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Establishing Best-Practice Principles for the Teaching of Group Design Projects

Dr. Richard Tucker

Deakin University, Geelong, School of Architecture and Building

ABSTRACT: As student-to-staff ratios escalate, increasing numbers of undergraduate architects are finding the reduction of 'one-to-one' studio supervision an impediment to learning. Group design projects are becoming a widespread solution to this problem. However, little analysis has been undertaken as to their effectiveness both in terms of student assessment and as a design teaching methodology.

The two hundred years of apprentice/master tradition that underpins the atelier studio system is still at the core of much present day architectural design education. Yet this tradition today poses uncertainties for a large number of co-ordinating lecturers faced with current changes in the nature of tertiary education and its funding structure. In particular, with reductions in staff/student contact time, in sessional funding sources and in the relative weighting of design-based subjects with respect to other subject areas, many design teachers are finding it increasingly difficult to maintain an atelier system that has shaped both their learning and, more pointedly, their teaching. If these deficiencies remain unchecked and design-based schools are unable to implement strategies that successfully overcome the resource intensive one-to-one teaching program, then architecture may prove to be an untenable course structure for many institutions.

Rather then spreading their time thinly, many co-ordinating lecturers are setting group projects in order to review less assignments but at greater depth. However, while this learning model better reflects design teams in practice, this approach may pose other pedagogical and assessment questions. What is clear is the urgent need for structured research into the teaching and assessment problems experienced by design teachers, and for a readily adoptable pedagogy for group design projects. At Deakin University, research is underway aimed at establishing best-practice principles for group design projects by analysing students’ performance and recording and implementing their feedback to adjustments made to the pedagogical fundamentals of assessment, group configuration, and program structure. There are after two years of preliminary studies already clear indications of what changes can be made to these to encourage more effective team learning. This paper will present the findings of these studies.

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INTRODUCTION

Architects must have collaborative skills needed to negotiate infinite design options within a building design process that can include over fifty kinds of participants and consultants (Cuff, 1991). The practice of architecture is indeed founded on establishing and maintaining good collaborative working relationships. As team-workers, architects and their fellow professionals must from the outset of practice exhibit a willingness to work collaboratively, and thus be equally comfortable in the roles of team leaders or team members. This willingness must be fostered by demonstrating to design students that, in addition to their functional role in a diverse team (with clients and fellow professionals); they will also have individual preferences as team-workers. For example, some professionals prefer to keep the team to task on a tried and tested path, whilst others in the spirit of innovation like to introduce new ideas and directions. Or as Greg Burgess (recent winner of Australian architecture’s highest honour – the gold medal of the Royal Australian Institute of Architects) rather more poignantly describes his collaborative role as an architect, “I have to be there strongly, to kind of lead the dance, or to encourage other people to join the dance, and listen to people and find the right step, the right rhythm” (Burgess, 2004). It is therefore essential to make design students aware of, and be able to use appropriately, a range of team-work methods. It would appear, however, from published curricula that architecture schools rarely teach team-working skills.

Hence, the basis of ongoing research at Deakin University has been informed by the need to address a fundamental shortcoming in architectural education. Namely, in the teaching of design, apart from the Clients and Users in Design Education project at Sheffield University, there has been very little structured research questioning the traditional studio system prevalent in most schools (the CUDE research programme has been funded since 1996 by The Higher Education Funding Council for England). This studio system relies on the iterative advancement of design solutions informed by the one-to-one review of student work that has largely been developed with little collaboration beyond peer review. Based on a review of literature, and in the experience of the author over almost twenty years across three universities, research into group collaborative teaching and learning is very rare in schools of architecture. In presenting the findings of the first stages of research into this at Deakin, this paper aims to present the beginnings of a pedagogical framework for the teaching of collaborative design projects.
1. BACKGROUND

