

Bad attitudes: Why design students dislike teamwork

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Abstract

Positive experiences of teamwork in design contexts significantly improve students' satisfaction with teaching and their attitudes towards future teamwork. Thus, an understanding of the factors leading to negative and positive team experiences can inform strategies to support effective teamwork. This paper examines design students' perceptions and experiences of teamwork. Three sources of qualitative data were analysed: a pilot survey completed by 198 design students in four institutions; five focus groups with 23 students; and a national survey completed by 417 students from 18 Australian universities. Students were from a range of design disciplines, with the majority studying architecture. The findings provide insights into issues and challenges of learning how to design in teamwork contexts, in particular the importance of adopting strategies to promote individual accountability within a team and ensuring fair assessment that acknowledges levels of individual contributions. The paper concludes with recommendations for teachers.

Keywords

student teamwork experience; assessment; design teaching

Introduction

Teamwork skills are essential in the design industry where practitioners negotiate often-conflicting design options in multi-disciplinary teams. Indeed, many of the bodies that accredit design degrees explicitly list teamwork skills as essential attributes of design graduates. In addition to the need to meet the demands of accrediting bodies, there are many reasons for the ubiquitous use of teamwork assignments in design schools. Teamwork learning is seen as being representative of work in a professional practice where design is nearly always a collaborative activity. Educators also recognise that teamwork can lead to an improvement in student learning due to: the development of social behavioural skills (Cohen, 1994; Goldfinch & Raeside, 1990), higher order thinking (Cohen, 1994), and critical thinking skills (Dochy, Segers et al., 1999; Gokhale, 1995; Sluijsmans, Dochy et al., 1999), the capacity for lifelong learning (Hanrahan & Isaacs, 2001), moving students from a passive to more active learning role (McGourty, Dominick et al., 1998), the ability to tackle more substantially-sized assessment projects (Goldfinch & Raeside 1990), and peer learning within teams (van den Berg, Admiraal et al., 2006).

Learning and teaching in teamwork design contexts are not without particular challenges, two of which this paper will consider in detail. First, many students graduate without having been taught the knowledge and skills of how to design in teams. Secondly, assessment tends to overlook the processes of teamwork in favour of the products of teamwork. Thus Knight (2002), for example, criticises “process-blindness” in traditional individual assessment approaches suggesting that assessment focusing on final products fails to acknowledge the learning processes involved. This process-blindness also often leads to a failure to acknowledge individual contributions to teamwork in assessment (see, for example, Kuisma, 2007; Nordberg, 2008), a problem identified as a prominent concern for students of the built environment (Tucker, 2011b).

This paper examines design students’ attitudes towards and experiences of teamwork assignments focusing on their understanding of the rationale for teamwork and the factors contributing to any dissatisfaction with their teamwork experiences. A brief review of the literature in this area is followed by an analysis of qualitative data from open-ended questions included in surveys completed by design students between 2011 and 2013. In addition, findings from focus groups are presented. Drawing upon the key themes that emerged from students’ comments, a detailed discussion follows on three topics: (1) fair assessment of teamwork (acknowledging individual contributions); (2) teaching teamwork skills; and (3) team formation approaches. The paper concludes with recommendations for design educators wishing to support positive team learning experiences.

Context and Background

The study reported in this paper was carried out as a part of a project funded by the Australian Government Office for Learning and Teaching, *Enhancing and Assessing Group and Team Learning in Architecture and related Design Contexts, 2011-2014*¹. The project addressed three primary topics: (1) how best to teach teamwork skills in the context of design; (2) how best to assess teamwork skills and team processes; and (3) strategies to fairly assess individual contributions to team-produced designs. Following an extensive review of research from a wide range of disciplines, the project included an examination of teaching practices in Australian higher education institutions through focus groups, online surveys of students and design educators, and two teaching symposia attended by academics from across the design disciplines.

Students’ attitudes towards teamwork

Teamwork in educational contexts has had a mixed reception from students. For some, group activities are more interesting, entertaining and supportive of learning than traditional teaching (for example, Bacon, Stewart, & Silver, 1999; Marin-Garcia & Mauri, 2007). Researchers have reported higher education students’ views of engagement in team and group work as a generally satisfying and productive learning experience (see, for example, Espey, 2010; Gillespie, Rosamond, & Thomas, 2006). In a survey of 264 university students, Van Duyne (1993) found an overall positive view of teamwork, with a mean score of 3.82 for attitude towards group work (on a scale of 1 to 5, with 5 being very favourable). In another survey of 172 undergraduate students, examining the perceptions and satisfaction with cooperative learning strategies, Hagen (1996) found overwhelmingly positive student feedback. Other research provides further evidence for students’ positive perceptions of team and group work (An & Kim, 2007; Burdett, 2003; Orr, 2010; Walker, 2001).

