### Managing group project-work in large classes with limited teaching supports; exploring self-directed mechanisms to assist students address group issues and the problem of the 'free-rider'

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#### Abstract

The management of experiential-learning activities in large classes can be challenging and resource-intensive, particularly for group work where the 'free-rider' issue can arise. However, the use of peer-assessment to address this issue raises concerns surrounding academic integrity and fairness. This research seeks to identify other mechanisms that address the free-rider issue, and other group tensions, ones that are student-directed and avail of technology, rather than additional teaching resources. A group 'project diary' and an individual 'reflective journal', based on Belbin's team-working framework, were tested in a class of over 250 business students undertaking a group project. A substantial reduction in time spent on project-group management was observed by the lecturer. A student survey demonstrated strong support for both the project diary and the reflective journal as a means to ensure greater fairness and more effective team-work when undertaking group projects in large classes.

**Keywords:** Large-class; group-work; free-rider; project diary; reflective journal

#### 1. Introduction

The purpose of this research, funded by CIRTL (Centre for the Integration of Research, Teaching and Learning), University College Cork (UCC), is to examine how group-based experiential learning can be more effectively utilised and supported in large-class environments. Group project-work, while offering many beneficial learning outcomes for students, discussed later, can also present challenges both for students and lecturers, particularly in large classes, where supervision may be limited. One of the most frequent issues in group-work are the tensions that arise around individual contribution, or lack thereof, and the problem of the 'free-rider'. A number of mechanisms such as peer assessment and individual grading for group work are used to attempt to address these concerns. However, these can lead to concerns of unfairness or create significant additional workload for lecturers. In the context of using group-work in large classes, this additional administrative element can be such that group work might not be considered feasible for modules with very high student numbers. This research examines two mechanisms that assist students to take responsibility for their own group management that do not require significant lecturer involvement or time, thus making group-work feasible even in very large classes.

#### 2. The Context of the Research

For this study, a module with 259 students featuring a group project was chosen. It is an under-graduate, five-credit module in market research, delivered on the Bachelor of Commerce programme in UCC as a core module, and also as an elective option for other business students. 50% of the final grade is awarded for the group-project with each group consisting of five members. All members get equal grades for the group project, unless there is clear evidence from the 'project-diary' (see below) that there has been a significant lack of contribution by any members. There is no peer-assessment or individually-graded elements for the group project. Individually-graded elements for the module consist of an end-of-semester MCQ exam and a 'reflective journal', which are 40% and 10% of the final grade, respectively. The reflective journal is designed to help students better understand their own and other group members' behaviour using the Belbin team-working framework (2010). All activity by students is self-directed and undertaken through Canvas, including a Belbin team-working self-assessment by each student at the beginning of the module. This gives students a greater sense of responsibility for their activities, development of their 'soft skills', and it also reduces lecturer administration time.

The pedagogic rationale for using group-projects in this module is: a) to enhance students' understanding of the market research process through active learning, b) to develop their research skills by undertaking 'real-life' market research, and c) to develop the 'soft-skills'

of students, such as those required to undertake a collaborative research process. This aligns with the module and programme learning outcomes which include enhancing both student personal and academic development, and their preparation for placement and later employment. However, the challenge posed by using this format of group learning is considerable in the context of very large classes (where there could be over 50 project groups in one class). It is this challenge that has prompted the current research into mechanisms to manage group work that puts the onus on the students to take more responsibility for the effective management of their projects.

The lead researcher is the lecturer of this module for over fifteen years. He had to spend time every year mediating group disputes, particularly around areas of individual student contribution and claims of low participation by some group members. He had previously used peer-assessment but had concerns about the effectiveness and fairness of this process, as did a former external examiner for this module. The high number of students involved in this module, and other modules with group projects taught by the lecturer, does not allow for grading of individual student contributions to group work. Nor is the use of individual grading considered an appropriate mechanism for fostering group-working skills. These challenges have been exacerbated by increasing student numbers and significantly reduced tutor support in recent years. It was decided to explore how the more wide-spread use of technology could enhance the management and transparency of the group-work process, while at the same time reducing the administrative burden.