While a significant body of research exists relating to the teaching of problem-based group work, e.g. Sanz-Menendez, Bordons, and Zulueta (2000), and Grigg, Johnston, and Milsom (2003), the focus of this previous research has rarely been the design studio. Only the CUDE project at the Sheffield University School of Architecture, discussed by Angela Fisher (2000), has focused on the issue of team-working skills in the design studio, although the findings of this research are untested elsewhere as a measure of student performance in collaborative team-working versus performance in individually assessed projects. Investigations at Deakin are attempting to redress this shortcoming by observing, recording and analysing student performance and feedback in design units that cover projects of the full range required for an extensive comparison - namely, individual projects (from 1st to 5th year), and group projects for teams of 2 to 12 students. A prime focus of this research is to address the problematic and largely overlooked question of assessment. In the experience of the author and many colleagues and peers interviewed, in particular, at the 2003 ‘Design & Research: Project Based Research in Architecture Second International Conference of the Association of Architecture Schools of Australia’, the issue of ‘fair’ assessment is that of the greatest concern to academics and students alike in team design projects – the success of which more often than not hinges on students’ perceptions of assessment reflecting their comparative qualitative performance. The four-year duration of this research at Deakin will crucially allow response to student performance and feedback to changes made to the programme and assessment of an annually taught collaborative team design project at Deakin that has adopted methods of teaching team-working skills advanced by the CUDE project. The purpose of this paper, therefore, is to describe the first two stages of a four-stage testing and refinement of a pedagogical framework focused on successful processes of collaboration.

2. METHODOLOGY

The observation, recording and pedagogical analysis of students’ performance and opinions (through qualitative and quantitative methods of data collection), and of the dynamics of group studio tutorials, has taken place in the first semesters of 2003 and 2004. Groups of three to six (of both predetermined group structure and that left up to the student cohort to assign) have been observed. During the second half of both of these semesters and of the second semester of 2003, control samples in the form of subsequent design units that are largely comprised of individual projects have been observed and their results used for comparison. The course co-ordinator of first semester third year design has moderated all student marks for the duration of the research to date to ensure that observed differences in student performance have not been the result of a variation in marking standard. Moreover, a study of the performance of the students involved in this research in other design units and other subject areas has been made in order to ensure that the assessment strategies adopted and discussed in this paper are a fair indication of capability in general.

3. THE 2003 DESIGN BRIEF

The writing of this paper was prompted by a situation that is likely all too familiar amongst those teaching design. At the beginning of the first semester of 2003, the incoming co-ordinating lecturer of the first semester third-year design studio at Deakin University was presented with a straightforward calculation – namely, what is six hours multiplied by three tutors divided by one hundred students? The answer is ten minutes and forty-eight seconds per student per week. Of course, this implies a perfectly efficient turnaround, and so this was rounded down to eight minutes. That is, each of the third year architects could expect a maximum of eight minutes per week one-to-one teaching time in the design studio. The unit co-ordinator, newly arrived from the UK, suspected there had been an error in the teaching budget figures provided to him. In common with the majority of architecture schools in the United Kingdom, at the University of Bath (where the co-ordinator had spent 12 years studying and teaching), studio projects had been structured around a traditional atelier studio system that taught largely through one-to-one tutorials. There, students, working almost exclusively on individual projects, met with tutors for at least one hour per week to discuss and operate upon their design solutions, both critically and physically, and thus develop them with their tutors through an iterative process of reading, questioning, testing, and reformulating. This was a tried and tested pedagogy – indeed, it is underpinned by two hundred years of the apprentice/master tradition. There had been, however, no mistake in the budget and no mistake, therefore, in the subsequent conclusion that if students at Deakin were set individual design projects they could not rely entirely on one-to-one contact time with tutors to advance their design solutions. There seemed to be one easy solution to this problem, and that was to review less assignments but at greater depth by setting group design projects.

The decision was taken to set two major design projects for the 2003 first semester studio. In order to use scarce teaching resources most efficiently, the first would be a team design project taught by two tutors largely through seminar-type group tutorials, and the second would be an individual project taught by four tutors allocated to individual students via sign up sheets for 20 minute tutorials (by offering sign-up slots it has generally been found that only 75% of students will come forward each week).

Of course, it was explained to the cohort of students that the reason for the group project was to develop the collaborative design skills necessary for professional practice in architecture. However, as the CUDE project in Sheffield has suggested, merely putting students into design groups, creating a collaborative team-working experience and hoping students will learn something from it is not an effective way to develop these collaborative skills. Any failure to promote collaboration at Deakin would, however, not be one fostered by an inappropriate design brief. Thus conclusions shall be drawn from the eventual refinement of this brief, it is appropriate at this point to examine it in some detail.

