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Facilitation training: supporting sessional staff in project-units

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ABSTRACT

CONTEXT

Project-based learning develops key professional engineering skills such as communication, teamwork and complex problem solving. Such projects require facilitated workshops, in which students work on projects in their groups, rather than traditional lectures with teacher-centred pedagogies. The context for this work is a degree with a project-based unit in every semester, which requires a large number of staff, and particularly sessional teaching staff, for unit delivery.

PURPOSE OR GOAL

This study explores the feelings of sessional staff members teaching into project-based units who are undertaking a professional development workshop on facilitation skills. The aim of the study is to understand the experiences and concerns of workshop participants to inform future professional development activities. Better supporting staff to deliver project-based units will improve the student experience and outcomes when undertaking their projects.

APPROACH OR METHODOLOGY/METHODS

Sessional staff recruited to teach into project-based units in engineering, science, computer science and ICT courses were invited to participate in a three-hour professional development workshop. Participants were surveyed before and after the workshop, to investigate their experiences, concerns and feelings regarding teaching in a project-based mode.

ACTUAL OR ANTICIPATED OUTCOMES

Common concerns of staff facilitating in project-based units included: worries about managing groupwork, fair assessment of individuals within groups, consistent marking across different projects, project implementation and expertise, delivering impossible project outcomes to industry partners, and interpreting vague instructions from unit convenors.

CONCLUSIONS/RECOMMENDATIONS/SUMMARY

Project-based learning can be intimidating to staff new to this as a pedagogy and they have many concerns. Professional development both to support staff in this teaching mode and to help staff build networks of others teaching in the same and similar units can help alleviate these concerns and lead to better outcomes for staff and therefore students.

KEYWORDS

Project-based learning, Pedagogy, Professional Development.

Introduction

Project-based learning (PBL) is used in engineering education to help students develop professional skills such as teamwork, communication and dealing with complex problems, alongside the application of theoretical knowledge and technical skills.

These professional skills are required for student learning, accreditation and career success, with PBL having been shown to be a key pedagogy in preparing engineers for their profession (Kolmos & de Graff, 2014). According to the ACED report on Engineering Futures 2035 Engineering Education Programs, Priorities & Pedagogies (Crosthwaite, 2021) PBL is explicitly cited in 30% of the national survey responses as a distinguishing feature of exemplary engineering education programs. This report also explicitly makes the recommendation that "Engineering education providers deploy adequate numbers of teaching staff with appropriate experience and expertise to [embed a stronger focus on student engagement with contemporary engineering practice and its sociotechnical contexts] whether this be through greater use of practice-based pedagogies, or project-based learning, or work integrated learning or multi-disciplinary projects" (Crosthwaite, 2021 p.4). Thus recruiting, training and supporting staff to be able to deliver effective learning experiences to students is key in the future of engineering education. However, there is currently a lack of PBL methods training (Nxasana, 2023), PBL facilitation training for teachers (Chen, 2021) and teachers are challenged when moving from traditional roles as lecturers to facilitating in a PBL environment (Chan, 2016).

A review of facilitation studies identified the three key factors contributing to effective facilitation: "suitable knowledge base regarding the topic under study, a willingness to become involved with students in an authentic way, and the skill to express oneself in a language understood by students" (Schmidt & Moust, 2000 p. 47). Hmelo-Silver & Barrows (2006) further identified strategies used by successful facilitators, including summarising, use of open-ended and metacognitive questioning, pushing for explanations, generating/evaluating hypotheses and encouraging construction of visual representations among other strategies more specific to their medical context.

Facilitators who do not have theoretical knowledge and practical experience of PBL methods often face challenges in designing course activities, navigating challenges with group dynamics and improving student work without having too much of a direct influence on the ideas and outcomes, and effective training is required for engineering staff to learn PBL pedagogies and facilitation skills to improve the effectiveness of PBL for students (Chen, 2021). With as much as half of Australia's academic workforce comprising casually employed staff (May et al., 2013) supporting sessional staff with relevant pedagogies is essential for the success of students in developing their professional skills.

