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A Conscious Team Building Spiral

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ABSTRACT

CONTEXT

Teamwork is essential in both educational and professional settings. Students are commonly assigned group assessment tasks to develop these skills in preparation for their future careers. However, teamwork in education faces additional challenges including the need to cover core-content and assessing an individual student's contribution. Merely encouraging teamwork by having group assessments may be insufficient to develop an individual's teamwork skills.

PURPOSE

This paper explores the development, implementation, and refinement of conscious team building (CTB) exercises across two key units in a pre-experience master's by coursework program. Despite multiple teamwork assessments across the program, student performance in the pre-graduation Capstone unit highlighted the need to improve team-building skills of the student cohort. CBT aims to present a deliberate approach to deepen students' appreciation of teamwork and meet professional expectations while providing a positive student experience.

APPROACH

Integrating teamwork to meet professional expectations of postgraduate students required a redesign of exercises to motivate and guide students through stages of conscious team building. Bruner's spiral curriculum theory is evident in the program design with repeated teambuilding tasks, increasing in complexity, wrapped around content that focused on different topics, and culminating in pre-graduation student teams delivering their Capstone projects.

The refinement of CTB exercises used an experiential learning pedagogy, encouraging students to adopt a deliberate approach to teamwork. The activities include four iterations of team-building exercises, ending with a Team Branding exercise that fosters collaboration while supporting the delivery of professional reports and presentations.

OUTCOMES

Over several semesters, feedback indicated that CTB exercises significantly contributed to a supportive learning environment. Even as the cohort size increased due to program restructuring, CTB proved scalable and effective in maintaining student cohesion and enhancing their experience. Student feedback surveys revealed high satisfaction with the unit, with CTB exercises highlighted as a key positive element. Evidence of the success of the CTB exercises is evident in student feedback surveys conducted by the University at the end of semester. The student rated the unit highly identified the team building as a highlight of the unit.

CONCLUSIONS

The CTB exercises described go beyond basic introductions and icebreakers, incorporating an incremental, scaffolded approach that encourage student teams to engage with course content and foster personal growth while readying them for professional life. The structured exercises are reusable teaching tools that can be adapted by educators to improve student teamwork, explain professional expectations, and develop team leadership competencies valued in the workplace.

KEYWORDS

Teamwork, Team Building, Professionalism, Student Experience

Introduction

In today's business environment critical activities are often carried out by multi-cultural and multidisciplinary teams which may be collocated or distributed (Siakas et al., 2018). From medicine (Dirks, 2019; Lerner et al., 2009) to software development (Kiely et al., 2022; Lindsjørn et al., 2016) and business (Riebe et al., 2017), teamwork is a professional attribute that enshrines the belief that collective effort and collaboration can achieve better results than individuals. A good team can harness the individual strengths and diverse perspectives of members while providing mutual support to overcome challenges and achieve common goals. As a result, teamwork is essential across diverse industries and highly valued by employers.

A report commissioned by the Australian Council of Engineering Deans (Crosthwaite, 2021) found that employers rated Engineering graduates as having above average teamwork and interpersonal skills. The report also found that Project Based Learning (PBL) was a distinguishing feature of exemplary engineering programs across the world because they develop teamwork and communication skills in a professional practice context. Top Australian and International exemplars included exposure to practice, Project-Based Learning (PBL) and collaborations with industry and community partners in their programs and identifies an opportunity for engineering education programs to provide an emphasis on units that can help to build professional skills including collaboration, communication, teamwork.

This paper describes the experiences developing student teamwork competencies in two "bookend" units in the pre-experience, three-semester, Master of Project Management (MPM) program at the School of Project Management within the Engineering Faculty at the University of Sydney. Each of these one-semester coursework units had specific learning objectives and content, with teamwork an important competency students developed in both:

- the Project Professional Practice, a first semester introductory unit taken by over 500 students that comprise roughly equal numbers of master's students enrolled in Project Management, for which it is a core unit, and Engineering Management, where it is an elective; and,
- the Project Management Capstone, a third semester core unit for the graduating PMP class of over two hundred students who worked to deliver near-real-world projects in teams (Taborda, 2022)

Over the course of 15 semesters, the author observed the challenges students faced in engaging with teamwork activities and developing the personal skills necessary for effective and collaborative work with their peers. The cohort comprises mainly international students, primarily from China, who entered the program with diverse undergraduate backgrounds and limited work experience. The pedagogical styles they experienced in their prior education is highly directed and predominantly individualistic, which did not predispose them to working in teams.