The 2003 third-year cohort of now 95 students (five had been lost since enrolment) were asked to divide themselves into groups of three for their first major design project – ‘Atelier Geelong’. The students were invited by the brief to enter a hypothetical competition to design in six weeks an atelier for a cooperative of Geelong graduates. The atelier
would provide living and working accommodations for six Geelong graduates mastered by a Deakin tutor working alongside them. There was also to be space for up to four Geelong undergraduates to work during vacation time alongside the six resident graduates. Within the scope of the hypothetical competition, the winning group would be notionally offered the chance to design and build the project, as well as a tenancy of the building. Each design group was asked to work alongside a partner group. This partner group was to adopt the role of their client group, for they would be the three graduate architects who would share the Atelier with the three ‘winning’ designers. Each design group and client group was asked to meet up at the beginning of every studio day for 30 minutes to discuss the progress of the design. The client group was asked to provide constructive criticism to progress the design, not destructive or obstructive criticism. The minutes of this meeting were to be recorded each week. Because of the split tenancy arrangement of the atelier, the project could readily be subdivided into three distinct elements. These might be:

a) Permanent studio and living accommodation for the design group of three graduate architects.  
b) Medium-term studio and living accommodation for the client group of three graduate architects.  
c) All of the remaining ancillary space. This was to consist of administrative resources, print room, meeting rooms, reception, toilets, library and outdoor and indoor social spaces. There might also be very short-term living accommodation for up to four nouveaux.

The brief concluded, “of course, the design of your atelier might counter this subdivision or even further it. This is unimportant, what is important is that at around three to four weeks into the project the design team must break their submission and presentation, and hence the focus of each individual member, into three separately appraisable elements.”

This concluding sentence lies at the crux of the problems of many a taught team design project, for what is ultimately desired is one design solution, i.e. one that reads as consistent and uniform, but one solution that allows for the separate appraisal of those who devised it. And of course this – the best of both worlds – is a difficult aim to achieve and one that is fundamentally conflicting. The difficult question of appraisal is one that shall be revisited throughout this paper. As can be concluded from the Atelier brief, the students of third-year design semester one, 2003, had certainly been asked to take part in “collaborative team-working experience.” Yet, as it turned out, many found the experience to be one of ineffective rather than effective team working.

When setting a group project, tutors have the choice of allowing groups to be self-selecting or allocating students to specific groups. Allocated groups can then either be randomly allocated or engineered to create teams that contain a range of different experiences and abilities. Each method, it will be seen, has its own merits. Although some students may prefer to be allocated to particular groups, and may view this as fairer, particularly if the groups are randomly selected, self-selecting groups are usually, in the experience of those teaching at Deakin, more popular for they allow friends to work together. This grouping of friends may also help minimise conflict and reduce the need for tutor intervention in disputes. For these reasons, the students were allowed to choose their own team-mates for the 2003 Atelier Geelong project.

4. INITIAL FINDINGS

4.1 Group Dynamics - Democratic, Oligarchic and Timarchic collaboration

In order to understand the nature of the pros and cons experienced by the design teams, it will be necessary to understand how they collaborated. In order to achieve this understanding we shall examine the teams in the three categories of organisation that came to reflect how they worked together.

The collaborative working structure of approximately 40% of the teams (14 out of 32) can be described with the term ‘democratic collaboration’. This resulted when there was no clear leader or dominating ego, and/or, in most cases of this type, when students were just too polite to criticise at any great depth. In such cases, all ideas were treated as equal, meaning that those that were pursued were in effect elected democratically. This often meant that the ideas that were pursued were those that had prompted the fewest objections. This frequently resulted in an end product that in advertising parlance is commonly (unkindly) known as LCD (lowest common denominator). This, clearly, was not a mode of collaborative working that encouraged risk and innovation. The problem of hierarchy within a collaborative group, or rather the lack of it here, is one that this paper will return to, for as shall be seen, it is a significant one.

From the analysis of students’ past results, it can be seen that more often than not, groups of the democratic type were comprised of students of similar ability. Indeed, the reason why this type of group accounted for the majority seemed to be that students, when allowed to choose whom they worked with, chose like-minded peers with similar levels of ability. High ability and/or highly motivated students, often considered by their peers as egocentric, were largely avoided by these students. The democratic collaborators could therefore, in the case of the 2003 cohort who were divided into self-selecting groups, be split into three sub-groups - the high achievers, the low achievers and the average achievers. As might be expected, the average achievers were, in numbering seven teams, the most widespread type of group. In 2003, there were two groups of high achievers, including one group comprised entirely of students who had in the previous semester achieved at least a distinction (70%) or higher. The high quality and large quantity of work produced by these two teams was in stark contrast to the work produced by the five teams comprised largely of students who had merely achieved pass grades (50 – 59%) the previous semester. Indeed, four of these five groups failed the projects and the contrast between their work and that of the higher achievers became the source of discontent. The low achieving groups were made acutely aware of how far they were behind the high achievers at an interim review, an awareness that led to the self-perpetuation of their lesser motivation. Some in the low achieving groups felt, what they saw as, the unfairness of this imbalance as an insurmountable disadvantage. Indeed, a number of students in these groups whose fragile self-confidence was further undermined never quite recovered. Their poor performance continued throughout the semester, but of course, whether or not a more positive experience of group design may have improved their subsequent learning and the work they produced is difficult to assess. What was certain, however, was the determination of those involved in the teaching of the unit to avoid
putting the poorer students in what the students clearly identified as a situation that amplified their weaknesses rather than one that addressed them.

