

## Fair assessment and blended learning in collaborative group design projects

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### Background – drawing on the Bath Model

As stated by Driscoll (2002), ‘blended learning means different things to different people, which illustrates its widely untapped potential’. However, the concept of blended learning as defined as the integrated combination of pedagogical approaches to produce an optimal learning outcome, coordinated with instructional technology focusing on skill-driven and intended learning, is not foreign to schools of architecture (Valiathan 2002). This is primarily due to the teaching methodology of the design studio, in which the aforementioned concepts of blended learning work to emulate collaboration in practice so that students of architecture can be taught the collaborative skills needed to negotiate infinite design options within a building design process that can include numerous participants and consultants (Cuff 1991). Collaborative group project working is a core aspect therefore of many schools of architecture. One such program that both authors worked with during the mid 1990s that highlighted many of the benefits of collaborative learning is the model established at the School of Architecture and Civil Engineering at Bath University. While the school operates separate course structures for two disciplines, they have blended learning components where both discipline cohorts combine in a studio environment to engage in joint project work. One of the program units manipulates groups to develop collaborative student teams consisting of at least one architecture student and at least one engineering student who work to submit a joint submission. Although most schools of architecture are single discipline focused, the authors strongly believed that, if managed appropriately, many of the benefits gained by having students working jointly in a blended learning environment – such as greater breadth and depth of knowledge acquisition, more thorough design exploration and resolution, and more accomplished presentation – could all be translated into a single discipline blended learning design curriculum.

The authors now operate as co-coordinating lecturers of the third and fourth-year studios respectively at Deakin and have introduced collaborative group projects to their cohorts. However, while the collaborative model works well in some instances, both authors are equally aware of situations where it has failed. Given the rapid changes that have come about in the funding of tertiary education, placing significant pressure on one-to-one staff/student contact time, an increasing number of schools and educators are being compelled to operate group projects. If, therefore, collaborative learning is to become a standard studio teaching model it is imperative to establish not only best practice teaching standards for the blended learning model, but also fair assessment criteria and the optimisation of group dynamics for such a model. The following is a position paper detailing the blended learning studio Atelier Geelong, which is the focus of a funded research program currently investigating these issues at Deakin University. It is hoped that the findings of this research will inform a pedagogical framework that at present does not exist for design teaching.

### Strategic teaching and learning research aims and methods

Members of Deakin School of Architecture and Building were recently named as recipients of a Strategic Teaching and Learning Grant (STALG) aimed at ‘Establishing Best-Practice Principles for the Teaching of Group Design Projects.’ The STALG project addresses four principal research aims under the banner of ‘Best Teaching Practices’. Firstly, the development of a new blended teaching program, secondly to identify the optimum group formation methods within this method, thirdly to identify the best teacher/tutor practices for delivery within this new blended framework and, finally,



the development of a complimentary mode of assessment. The outcome of these research questions are addressed through several forms of evaluation: formative evaluation of student satisfaction through questionnaires, summative evaluation of student achievement through reflective folio assessment and the analysis of grades and graduate outcomes, and also the appraisal of knowledge and skills gained through the measure of student design projects. An illuminative evaluation is also considered through focus group discussions and the observation of tutorials. The effect of the make-up and selection of groups on the decision making processes as assessed by studio observations, informed by the results of Myers-Briggs based personality type-testing, is also considered.

Although the quantitative analysis of this research is not yet complete this paper will draw on the data collected thus far, detailing the emergence of trends within the data and qualitative reflections of the students, tutors and researchers. A preliminary analysis will serve therefore to elucidate the projected outcome of informing changes of classroom/studio practices that govern the assemblage, teaching and assessment of design teams. This outcome also includes the development of adult learning principles such as self-directed skills-based learning, goal and relevancy orientation and grounding through a focus on effective collaboration and fair assessment procedures leading to an enhanced student group-learning experience (Knowles 1970).

### **Atelier Geelong – fair assessment, personality types and the facilitating tutor**

‘Atelier Geelong’ – the first major design project of the third year design programme at Deakin – has been running for three years and has been a prime focus of research aiming to develop new blended learning and assessment models to encourage effective collaboration in student design teams. What follows is a brief summary of these models.