The value of this paper lies in the contribution it makes to overcoming the challenges of teaching teamwork to higher education students. The Conscious Team Building (CTB) approach provides a set of reusable, example exercises that have been successfully trialled over two years across two cohorts described above, providing initial evidence of the applicability of CTB in engineering education. There is the potential to apply the approach more widely as projects are common in the workplace with teamwork a foundational competency expected across a range of disciplines.

Educational Objectives

While teamwork is valued in the workplace, it also provides educational opportunities for students to engage more deeply with the content. Using teams for class activities is commonplace in engineering education as it maximises the utilisation of teaching spaces and laboratory

equipment. Team-Based Learning (TBL) approaches have been used widely in the humanities to generate critical thinking and engagement (Sweet & Michaelsen, 2012), becoming increasingly popular with the trend towards flipped classroom teaching (Abeysekera & Dawson, 2015).

The two units described above form the basis for this paper and used variants of the TBL approach. The introductory first semester unit utilise TBL with students expected to preview online course materials before attending workshops where students undertake team-based exercises to drive discussion and engage deeply with the content. Students repeatedly form, build and work in teams to undertake key assessments. In contrast, the pre-graduation Capstone students form a single team for the duration of the project (one semester) working to deliver on the project requirements – hence the approach is more appropriately termed PBL.

The MPM students undertake both units (engineering students only take the introductory unit) and therefore benefit from repeated teambuilding tasks that culminate in their pre-graduation Capstone projects. The teambuilding exercises increase in complexity and effectively wrap TBL around content focused learning outcomes – developing the soft-skills related to teamwork to better engage with and comprehend technical content related to hard-skills. In the MPM, the relatively inexperienced and immature cohort benefit from the application of Bruner's spiral curriculum theory (Takaya, 2008) which posits that difficult subjects can be taught at any developmental stage with repeated exposure, increasing difficulty, and reflective practice that connects new learning to previous knowledge.

Effective teamwork is therefore a learning technique that offers immediate educational value, while also being an essential workplace skill that is essential for a future professional career. Teaching teamwork therefore offers students significant advantages that include:

- In a class that utilises TBL, teamwork and communication skills enable deeper engagement with content and the sharing of ideas.
- Group assessments benefit from team coordination and collaboration with student groups the most adept at these skills more likely to gain high grades.
- Improved confidence and personal communications skills that result from supportive team interactions.
- A fun and encouraging learning environment which makes students comfortable and better retain key learnings.
- Experiential learning based on consistent and progressive teamwork exercises prepare students to meet or exceed the expectations of the professional workplace.
- Finally, and by no means least, the CTB approach described prepare students for leadership roles by providing them with tools and techniques they can apply when they are called upon to establish and manage teams themselves.

Teaching teamwork concurrently with course content can address a range of educational outcomes that should motivate educators to take a more deliberate approach. However, to be successful requires educators recognize and address the significant challenges that students face that can undermine any attempts to develop their teamwork competencies.

Challenges

While professionals commonly work in teams, effective teamwork can be elusive. The challenges faced by professional teams in the workplace can be pre-empted by educators who have an opportunity to develop the necessary competencies in students at an early, formative stage in their career. One advantage of inexperience is that the students (mostly recent graduates in their early twenties) are open to new experiences and can attempt new techniques in a fail-safe, learning environment, where they can be led and supported by both educators and peers. The problem for educators, however, is that it is not entirely clear how best to teach or develop teamworking skills.

Researchers have identified a gap in the literature regarding the processes by which practical skills, such as teamwork, should be taught (Scott-Ladd & Chan, 2008). This is particularly the

case when educators look to develop authentic communication, collaboration and coordination skills that help students enter the workforce. While we are more likely to know good teamwork when we see it, the question of how to produce that outcome remains an open challenge.

There is a legitimate question of how much time is necessary to teach teamwork. Business game simulations have been used to develop teamworking skills over a period of a few days (Drake et al., 2006) and there examples of using Lego in structured team building exercise (Casper, 2017). However, while there can be merit in short, intensive teambuilding exercises, experiences from the MPM suggests that simply repeating team-based exercises and assessments is insufficient to develop professional teamwork competencies in students – or the confidence and composure in dealing with real-world stakeholders.