High self-esteem commonly had a positive effect in groups whose output was driven by one or two high achievers. The temptation shall be resisted to label the output of this type of group, in contrast to the democratically chosen designs, as 'fascist' architecture – for students are rarely as autocratic as that. It would perhaps be more appropriate to describe this type of group - the least common of the three primary collaborative modes in the ninety-five strong cohort (there were six groups of this type) - with the more positive term 'oligarchic collaborators.' Indeed, it was found that not only did such a group more often than not produce the most accomplished and, moreover, innovative designs, but also that this was usually a positive learning experience for everyone in the group. For often, the low achievers were taken along on an enlightening and inspiring journey. Here, hierarchy within the group was certainly of positive benefit.

If 40% of the teams could be described as democratic and 20% as oligarchic then, in turn, to describe the organization of approximately another 30% of the teams we might use another term with Platonic origins, namely 'timarchic collaboration.' For, in common with Plato’s description in the Republic of a society divided by internal strife and characterised by conflict and selfish ambition, this last type of group was born out of dissent and disagreement. Most groups found it necessary to meet up at least once a week outside of allocated studio time. As many students worked part-time (indeed some believe it is possible to work full-time and study part-time for a full-time course), groups found it difficult to get all together in one place at the same time. Even when regular meetings were agreed upon, absenteeism was a familiar complaint. What this commonly led to was individuals being asked to work on ‘their part’ until the next studio session. Often the result was piecemeal design with little cohesion – a kit of parts with little to unite it. Indeed, once this model of team working was established (and accepted in desperation by the tutors), most subsequent failures of teams to bond, due to either clashing egos or other failures to communicate – to listen to team-mates, to resolve conflicts, to generate ideas and develop them – led to this common solution; namely, the piecemeal design of parts defined merely by an allocated footprint. The problem of piecemeal design was, it must be admitted, exacerbated by the explicit demand in the brief that each student must eventually, and - as needs might be - selfishly, focus on a ‘separately appraisable element.’ For 2004, it was decided that in order to at least not encourage this situation, the requirement for a separately appraisable piece of work would only be introduced towards the end of the project when presentation became the prime focus of the students, for presentation by it’s very nature demands the sharing out of required drawings and models. To further encourage team-working, it was also decided in 2004 that a division of final submission marks between group and individual contribution would be weighted sixty/forty in favour of group work.

4.2 Role-play

Despite the fact that client groups were given clear instructions to criticise constructively in order to advance a design solution in collaboration with their design groups, this is not what happened in practice. Client groups either gave little or lackadaisical feedback, or, conversely, made specific and/or inflexible demands at odds with the design group’s intentions. Design groups often felt that such demands were unfair and, in some cases (with some justification) deliberately obstructive in order to achieve a competitive advantage. Although competition in the design studio is often productive, here it was certainly counter-productive and indeed counter to the intentions of the programme. As students had yet to experience how they might learn in collaboration as much from each other as from their tutors, a notion that the teaching staff tried to nurture, they felt they had little to gain from these meetings. This was a perception heightened by the fact that the meetings were not part of the tuition or assessment programme. Thus, for 2004, it was decided to make the minutes of and reflection upon the design/client group meetings part of an assessed weekly design report.