Study Design

Context

A scaffolded series of project-based units are being introduced in all majors in Engineering, Computer Science, ICT and Science degrees at Swinburne University of Technology, colloquially referred to as 'Spine' units as they form a backbone through all STEM degrees. In the first-year of the engineering degree these units are core for all majors, meaning the cohorts are often large and require multiple facilitators to staff all the project workshops. This inevitably means a proportion of workshop facilitators are either experienced teachers who may be unfamiliar with the student-centred project-based learning approach, or sessional staff who have received little or no formal instruction on project-based teaching and learning pedagogies.

Study Aims

This study aims to explore the concerns of sessional staff being asked to teach into these new project-based units, to assess whether participation in the training workshop described here allayed those concerns, and to identify gaps not addressed by this workshop so as to propose additional training required to support staff teaching into such units.

Participants

Participants in this study were sessional staff teaching into the project-based units in engineering, science, ICT and computer science. All sessional staff identified as teaching into project-based units in the School of Science, Computing and Engineering Technologies were invited to attend a three-hour workshop (paid). The purpose of the workshop was described as a hands-on introduction to the pedagogy of Project Based Learning in the context of the Spine units. Part of the workshop involved completing pre and post workshop surveys. In accordance with Human Ethics Research procedures, workshop participants were provided with an information statement and given the option of opting in or out of this study and having their responses analysed for this work or used only in the workshop context to prompt self-reflection and discussion. Fifteen out of sixteen participants opted to allow their surveys to be included in the research and are analysed in this paper.

Training Workshop Structure

The workshop was designed to mirror the weekly teaching structure of the project-based units (Figure 1), which have an hour lecture delivering project and technical content, an hour class in which students are introduced to and practice professional and technical skills, and a two-hour workshop in which students work in their groups on their projects. It is the workshop sessions that the sessional staff in this study would be facilitating. As indicated in Figure 1, the aim of the training workshop was to model the structure and varying pedagogies used in the project-based units.

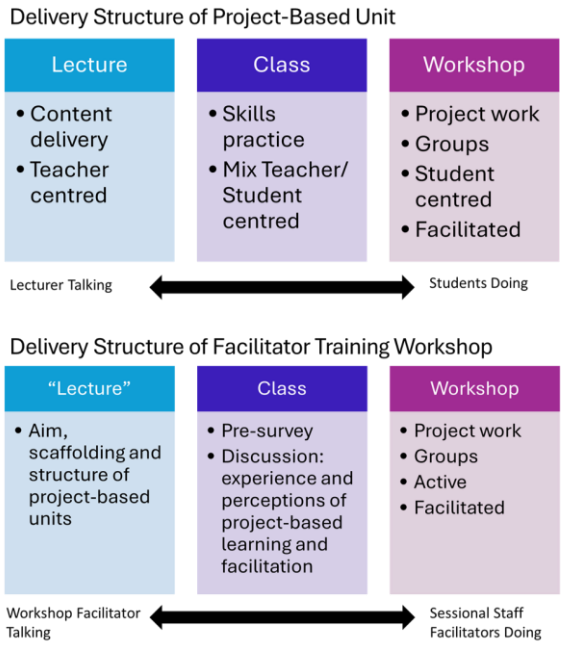

Figure 1: The structure for training workshop – designed to model the teaching structure of the project-based units.