#### 3. Literature Review

There is increasing pressure on faculty by higher education administrators and external stakeholders to deliver experiential learning, even in large classes (Dean & Wright, 2017) and demands by employers to enhance student employability (Knight and Yorke, 2003; Page et al., 2021). The benefits of experiential learning have been well documented (Dean & Wright, 2017; Knowles et al, 2014; Miettinen, 2000). So too have the additional benefits of experiential learning, and professional development, through group-work (Fearon et al., 2012). However, the challenges of maintaining a satisfactory level of experiential learning in large classes is also well recognised (Black et al., 2021; Donovan & Hood, 2021; Ferlie et al., 2010;). While the definition of a 'large class' varies by size and discipline (Shamim & Coleman, 2018), often considered over 100 students (Maringe & Sing, 2014), for the purposes of this research, with over 250 students, the module used for this research is considered to meet any definition of a 'large class'. The increase in large-class teaching, at least in some higher-education institutions, is often attributed to a reduction in teaching and other educational resources, while at the same time often experiencing increasing student numbers (Dean & Wright, 2017; Maringe & Sing, 2014). This does not always mean that

'big is bad' (Page et al., 2021). However, to date, there has been little research into 'mechanisms for leveraging the benefits, while mitigating the challenges, of experiential learning in large classes' (Black et al., 2021). For this reason, this research seeks to explore how experiential learning, particularly involving group-project work, can be achieved to a high standard, while, at the same time, not requiring significant additional teaching resources, and applying technological supports where possible. A frequent concern of students working in group projects is the so-called 'free-rider' problem (Maiden & Perry, 2011; Pauli et al., 2008). While peer-assessment is widely used to address this concern, particularly for group-project work in large-class settings, there are also significant concerns with this approach to assessment (McMillan et al., 2021; Panadero et al., 2013; Papinczak et al., 2007). For this reason, this research looks for mechanisms that address student concerns about the 'free-rider', but that do not involve peer-assessment. The recent Covid-induced 'digital pivot' has created new technological possibilities to offer a more hybrid academic delivery, as both staff and students have acquired additional digital skills (Clancy et. al, 2021). Central to this research is to identify ways that self-directed student activity, combined with technology, can be utilised to reduce already-stretched academic resources, in the face of increasing class sizes.

#### 4. Research Activity and Findings

#### 4.1. Research Question

The purpose of this research is to identify and test mechanisms that might facilitate more effective group-work in large classes without requiring significant additional teaching resources. In particular, a group project diary and an individual reflective journal are examined. Data on how an enhanced student understanding of group-work dynamics and an increased awareness of their own, and others' behaviour, while working in a group, can also be used to facilitate more effective group-work in large classes.

#### 4.2. Research Methodology

This was a two-part study consisting of both a qualitative and quantitative analysis of student experiences using a group project diary and a reflective journal. For the purposes of this paper the quantitative analysis is presented as it addresses the particular research question posed here. The qualitative analysis is more focussed on student personal and professional development while undertaking the group project by means of an examination of reflective journal entries. This will be the subject of a further paper.

#### 4.3. Online Survey

A link to an online survey, using the Qualtrics platform, was emailed directly to all 259 class members using their university email address. It was also posted on the Canvas page for the module. This link to the online survey allowed for anonymous responses. An initial 10% response rate was obtained. The class representatives were then asked to encourage the rest of the students to participate. This saw the number of respondents increase to 76 students, a significant 30% response rate (Fan & Yan, 2010). The survey used a mix of question types, including a Likert scale, to measure students' attitudes to the group project and the mechanisms introduced to help them more effectively manage group dynamics. In particular they were asked a number of questions relating to the project diary and the reflective journal, detailed below.