It is less a question of how long, or even how we to teach teamwork – it is more a question of helping students overcome the personal challenges they face when confronting teamworking activities. While behavioural profiles like the Belbin team inventory test (Belbin, 2011) look at the team roles students might naturally be suited for, more introverted individuals can find it awkward to work in teams and prefer independent study. In extreme cases, social anxiety can make team interactions extremely unpleasant for some students. Crome and Baillie (2014) list the top three social situation that respondents strongly fear as: talking to an audience (83.8%), speaking up in a meeting or class (83%), and meeting new people (72.8%).

Underlying anxieties can lead to bad team experiences, especially as pre-experience students are unfamiliar with accepted social behaviours and lack exposure to the workplace norms. The perception that some individuals are putting in less effort than others is referred to as free riding or social loafing (Butterfield and Pendegraft, 1996; Karau and Hart, 1998) and can result in a negative attitude to team assessments. These fears are present in every class, which explains students' preference to work with friends, something that cannot happen in the workplace.

Where teamwork is undertaken in education, there can be a tendency for students to disengage with their team and revert to "doing just their part" – without support, teamwork can revert to groupwork. The distinction between teamwork and groupwork is important but often blurred (Drake et al., 2006; Zhang, 2023) and where groupwork may take a "divide and conquer approach" with individuals working on separate parts of an activity, teamwork requires the team to focus and collaborate on a common activity and develop a shared understanding that can lead to a coherent plan, innovative solutions for a problem statement, or to creative collaboration in a design-context (Tucker & Abbasi, 2016).

The above challenges are familiar to educators, but the MPM faced the additional challenge of international students. Particularly for the first-semester introduction unit, many pre-experience students are not simply new to project management, they may arrive in Australia a few days before the unit begins; have few, if any friends; are unfamiliar with the Campus and struggle to find the classroom. Importantly, most of the students have English as a second language, have studied under a different educational system, and must adapt to a new teaching approach and meet the expectations of the Australian higher-education system.

There are significant challenges that educators must overcome to help students develop teamwork competencies. They can appear insurmountable and drive some to avoid teamwork and assessments due to the obstacles they present. Yet, professionals routinely form teams based on the availability of resources; strangers working together as to create a high-performance team. This duality presents an opportunity to reassess and improve the way that we teach teamwork in higher education.

Conscious Team Building

A key observation from the MPM program is that teamwork does not simply happen, even with repeated opportunities to work together the challenges can be too great for students to develop the desired teamwork competencies. The initial realisation came in the pre-graduation Capstone unit when students remained uncomfortable and lacked engagement in their project. This led to

the introduction of CTB activities in the first semester introductory unit to help students develop the required skills at an earlier point in the MPM program.

Team Building Process

In adopting a TBL approach teamwork is critical to engaging with the unit content and meeting the learning objectives. Therefore, the will class is divided into teams of five students, not once, but in multiple iterations, or rounds, over the semester and designed to make students more comfortable with team building at the end of the unit – a form of exposure therapy for the anxieties students can face about teamwork.

A clear statement is made stating that the class is a safe learning environment that aims to provide a welcoming student experience for the incoming student cohort. Students are guided in the process with the class briefed on what will be taking place over the semester. Instructors, who are experienced professionals working as university tutors, support multiple teams by addressing student concerns and expectations honestly with past student feedback providing reassurance.

The key element in the CTB process is that team formation and building must be visible and evident to students so they can track the progression. Tuckman's classic, arguably simplistic, model of team formation (Bonebright, 2010) is presented to students as a means of tracking their progress. The terminology of *forming*, *storming*, *norming*, *performing*, and *adjourning* is applied in class discussions and the causes of the "*storming*" phase foreshadows the challenges teams face before they can work effectively together and perform adequately. Further guidance is provided on behaviours associated with successful project teams such as Tippett and Peters' (1995) paper.

The CTB process iteratively employs an experiential learning approach to team building, offering students engaging activities to reflect upon, conceptualize, and act on in future iterations. Our application of CTB begins in the first-semester introductory unit (Project Professional Practice) with four iterations over the 13-week semester, culminating in the fifth iteration conducted in the pre-graduation, one-semester Capstone unit.