¹ For more information, see <http://olt.gov.au/project-enhancing-and-assessing-group-and-team-learning-architecture-and-related-design-contexts-201>

While some students view team projects as effective preparation for their future employment, others are sceptical about their value, believing that “the way group work is carried out and assessed in universities is rarely the way it is carried out or evaluated in ‘the real world’” and perceiving team assignments simply as “a tool used by academic staff primarily to reduce their workload” (James, McInnis, & Devlin, 2002, p. 49). As Ulloa and Adams (2004) stated, results from initiatives aiming to encourage teamwork and collaborative learning in universities have shown that “students recognize that the teaming experience improves their interpersonal skills, yet they still prefer work individually” (p. 145). Such negative attitudes towards teamwork largely originate from students’ previous negative experiences of working in teams (Krug, 1997; Ulloa & Adams, 2004). We shall briefly consider now the factors identified in the literature that impact student experiences of teamwork.

Determinants of students’ attitudes towards teamwork

In a survey of 344 final year business degree students about their experiences of teamwork, Burdett (2003) found that positive attitudes were associated with equal workload and fair assessment. Students who held positive perceptions of teamwork were more likely to believe that: “the workload was fairly shared,” “they could not have achieved better outcomes when working alone,” and “marks awarded were generally fair” (Burdett, 2003, p. 182). Other researchers also report correlation between students’ perceptions of fair assessment and positive attitudes towards team experiences. Chapman and Auken (2001), for example, found that students are more likely to have positive attitudes about group work when the teachers used “methods to evaluate individual performance within the group (e.g., peer evaluations)” (p. 117). Following the inclusion of peer assessment in small group projects, Walker (2001) found that students were much more positive towards group work. Similarly, in a study by Pfaff and Huddleston (2003), the use of peer evaluations was suggested to be a significant predictor of students’ attitudes toward teamwork. It was noted that the “measures [that] allow students to feel that they are in more control of the result of their efforts” include being able to report team members’ different levels of contributions (Pfaff & Huddleston, 2003, p. 43).

Other research has examined the impacts of team formation methods, team composition and gender on students’ attitudes toward teamwork. Chapman et al. (2006) found that “the method of group member assignment does influence group dynamics, attitudes toward the group experience, and group outcomes” (p. 557). In a study of students’ team experiences and attitudes in hospitality management courses, Ro and Choi (2011) found that “female students have attitudes toward team-based work that are more negative than male students” (p. 149). In another study of the influence of race, age, and the presence of “social-loafers” on students’ perceptions, Payne and Monk-Turner (2006) found no significant difference in attitudes across gender and age groups. However, their results showed that “working with ‘slackers’ has a strong influence on attitudes” (p.132). The influence of teaching on students’ attitudes towards teamwork has also been addressed. In particular, students have been found to be more likely to have positive attitudes about working in groups if the teachers provided some levels of training on teamwork and discussed group management issues (Chapman & Auken, 2001).

Method

The data informing this paper is drawn from two surveys of student experiences of teamwork in design and a series of focus groups.

Participants

The qualitative data from students' answers to these questions was analysed by coding and counting students' comments under the major themes revealed. Throughout this paper, students' quotes are identified with a letter, namely, A, B, C and D (the institution that the student is studying in) and a number (a student in the institution).

Pilot Survey: In all, 198 students from four institutions completed the Pilot Survey. All students were enrolled in degrees in the Built Environment disciplines, with the majority studying Architecture. They represented a wide range of age, gender and course. There were 36 students (18.4%) under 20 years of age, 133 (67.9%) were 20 to 29 years old, 19 (9.7%) were 30 to 39 years old and eight (4.1%) were over 40. There were 120 (61.2%) males and 76 (38.8%) females, 160 (81.6%) undergraduates and 36 (18.4%) students enrolled in Masters by coursework programs, and 149 (76%) domestic students compared to 47 (24%) international students.

National Survey: The national survey was completed by 417 students from 18 Australian institutions (see Table 1). There were 67 students (16.1%) under 20 years of age, 252 (67.9%) were 20 to 25 years old, 45 (10.8%) were 26-30 and the rest of the participants were over 30. There were 231 (55.4%) males and 183 (43.9%) females, with 3 students choosing not to reveal their gender. There were 312 (74.8%) undergraduates, 93 students (22.3%) enrolled in Masters by coursework programs, and the rest of the participants Master by research, PhD and Other types of enrolment. Students were enrolled in a wide variety of design disciplines. There were 347 (83.2%) domestic students compared to 70 (16.8%) international students. Table 1 summarises the numbers of students completing the survey by institution.

Focus Groups: Twenty-three students from four institutions, enrolled in four design courses, attended five focus groups.