#### 4.4. The Project Diary

What is being termed the 'project diary' is a weekly record of project-group activity, akin to meeting minutes. It involves a one- or two-page record of the group activity for the week, recording the individual contribution of each student (see Appendix A for the project diary template). While there were no marks being allocated for the weekly project diary, on the basis that it would be too burdensome to grade each week for so many groups, students were advised of the benefits of keeping a project diary. They were also informed that, in the event of a group dispute being escalated to the lecturer, they would be required to produce an up-to-date project diary, to assist in any group mediation. The lecturer is not in favour of awarding marks just for submitting a weekly diary.

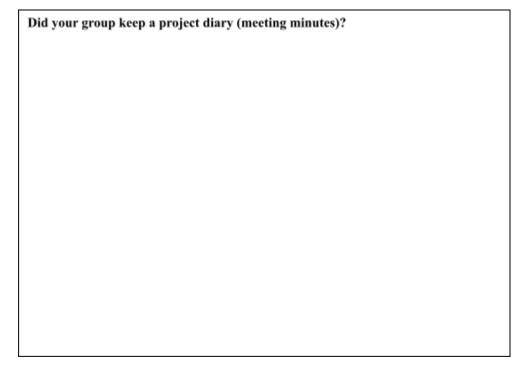
#### 4.5. The Reflective Journal

Students were also required to keep an individual reflective journal throughout the semester, based on identifying, and addressing, their strengths and weaknesses while working on the group project. This was private, and not part of the group project diary. The first reflection, of three, was based on undertaking a Belbin self-assessment at the start of the module (via Canvas) to help students reflect on their own group-working style (whether they agreed with their Belbin result or not). This was also to increase the students' awareness of the working styles of other personality types in a group setting. They then had to apply one reflective-writing model, drawing on Schon (1991), Kolb (2014) or Gibbs (1998) for the two subsequent entries on how they might address their weaknesses and build on their strengths in future academic or professional group-work (see Appendix Two for the instructions and template for the reflective journal – this was reduced to two entries per student, for the following year). Students were also given support online, via Canvas, regarding how to undertake reflective writing, with material and instruction provided by the

second author, who works in the Skills Centre in UCC. The reflective journal entries were graded on an Honours, Pass, Fail basis. The rationale for this grading was two-fold: a) it allowed students to be honest in their self-appraisal, as they were only graded on whether they had applied the necessary framework(s), had met the word-count and had undertaken adequate reflection (regardless of whether they admitted to having been lacking in their contribution to the group, as a number of students did, or to any other weaknesses, which are also important to understand for their future self-development), and b) it made grading easier, which is very important given the large student numbers.

#### 4.6. Survey Results

The first part of the survey asked students about their attitude towards the project diary and their experience of completing it.



 $Figure\ 1.\ The\ proportion\ of\ students\ who\ kept\ a\ weekly\ project-diary$ 

An unexpectedly high number of students (34%) did not keep a project-diary at all, and a further 20% only kept the project-diary for 'a few weeks'. However, this situation allowed for a very interesting comparison of attitudes of those who did and did not keep a project diary (below).

Table 1. Attitudes to the value of the project diary, by those who did, and did not, keep a project diary

project diary						
Did your group keep a project diary (meeting minutes)?						
Do you think the project diary helped reduce the likelihood of group tensions?	Yes, every week	Yes, for most weeks	Yes, but only for a few weeks	No, not at all		
Yes, it definitely helped	50.0%	16.7%	6.7%	0.0%		
Yes, it probably helped	18.8%	38.9%	46.7%	0.0%		
Not sure if it did or did not help	25.0%	16.7%	20.0%	8.0%**		
No, I don't think it really helped	6.3%	27.8%	20.0%	4.0%**		
We did not keep a project diary*	0.0%	0.0%	6.7%*	88.0%		

<sup>\*</sup> Some students who only kept the project diary for a few weeks also identified as not keeping a project diary for this question.

<sup>\*\*</sup> A few students who stated they did not keep a project diary still gave views on whether they thought it helped or not.

