexpected final evaluations. It was hoped too, as Dominick et al (Dominick, Reilly & McGourty 1997) have found, that students who completed the qualitative feedback, even if they themselves did not receive feedback, might be motivated to improve their performance.

3.2 The Collaborative Structures of Atelier Geelong Teams

Collaborative learning refers to an instructional approach in which students work together in small groups towards a common goal (Dillenbourg 1999), which in this case is a design schema for Atelier Geelong. In order to understand a little of the effect of group assessment procedures on the collaborative learning of design teams, it will be necessary first to comprehend something of how the teams collaborated. In order to achieve this understanding we shall briefly
examine the teams in the three categories of organisation that came to reflect how they worked together in 2003 (for a more detailed explanation of this see Tucker 2004).

When, in 2003, students were allowed to choose their own team-mates, the team-working of approximately 40% of the teams could be described with the term ‘democratic collaboration’. This resulted when there was no clear leader, and/or in most cases of this type when students were too polite or of such similar ability that they felt they had no right to criticise at any depth. In such cases, all ideas were treated as equal, meaning that those developed were those elected democratically. This often implied that the ideas selected had prompted the fewest objections, which frequently resulted in a product that in advertising parlance is commonly (unkindly) known as “lowest common denominator.” This clearly was not a mode of collaborative working that encouraged risk for as Schrage implies, innovation is more often than not the product of a diverse range of skills and abilities (Schrage 1995). The least common of the three primary collaborative modes, accounting for only 27% of the students in 2003, can be defined as ‘oligarchic collaborations.’ These groups are generally driven by one or two high achievers and were characterized by a strong hierarchical structure. The organization of the remaining 33% of the teams can be described via the Platonic definition of ‘timarchic’ societies, for in common with Plato’s description (Lee, 1955) of a society characterised by conflict this last type of group was born out of dissent and interpersonal conflict, which often resulted in piecemeal design. We shall consider in our conclusion what effect the use of different assessment modes may have had on the proportional distribution of these three collaborative modes.

4. ANALYSIS

4.1 Student reaction to new assessment models in Atelier

Given a choice of four types of group assessment in the questionnaire completed by around 70% of students at the beginning of Atelier 2005, the majority of students questioned, namely 69%, preferred anonymous on-line peer-assessment. This is not surprising in light of the fact that 70% of students felt that in previous group projects not everyone had contributed evenly. In 2005, with six peer-assessments of the relative contribution of team members, only 42% of students felt that not everyone had contributed evenly. When asked too whether the 2005 peer-assessment model ‘was a fair way of assessing group design projects,’ the mean score on a 5-point Likert scale was keenly in favour of the model at 2.145. This is not the only positive reflection of our revised assessment methods, for the collaborative working structures of the groups seem to have responded favourably too. We recall that 33% of the teams in 2003 could be termed as ‘timarchic collaborators,’ for their teamwork was characterised by conflict. In 2004 groups were engineered to contain a range of different experiences and abilities, which resulted in many more timarchic teams, indeed 60% could be described as such - for grouping strangers rather than friends led to much more internal strife and conflict was a common occurrence. In 2005 the timarchic collaborative teams numbered only 20% of the cohort, when peer-assessment seemed to act as a pressure valve alleviating many of the grievances generated by perceptions of unequal workload and unfair mark allocation. Consistent with the findings of Webb (1997), in our opinion and those of students who attended the focus groups, by concentrating on such constructs as group productivity, division of labour and teamwork skills, continuous peer-assessment throughout the unit that allowed for penalty and reward significantly discouraged free-riding by team-members. By creating a non-confrontational forum for expressing dissatisfaction with under-performing team members, the continuous peer-assessment model also prevented disunity within teams and fostered, therefore, a more positive collaborative learning environment. Significantly too, and in line with the findings of Filete (1969) and Falchikov (1986), the computed average grades and accompanying qualitative comments assigned by students usually approximated the grades and comments assigned independently by tutors to back-up and test peer grades. It is the intention of the research team to reinforce the continuous peer-assessment model by building into it formative feedback that, as Topping et al suggest (Topping, Smith, Swanson & Elliot 2000:150), gives “rich and detailed qualitative feedback information about strengths and weaknesses, not merely a mark or grade.”

The continuous assessment model in 2005 had been refined from that of 2004 to only five assessed exercises that focused, in tandem with on-line peer-assessment, on the process of design rather than its product, and was thus more in tune with how students operate upon and develop their design solutions. The cohort was asked to agree or disagree on a 5-point Likert scale with seven statements relating to continuous assessment. These were as follows: “Continuous assessment of weekly tasks is a better way of assessing design,” “Continuous assessment throughout Atelier has more evenly distributed my workload,” “Continuous assessment throughout Atelier has added to my workload,” “The weekly assessed tasks throughout 3A (third year design) helped the development of our designs for the Atelier Geelong project,” “The weekly assessed tasks throughout 3A were an obstacle to the development of our designs for the Atelier Geelong project,” “Continuous assessment throughout 3A has enhanced my learning experience,” and “Continuous assessment throughout 3A has given me a greater understanding of what has been expected of me in the unit.” If we reverse the results of the two negatively posed questions, then we get an overall mean of 2.4 strongly in favour of continuous assessment.