The training workshop started with an introductory “lecture” on the purpose, structure and scaffolded learning outcomes of the project-based units in the relevant degrees, delivered by the training facilitator in a teacher-centred style. The “class” section of the workshop, mimicked the tutorial style class in the unit. This consisted of participants completing a written survey asking about their experiences with, perceptions of and concerns about facilitating project-based learning. They then discussed their answers in pairs and small groups, which fed into a whole workshop facilitated discussion. The class thus had a mix of student and teacher led activities, with more student activity than the lecture, but still being very teacher-directed. The final section was a hands-on activity modelling the “workshop” experience, in which participants worked in groups on a challenge, with the workshop facilitator providing minimal instructions and circulating around the groups to provide support as necessary. The workshop concluded with a discussion of the activity and an analysis of the facilitator’s role in it. These distinct sections of the workshop were clearly signaled to the workshop participants, with the first part of figure 1 shown and discussed to emphasise the differences between the aims, styles and pedagogies employed in each different section of the unit teaching structure.

Data Collection Methods

Data was collected via the pre and post workshop surveys. Surveys were completed anonymously and corresponding surveys matched via a code devised by the participants to maintain anonymity. The pre-survey was conducted at the start of the class portion of the workshop (figure 1), with participants completing a paper-based survey form individually, handing it in and then discussing their responses and experiences in a pair-share activity. No data was captured from the discussion portion of the activity. The post-survey was completed at the end of the workshop after all other activities had been completed.

The survey questions asked were:

Pre-workshop Survey

- Do you have previous experience with teaching project-based learning?
- What do you think are the benefits of project-based learning?
- What do you think are the challenges of project-based learning?
- What are your concerns about teaching in a project-based unit?
- Do you have any other comments about teaching and learning in the spine units you would to address in this workshop?

Post Workshop Survey

- What aspects of project-based learning are you more confident in after this workshop?
- What aspects of project-based learning do you have concerns about?
- Is there an aspect of the spine units you would like more information about/ training on?
- Any other comments?

Thematic analysis was used to code the responses and identify common themes (Braun & Clarke, 2012).

Workshop design

For this study the hands-on activity used in the “workshop” section of the training was the challenge to build an automaton. Participants worked in groups of 3-4. The instructions provided were deliberately vague, materials were laid out but not explained and the activity was designed to provoke feelings of confusion and frustration in the group at the start of the activity. Participants were given a diagram and some examples of previous work, but no explicit instructions.

After they had constructed their automata, groups were asked to present their models and reflect on the creation process. This then led to a structured discussion on their processes, group work, and the feelings they experienced during the task (Figure 2). Finally, participants were asked to dissect the interactions they had had with the facilitator and how those in the “workshop” compared with the role the facilitator had taken in the “lecture” and “class” sections of the training.

Figure 2: The emotional stages of project work as shared with and discussed with participants.

The focus on the emotional aspect of the process was key, with a take-away message that facilitators should communicate explicitly with students that the feelings of confusion and frustration are a normal part of the process in tackling real-world challenges. Hence, facilitators should not rush students through the stages by providing a solution to alleviate their discomfort as it reduces the time spent in the problem space.

Results

The majority of sessional staff who participated in this workshop and study perceived dealing with groupwork as the greatest challenge, followed by assessment and engagement, with several concerns that spanned the boundaries of these three areas (see Figure 3a). There were also lesser concerns around staff feeling they did not have the relevant technical and professional skills to support students in their project work, or did not have enough information about the project itself (Figure 3b). Some project concerns related to the suitability of the project itself to the learning outcomes of the units. Others cited a lack of clear communication of the project scope, goals and areas of flexibility from the unit convenor or lecturer, leading to a lack of understanding of the necessary decision making required in the project context