Table 1
Number of responses from design schools in Australia universities (in alphabetical order)

Institution	# Responses (N=417)	%
Australian Catholic University	2	0.5%
Australian National University	2	0.5%
Central Queensland University	29	6.9%
Deakin University	148	35.5%
Griffith University	9	2.2%
La Trobe University	1	0.2%
Queensland University of Technology	18	4.3%
Swinburne University of Technology	17	4.1%
University of Adelaide	10	2.4%
University of Canberra	1	0.2%

University of Melbourne	6	1.4%
University of Newcastle	17	4.1%
University of Queensland	39	9.3%
University of South Australia	2	0.5%
University of Tasmania	27	6.5%
University of Technology Sydney	1	0.2%
University of Western Australia	68	16.3%
Victoria University	20	4.8%

Data Collection

As noted, the data for this paper is taken from two surveys and a series of focus groups.

Surveys

Items in two surveys (a pilot and follow-up national survey) were informed by a literature review investigating the factors that impact effectiveness in teams. The surveys examined aspects of teamwork experiences that included: (1) satisfaction with teamwork in the students' most recent team assignment; (2) team size; (3) teaching of teamwork skills; (4) the level of formative feedback on teamworking; (5) the method by which teams were formed; (6) whether the students considered that the product of their teamwork was fairly assessed to recognise individual contributions; and (7) whether "at least one teammate had made little or no contribution to the teamwork."

After a brief introduction, plain language and consent statements, the surveys commenced with sections on Student Demographics, including questions about age range, gender, institution and the nature of the program that the student was enrolled in. Both surveys included a section to determine Student Learning Styles, with questions from the Kolb Learning-Style Inventory (Kolb, 1985). While the Pilot Survey opened with the Learning Style section, the National Survey opened with sections on Experiences of and Satisfaction with Teamwork and ended with Learning Styles. This change was due to a high dropout rate at the Learning Style section in the Pilot Survey. In addition to Likert-scale questions asking students to rate their levels of satisfaction with teamwork assignments, open-ended questions were included. In this paper, two of these open-ended questions are closely examined:

- *What is your understanding of the reasons for group projects within your current course?*
- *If you are unsatisfied in your degree program with any of the aspects of your group/teamwork learning experiences, please tell us why?*

Focus Groups

At the beginning of each of the five focus group sessions, the facilitator gave students a series of 9 statements in relation to the teamwork assignments in their courses (Table 2). Students were asked to spend five minutes specifying their level of agreement or disagreement with those statements. The facilitator then asked students to discuss their choices and provide elucidating details.

Results

The results from the data collection instruments provided a rich source of student reactions and responses to group work. This section begins with a summary of the findings of the focus groups before combining the findings from the pilot and national survey into salient themes.

Focus Groups

Table 2 lists the nine statements presented to participants. It summarises their responses on a 5-point Likert scale (Strongly Agree to Strongly Disagree). The findings show a general agreement with the processes of team work in their design courses. This data provides a context for the analysis of survey data.

Table 2

A summary of focus group participants' experiences of teamwork in their design courses

	SA	A	U	D	SD
	(%)	(%)	(%)	(%)	(%)
1. Teamwork and group work in my course has been a positive experience.	26	61	13	0	0
2. The teaching of collaborative design skills has been successful.	4	65	22	9	0
3. The teaching of generic teamwork skills has been unsuccessful.	4	13	22	61	0
4. The ways that groups and teams were formed was successful.	30	44	26	0	0
5. I was satisfied with the method of assessing team-and-group work.	22	48	26	4	0
6. I think the process of teamwork should be assessed.	13	61	26	0	0
7. I think teamwork skills should not be assessed.	0	13	13	61	13
8. I think student should be taught how to deal with conflict.	31	52	13	4	0
9. I think that teachers are not needed to help students manage conflict in their teams.	0	9	9	65	17

Notes to Table: SA (Strongly Agree); A (Agree); U (Undecided); D (Disagree); SD (Strongly Disagree)

Surveys

The data from the two surveys is presented here as a response to the previously provided questions. These are:

- *What is your understanding of the reasons for group projects within your current course, which asks students about their understanding of the rationale for team work; and,*
- *If you are unsatisfied in your degree program with any of the aspects of your group/teamwork learning experiences, please tell us why, which sought to determine students' reasons for dissatisfaction with team work.*

Design students' understanding of rationales for teamwork (Pilot Survey)

Students' perception of "rationales for teamwork" was only addressed in Pilot Survey. A total of 205 usable students' comments were recorded and coded under four themes (Table 3).