If we look at student outcomes as measured in grades there are further positive signs for continuous assessment operating in tandem with staged continuous peer-assessment. In 2003, with one assessed submission and no peer-assessment, the average mark for each individual student for the team design project was 57.8%. In 2004, with nine assessed submissions and one peer-assessment at the completion of the project, the average mark was 59.3%. Then in 2005, with six assessed submissions and six peer-assessments the average mark for completed submissions was 69.5%, which is the highest average mark for a third year project at Deakin, and this for a cohort that has performed comparatively equally with other cohorts on previous projects and in other subject areas.
Although these serve as a positive platform for further research and development of assessment practices, it must be also noted that there are many variations between the three Atelier programmes compared here that still need to be accounted and controlled for in further research.

We might draw from the trends that can be seen in this data, and from comments made by students in the focus groups, the following conclusions. Students perform better in group design projects than in individual design projects – a finding confirmed by questionnaires we have received from unit coordinators in design schools world-wide that have shown that the average grade achieved by students is 5% higher for group design projects; the quality of work as measured in grades increases with continuous assessment that is anonymously peer-assessed; students prefer to other models continuous peer-assessment of an individuals contribution to a team; as Brooks and Ammons argue (2003) - students prefer continuous assessment to design projects assessed largely on final submissions for the model encourages evaluation that is more objective as opposed to subjective assessment made by a single assessor; and students see the learning value of continuously assessed tasks as a means of developing critical thinking in the evaluation of design solutions. These findings reinforce the findings of Clark et al. (2005:9) that on-line continuous peer-assessment “can provide timely feedback to students and enables the lecturer to manage the assessment of larger and more diverse student cohorts.”

In the second questionnaire polling the 2005 cohort on their opinions of the group assemblage and assessment models used in Atelier 2005, opinions appear to have shifted. 82% of students found group work in the unit to be a positive experience, and this positive impression was reinforced by their stated preference at the completion of Atelier for group design projects, for only 37% claimed a preference in the second questionnaire for individual projects. 33% of students preferred to choose their own team-members, while 32% preferred to choose members from limited pools – as they had at the beginning of Atelier (only 12% of students stated a preference now for groups to be randomly allocated by tutors, while 21% preferred groups engineered for diversity). What is noteworthy about this feedback is its refutation of the common perception that group-design is unpopular amongst students of architecture.

4.2 Personality Type-Testing

Seventy-six of the ninety-five third-year students who were present at the introduction of the STALG project agreed to take part in studio observation and complete the Keirsey personality test (Keirsey 1998). The results of the type testing has shown that while students were, as illustrated in Figure 1, of a wide range of personality types, a number of “function” types dominated their motivation. Of the students that sat the test, thirty of which were female, thirty-six male, 57% can be described as extroverts while 43% can be described as introverts. There was an equal split between extrovert and introvert in the females, while 62% of the males were extrovert. The most common of Jung’s eight types in the cohort is the Extroverted Sensation type, which number 39% of those tested (of which 61% were male), whilst the least common was the Introverted Thinking type, which numbered only 9%. 67% of the cohort was driven by Sensation rather than Intuition, and 70% by Feeling rather than Thinking. Moreover, and perhaps most notably, 90% could be characterised as Judging rather than Perceiving. Thus, 55% of the cohort conform to the one-of-four Myers type termed as the Concrete Co-operators – a type Myers had observing their close surroundings with a keen eye for the purpose of “scheduling their own and others’ activities so that needs are met and conduct is kept within bounds” (Keirsey, 1998:19). Students of this type were grouped together in one pool to form seven teams. The grades achieved by the groups would suggest that the range of personalities within a team had no effect on the quality of design produced, for the average mark obtained by the three types of group – the same personality groups, the diverse personality groups and the control groups – was exactly the same, namely 64.8%. Yet in contrast to the findings of Chambers et al., it is worth noting that the number of ‘timarchic’ team collaboration structures appeared to be drastically reduced amongst the teams consisting of same personality types. It can be postulated that this reduction in the amount of interpersonal conflict that occurred may be due to the disposition of the personality type of the Concrete Co-operators towards regulating goals and conduct within the group in the absence of tutor intervention, which may have advanced the team’s cohesion.

For the three years Atelier Geelong has been run, 69.5% is the highest average grade achieved. Although a detailed analysis of the reasons for the grades is still needed, it could be suggested that the high marks obtained by the 2005 and 2004 cohorts can be attributed partly to the team formation restrictions placed on both programmes. Restrictions discouraging the option of working with friends, which encouraged diversity within teams, seemingly lead to a more
challenging learning environment. In 2005 this was achieved without the increase in timarchic collaboration that resulted from engineered teams in 2004, for allowing students to choose team-mates from pools avoided personality and social conflict. Restricted pools is a group formation compromise that is popular amongst students too, for 82% of the 2005 cohort, compared to only 51% in 2004, claimed to enjoy the Atelier project.