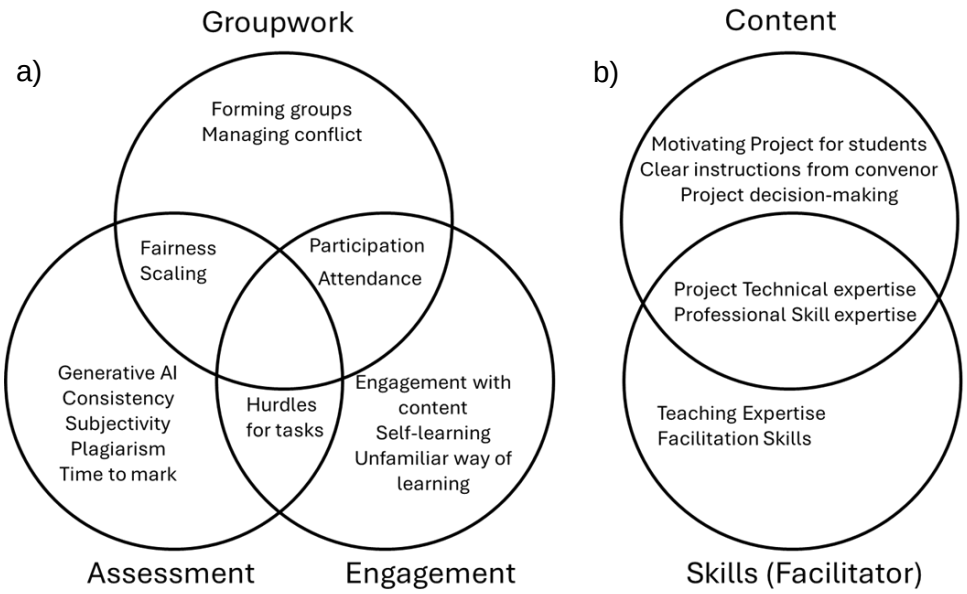

Figure 3: A visual summary of the key themes emerging from the concerns sessional staff stated about teaching in project-based units

From the overarching themes displayed in Figure 3, group work was by far the greatest concern for sessional teaching staff, with several aspects being raised as points of concern including: forming groups, managing conflict, dealing with students with special considerations or educational access plans, and managing students with grade averages to maintain for scholarships.

For example, the following were responses to the question “what are your concerns about teaching in a project-based unit?” in the pre-workshop survey.

> *Catering to different student’s needs when they are in the same group.*
>
> *Knowing how much guidance to give struggling teams vs high performing ones*
>
> *Differences in personalities, individual goals, cultural backgrounds, and complexity of the project subject.*

The greatest concern regarding groupwork was the overlap of groupwork and assessment, and in how students with unequal contributions to the project could be fairly assigned grades. Policy on this would be at the discretion of the unit convenor and most units apply some scaling of group grades for individuals based on peer and self-assessment ratings. However sessional staff would likely not be involved in the grade scaling processes and many appeared not to be aware of them. Comments included:

> *How to adjust individual marks while still keeping this as a team project – if you go too far all the results is a group of individuals, not a team!*
>
> *Teamwork problems: can be vast differences in individual objectives and work ethics. How to adjust individual grades to better reflect each persons input/performance without killing team cooperation?*
>
> *Efficacy of peer assessment? Could fail or pass students depending on friendship group*

There were also concerns about marking that were unrelated to groupwork.

> *Project based marking is often subjective to some degree and that makes it difficult for tutors and students*
>
> *Marking is often focussed too much on documentation rather than process and outcome.*
>
> *Many of the staff members are not well aware of the AI abilities and somehow this causes that staff are behind the students*

Engagement also posed a significant concern, with many staff feeling that students either didn’t attend their workshops, which also impacted on groupwork, or hadn’t sufficiently engaged with the pre-workshop content from the lecture and class to be able to meaningfully contribute in workshops, often leading to the workshop facilitator having to repeat content during the time allocated to student groups progressing their project work. Some comments relating to engagement include:

> *How can we engage un-attendance students to join the workshops and collaborate with their teammates?*
>
> *Attendance of students in their team activities and workshops is the main challenge, I believe. It is not easy to convince some of them to be active enough in order to help their teams.*
>
> *Students do not finish their self-learning activities. Some students lost their track and workflow.*

Students not attending the classes -not engaging with unit materials given

Students not engaging. Students not participating. Students not coming to class

One participant suggested a way to increase engagement by adding pre-workshop or start of workshop hurdle tasks or quizzes.