Table 3
Design students' understanding of rationales for teamwork

Themes emerged from students' comments	<i>n</i>	%
Preparation for professional practice	106	51.71%
Developing social and interpersonal skills	80	39.02%
Cost and time efficient educational policies and teaching methods	12	5.85%
Highly negative and sceptical views	7	3.41%

Preparation for professional practice. The most common theme was preparation for professional practice ($n=106$, 51.7%). This implies that students believed that teamwork was provided to help them develop the team skills necessary for designing in the workplace. The comments suggested that students understand the reality that design practice is dominated by teamwork. For example, A1 suggested that:

The uni is trying to reproduce a work place environment where you do not get to choose who you work with and get an understanding of working with other people. Architecture and construction is always going to be about teamwork and dealing with many people within a project. (A1)

Learning social and interpersonal skills. The second major theme related to the benefits of teamwork in developing social and interpersonal skills, namely, communication, collaboration and negotiation. The students did not specifically relate these skills to practice, but the overlap with practice preparation is clear. A2 commented that:

[Teamwork] encourages collaboration, combines individual skills, allows for greater volume of research/knowledge gain over a given time frame, teaches respect for diversity of opinion, cross-fertilisation of ideas and skills, provides a shared experience, develops fellowship and friendship. (A2)

Cost and time efficient educational policies and teaching methods: Contrasting to positive attitudes to teamwork and its benefits, 12 students' comments (5.85%) reflect the view that the use of teamwork assignments is related to cost and time efficiency, motivated by the aim of teachers to reduce their marking loads. This findings echo those of the 2002 study of James, McInnis, & Devlin.

Highly negative and sceptical views: Seven students (3.41%) also expressed other highly sceptical views of teamwork. Their views are encompassed in the following discussion of overall dissatisfaction.

Reasons for dissatisfaction with team work

In ascertaining students' dissatisfaction with team work, 86 relevant student comments from the Pilot Survey and 185 student comments from the National Survey were coded into 8 broad themes representing the factors contributing to negative teamwork experiences (Table 4, Figure 1).

Table 4

Factors accounting for negative teamwork learning experiences, findings of Pilot and National surveys, sorted by total comments

Themes emerged from students' comments	Pilot (N=86)		National (N=185)		Total (N=271)	
	#	%	#	%	#	%
Unequal workload contributions	66	76.74	48	25.95	114	42.07
Individual differences	62	72.09	36	19.46	98	36.16
Unfair or inappropriate assessment	53	61.63	45	24.32	98	36.16
Team process-related issues	28	32.56	35	18.92	63	23.25
Team formation methods	8	9.30	22	11.89	30	11.07
Lack of appropriate training and support on teamwork skills	4	4.65	19	10.27	23	8.49
Task design-related issues	9	10.47	11	5.95	20	7.38
Too much teamwork in the degree program in an academic period	7	8.14	6	3.24	13	4.8
Dominating team members	10	11.63			10	3.69

This data can also be represented as a simple graph showing the issues and the weight given to them by students in both surveys (Figure 1). Interestingly, there was little comparability in the percentages from the two surveys. Investigating this phenomenon is beyond the scope of this paper and may well be rooted in local contextual issues.

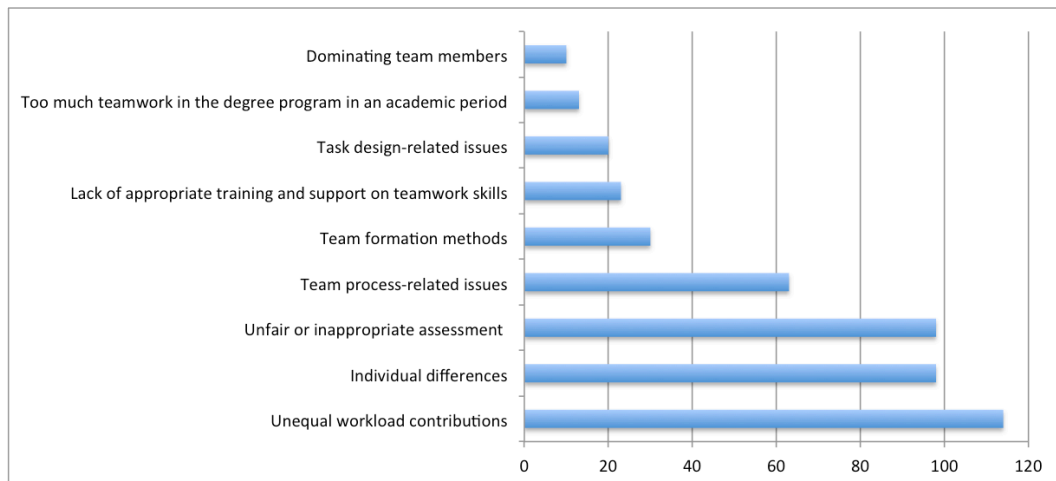


Figure 1. Comparison of factors accounting for negative teamwork learning experiences (in descending order)

These themes can be further grouped into three categories: (1) unequal contributions and unfair assessment, (2) individual differences between students and other issues arising from the process of designing, and (3) pedagogical factors including team formation, task design and teaching.

