CASE STUDY

Improving student engagement through employability themed group work

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Abstract

In an ideal world, universities and their departments are able to reach out to employers for collaborative, employer-set, authentic assessment which align industry expectations with an assessment that tests the intended learning outcomes of a module. This is a large and ambitious undertaking for practical reasons. The author identified three practical challenges as: sourcing willing employers, relevance and level-setting, and scalability, i.e., use in modules with large numbers of students. As module leader, each of these challenges were addressed and solutions identified allowing the employability project to be embedded into a module with 150 participating students contributing 30% towards the overall module mark.

Keywords: confidence, engagement, embedded employability, digital story, group work.

1. Introduction

The ultimate goal for the average mathematics graduate is to land that dream job setting the foundation of their career. However, to what extent does their studies prepare them for that leap into industry? Employers perceive there to be a graduate skills gap in global recruitment markets and suggest universities do not provide enough opportunities for students to develop valued skills; see the QS Global Employer Survey 2018 & the CBI's 2017 Education and Skills Survey. In this case study, the author, acting as the Module Leader, strived to introduce an authentic assessment which simulates a real-life assignment into Level 5 Financial Mathematics, giving students an opportunity to develop professional skills within their studies. Students' sense of belonging at their home institution and engagement with their studies are key contributors to student success; (Thomas, 2012). The year under consideration had an equal split between local student and overseas student from the Chinese partner university which presented challenges from the point of engagement, and opportunities for a culturally rich experience. As part of the evaluation of the assessment, the Module Leader analysed the impact on students' change in confidence following completion of the assessment task. The methods used align with those in York, 2016**,** which considers the importance of belongingness, student engagement and self-confidence.

The Module Leader made attempts to connect with employers in North West England. However, it became increasingly apparent that their proposals required extensive knowledge of financial mathematics beyond that of the module, advanced knowledge of software packages such as MATLAB including use of toolboxes, and often deviated from the proposed intentions of the assessment.

2. Constructing assessment tasks within a fictional secondment

One solution for aligning assessment aims with employer-set projects is to simulate the workplace. This way, employers' input can be obtained, but it is not essential for them to have an active role. An excellent starting place for designing a simulated work-related project is with MathWorks Inc. They are the software developers for MATLAB providing a specialist package used in industry, particularly finance, and have strong links with many HEIs in the UK supporting scientific research. The Module

Leader was able to connect with MathWorks through their Education Consultants and obtain industry insights, for example, the software needs of MathWorks customer base, understanding routine processes using software, and the typical challenges encountered for which developers support their clients. The Module Leader was able to access real-life stock market data freely available online and run trials based on the input from MathWorks within MATLAB. This became a basis for designing assessment tasks which involved exploring trends in the data, presenting financial measures, running procedures for analysing relationships between variables, and making recommendations to corporate clients using the financial framework of modern portfolio theory. By reviewing the annual reports of financial companies listed on the FTSE100 stock exchange, it was possible to develop a back story to add to the authenticity of the assessment giving context to industry problems. Searching job websites for 'Financial Manager', 'Director of Risk', 'Portfolio Manager' is a useful tool for getting an insight into role descriptions and operational matters such as chains of command. Putting all this together, the Module Leader created the profile for a fictional secondment to a fictional company which he named *Consultio International*. The assessment task was an investigative brief set by the Portfolio Manager at *Consultio International* for which the five successful applicants were seconded. The assessment involved presenting financial analyses and making financial recommendations using the financial framework developed in lectures, incorporating the use of financial software via MATLAB.

3. Group work

Naturally some students lack confidence and to some extent rely on peer support. The assessment task aimed at allowing these students to develop key skills such as problem solving and communication in a supportive environment. Many students use English as a second language and naturally gravitate towards common nationalities due to a lack of confidence. To respect the challenges many students face, and to foster a collaborative environment, they were permitted to buddy up in pairs before wider groups were formed. This allowed diverse groups of students to come together whilst they worked on a common work-related project, including digital story, and have a safety net via peer support. The Module Leader formed groups with five-members (30 submissions for this large module) and each group had to appoint a Project Leader. The Module Leader made clear from the beginning that all team members are responsible for all areas of the project, however, as a group they should decide how best to split up roles. As part of the project, students submitted a written report which addressed the project brief. In addition, each group submitted a digital story; (see below). A range of expertise was required in the areas of leadership, organisation, communication, problem solving, using mathematical software and report writing. The Project Leader represented the group when the Module Leader was involved with group matters, for example investigating non-attendance. This person also ensured the group was functioning as agreed, in line with group agreements and the project instructions. Teams were required to hold at least one meeting with all members every week and ensure minutes of the meeting were submitted to the Module Leader. Groups were not required to persistently follow up on non-attendance; this was handled by the Module Leader signposting relevant information such extenuating circumstances procedures and academic support. Collectively, groups were responsible for assigning roles within the team, agreeing subgroups to work on different sections, assigning responsibilities to individual members, determining timescales, and ensuring support was available to members who needed it. This focussed students' attention on their area of the project and allowed the Module Leader to monitor progress. These documents were used as part of the peer moderation, facilitated using Buddy Check, when assigning individual marks for the group's final product.