This analysis showed strong support for the project diary from those who kept it weekly, with 50% of those students saying they believed it definitely helped reduce the likelihood of group tensions, with another 18% saying it probably helped. Based on the positive experience of those who kept the project diary weekly, in terms of reducing group tensions, the process for maintaining the diary was modified for the following year. A Canvas page was set up where each group had to submit their project diary for each week. At a quick glance, the lecturer can see if all project diaries have been submitted (see Appendix 3). Project diaries are not reviewed by the lecturer except in the event of an issue being raised by any of the group members. In the context of over 50 project groups, this made the process very manageable, and it also ensured that all groups maintained and submitted a diary entry weekly as they were made aware that their submission would be immediately visible to the lecturer. Therefore, in the second year of the research, there was almost complete compliance with the project diary submission (and still without the need to grade these, or award any marks for submitting them). This has proven to be a significant contribution to ensuring the project groups run smoothly, in spite of the very high student numbers.

The second part of the survey examined student attitudes towards the individual reflective journal, the self-reflection process and its contribution to more effective group work. A combination of negative and positive statements were used in a Likert Scale.

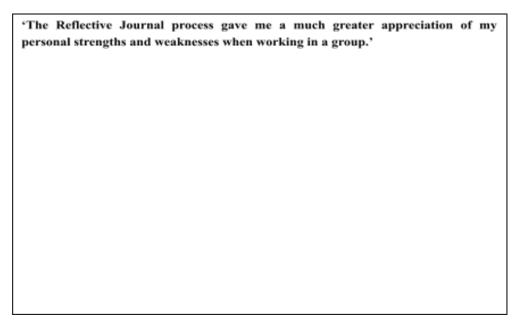


Figure 2. Attitudes towards the value of the reflective journal

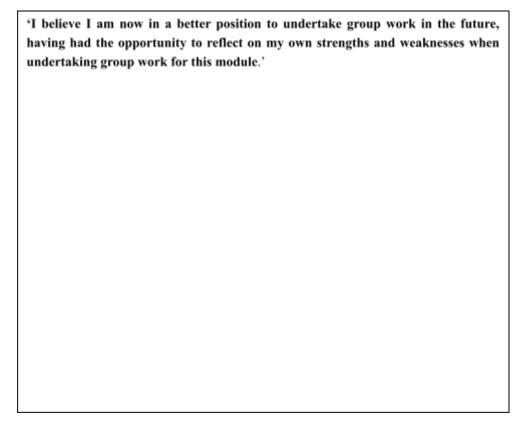


Fig. 3. Attitudes towards the benefits of the self-reflective process

The responses above, amongst others in the survey, indicate a significant benefit to student understanding about group-work from undertaking self-reflection, particularly around developing personal insights into their strengths and weaknesses while working in a group. Giving the students increased skills to better understand and address their group-working behaviour patterns enhanced their ability to better manage their project group dynamics themselves. In the context of very large classes, this means the benefit to the lecturer is two-fold: a) there is less management of individual project groups required, with fewer group disputes arising, and b) this learning is self-directed and undertaken via online platforms, thus reducing the need for the lecturer to provide this additional soft-skills development.

#### 5. Going forward: implications for practice and future research

The above analysis, combined with the lecturer's experience, demonstrates the significant benefits of using both the project diary and the reflective journal to help students better manage their group-work themselves. With regard to the lecturer experience, in the academic year 2022 – '23, only one project group, out of 54, brought concerns to the lecturer about a group member not participating, or any other group issue. In this case, the lecturer was able to consult the group's project diaries and confirm that the student was not contributing and address this appropriately. This was the lowest ever number of issues raised by students for this module, in over 15 years. Neither were there any complaints by some group members, made at the time of the project submission, of non-participation by other group members (which happened in almost all previous years of this module).

This project diary differs from other records of individual contribution, in that it is not used to establish individual grades for group-work, but it does allow students to record their contribution to avoid group tensions or for mediation purposes in the event of a group dispute. Keeping meeting minutes is also a very useful discipline for students to develop, one which contributes to the 'soft skills' so much in demand by employers today. It also means that, in the context of large classes, there is almost no administration required, as it is self-directed student activity, undertaken online, so that it is easily overseen by the lecturer.

