

# *TEAMMATES: Improving the Student and Staff Group Assessment Experience*

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*Groupwork is an essential transferable skill, which is beneficial to student development beyond their academic studies and into their future employment. However, for a variety of reasons, the assessment of groupwork is often a contentious issue for many students. As such, establishing effective methods to improve this situation is crucial. The aim of this preliminary study was to implement the TEAMMATES evaluation and feedback system to enhance the group assessment experience for students and staff within the Engineering and Applied Sciences Foundation Year Programme (EAS FYP) at Aston University. This paper describes the successful integration of TEAMMATES into the EAS FYP and shares the experiences of the linked staff and students.*

## **Introduction**

As a consequence of pedagogical developments and the shift away from traditional lecture-style delivery towards a more student-centred collaborative learning experience, groupwork is far more prevalent during education (Ferdous and Karim, 2019). For group tasks to be completed effectively, students must exhibit both teamwork and self-management skills (Salas *et al*, 2015), the importance of which is often emphasised by explicit learning outcomes at Higher Education level. However, employers often report a skills gap with regards to graduates' ability to undertake teamwork, therefore, students clearly require increased opportunities for development of these skills (Adrian, 2017). At Aston University, and across the Higher Education sector in general, groupwork as a method of summative assessment is ever more popular, and students are now expected to participate in a form of assessed groupwork at some stage of their university studies (Aston University, 2020). Nevertheless, students can experience a certain level of anxiety and concern surrounding groupwork (Ferdous and Karim, 2019). Announcement of group assessment is often met with student disapproval, despite the benefits of such activities (Burke, 2011). Lack of equal contribution to the group project tends to be the primary problem linked to group assessment (Freeman and Greenacre, 2011) and it is thought that learning group social-loafing and freeriding is more prevalent than in employment situations, due to their

temporary nature (Davies, 2009). As such, it is crucial to address these issues in order to endeavour to achieve successful groupwork practices (Ferdous and Karim, 2019).

The ‘Essential Skills for Engineering and Applied Sciences’ (SEOESE) module, of which I am module leader, contained established group assessments at the point of my employment at Aston University. Continuation with this practice was important, as the implementation of social constructivist ideologies within teaching practices is beneficial for students’ engagement and attainment (Vygotsky, 1978), thus supporting this intended practice. The SEOESE module develops students’ important transferable skills, required for their studies and into employment, and therefore the implementation of groupwork is essential. Moreover, groupwork is specifically referred to within the learning outcomes for the SEOESE module. Additionally, the module has a groupwork summative assessment element alongside formative group tasks, as is seen with a number of other modules across the Aston University Engineering and Applied Sciences Foundation Year Programme (EAS FYP).

Knowing the issues faced with these types of assessments, there was a clear requirement to integrate an element of individualisation to the marking of the deliverables, which could provide a consistent approach across all EAS FYP modules containing groupwork. Initially, implementation of a temporary approach was integrated into the SEOESE module, during my first academic year as module leader, which included visual assessment of group logbooks for individuals’ contributions towards project deliverables. However, investigation of more effective methods was clearly needed in order to establish an approach that would be more beneficial for the students and staff alike. The integration of the TEAMMATES software into the SEOESE module was piloted for this purpose.

## Our Solution

### **What is TEAMMATES?**

Sridharan *et al* (2018a) proposed that the aforementioned issues inherent to groupwork can be effectively circumnavigated by the employment of peer- and self-evaluation activities. Peer-assessment has both formative and summative benefits, in that the focussed feedback can lead to improved student learning, whilst linked grading can provide an effective method of individualising summative marks. In addition, peer-assessment supports self-assessment, which is also a crucial element of formative assessment, leading to improved learning effectiveness (Reinholz, 2016; Pandero *et al*, 2017). However, students require adequate opportunities to develop these skills and in order to address this we utilised TEAMMATES software.

TEAMMATES is a free-to-use software which allows students to provide peer- and self-evaluation feedback within a groupwork setting (TEAMMATES, 2020a). It is very user-friendly and, as a consequence, has a fast-growing user-base across the global higher education sector (TEAMMATES, 2020a). Students do not require a login to access TEAMMATES as they can submit and view peer-feedback responses via the unique links which TEAMMATES emails directly to their university account (TEAMMATES, 2020b). Through the peer-evaluation sessions, students provide anonymous peer-feedback to group members, along with confidential peer-evaluations direct to the module tutor (TEAMMATES, 2020b). Once evaluative feedback sessions are closed, the collected responses are easily accessible for module tutors and it is possible to download the content as a spreadsheet (TEAMMATES, 2020b).

### **Establishing TEAMMATES Feedback Sessions for the EAS FYP**

The academic term at Aston University spans twelve weeks; consequently, the feedback sessions were spaced equally throughout this period in an attempt to avoid overburdening students with peer- and self-assessment activities. They were tasked to complete two formative feedback sessions (during Week 4 and Week 8) and one summative feedback session (during Week 12), which aligned with the presentation of their group-produced assignment.