While groupwork was a universal concern, and assessment and engagement cited as challenges or concerns by many participants, there were also some specific concerns for individuals, which included vague instructions from convenors, inappropriate use of digital tools, working with real clients and concern over technical and professional skills.

How to teach it? - Content covering the basic knowledge for delivering the project

Different guidelines are given in lecture and tutorials misleading students in the workshop sessions

Providing same content as the lecturer

Access to data. Access to materials and equipment

If a client is involved this adds further challenges as objectives and goals sometimes don't align.

Have all of us sufficient "soft touch" skills training? Probably not.

The teaching materials are either a) Bright new shiny toy biased e.g. introducing digital tools, particularly the "tool du jour" or b) Theoretical/simplistic compared to professional projects

The post-workshop survey indicated that participants felt much more comfortable with their role as facilitator rather than lecturer or tutor after taking part in the activity and discussion. However, only two participants commented that this included feeling more confident in dealing with potential groupwork issues, with groupwork remaining the biggest concern at the end of the workshop for most sessional facilitators.

The following are some answers to the question "What aspects of project-based learning are you more confident on after this workshop?"

The role of a facilitator and how it is different from a tutor

The role of the facilitator when students are involved and engaging in groupwork. Explaining to students the purpose of project-based learning and the "hands-off" approach that facilitators and convenors may take

Guidance on what and what not to do as a facilitator. Applying theory (at the start of the workshop) to a hands-on activity for deeper understanding of team facilitation responsibilities and experiences

In supervising project-based units on the following aspects 1) time management 2) dealing with the teams that are lack of motivation

The following quotes are from the post-workshop surveys answering the question "What aspects of PBL do you have concerns about?" and illustrate the remaining concerns participants had about managing group-work and assessment after the workshop.

How to mark those students who make less/much less contributions

Dealing with group progress. Steps I should take to support students during the semester

Teams managing individuals and team composition etc.

Group dynamics/politics and how to manage

Though this study had a small sample size, the data identified both some common themes around group work, assessment and concerns around student engagement, as well as highlighting some issues that were unique to those teaching into particular subjects, such as the technical challenges of more digitally focussed units, or accessing materials and equipment. While a larger sample might highlight additional unique issues, the common concerns that were described by the large proportion of sessional staff in this study can reasonably be expected to be representative of the feelings of the population in general.

Discussion and Conclusions

Staff, in particular sessional staff, who are teaching into project-based units indicated they have many concerns about the new pedagogies associated with facilitation rather than more traditional teaching methods. These included worries about managing groupwork, fair assessment of individuals within groups, consistent marking across different projects, project implementation and expertise and interpreting vague instructions from unit convenors.

It is proposed that professional development, such as that described here, can help prepare staff and alleviate some concerns by the following:

- Providing an experience simulating that of students attempting a project, allowing staff to empathise with the student experience in a project workshop
- Modelling and analysing facilitation, rather than simply describing it
- Prompting discussion of concerns and experience among staff, giving them a range of strategies they can apply in their own classes
- Creating a social support network for sessional staff, who are often isolated and do not meet one another.

Participation in this professional development workshop alleviated some fears around unit structure and the role of the facilitator in the classroom, though many participants still had concerns around group management and fair assessment of individuals within groups at the end of the workshop. Assessment and group dynamics in project-based learning were not the focus of this training workshop, but could be the focus of future professional development, especially as sessional staff did not seem aware of the peer and self-assessment models already being used to provide individual grades within group projects. Future training could also include working and dealing with generative AI, which was a source of concern for several staff.

From the concerns that persisted after the workshop it is proposed a future training session be designed to:

- Describe group formation theories and best practice in creating group agreements/charters
- Discuss strategies for managing group conflict
- Explain methods of self and peer assessment to provide feedback and scale group grades based on individual contributions.
- Explore uses and abuses of generative AI in writing project reports

Training and support in these elements could better equip sessional staff to help students develop the employability skills that project-based learning aims to provide.

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