1. Unequal contributions and unfair assessment

The most cited individual factor leading to dissatisfaction with teamwork was unequal workload contributions ($n=114$, 42.07%), that is, the presence of “social loafers,” poor engagement in team meetings, and the poor quality of work contributed. The second (equal) most cited reason was unfair or inappropriate assessment ($n=98$, 36.16%), a concern clearly related to a desire for assessment reflecting contributions teamwork that could minimise the impact on student marks of social loafing. The issue of uneven contribution was suggested to be associated with a lack of repercussion or failure to hold individual team members accountable for their actions. B1 commented that:

Those students who don't contribute aren't really held accountable. I feel as though they are passing these courses by relying on myself and other productive group members to complete or strengthen their sections at the expense of the quality of my learning experience. (B1)

Regarding unfair or inappropriate assessment, specific references were made to: (1) a lack of individual accountability in the assessment strategies adopted ($n=27$); (2) problems with self- and peer-assessment ($n=7$); and other assessment issues ($n=19$). As might be expected, reference to the issue of unfair assessment was almost always associated with unequal contributions to team workloads. Students generally believed that it is unfair to assign the same team mark to different team members whose contributions may have not been the same. C1 suggested that:

Where there is no individual mark/grading of the process parties can behave in an unaccountable manner and have no incentive to comply/participate in a collegiate manner. (C1)

The references to assessment as a reason for dissatisfaction with teamwork experiences reflects research we have published elsewhere on the detailed analysis of the quantitative data from the pilot survey (Tucker & Abbasi, 2014a, 2014b), which showed student satisfaction with the outcomes and processes of teamwork to significantly correlate with: (1) the presence of free-riders in teams; and (2) student perceptions of whether assessment was fair. Not surprisingly, students in the focus groups echoed these concerns, highlighting the need to monitor team processes and provide feedback and support especially when teams are in conflict and/or facing the challenge of social loafers (see Table 2).

While there was some criticism about the use of self-and-peer assessment, students suggested that this could alleviate conflict in teams by addressing the problem of non-contributing members. Participants from three courses discussed the importance of individualised marks, or including components of teamwork projects that are marked individually. A3 commented that:

... we were also assessed on ... – a personal reflection – and that was also taken into consideration. So there was still that individual component we still had that personal control over ... it wasn't left to a full group mark. (A3)

Participants from all five courses addressed the need for ongoing assessment and feedback on team processes. In one unit, students generally believed that they received feedback on the content of the unit but not on teamwork processes or how they functioned as a team.

2. Individual differences and process-related issues

References to individual differences occurred 98 times (36.16%) across both surveys. These related to individual differences in terms of abilities, skills, knowledge, personalities and attitudes to teamwork as well as varied levels of motivation, commitment, expectations and standards of quality and the effect of these differences on the team climate. D1 regretfully noted that:

We couldn't come together as a group at all. Our personalities clashed terribly. (D1)

Issues concerning team processes ($n = 63$, 23.25%) that contributed to negative experiences included: (1) issues with communication and establishing team goals ($n = 22$); (2) management issues such as the coordination of tasks and time management ($n = 16$); (3) difficulty in reaching consensus or collaborative decision making ($n = 9$); (4) dealing with team conflict ($n = 6$); and (5) challenges associated with meeting together as a team ($n = 5$).

3. Team formation, task design and teaching teamwork

Students' answers also pointed to issues around teaching practices and task design. Among the factors addressed were methods of team formation ($n = 30$, 11.07%), lack of preparation or not receiving training from teachers on teamwork skills ($n = 23$, 8.49%) and inappropriate task design, namely, large team size ($n = 20$, 7.38%).

With regard to team formation, the major criticism was of teacher-assigned teams that grouped students with different expectations, standards, levels of commitment and motivation, prior skills, knowledge, personality and learning styles. These problems were also linked to accentuating issues due to individual differences. E1 observed that:

Usually group work is fine if we can choose our groups, but sometimes we have been allocated groups and this is when people do not have the same work ethic and slack off. (E1)

However, other student comments identified counter arguments for self-selected teams. For instance:

I believe students should be allocated into groups by the subject teacher. It's very rare you get to choose who you want to work with out in industry. The purpose of group work is collaboration with different people, from different backgrounds who have different ideas. (B2)

Focus group participants also expressed mixed views on this subject of team formation. Students from two cohorts expressed positive views about teacher-assigned teams viewing this as preparation for professional practice where designers may not be able choose who they work with. Students also acknowledged some benefits of having to work in teams with a diversity of individuals' skills, knowledge and background. Focus group participants from another cohort expressed positive comments about a self-selection practiced with guidance from the teacher, an approach that can be termed "teacher-directed" self-selection. B3 recalled that:

For the first two or three weeks we actually got to do this speed dating task where we moved around in groups to meet a variety of people. ... after a range of different small tasks over two or three weeks, we were actually able to choose groups for our final design assessment that we knew we'd be able to work with because we'd previously been able to test it out. (B3)

Another student, A3, reiterated the importance of giving students time to get to know each so that they could make an informed selection of teammates:

Consider how you are devising groups throughout the class ... how do people feel, when they are pressured into selecting a group on the spot, for an assignment that is worth up to 50% of their overall unit mark ... I would like to see students being given more time to think about their groups. (A4)

Students also suggested that where a student lives should be addressed in the team formation criteria to easier facilitate face-to-face meetings outside of class.