Students were thoroughly introduced to the TEAMMATES software through a taught session during the first teaching week of the academic term. Supplementary information regarding TEAMMATES was also provided via the SEOESE module's Blackboard page, allowing the students to refer back to this information throughout the term. Expectations of the students' interactions were fully explained during this session and reminders were provided on the release dates of the feedback sessions.

#### **Formative Feedback Sessions**

The format of the formative feedback sessions was a mixed approach, with a combination of simple multiple-choice style questions and 'Comment' link short answer questions. In the first formative feedback session, students were asked to provide a judgement on the following criteria for their group members and themselves: level of participation in discussions; level of communication outside of class; level of organisation and planning; and level of helpfulness towards other team members. Students had the option of ranking individuals as either 'Excellent', 'Good' or 'Needs improvement' (Figure 1).

**Question 1: Rate your teammates level of participation in discussions.**

Only the following persons can see your responses:

- The receiving students can see your response, but not your name.
- Instructors in this course can see your response, the name of the recipient, and your name.

Evaluee/Recipient

**Abeeha (Student):**

Excellent  
 Good  
 Needs Improvement

[Want to add comment to your response? Click here.](#)

**Amy (Student):**

Excellent  
 Good  
 Needs Improvement

[Want to add comment to your response? Click here.](#)

Figure 1: An example of the student view for formative feedback session one within TEAMMATES. Image taken from TEAMMATES software (<http://teammatesv4.appspot.com/>) [Accessed 28 February 2020].

In the second formative feedback session, a Likert scale was utilised by the students for assessing the contributions of their group members and themselves towards: the project's deliverables; leadership or organisation of the project; communication outside of class; and group discussions (Figure 2).

**Question 1:** This teammate is making a significant contribution to the project's deliverables (eg. log book, research, presentation).

Only the following persons can see your responses:

- The receiving students can see your response, but not your name.
- Instructors in this course can see your response, the name of the recipient, and your name.

**Evaluee/Recipient**

Abeeha (Student):

**Strongly agree**  
 Agree  
 Disagree  
 **Strongly disagree**

Want to add comment to your response? Click here.

Amy (Student):

**Strongly agree**  
 Agree  
 Disagree  
 **Strongly disagree**

Want to add comment to your response? Click here.

Figure 2: Example of student view for formative feedback session two. Image taken from TEAMMATES software (<http://teammatesv4.appspot.com/>) [Accessed 28 February 2020].

In both formative feedback sessions, students were also asked to provide specific feedback comments to each group member, which were shown anonymously to that individual. Additionally, they were asked for comments about each group member in a confidential manner which were only shown to the module tutor. This information in particular was important in keeping track of student engagement with the project from the start to the finish and monitoring any group conflicts. In addition, it was also helpful in the moderation of student-provided individualised adjustments for fairness.

#### Summative Individualisation of Marks

The final summative feedback session was utilised for the individualisation of marks provided to the groups during their assignment presentation. To achieve this, students were given grading criteria with associated descriptions (Figure 3) and were asked to choose which narrative best described each of their group members' and their own contribution(s) to the project. This information was then collated by the module tutor and utilised for the individualisation process whereby the following algorithm, evidenced in Equations 1 and 2, was implemented for each student within a group (Mohd-Yusof, 2019). An example of the implementation of this algorithm is shown in Table 1 utilising fictional student values.

$$\frac{\text{average opinion}}{\text{team opinion average}} = \text{adjustment value}$$

(Equation 1)

$$\text{group artefact grade} \times \text{adjustment value} = \text{individualised final grade}$$

(Equation 2)

<b>Instructions:</b>	You must rate the degree to which each team member fulfilled their responsibilities in completing the project (including yourself) reflecting what you think was their overall contribution to your group meetings, logbook and final artefact.
	<b>Excellent (8)</b> - Consistently went above and beyond - tutored teammates, carried more than their fair share of the load, led discussions and drew in quiet members, provided references and explanations, insightful, highly positive, motivates and encourages others.
	<b>Very good (7)</b> - Consistently did what they were supposed to do, very well prepared and cooperative, generate discussions, always positive and encouraging.
	<b>Good (6)</b> - Always did what they were supposed to do, prepared and cooperative but doesn't go beyond what is necessary, participate in discussions, always positive.
	<b>Satisfactory (5)</b> - Usually did what they were supposed to do, acceptably prepared and cooperative, tries to participate in discussions, usually positive. OR: Sometimes dominating, had a tendency to dominate discussions but attempts to tone this down however not always successful.
	<b>OK (4)</b> - Often did what they were supposed to do, sometimes participates in discussions, somewhat positive but can be negative at times. OR: Dominating, often blocks or disregards others' opinion.
	<b>Unsatisfactory (3)</b> - Sometimes fail to show up or complete assignments, rarely prepared, sometimes negative. OR: Very dominating, refuses to let others offer their opinion, cuts off others when they tried to offer opinion.
	<b>Insufficient (2)</b> - Consistently fail to show up or complete assignments, unprepared, negative and demotivate others.
	<b>Poor (1)</b> - Practically no participation.
	<b>No show (0)</b> - No participation at all, did not come at all.