A number of colleagues have now started to use a similar project diary. In module feedback received by the lead researcher, some students commented that they now ask their group members in other modules, where there is no project diary or other mechanism to record individual contribution, to voluntarily keep a similar project diary. Yet other students have suggested that this form of project diary should be mandatory for all the group projects on their programme.

The results also indicate strongly that the self-reflective process, based on the Belbin frame-work and the reflective journal, has allowed students to gain a better understanding of their behaviour, their strengths and their weaknesses while working in groups. It is proposed to undertake further research, in the coming academic year, to examine further the students' attitudes to the value of using the Belbin Team-work Framework and to more precisely gauge the extent to which they think a greater understanding of different working styles and personalities can help them navigate group dynamics and address group issues, before they escalate.

Any mechanism that allows students to manage their own group work more effectively will be of significant benefit to any lecturer, but particularly those dealing with a large number of project groups in big classes. There is further scope to explore how current digital learning platforms can facilitate and enhance this type of self-directed learning and project group management, without adding significantly to lecturer work-load in large classes.

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Appendix One: Project Diary Template

#### **Project Diary Template**

(Completion of diary be rotated amongst group members each week, and to be submitted via Canvas each week, via Assignments, by that group member)

Group No.

Date / Time (start and finish)

Venue (or 'via Zoom', Teams etc.):

Attendance:

Review of last week's minutes (not relevant for first week) – was the work agreed completed, by whom, and to a satisfactory level? If not, what is planned to address this?

**Items discussed:** brief description of key items discussed and agreement reached (bullet points are fine). Any unresolved disagreements can also be recorded, for the record.

**Work allocation for next week:** tasks to be undertaken by next week and name of person(s) responsible for doing this work. If it's a task for a longer horizon than one week, the agreed date for completion of the work.

**Any other business:** Any other matters arising, concerns, unexpected issues arising, new information etc.

#### Appendix Two: the Reflective Journal

#### What is the Reflective Journal?

The reflective journal is where you can reflect on, and learn from, any difficulties, and achievements, you experience in the group-project throughout the semester. It is not about trying to achieve any ideal goal, but, rather, to allow you to journal an honest reflection of your experiences and own behaviour while undertaking the project, with a view to learning from this for the future. The grading for the reflective journal will be awarded based on suitable completion for each entry (i.e. meeting the word-count, applying relevant framework(s) where required, demonstrating reflective thinking) and is worth 10% of the overall module marks. Grades will be an Honours (100%), Pass (40%) or Fail (0%) mark. This grading format is used to allow you to be honest in your reflection, as there is no 'right answer' being sought. You are being graded for the effort you put into personal reflection, and the application of the relevant frame-work(s), which are given on Canvas. You are encouraged to explore any weaknesses, or mistakes, you have made, and, more importantly, to demonstrate your awareness of these and how you might address them in the future. You will also have an opportunity to identify personal strengths, ones that you can develop and carry forward in your later academic, professional and personal life. You are free to disagree with any of the frame-works given to you to complete, on reflection, once you give a clear rationale for why you disagree with them. However, you must still, first, attempt to apply the frame-work(s).

#### How to complete the Reflective Journal:

There are two entries in total, one in late Oct., and the final one in early Dec. (exact submission dates are given below). Each entry should be in the region of 600 words (plus or minus 10%), and submissions will be through Canvas 'Assignments'. You will be required to upload a Word document on Canvas, copied from the template provided below, for each of the two entries. You need to complete this carefully and ensure you answer the question(s) and apply any frame-works required.

## Submissions that do not use the templates given below, for each entry, will not be graded.

For each entry you will be given a question to encourage critical thinking of your experiences to date while doing the Group Project. Your reflection should use one of the reflective models provided in the Skills Centre Reflective Handout found in the appendix (along with applying any other frame-work(s) required for that entry). Your comments and

reflections should draw upon your own personal experiences during the project for this module, in particular, but you may have noticed patterns from your experiences and behaviour on previous group projects and you can mention this also. You should also review the video material posted in the Reflective Journal section of 'Modules' on how to engage in personal reflection and undertake reflective writing.