Twenty-three students (8.49%) pointed to a link between the difficulties of working in teams and a lack of appropriate teaching of teamwork skills. Specific mention is made of the need for teaching students appropriate methods of collaboration within design teams. In addition, some comments explicitly addressed a lack of instruction from the teachers about dealing with conflict within teams. For instance:

- *There is strong mix of cultures, ages and experience in my degree but there is no contribution by lecturers or tutors to assist or educate students about working in teams - it's a work-it-out-yourself approach ... this approach does not work and teams primarily exhibit dysfunctional team behaviours. (F1)*
- *The problem I have found in working within University imposed teams is that there is no 'team work' training. Therefore, if there is a difference of opinion that causes friction there is no way to definitively solve the conflict. If team work is to be imposed on students as a means of examining specific areas of work, there needs to be training involved in the teaching process. (G1)*

The fourth most frequently cited group of determinants of negative teamwork experiences in both surveys (combined) were issues related to team processes derailed by inadequate teamwork skills, namely, poor coordination of tasks, time management, ineffective communication, team decision making and team conflict. In contrast, the focus group participants who had received explicit teaching on teamwork skills generally held positive views about this training. Some of those who had not received explicit teamwork skills training identified their first year as the right time to address this gap, while others suggested that these skills should be experientially learned across the course by students. With regard to collaborative design skills, some students believed that they were not really taught how to design in teams.

The importance here to students of being taught teamwork skills reflects research we have published elsewhere on the detailed analysis of the quantitative data from the pilot survey (Tucker & Abbasi, 2014a, 2014b), which found student satisfaction with the outcomes and processes of teamwork to significantly correlate with: (1) satisfaction with teaching of teamwork; and (2) satisfaction with process feedback on working in teams.

The task-design related issues addressed by students were: (a) team size; and (b) structure, duration and description of the team task. It was suggested that, with teams of more than seven members, it becomes challenging to address time management, schedule meetings, assign roles and evenly distribute workloads. The problem of “social loafing” was also seen to increase with team size. Projects with no clear brief were seen to make starting difficult, and projects of a short duration were seen to make completion difficult – a problem heightened with larger teams. H1 and G2 respectively noted that:

- *Recently we have had an assignment where we had to do group assignments in groups of about ten. ... it is incredibly difficult to organise this many people and to arrange meetings/site visits. ... Also this number of people makes it difficult for equal distribution of work. (H1)*
- *The more people involved in a design project, the more communication and time is needed to satisfy all parties and to produce quality work. These assignments should be given more time to complete. (G2)*

A few students’ responses also cited too much teamwork in the degree program in an academic period ($n=13$, 4.8%) and dominating team members ($n=10$). It is of interest to note that there was no reference to “dominating team members” in the national survey and that there was a disproportionately higher representation of references to “too much teamwork” in the pilot survey. A typical comment regard dominant team members was that:

Working with such big personalities meant that my ideas were rarely heard and often totally ignored. (I1)

Recommendations

Detailed recommendations are presented on the three prime reasons identified for negative teamwork experiences. We believe that teachers can most readily address these reasons to foster more positive attitudes towards teamwork: (1) Assessment of Teamwork; (2) Team Formation; and (3) Teaching of Teamwork Skills. The issue of “individual differences” in relation to skills, abilities, prior knowledge and experiences is not discussed separately because this can be largely addressed by effective team formation. Similarly, “team process-related issues” can be addressed by providing students with explicit teaching of teamwork skills. We discuss fair assessment and unequal contributions together, because assessment that acknowledges individual contributions alleviates social loafing.

1. *Assessment of Teamwork: Examine strategies to encourage individual accountability and reduce social-loafing*

Data from both the pilot and national surveys shows that the most common reasons for students’ negative teamwork experiences is the perception of unequal contributions and social loafing. One way to address this issue is to adopt assessment strategies that individualise team marks. As one of the survey respondents, D2, stated:

There is always an uneven distribution of effort from team members. Often only a couple of people contribute while staff often turn a blind eye. It would be nice if teachers could be explicit about the minimum required of each member and build this into the mark without making it an entirely individual one. (D2)