4.3 Assessment

After only a few weeks into the project, it became clear that the more conscientious students were aggrieved by what they saw as an inequality of workloads. As one student complained, “it is easy to free-ride in a group, and, unfairly, it is us the hard workers that have to carry the lazy ones.” It became clear from this point in time that a mechanism would have to be built into the appraisal of the projects that appeased these grievances - that rewarded those putting in the effort whilst penalising those that were not. It was therefore soon made clear to the students that after the final review they would be asked to self-assess each other’s contribution to the team. The self-assessment method was adapted from one that for some years had been successfully used in another course within the school. The method relied on every student marking each other out of a possible five for both ‘individual contribution’ and ‘team contribution’. A student’s total score was then divided by the average total score to give a multiplier by which their grade would be adjusted. Thus, if all the students in a group awarded each other ten out of ten, each would have a multiplier of one, and all grades would be equal. This system achieved the prime objective of appeasing those who felt aggrieved, but suffered from two problems. Firstly, it relied on every student in the group filling out the assessment sheet and handing it in. Often those that had most to lose from the system, i.e. the less motivated students, had little motivation to complete the forms. This greatly delayed the marking process. The next time the project was run in 2004, the self-assessment system was introduced at an early stage and made compulsory with strictly enforced late submission penalties. The second problem was that with only one self-assessment, the adjustment of grades could be in the extreme. If a number of students were feeling particularly vindictive, for whatever reason, their exaggerated misallocation of marks could unfairly penalise team-mates. In one case, two students were allocated 1.3 times the assessed project grade whilst their team-mate – with whom there had been a personality clash but who was certainly not a fail student – received 40% of their assessed grade. Without the intervention of the unit co-ordinator, this would have resulted in two higher distinctions in comparison to a low fail, when perhaps a fair assessment would have seen only a few percentage points separating the three. An obvious solution to this problem, and that pursued in 2004, was continuous self-assessment – on a weekly basis as it turned out – to even-out anomalous or unfair scoring across the semester.
4.4 Student Results
Two statistics stand out from the results of the 2003 cohort. The first can be seen from the distribution of results for the group project, namely that 40% of students achieved marks that were outside of one standard deviation from the mean mark of 55.3%. This compares to the 32% that can be expected from a normal distribution. It should be noted here that marks are not adjusted at Deakin to distribute them according to the normal distribution bell curve. This high number of fails and of distinction or higher students was due to the large combined total of democratic collaborative groups consisting of high and low achievers and high achieving oligarchic groups. A high proportion that, as has been noted, highlighted especially to the low achieving students what they perceived as a chasm in the comparative quality of the poor and exceptional design projects. In 2004, it was decided to counter this problem by engineering teams to contain a range of different experiences and abilities. Moreover, it was also decided to take advantage of this engineering by equally distributing overseas students and thus countering the isolation that many of them felt when left to work with each other (which is what usually happened when groups were self-selected). The second statistic was even more prominent, and gave the teaching staff perhaps their greatest encouragement to continue with group teaching. Namely, that the average mark achieved by students for the group project was 3.5 percentage points higher than that which they achieved for the subsequent individual design project. The contrast in performance was not only seen in student marks, for the studios were perceptively less industrious and less populated during the second half of semester when the individual design projects were taught. A third statistic that came from the anonymous course evaluation forms that students are asked to fill out at the end of each semester also offered encouragement. Thirty percent of the cohort responded in this survey, in which they had to rate the question ‘this unit developed my ability to work as a team member’ along a scale of one to five corresponding to the statements ‘strongly disagree’ to ‘strongly agree’. The mean score for this question was high at 3.5, with a standard deviation of 1.03 (the university average for this question is 3.2 with a standard deviation of 1.21). Indeed, over 50% of the students rated this question as 4 or above, indicating that their experience of team working had indeed been a positive one.

5. THE 2004 DESIGN BRIEF
In addition to the above noted changes concerning the selection of groups, their assessment and the need to reinforce client and design group roles, in the 2004 version of Atelier Geelong there were further responses to the experiences of 2003. The first significant further change was to increase the size of the groups from three to six, for this is the number that the majority of educators find is the most effective for collaborative learning. A second further response was prompted by a number of general comments students made in anonymous feedback sheets. Much of this comment focused, without prompting, on the pros and cons of team-working, and suggested than many of the significant problems that students experienced arose from their lack of team-work skills. It was therefore decided to attempt to teach some of these skills at the outset of the 2004 first semester. This was done by adapting to the programme a ‘team building’ esquisse and two workshops developed by the CUDE project at Sheffield University School of Architecture. The aims of the workshops, as summarised from the description of the CUDE project (Fisher, 2000), were as follows:

i) To develop respect for different contributions and points of view.

ii) To recognise the different team role preferences within a group and explore how these might be used to benefit the group.

iii) To plan how the group will work together by devising team contracts, including guidelines for behaviour, and agreeing methods for working to these for the duration of the project.

iv) To devise methods of generating ideas as a team, of rejecting and selecting ideas for further development, and of resolving possible conflicts.

v) To build in to a group’s collaboration a process of reflecting on the effectiveness of their team-working through discussion, teams journals and project records.