Iteration 1 – Weeks 1 to 2

The first round of team building is conducted with randomly selected members – which means that most students are meeting four students they do not know. Students have however introduced themselves on an online discussion forum prior to attending class, and that personal introduction is used as a focus for improvement over the iterations of teamwork.

Prior to meeting in class, the students are briefed on the importance of team building and effective teamwork to career success. The exercises are couched as an opportunity for personal growth and prefaced with a discussion of brain plasticity and the opportunity to consciously develop both new knowledge and empathy with the support of their new teammates. The promise is that students will have greater confidence as they develop new inter-personal skills. And all it will take is a few minutes of discomfort.

Before team members meet each other the awkwardness of first meetings is discussed with reference to this being a common feature of professional teams. Being cognizant of student's anxieties, the team building activities are couched as a few minutes of awkwardness that can result in meeting fellow students and potentially making friends.

Good natured humour can be important to reduce the nervous tension with students reminded that everyone feels awkward at the start and encouraged to "go meet four strangers" who will be know each other quite well by the end of the class. As a means of structuring their first introductions, students are prompted to use their previously developed personal introduction when meeting team members for the first time. Team members are encouraged to respond to each introduction with some feedback and at the end of the activity reflect on who they might improve their personal introduction.

Students meet with their first iteration team for only two weeks and the instructors provide their own personal introductions with their choices and style discussed. Instructors also share personal stories of good and bad team experiences, before the student teams focus on working together to engage with the course content for the first two weeks.

Iteration 2 – Weeks 3 to 4

The second round of team building is similarly conducted with instructors creating new teams comprising students who have not previously worked together – a new set of strangers are forced to meet and apply the TBL approach to the course content.

The exercises follow a similar pattern to the first iteration, with students asked to refine their personal introductions and provide each other feedback on a personal “elevator pitch” for each member – a valuable professional asset that can be utilised in their student profiles or their curriculum vitae. Pascal’s quote: “If I had more time, I would have written a shorter letter” is discussed as an example of succinct communications,

Iteration 3 – Weeks 5 to 10

In the third round of team building, students are allowed to self-select team membership as they have now met and worked with at least eight students in this class. This is also the team that must complete a professional grade report for their team assessment and need to use teamwork to achieve that outcome over six weeks.

Students are repeatedly made aware of the teambuilding process, to reflect on how they can personally improve and adapt based on the earlier two iterations. The concept of “building a team” is stressed and the process of developing the required intangible soft skills required are positioned as necessary and attainable to everyone irrespective of individual predispositions. The class is drilled on the tenet that teamwork is too important to be undertaken randomly, and that each team is to behave as a professional unit – they do not have to become friends, or even like each other; but they must find a way of working harmoniously together to accomplish assigned tasks.

As team members are more likely to know each other in this iteration, team exercise focus on how the team is to work at a professional standard. To achieve that students are encouraged not to rely on previous introductions but to take deliberate steps to build their “new” team to tackle the current task. More detailed instructions are provided to flesh out the “ceremonial” nature of creating a new team with a record of their team building activities to be submitted as a part of the final report. These include the obligatory “team selfie”, the sharing of behavioural profiles and Belbin role preferences to better know the members that constitute the team, and a directive to undertake an activity outside of class.

Teams are prompted to discuss and envision a perfect team environment and discuss expected behaviours that are captured in a Team Charter that lists agreed principles that will guide their teamwork. Teams must then determine the processes and tools that they will use in undertaking the assignment that includes scheduling regular times for meetings and deciding on the communication medium or application they will use to keep in touch. Determining the team’s WOW (way of working) is itself a learning outcome for project management, one that is generally applicable to all manner of teamwork.

An early, fun exercise all teams participate in is to determine their team brand. Each team is assigned a letter of the alphabet as an identifier and students are directed to create a team name that begins with that letter. This name, together with an appropriate graphic logo, is to be used throughout the iteration, made visible in class with signs designating the team’s location in the classroom and used as Zoom backgrounds where appropriate. The team’s name and the selected (often quite elaborate) logo is used to represent a consultancy with students acting as a professional consulting team addressing the assignment brief. The students must utilise their brand and develop their own report template that is to be used for their final submission with the professionalism of the report layout being a part of the assessment criteria.