#### **Assessment**

The Atelier Geelong is designed over the course of six weeks by students to provide hypothetical living accommodation and studios for Geelong graduates mastered by a tutor. In common with most team design projects, what is desired by those assessing the project is one design solution that reads as consistent, 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. Three years of testing assessment models has revealed that if team design is to reflect the type of collaboration demanded by professional practice, then the product of the design process can only be assessed as a team product. The assessment of an individual’s contribution to the project must focus therefore on the process of design rather than its end product, and as teaching staff are only party to a fraction of this process then only the students themselves can accurately evaluate contribution to this process. 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.

Team members log-in at the end of each week to complete a six-sheet Excel chart in which each student rates themselves and their team-mates using two quantitative measures and one qualitative measure. The first measure asks students to award their peers a percentage of a team grade, but as students often award 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 and McKenzie 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 evaluation. This Likert evaluation, which is commonly used to rate aspects of the group experience (Ellis and Hafner 2005) also allows for the coding of responses and the subsequent statistical analysis of possible patterns of bias in student assessments. It was hoped too, as Dominick, Reilly, and McGourty (1997) have found, that students who completed the qualitative feedback section, even if they themselves did not receive feedback, might be motivated to improve their performance. 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. At the end of the project an assessment matrix is generated for the teams that awards each student a multiplier of the team grade that has been awarded to the final submission. Eighty-five percent of students in 2005 were awarded multipliers within the range of 0.9 – 1.1, for the only students heavily penalised were those who were consistently rated by all their team-mates as under-performing.

At the time of writing, the first of the STALG questionnaires has been completed by sixty-eight of the ninety-five students in third year. Given a choice of four models of assessing the contribution of team members, the majority of students questioned, namely 69%, preferred anonymous continuous peer assessment. In the opinion of the Atelier teaching team, and those of students who attended the STALG focus groups and completed the questionnaire, continuous peer assessment throughout the unit that allows for penalty and reward significantly discourages free-riding by team-members with over 70% of students affirming this model to be a fair means of group-assessment. This is in stark contrast to previous years when an average of 73% of students answered the same question in the negative, suggesting that the assessment model adopted in 2005 is perhaps the first that genuinely provides fair assessment of an individual's contribution to a team design project. Significantly too, and in line with the findings of Filene (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, Smith, Swanson and Elliot (2000) suggest, gives 'rich and detailed qualitative feedback information about strengths and weaknesses, not merely a mark or grade'.

## **Group formation and the introduction of personality testing**

Collaborative learning refers to an instructional approach in which students work together in small groups towards a common goal (Dillenbourg 1999), which in the case examined here is a design schema for Atelier Geelong. In order to understand a little of the effect of group assessment procedures on the collaborative blended learning of design teams, it will be necessary first to comprehend something of how the teams collaborated.

In 2003 students were allowed to choose their own team-mates. The team working of approximately 40% of these teams could be described then 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. 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 characterised by a strong hierarchical structure. The organisation 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.

Groups in 2004 were engineered to contain a range of different experiences and abilities as dictated by the previous semester's grades. This approach was taken to counter the disparity between groups of higher ability and those with lower abilities, as it was often the case when students were left to choose their own teams (as they were in 2003) they primarily chose to work with friends who more often than not were of similar ability to themselves. When the teams who were comprised of students with lower abilities compared their standard of work with that of the higher achieving teams a sense of frustration at their own perceived lack of ability quickly externalised to discontent with the course in general. It was hoped that in engineering the teams to contain students of mixed abilities a diverse and challenging learning environment would develop. Although the overall average grade was higher for the 2004 Atelier project compared to 2003, this formula resulted in many more timarchic teams. Indeed, 60% could be described as such – for grouping strangers rather than friends led to much more interpersonal conflict. Thus although the conflict within groups may have provided

a more challenging working environment leading to a higher quality of work, student satisfaction and enjoyment of the course was sabotaged by the stress of clashing personalities within the teams. The mixed feelings for the 2004 version of Atelier can be summed up in the Learning Services survey in which 77% of the cohort stated that the group project had offered positive experiences of group working, while 54% of the cohort identified ‘choosing your own group’ as the change that would make the experience more positive.

The decision was made in 2005 to draw on and blend personality type theories from the discipline of psychology to more effectively engineer group structures in an attempt to reduce the number of timarchic team structures. 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 observations 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. The most common of Jung’s eight types in the cohort is the Extroverted Sensation type, which number 39% of those tested 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; p.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, Manning, and Theriot (2000) 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.