Deakin School of Architecture and Building responded to the challenges highlighted by the first year of research into collaborative design teaching and learning in one further way. An educational social worker from Deakin Student Life Support Services was invited to collaborate with design tutors across the school to analyse - through qualitative and quantitative methods of data collection - student and staff experience of group work, and thus explore the need for additional support resources to assist and promote such group work. The findings of this analysis will be discussed in the concluding passages of this paper.

6. FURTHER FINDINGS
In common with the student responses given to the CUDE team, students at Deakin voiced in their end of semester feedback for 2004 an almost unanimous appreciation of the manner in which the team-working workshops highlighted (if not actually ‘taught’ as such) the significance of the skills necessary for effective collaboration. At Deakin, the learning of these skills came from the subsequent frequent focus on them throughout the semester. The steadiness of this focus was achieved by asking the students to reflect on the effectiveness of their collaborative skills in weekly-assessed reports. The initial purpose of these reports had been threefold, namely – firstly to record and assess the outcomes of client/design group meetings, secondly, to allow for tutor assessment of progress and student self-assessment throughout the semester (that might highlight problems within teams), and, thirdly, to spread assessment and thus workload throughout the project. The reports were effective in achieving the first two of these aims – design/client group meetings became a well-attended and productive forum, and the self-assessment anomalies that had unfairly over-compensated some students’ marks in 2003 were largely resolved. The addition of these reports to the programme had not however spread the workload; it merely, in the perception of students, increased it. The intention of the reports had been to encourage a staged progression of design that might alleviate
the characteristic working pattern of school design studios that often sees the majority of work produced during the later stages of a project. Students saw, however, the activity of design as separate to their learning of collaborative skills, and thus the frequent focus on the processes of collaboration as a hindrance to design. The CUDE project had stated two important constraints in their approach (Fisher, 2000, p. 140), namely that “nothing was to be lost from the course to make way for the development of these [team] skills” and that “any interventions must support the students’ design work and contribute to the design projects.” It would seem that the weekly design reports failed in this. Significantly, it might be suggested that this failure merely emphasises the need to work within the constraints suggested by the CUDE team. A solution to this failure offered to those intending to adopt similar methods might simply be to remove reflection on the collaborative process to a period in the programme after the final review and before final assessment. The focus on reflection would therefore merely be implicit in the requirement for weekly self-assessment by students.

In order to conclude the further findings of our research at Deakin, it would be sensible to revert to the sub-headings adopted earlier in this paper, namely – Group Dynamics, Role Play, Assessment and Student Results.

6.1 Group Dynamics in 2004

The allocation of students to larger teams, containing a range of different experiences and abilities, at once evened out the significant disparity in quality of work that in 2003 had so undermined the self-confidence of low achieving students. In 2004, none of the teams lagged behind significantly. Indeed, in 2004 not one team failed the group project Atelier Geelong. Thus, it can be seen that the engineering of teams was successful in its prime objective of improving the performance of the weaker students. It was also, on the face of it, successful in integrating the overseas students into the cohort. For, whereas the unit evaluation question “my experience in this unit encouraged me to value perspectives of people from different cultures,” had rated only a 2.9 in 2003, in 2004 it rated a very positive 3.8. Yet these significant victories were achieved at a great cost. For, the distribution of the three modes of group-organisation saw a large increase in the proportion of teams that could be described as timarchic collaborators. Grouping strangers rather than friends together (and there are a surprisingly large number of students in a cohort of almost one hundred that do not know each other), led to much more internal strife and conflict. 'Spat dummies' as one student rather charmingly put it, were a common occurrence. Indeed, one significant incident, unprecedented in the experience of all who teach within the school, saw a significant alteration between two students. This eventually saw one of the students suspended from the school for two weeks and the need for a security guard to be posted at an interim review. Although it is likely that the incident was a one off borne out of an extreme clash of personalities, it was well publicised amongst the student body and hence the repercussions of it are still being felt. The experience nurtured a perception that the engineering of students into groups benefited the tutors, who no longer had to deal with ‘remedial’ groups, rather than the students themselves. In its prominence and notoriety, the incident also overshadowed the feeling of a significant number of students that the diversity and often the inherent hierarchy of a mixed group enhanced collaboration. As one student put it in a sentiments summing up the advantages and disadvantages of allocated groups (Anderson, 2004, p. 23-4),