Iteration 4 – Weeks 11 and 13

The final round of team building in the introductory unit comes after third iteration teams have submitted their team assessment. This iteration reverts to assigning students who have not worked together to new teams. It was only introduced in the last year and remains somewhat unpopular because, ironically, students now feel comfortable working in the second iteration teams and are somewhat resentful of the need to begin teambuilding again.

The key reason for introducing this last iteration is that it offers students an opportunity to both reflect on their efforts in completing the assessment task and to evaluate their peers. This latter activity is required to ensure that individual students receive a fair grade for the assessment and the SparkPlus peer evaluation tool (Willey & Gardner, 2009) is used for this purpose.

This iteration was initially of two weeks duration but in response to student feedback (that they did not see value in this final iteration as it did not leave sufficient time to get to know members of their final team) this iteration was extended to three weeks and an additional activity introduced.

Being at the end of the semester, this iteration aligns with the University's student feedback surveys, and by coincidence with the course content that introduces process improvement. This allows students to be made conscious of the need to reflect on their own teamwork in the previous iteration. The concept of a Scrum retrospective is applied with students sharing and discussing with their new team members what they would start, stop and continue to do in future teams they might work with.

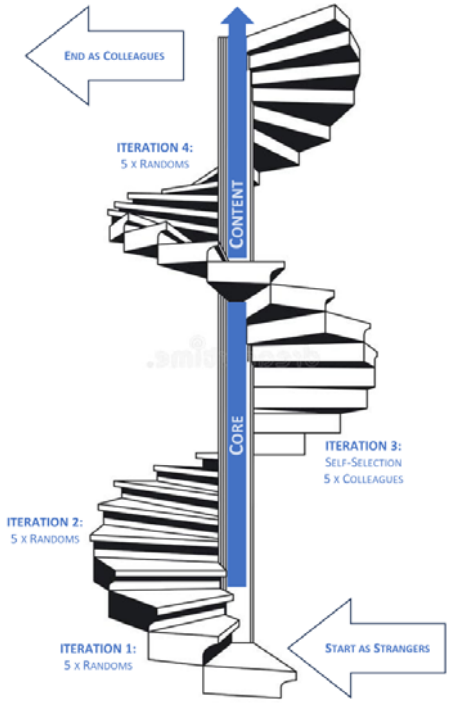

Figure 1: Team-building activities work around core content.

Iteration 5 – Capstone Project

As show in Figure 1, there are only four iterations used in the introductory. However, it is worth noting that the goal is to develop a CTB culture in the MPM that culminates in students' pre-graduation the Capstone unit – termed Iteration 5 for simplicity. Here, student teams are formed based on a matchmaking process that is indebted to the CATME team formation process (*CATME Overview*, 2018). While some students expressed concern about working in allocated teams outside of their control, the CTB activities they have experienced in their first semester make teambuilding with new members less daunting.

All the previous CTB activities are repeated in the Capstone unit with the Team Branding activity now becoming a central aspect of this semester long unit. Teams develop their team identity in communications with their project sponsors and must submit a project poster that features their team brand. The team cohesion that builds over their Capstone project is evident to the teaching team and provides some satisfaction that CTB contributes to the creation of a team culture through a series of activities that engage students in the “serious fun” that is building a team.

Conclusion

In the modern, multidisciplinary workplace, teamwork is an essential competency demanded of new graduates. Educators face significant challenges when attempting to provide students with these essential skills.

This paper describes the CTB approach that was created to improve teamwork outcomes in a postgraduate project management unit in the University of Sydney’s Engineering Faculty. The approach and related activities and assessments have wide application as the principles of effective teamwork are generic and applicable across a range of disciplines.

While teaching students the teamwork skills necessary for a competitive employment marketplace are often as seen as distinct skills, to be taught separate from the course content (Casper, 2017) the paper describes how the use of TBL and/or PBL enables a more integrated approach that can transfer the subject-matter knowledge while also providing students with the opportunity to consciously develop their teamwork skills. The guided repetitive structure of CTB recalls Bruner’s spiral curriculum theory which when carefully designed and integrated can develop teamwork competencies in students even as they engage with the core content of a unit.

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