Teachers may apply a range of tools to individualise team marks. One we strongly recommend is self- and peer-assessment (SAPA), for which there is a large body of supporting literature (see, for example, van Zundert, Sluijsmans, & van Merriënboer, 2010; Elliott & Higgins, 2005; Harris & Brown, 2013; van Gennip, Segers, & Tillema, 2010; Kearney, 2012; El-Mowafy, 2013; Shams & Tavakoli, 2014). Hanrahan and Isaacs (2001) suggested that “in order to gain benefit from peer and self-assessment schemes students first need training in the specific scheme being used; ideally they will play a role in devising the scheme” (p. 53). Freeman and McKenzie (2002) introduced a Self and Peer Assessment Resource Kit (SPARK), a web-based template aiming to improve learning from teamwork and make assessment fairer for students. The benefits of SPARK for students are suggested to be improved confidentiality and accurate assessment of relative contributions. For academics, the benefits of web-based SAPA are said to be the potential for improving student learning from teamwork tasks, and saving time in calculating self and peer adjustments of assessment grades. Willey and Gardner (2007) used another confidential online tool to gather data on the student self and peer assessment ratings that acts as both formative feedback and assessment purposes. Another SAPA tool, developed by Tucker, Fermelis and Palmer (2009, 2007), is an online Self-and-Peer-Continuous-Assessment tool (SAPCA) that was initially developed to allow for the individualisation of grades in teamwork assignments undertaken by architecture students. The tool is continuous in that students make multiple assessments at regular intervals throughout a team assignment. A one-year study has shown the tool to be robust under the most testing of educational conditions when around two thousand students in two courses in two faculties used it. Fellenz (2006b) also developed the Groupwork Peer-Evaluation Protocol (GPEP) to enable the assessment of individual contributions to graded student groupwork, provide accurate and fair assessment, support student learning and facilitate group self-management. In addition to assisting teachers in identifying free riding problems in teams, applying self- and peer-assessment may support students “to have a sense of control over their grades or provide a legitimate opportunity to express dissatisfaction with team member performance” (Pfaff & Huddleston, 2003).

In our own research published elsewhere, we have made the following summary recommendations with regards to the assessment of teamwork (Tucker & Abbasi, 2014b, p.19).

- *Assessment*

Task assessment criteria need to be determined taking into account issues such as assessment of individual contributions, students’ perception of fair assessment and assessment of both product and process of teamwork.

- Differentiate between: (1) Task performance i.e. submitted product – usually a designed artifact; and (2) Teamwork skills.
- Adopt appropriate methods of evaluating teamwork processes i.e. students’ reflective statements/journals and self-and-peer-assessment (SAPA).
- Apply methods to ensure students’ perceptions of fair assessment e.g. the use SAPA.

- *Team Formation*

Closely consider various aspects of your team formation criteria and communicate the rationales behind this to your students. If teachers assign students to teams rather than let them choose their own teammates, it is important to consider four key steps:

(1) decide on the team formation criteria;

(2) collect necessary information from students to assign them to teams based on those criteria;

(3) prepare students for the teacher-assigned team formation method by explaining the rationales and how they benefit from it; and

(4) provide guidance and support for teams to manage conflicts, because teacher-assigned teams may be prone to a high incidence of team conflicts due to differing individual expectations, standards and commitment levels.

As one of the survey respondents, J1, stated:

Because, if you don't get to select the members in your group, you don't know if they are capable of the same standard of work as you are and as a result they bring your overall grades down or you have to do the other group work yourself because the people in your group are slack. (J1)

While sound assessment strategies, effective teaching of teamwork skills, and appropriate team formation may alleviate many of the negative experiences that prevent effective teamworking and learning in team contexts, it is almost impossible to ensure only positive experiences for all students. However, negative experiences need not lead to negative attitudes to future teamwork if students' attitudes are managed through reflection. We have found an effective strategy is to bookend reflection on teamworking experiences at the beginning and end of an assignment. On both occasions, students are asked to reflect on positive team experiences and the strategies that might lead again to these, and of negative team experiences and the strategies that might avoid these in future. At these times, students are also asked to consider the teamwork skills they have learned and what skills they need to improve. A reflective journal may be submitted to present these experiences, which has the advantage of providing an artefact that can be used to evaluate what students have learned about teamwork. Through such reflection, students are able to differentiate negative from positive experiences, and also see what the negative experiences may have experientially taught them.

In our own research published elsewhere we have made the following summary recommendations with regards to team formation (Tucker & Abbasi, 2014b, p. 21). Teachers have two basic ways to form teams: by forming the teams themselves or by allowing students to self-select. Both ways have pros and cons that teachers and students should be aware of. These are:

- Consider forming single-sex teams, if a team cannot have at least two members of one sex.
- For culturally diverse teams, try not to isolate single members of a culture who are different from the rest of their teammates.
- Consider the location or where students live to facilitate out-of-class meetings.
- Closely examine the consequences of team formation methods before adopting one.