All the entries must be your own original work, as they record your own learning. Therefore, copying and pasting text from other sources, even if it is work you have done previously, on another module, will be considered plagiarism. There is no need to describe in detail the models and frame-works being applied (e.g. Belbin); you can just reference which model(s) you are using. Also, you are not required to reference any other academic literature.

#### Note on confidentiality:

While you are encouraged to discuss with your fellow students any content being covered in the course, and project, please be assured that, when you hand in your journal, the contents will not be disclosed to anyone apart from staff involved in teaching and assessing the course. While this analysis is based on the group-work you are involved in, it is a personal and private reflection. You will not be required, and are advised not, to share it with your other group members. If you wish to share your Belbin group profile, that is your own choice. Some students find it useful to share this with their group members, others prefer not to.

The questions for each of the journal entries are given below. You can copy these and put at the top of a blank word document and then submit this via Canvas Assignments (links will be given in due course).

#### **ENTRY 1**

#### Due: Friday, Oct 21st, 2022

- 1) Result of Belbin Self-assessment (state what role, or combination of roles, you scored, having undertaken the Belbin Self-assessment, given on Canvas):
- 2) Do you think this score is an accurate reflection of what you would consider to be your personality type when working in group(s)? Why (not)?
- 3) Reflect on the process you and your group went through when choosing a brand, and when formulating the research proposal. Did awareness of your Belbin self-assessment and your understanding of the different Belbin roles that other members might play, help you in your contribution to this process? Why (not)?

4) Are you happy with your contribution to the project so far? Why (not)? What might you have done better, if anything? Use one of the reflective-writing models / frameworks given below (and state which model / framework you are using).

#### **ENTRY 2**

Due: Friday, Dec. 9th, 2022

- 1) Looking back over your contribution to the group project during the full semester, pick one task that you undertook (it could be collecting certain secondary data, moderating a focus group, designing or conducting or analysing a survey etc.) and reflect on the process you went through to complete this work and to ensure it met the expectations of the group. Did you experience any challenges when undertaking this task? If yes, how did you overcome them? If not, what do you think you did to ensure it went so well?
- 2) Looking back over your contribution to the group project during the full semester, describe what you would now consider as one of your main strengths, when undertaking group-work, and one that you believe you will be able to bring forward to future academic and professional group activities. Use any one reflective-writing frame-works to help you analyse your overall contribution to the group, and to identify what you now consider to be your main strength.
- 3) Very briefly, having now completed the project, do you think the Belbin self-assessment score you achieved is now more or less accurate than you thought when you completed Journal Entry 1, and why?

(word-count approx. 600 words)

# Appendix Three: Screenshot showing project diary submissions on Canvas by project group

· ocuren acolgriments						
Project Diary 1 Out of 0 MANUAL	Project Diary 2 Out of 0 MANUAL	Project Diary 3 Out of 0 MANUAL	Project Diary 4 Out of 0 MANUAL	Project Diary 5 Out of 0 MANUAL		
<b>B</b>	<b>B</b>	P		E O		
Po	Po	Po	Po	PO		
Fo	Po	B	Po	-		
Po	Po	B	Po	PO		
Po	Po	P	Po	E <sub>O</sub>		
Fo	Fo	B	P			
Po	Po	B	P	EQ.		
Po	B	B	Po	-		
Po	Po	B	B	<b></b>		
Po	Po	Po	Po			
Po	Po	B	P	E-0		
Po	Po	B	₽	Po		

This demonstrates how, at a glance, the lecturer can see if the weekly project diaries have been submitted. This is just a partial screenshot of the complete page. It also means that all diaries are easily accessible, within one page (on Canvas), in the event of a group dispute and the lecturer needing to review any of them.