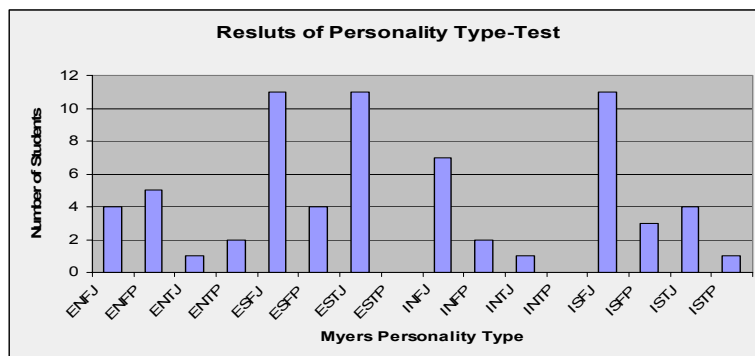


Figure 1. Graph showing composition of 2005 cohort as determined by Keirsey Temperament Sorter

Although there was no difference in marks between the different personality formations of groups, the average grade of 64.8% for the Atelier Geelong of 2005 project is the highest average grade achieved for a third year design project. Although a detailed analysis of this finding 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 teammates from pools structured and informed by personality theories avoided personality and social

conflict whilst empowering students towards a more self-directed style of collaborating. 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.

## **Adapting teaching methods to a new pedagogy**

As well as being informed by the structure of the teaching program, group formation and assessment, teaching methods also had to be adapted to the evolving pedagogy. 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, Reilly and McGourty 1997). In order therefore to avoid leading the design process and to foster a more self-directed style of learning, tutors merely adopted a role at the head of client groups in their meetings with their design groups – to identify the ideas that might be developed rather than suggesting them.

Although the data from studio observations is still being compiled, the presence of an observer has already informed teaching. In order to allow observation of student collaboration the client/design meetings that form the basis of the Atelier tuition model were restructured around a less assertive teaching model. Only at the end of the sessions were tutors allowed to lead the discussion in a summing-up of design progress. After a short number of meetings, students adapted to this process and began to establish a dialogue of critical review that advanced designs without a reliance on tutor intervention. Here the tutor acts for the large part merely as a facilitator. The spirit of collaboration fostered in these sessions contrasted to the un-observed sessions, where the tutor often reverted to a more assertive and traditional lecturing role, focusing attention on those within the teams who were leading the design. This often 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 can have advantages of over teacher-centred one-to-one tutorials. It might be argued that the introduction of a more participatory student-centred self-directed design forum where blended 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.

## **Conclusion**

In recognition of the escalating financial and time constraints within design teaching departments leading to an increase of group projects this paper has introduced a current enquiry into developing best teaching practices aimed at informing a new andragogical framework that at present does not exist for design teaching. Through incorporating the theories of blended learning, two studios; Urban Heart and Atelier Geelong, are being shaped and examined in terms of optimum group formation methods informed by results of Myers-Briggs based personality type-testing, best teacher/tutor practices for delivery within this new blended framework and finally by the development of a complimentary mode of assessment. The outcome of this research is currently in the process of being addressed through several forms of evaluation; although the quantitative analysis of this research is not yet complete this paper has highlighted the emergence of trends within the data. Hence, a preliminary analysis suggests a number of conclusions that are already apparent in the data:

- students perform better in group design projects than in individual 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;
- students prefer continuous assessment to design projects assessed largely on final submissions;



- students certainly see the learning value of continuously assessed tasks as a means of developing design solutions;
- restrictions on group formation discouraging the option of working with friends, whilst leaving students with a degree of choice (to avoid ‘adversaries’), encourages diversity within teams and leads to a more challenging learning environment; and
- the most popular size of group is 3 – 4.

These preliminary findings have successfully advanced the aim of researching and developing an improved teaching methodology for group work in the design studio. These conclusions are supported not only by the theoretical and practical experience of the researchers and tutors involved but are 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 against a larger sample size and continued development, there are already significant findings allowing for improvements to be made to the teaching methodology and assessment models of the student design studio. As research at Deakin merely reinforces, if architectural design teaching is to promote itself as a developing and informed discipline aligned with modern funding and departmental constraints, it must recognise the importance of developing innovative blended teaching methods aligned with informed group-formation structures and fair assessment models. In the Atelier Geelong studio, models such as these are blended with the traditional atelier studio system to foster experiential student-centred learning in students who, free from the shackles of the master/apprentice relationship, are far more able to operate critically upon their own and their peers’ design solutions independent of tutors.

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