‘Has working in an allocated group been a positive or negative experience? Both because I may not have enjoyed any of the experience, finding it stressful and upsetting due to group dynamics and personality clashes but it was a positive learning experience about how to work with people that you don’t know or get along with or don’t respect you. I also learnt a lot about my own flaws and ideas that I can bend and adapt to work better with people in the future. The mixed feelings for the 2004 version of Atelier Geelong can be summed up in the fact that although 77% of the cohort stated that the group project had offered positive experiences of group working, 54% of the cohort identified, in ten responses, ‘choosing your own group’ as the change that would make the experience more positive. Significantly, 52% of the cohort also identified the desire for smaller groups as the next most popular change to be made. For the problems of collaborative designing, at least in the school studio, were seemingly exacerbated in larger groups. A significant reason for this is one that shall be discussed when looking at role-play, namely a lack of hierarchy – a problem that was amplified in larger groups. Before we move on to this let us however summarise our findings on the dynamics of different group structures by establishing the principles relating to this that shall be adopted and refined for the further period of this research at Deakin. For 2005, the Atelier project will ask the cohort to self-select themselves into groups of four. However, diversity in these groups shall be encouraged by adding controls to this self-selection process. For, students will be asked to form groups within diverse pools that may not necessarily contain their friends, as these pools will be assembled according to diverse personality natures identified by type indicators such as the Myers-Briggs test. This type of test has already been found within the faculty to be a ‘fun’ way of assessing and identifying the different team role preferences that can benefit collaborative working. It remains to be seen whether the best of both worlds of self-selection and group diversity is indeed achievable.

6.2 Role-play in 2004

The responses of two students sum up a problem voiced regularly relating to the lack of hierarchy within the groups (Anderson, 2004, p.25, p.28).

‘If it’s not on the students’ part to choose their team members there’s a whole lot of problems. In working atmosphere, people have different posts so it doesn’t cause problems.

I (personally) find that I work a lot better on my own. My own skills improve when it’s my own project. Working in groups in a work environment is a lot better. It has structure and a definite leader (You also have designated working time together i.e. 9 – 5pm).

The question of hierarchy within the groups is important seemingly for two reasons. The first relates to a perception touched upon by both of these students and echoed by many of their peers, for although 68% of students saw the purpose of the project as preparation for employment, many saw it as an unrealistic construct of professional practice, for practitioners, unlike themselves, have clearly differentiated and ordered roles. This perception not only undermined the credibility of the group project as a mode of teaching the collaborative skills needed to negotiate the building design process, it also undermined the collaboration of the groups themselves. For, without clear leadership
within a team it is often impossible to make decisions, or rather the decisions that are made are merely those that offend the least. Most students recognised that these “lowest common denominator” decisions were not always the best. Although the allocation of students to diverse groups sometimes led to the identification of a dominant leader or leaders, and these oligarchic groups in both the 2003 and 2004 semesters produced the best work, this was not the case for the majority of groups. It is our feeling after two years of this research that all teams should elect a team leader or spokesperson, but that the focus on this leader should be made less sharp by providing a leader at the next level of hierarchy in the design tutors themselves. In order to avoid leading the design process, tutors will need to adopt 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 these ideas. This directs us to a final conclusion in relation to role definition, and that is the nature of the role of the teaching staff themselves in collaborative design projects. When asked what would make group work more a positive experience, 35% of students stated that greater staff support in the process of collaboration itself was necessary. Although this shall be returned to soon, suffice to say for now that for 2005 a major change that will be made to studio teaching will be to more tightly structure tutor interaction. During the last two years, tutors did not allocate tutorial times in order to avoid students attending studio during these times alone.

Yet, whereas studio attendance can often be erratic during individual projects, we have found that during group projects studios are a hive of activity. Tutorial times might therefore be better allocated to coincide with design/client group meetings held throughout the day. Tutors can act then as mediators in design decisions and play an active role in conflict resolution – a role for which many students seek support.

6.3 Assessment in 2004

Although continuous self-assessment has solved many of the problems of unrealistic allocation of marks, it would seem from the Deakin Student Life Support report of student experiences that fair assessment is still a major concern. Indeed, out of eighteen comments made on the negative experience of group working, twelve focused on the thorny topic of assessment. The following two statements were typical of these (Anderson, 2000, pp.24-5):

- Because some people are slack and as a result, the people who do the work have to do extra to compensate for it.
- All the while the people who do nothing reap the rewards of the people who do the work.

The first project we did we were put into groups, this was a very bad choice! We had 6 in our group, 5 of the members were fantastic, but the other one was terrible and did no work. We had the work structured into individual and group posters. The people who did more work on the group posters didn’t have time to do their individual posters and some failed their individual mark. Group work works in some situations but is hard in others. Altogether, you get a worse or unfair mark in group work.