5. THE FACILITATING TUTOR OF PARTICIPATORY COLLABORATIVE LEARNING

To make collaborative learning successful it is important to shift the student’s role from a passive receiver of information into an active participant (Dominick et al 1997). The studio is a lively place of experiential problem-based learning where teaching models can readily be adapted to encourage students to participate collaboratively with the processes and outcomes of design. As Salama has suggested (Salama 2005:12):

There are several strategies for introducing the concept of participation in the architectural design studio: One strategy can be exemplified by allowing students within a studio group to play different roles. The students can act as clients, users, and designers. They can review each other to introduce a layer of evaluation different from and equally influential to self-evaluation. The design instructor could also play one of the roles needed to simulate a real life situation. Interdisciplinary design studios, that include students from different disciplines related to the design field, are beneficial since such studios replicate the professional environment, where a group of specialists will collaborate to create a coherent design solution.

The Urbanheart design research forum exemplifies a participatory model. Another such strategy that has been tested at Deakin forms the basis of Atelier tuition, where client/design team meetings have replaced the traditional tutorial. Here each student design-team meets with a second student team who role-play clients. All client-teams are asked to elect a leader or spokesperson, but the focus on this leader is made less sharp by providing a leader at the next level of hierarchy in the design tutors themselves. To avoid leading the design process, tutors merely adopt a role at the head of client-groups - to identify the ideas that might be developed rather than suggesting them. Although the data from the observations of the client/design team meetings is still being compiled, the presence of an observer in the form of a research assistant has already informed teaching. To permit observation of student collaboration the meetings were restructured around a less teacher-centred model. Only at the end of the sessions did tutors lead the discussion in a summing-up of design progress. After a short number of meetings, students adapted to this process and began to advance designs without a reliance on tutor intervention. The independence grew out of a healthy dialogue of critical review and the type of reflection-in-action that Schöns describes as inherent in the educational processes of successful design studio (Schön 1985). Here the tutor acts for the large part merely as a facilitator, such that increased participation by students harnesses collaboration in the process of design and also toward the making of a coherent architectural product. The spirit of collaboration fostered in these sessions contrasted to the unobserved sessions, for here the tutor often reverted to a more assertive role akin to the traditional teacher-centred transmission model of knowledge - “lecturing” to the majority and restricting participation largely to those leading the design. This disassociated the majority of students taking part in the meeting. What has become clear therefore to those teaching design at Deakin is something that educators in other fields have known for some time, namely that group-learning requires a very different model of teaching, and that this model has advantages of over teacher-centred one-to-one tutorials. The introduction of a more participatory student-centred design forum where learning takes place collaboratively with peers, rather than in an individualistic or competitive manner, appears to empower students to develop in tandem with their creative skills the interpersonal, professional, and cognitive skills that are needed to filter and synthesise more efficiently the relevant information necessary for designing. Such a participatory model may even, it is hoped, foster sensitivity in students to listen as professionals to their real clients and users.

The student-centred learning model is readily adaptable to studio if it can inform teaching throughout a project, including reviews. At Deakin, therefore, the traditional jury led review (with the jury being composed or tutors and professionals) is being replaced in many instances by student led reviews. Here, students are reviewed rather by peers, with tutors acting merely as facilitators who are present to suggest to students new ways of thinking that engage them in a critical scrutiny of their own and their peer’s designs. In this review model the attack-and-defence mode of discussion so common to tutor led reviews is less frequent, avoiding therefore the formation of defence qualities that Parnell (Parnell 2004) has shown might result in the formation of (perceived) arrogance.

6. CONCLUSION

In recognition of the escalating financial and time constraints within teaching departments leading to an increase of group focused teaching models; this paper has proposed to lead an enquiry into the effects of group management and the assessment of these groups in the student design studio. These preliminary findings presented have successfully advanced the aim of researching and developing an improved and financially sustainable teaching methodology for group work in the design studio. This conclusion is supported not only by the theoretical and practical experience of the researchers and tutors involved but is moreover directly informed by the students’ experience of the design studio – students who are the direct consumers of the different teaching, assessment and group models explored and developed here. Although these models still require further testing and development there are already significant findings allowing for improvements to be made to the teaching methodology and assessment models of the student design studio. If, it would appear, participatory group design projects such as Atelier Geelong and UrbanHeart are assessed fairly, they can come to represent a “pedagogy of freedom”, as Paolo Freire terms it (Friere 1998), compared to the limits imposed by the traditional transmission model of one-to-one tutorials and tutor led reviews. Student-centred learning, rather than the teacher-centred learning of the master/apprentice atelier model, motivates and enables reflection upon experience and previous knowledge, encourages active participation and fosters deeper learning (Entwistle 1992). In this atmosphere, where ideas can be
expressed by students to their peers without fear of affronting the design principles of their assessors, students are more open to pursuing new ideas and engaging in an authentic dialogue of reflection-in-action.

REFERENCES