We also suggest that before teams are formed, students might be asked to complete a simple learning style test and discussing the results at the outset of teamwork. This allows:

... an awareness in students of how different learning styles can be reflected by teammates' engagement in different aspects of teamwork, and by the types of task they are best suited to, can prevent conflict by facilitating understanding, empathy and better communication. Students might also be made aware that their learning style, and thus aptitude for teamwork, can affect the attitudes they bring to teamwork. Negative attitudes to teamwork can have detrimental effects on team processes and on student's satisfaction with design outcomes unless students are mindful of differences between teammates.

(Tucker & Abbasi, 2014b, p. 9)

Furthermore, we strongly recommend that international students should not be isolated with culturally dissimilar teammates, unless they are comfortable with this. Moreover, “both the teachers and teammates of international students (especially those non-fluent in the domestic tongue) should be encouraged to acknowledge and compensate for the difficulties these students might have with communication and integration” (Tucker & Abbasi, 2014b, p.9).

- *Teaching Teamwork Skills: teach your students teamwork skills and provide ongoing support for teams throughout the team project*

It is recommended that teachers provide students with training on teamwork skills, that is, establishing ground rules and agreed ways of working together, assigning roles and responsibilities, effective communications, planning and decision-making. Teaching and learning centres in different institutions have started developing resources for teamwork assisting teachers to integrate teamwork learning in their units and assessing this learning. An example is the *Teacher Manual for Teamwork in Design*². There are also guides for teachers based on classroom experiences, consultation with organisational teams and literature reviews (see, for example, Buckenmyer, 2000; Felder & Brent, 2001; Frey, Fisher, & Everlove 2009; Jaques & Salmon, 2007; McGourty & De Meuse, 2001).

Increased guidance from teaching staff would also be beneficial for the management of conflict in teams. Students need to become familiar with the strategies they might use to deal with conflict. Support structures may also be put in place for situations where the students themselves are unable to resolve conflict within their teams. In our own research published elsewhere we have made the following summary recommendation with regards to teaching teamwork skills (Tucker & Abbasi, 2014b, p. 21). We recommend that students are asked to work in teams in a large proportion of design assignments, but in most cases are taught little if anything about teamwork. This is achieved by:

- Teaching student both generic teamwork skills and collaborative design skills.
- Providing basic training in teamwork skills for teaching staff.
- Acknowledging the different characteristics of graduate and undergraduate students and determine the teaching style that suits each cohort.

In our detailed analysis of the quantitative data from the pilot survey (Tucker & Abbasi, 2014b, p. 67), we found that both teachers and students agree that the learning of the following six teamwork skills leads to consistent and measurable outcomes in relation to successful teamwork, good design outcomes, improved teamwork abilities and positive attitudes to future teamwork: (1) Coordination of tasks and responsibilities; (2) Communication via speaking, writing, drawing, modelling; (3) Idea generation, evaluation and selection; (4) Decision making; (5) Leadership; and (6) Conflict management.

Conclusion

This paper has examined design students’ perceptions and experiences of teamwork using three sources of qualitative data: two surveys completed by a total of 615 design students in 18 Australian universities; and focus groups with 23 students. Analysis of this qualitative data identifies three categories of factors most often identified by students as leading to negative teamwork experiences: (1) unequal contributions and unfair assessment, (2) individual differences between students and other issues arising from the process of designing, and (3) team formation, task design and teaching.

² See <http://www.teaching-teamwork-in-design.com/manual-on-teamwork-in-design-for-teachers.html>

Importantly, our analysis of the quantitative data in the 615 completed surveys aligns with these findings (Tucker & Abbasi, 2014b). Here, three outcomes of teamwork – quality of design, the learning of teamwork skills and future attitudes – most strongly correlated with student satisfaction with team learning experiences. Effective team communication and cohesion were the next highest rated factors leading to positive experiences followed by the following pedagogic factors: assessment, the teaching of teamwork, task design and conflict intervention by teachers. Elsewhere, 40 teachers surveyed globally identified team processes as the most important contributors to positive learning experiences, such as communication, decision-making and coordination, team climate and team cohesion (Tucker & Abbasi, 2014b). For teachers, the pedagogical factors were the next most important – task structure, team size, assessment and conflict intervention. Team formation, and the characteristics of teams and their members – composition, students’ knowledge and skills and learning styles – were the least important.

We conclude therefore by reinforcing a recommendation born out of the quantitative data in the student surveys. This recommendation relates to the importance identified by students of managing what is the focus of this paper, namely student attitudes toward teamwork. Students saw that their attitudes to teamwork informed by previous experiences are a significant determinant of the success of future teamwork. While teachers cannot always ensure positive experiences, it is however possible to help students see the value of negative experiences. Thus we suggest that during teamwork assignments students are encouraged to reflect on team processes regularly – within their team and as individuals – so that they can identify how to improve teamwork skills. In addition, as we suggest earlier, at the beginning and end of each team assignment, students should be asked to critically reflect on previous experiences of teamwork. Thus students can see all teamwork experiences as important opportunities for learning, reinforcing improving and expanding team skills.

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