Perhaps the greatest cause of these problems was the choice of self-assessment that was given to teams when they were compiling their team contracts that would define how they would work together. After discussion with the cohort as a whole the students devised three options of mark allocation, either by round the table ‘bargaining’ with each other, by secret ballot, or by simply agreeing to ‘work as a team’ and thus to allocate marks evenly. It was amongst the teams that (in retrospect rather naively) chose the third option, and this was the majority of teams, that most problems arose. For, as might be expected in a group of six, not everyone pulled their weight, and this unfortunately gave rise to a growing resentment that undermined the teams and their somewhat idealistic intentions. In contrast, the teams that adopted the two assessment methods that allowed for penalty and reward saw the allocation of marks as fair. Significantly, the vast majority of students in these teams described in their reflective portfolios the group project as a positive learning experience. The two methods of continuous self-assessment chosen by these contented teams will certainly act as a model for all future collaborative design projects taught at Deakin.

6.4 Student Results in 2004

It can be seen from the graph illustrated in Figure 1 that the distribution of grades across the 2004 cohort does not quite correspond to the bell curve of normal distribution. For, 90% of students, rather than the 68% of a normal distribution, lie within one standard deviation of the mean grade. By uniformly allocating students to teams according to ability (as indicated by their grades in the previous semester), the grades of the groups were effectively evened out. Significantly, not one group failed the project, yet in line with this there was only one higher distinction project – a grade, incidentally, awarded to an oligarchic collaborative team led by one of the most talented students of recent years at Deakin. This levelling of grades rather supports the statement of one student that “by putting us into groups in a combination of strong and weak students it’s going to create problems where the strong students have to carry the weak. The strong students just get dragged down and the weak students pulled up – is that fair?” The answer to this question is entirely dependant, of course, on who is asked it. For the weak student is likely to have a very different view to that of the strong student. Yet although it is arguable whether the more even distribution of marks is desirable, the level of marks across the year would certainly indicate that group working is becoming a success, if not an altogether popular one. For significantly in 2004, the average mark of 66% for the project group was an extraordinary eight percentage points higher than the 58% average achieved by the same students for the subsequent individual project. Moreover, a comparison between the performance of this cohort and that of the previous year’s cohort leads to further deductions. For, whereas the 2004 cohort outperformed the 2003 cohort by only 1.8 percentage points for the second semester second year design course, and by an average of 1.6 percentage points across all other courses, in the Atelier Geelong project the 2004 students outperformed those of 2003 by 7 percentage points. This might lead to the deduction that the teaching of collaboration skills in 2004 increased the effectiveness of the Atelier project as a learning experience.
7. CONCLUSIONS

The outstanding findings of the research at Deakin thus far are that students’ performance is appreciatively higher for group design projects compared to individual projects, and that this improved performance is enhanced further when collaborative skills are taught as part of the group projects. A successful pedagogy for collaborative design projects must, it would seem, include the teaching of collaborative team-working skills. Moreover, student feedback indicates that collaboration would be a more positive experience if there are less than six persons in a group, and if students have a degree of control over the selection of these groups and in the assessment of their work. Although students would prefer to self-select groups, it has been found that the performance of the cohort as a whole appears to increase when groups are engineered to contain a range of experience and abilities. It is suggested therefore that groups should be self-selecting according to rules that encourage their diversity. It has also been found that students found self-assessment to be more manageable and a more accurate reflection of their efforts when it is continuous throughout a project and, furthermore, allows for reward and for penalty. The Deakin Student Life Support report has further concluded that (Anderson, 2000, p.13):

While group work has been a positive experience for the majority of students this appears to be variable and dependant on a number of factors...These may include personality types, age of participants, gender of individuals, and level of maturity, motivation and cultural factors. These factors may contribute to the overall cohesiveness of the group and an individual’s ability or willingness to participate...While staff cannot be completely responsible for group work processes and functioning given the notion of experiential and adult learning, they can provide students with greater support in the provision of resources.

This final sentence highlights what is perhaps the feeling of most involved in this research project to date. For what has become clear from adopting the CUDE model is that students need help to develop the communication skills essential for effective collaboration, and that this help must come from tutors who have the time, and moreover the training, to carefully teach and even model these skills. In other words, the notion that group projects demands less teaching resources is based on something of a false economy.

REFERENCES

Burgess, G. (2004) as quoted by Bernard Lane, urban affairs writer in “Less ego, more soul the key to good design” in The Australian, Wednesday March 24, p.9.