4. Digital story telling

The author's view is that embedded employability activities should provide students with opportunities to develop and reflect upon key skills. The challenges they encounter within the group environment, and their responses to them, are not only character building, but also opportunities for evidencing specific skills. This is particularly useful at, say, interviews. These experiences will be unique to individual members of the teams and provide a backdrop for demonstrating critical thinking in a specific situation. Digital story telling is one method for supporting students with articulating their impact in the group. As part of a fictional secondment, each group was required to produce a 3-minute digital story using video editing software Canva. Prior to the project, students were directed to resources from the Careers and Employability at the University of Liverpool Careers Hub. The purpose was two-fold, firstly to put many students onto the careers journey, and secondly to allow them to interact with job advertisements to discover skills relevant to appealing industries. At the end of the project, students will have had a clear idea about their priority skills and encountered a simulated employment environment to put them into action. The digital story encouraged group reflection for skills development. As part of the assessment, students were tasked with identifying three common group key skills. Using the STAR reflection model, students developed a script based on the situations that had arisen, the tasks they collectively agreed, the actions they took and the result as a direct consequence. This approach to reflection is recommended widely in the jobs market, for example, it appears as online advice from recruitment agencies due to its effectiveness and ease of use. The Module Leader's aims were to encourage students to: communicate experiences between themselves, reflect upon the group work, view their experiences as examples for demonstrating key skills, practice verbalising their achievements and improve confidence, doing this via the video recording. Canva is especially beneficial for students with low verbalising confidence since these students can record a reflection privately, as many times as they wish without peer pressure, and embed their finished contribution to the main story later. Overall, digital stories add value to embedded employability tasks and prepare students for modern interview methods using pre-recorded videos.

5. Evaluation

At the completion of the employability project, students were asked to reflect upon their change in confidence following the completion of the fictional secondment. This was divided into three categories: communication, using technology and study confidence.

1 - Communication. This category was broken down by:

- Responding to questions asked by a lecturer in front of a full lecture theatre.
- Asking lecturers questions about the material they are teaching during lectures.
- Attending an office hour to ask the lecturer a question.
- Discuss project work in groups with fellow students.

The assessment activity was designed to support students who lacked confidence. In the category of communication this represented 27 (8+19) students; see Figure 1 row 1 and row 2. Of those, 13 (2+8+3) students reported an improvement, 13 (6+7) student who remained unchanged and only 1 student who felt a little worse, demonstrating the project's value. The biggest beneficiaries were the most confident students before the start of the project in the D4 – E5 block of Figure 1. These account for 50 (15+6+4+25) students out of 71 (34+37) who reported an improvement (columns D and E).

Before \ After	A A lot worse	B A little worse	C Stayed the same	D A little better	E A lot better	
1 - Not confident at all	0	0	6	2	0	**8**
2 - Not very confident	0	1	7	8	3	**19**
3 - Neither	0	0	9	5	3	**17**
4 - Fairly confident	0	1	8	15	6	**30**
5 - Very confident	0	0	4	4	25	**33**
	0	**2**	**34**	**34**	**37**	*107*

Figure 1. Students' responses after reflecting upon changes in confidence in communicating mathematics

The author's view is that students felt this project bridged their current studies to potential career pathways, with an appreciation for the development of key skills which could be put into action in this simulated environment.

"I really enjoyed the project. Went in to it with little confidence but group environment was very reassuring, and the practicality and timing resulted in a consistent urgency without an overload of pressure. I personally much prefer these types of assignments over class tests".

Of the 17 students who felt neutral before the project in the third row, 9 students responded with no changes to their confidence. They did, however, take positives from the group environment.

"As much as I was already happy with group projects before this one, I really enjoyed working together with this group and it helps when others share a good motivation and work level".

Confidence being attributed to their preference for less time-controlled assessment and more exploratory open-ended projects with their peers. Overall, the responses show the assessment activity has had a positive impact on approximately 50% of the least confident students (row 1 and 2), 47% for those neither confident nor lacked confidence (row 3), and 80% of the most confident students (row 4 & row 5).

2 - Using technology. This category was broken down by:

- Solving mathematical problems using software, e.g., MATLAB, Maple, R.
- Using other technology as part of your studies, e.g., Teams, Zoom, Outlook, Word.
- Getting satisfactory grades in modules using mathematical software.

Before \ After	A A lot worse	B A little worse	C Stayed the same	D A little better	E A lot better	
1 - Not confident at all	0	0	1	2	0	**3**
2 - Not very confident	0	1	8	5	2	**16**
3 - Neither	0	0	7	6	1	**14**
4 - Fairly confident	0	0	9	18	9	**36**
5 - Very confident	0	0	0	5	33	**38**
	0	**1**	**25**	**36**	**45**	*107*

Figure 2. Students' responses after reflecting upon changes in confidence in using technology in their studies

A total of 19 (3+16) students reported a lack of confidence using technology prior to the assessment task; this was lower than communication (Figure 2). Of those, 9 students (2+5+2) reported an improvement, 9 (1+8) remained the same, and 1 felt worse. Peer support had a noticeable impact on the students who previously lacked confidence using technology. The Module Leader, for example, observed students taking time to explain their ideas when developing approaches to problem solving. Other group members demonstrated patience when alternative ideas were presented from different viewpoints. There was a keen sense of mutual respect during the project work. This can be seen in the open response comments.

> *"I realised other students are in the same boat when struggling with work, so I don't feel so hard on myself that it's just me."*

> *"Very good experience for me, especially for the video making."*

> *"Really enjoyed the group project :)"*

In the same way as the previous category, the data is heavily weighted towards the bottom-right of the table in Figure 2. In the author's view, this demonstrates the value that can be achieved via the introduction of authentic assessment.

> *"This project allowed me to use my soft skills to my advantage so that I could apply my theoretical knowledge in areas that I felt more comfortable and learn in areas that I was less confident."*

Overall, the responses show the assessment activity has had a positive impact on approximately 47% of the least confident students (row 1 & 2), 50% for those neither confident nor lacked confidence (row 3), and 88% of the most confident students (row 4 & row 5). The positive effect on previously confident students is higher in use of technology than the communication category.

3 - Study confidence. This category was broken down by:

- Producing your best work in coursework assignments.
- Studying effectively on your own in independent/private study.
- Work collaboratively in a group environment.
- Mange your workload to meet assessment deadlines.
- Remaining motivated throughout your studies.

Before \ After	**A** A lot worse	**B** A little worse	**C** Stayed the same	**D** A little better	**E** A lot better	
1 - Not confident at all	0	1	1	0	0	**2**
2 - Not very confident	0	1	3	1	3	**8**
3 - Neither	0	1	4	4	4	**13**
4 - Fairly confident	0	2	11	17	11	**41**
5 - Very confident	0	0	5	6	32	**43**
	0	**5**	**24**	**28**	**50**	**_107_**

Figure 3. Students' responses after reflecting upon changes in confidence with studies

A much smaller group of students reported a lack in study confidence prior to the assessment task; 10 (2+8) out of 107 students (Figure 3). Two respondents felt less confidence, one of which, commented: *"I like the module".* However, no addition insights were obtained. A total of 85 (41+43) out of the 107 respondents felt more confident with their studies. The author attributes this to the

authentic nature of the assessment and the realisation of their progress within their studies. The sense of achievement was supported in open response:

> "I feel 5 about myself now. Thank you for the project. I love it."

In the improved category, one respondent commented about their preference for open-ended projects over time-controlled examinations such as class tests.

> "I feel that this kind of project work makes for a more sensible and meaningful method of assessment than exams. Exams have many luck factors we cannot control such as material coming up that we were less comfortable with than other material. The extra time projects give us helps mitigate these luck factors."

Overall confidence

Overall, this case study demonstrates that the benefits of authentic assessment cannot be under-stated given the positive impact on a range of students from diverse backgrounds. Also, employability activities do not necessarily require direct involvement from employers. The Module Leader witnessed improved engagement and intriguing collaborations between local and overseas students during timetable sessions. The original intention was to support students who lacked self-confidence. Although students in this category benefited from this process, the biggest impact came from students who were already confident and, in the Module Leader's view, saw this as an opportunity to begin preparations for their careers journey. Unfortunately, some of the students who lacked confidence, and later stayed the same, did not offer any insight into why this might be the case; the author plans to explore this in future years.

6. Outlook

In the future, the author will continue to run the embedded employability project and plans to extend the evaluation by incorporating belongingness within the student community. He also plans to take steps to understand how students can be better supported with their studies. The author would be delighted to discuss this activity further with Module Leaders who have similar aspirations or would simply like to know more about this one.

7. References

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