Figure 3: Example of student view for individualised grading criteria linked to the summative feedback session. Adapted from (Mohd-Yusof, 2019). Image taken from TEAMMATES software (<http://teammatesv4.appspot.com/>) [Accessed 28 February 2020].

<b>Group</b>	<b>Name</b>	<b>Grade</b>	<b>Group Member Opinion</b>					<b>Average Opinion</b>	<b>Team Average</b>	<b>Adjustment</b>	<b>Final Grade (%)</b>
			<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>				
A1	'Student 1'	68	6	7	7	6	6	6.4	6.08	1.05	71.58
	'Student 2'	68	5	6	7	6	6	6.0	6.08	0.99	67.11
	'Student 3'	68	7	7	6	7	7	6.8	6.08	1.12	76.05
	'Student 4'	68	6	7	6	8	6	6.6	6.08	1.09	73.82
	'Student 5'	68	4	5	5	4	5	4.6	6.08	0.76	51.45

Table 1: Example of summative mark individualisation utilising fictional student values.

Further peer- and self-assessment was gained via the linked short answer questioning, where students were asked to 'state the reasons for the rating you gave your team mates and yourself', 'state one positive trait for each of your team mates and yourself' and 'state one area for improvement for each of your team mates and yourself'. As with the equivalent formative feedback session questioning, this further aided moderation of the individualised adjustments to the assignment grade for fairness.

***Roll-out of TEAMMATES in the EAS FYP***

Initially, the TEAMMATES software was trialled on the SEOESE module during the first term of the 2018/19 academic year. Subsequent to the positive feedback received from the students and the linked benefits for the module tutor, the pilot was expanded to incorporate two further modules on the EAS FYP, ‘Biological Science Foundations’ and ‘Foundation Chemistry for Engineering’, during the second term. Again, the integration of TEAMMATES software was received positively by both staff and students alike. The TEAMMATES software has now been successfully integrated into the group assessment of seven modules within EAS FYP during the 2019/20 academic year. All modules have shown equal levels of success with its implementation.

**How Effective was this Solution?*****Student Perspective***

Subsequent to the summative feedback sessions for the modules, students were asked to complete an evaluation session, allowing them to provide comments on their perceptions of using the TEAMMATES software. This process was key to understanding how effective the use of TEAMMATES was and provided lots of useful information. It was evident from the student evaluation comments that the software had allowed for fair assessment of self- and peer-contribution towards the project: “... a great platform to ensure our groups are fairly evaluated”, “... very helpful in awarding the marks fairly to each individual in the group around the average mark for the work itself”. Students also commented positively on the ability to recognise and reward those peers that had gone above and beyond with their contributions to the project: “...allows those who excelled to be recognised”. There was also a consensus that TEAMMATES had acted as a motivational tool: “...motivates individuals to work harder as they know they will be marked down if they don't contribute”, “...motivates everyone to do their fair share”. Beyond providing fair individualisation of assessment grades, students also felt that development of their transferable skills went beyond teamwork and self-management, with some comments linking to improved self-reflection: “...helped me see what others think of me and it will allow me to reflect on this making myself a more confident individual in the working world”, “...helped us understand our strengths and weaknesses”. A reduction of group conflict was also a highlighted benefit for students: “...an excellent way for people to know what to improve on without causing any conflict”, “... a good way to communicate with your team and raise any concerns”. It was also apparent that TEAMMATES allowed those who are more introverted in face-to-face situations to have a voice: “Very useful and helpful tool to see what your teammates think about you and where you can improve upon as some people may leave things unsaid face to face but use this tool to help speak their problems”, “TEAMMATES has been a great help to get my point across and get feedback from my team members”. This was a very positive step forward with regards to achieving inclusivity within teaching practices.

The data presented in Table 2 shows the percentage of student engagement for the different feedback session types across the modules on the EAS FYP which utilised the same feedback question templates. It is evident that there is still room for improvement with regards to student engagement with the software and increased interaction with TEAMMATES could potentially be achieved through a more consistent approach to its usage across the EAS FYP. Nevertheless, the use of the formative feedback sessions alongside the summative feedback session was also appreciated by the students, as they felt it allowed them to use the constructive

feedback to make changes in a proactive manner: “TEAMMATES was very useful tool to understand how well our teamwork was and what I could do to develop my skills to further strengthen our task”, “Making updates along the way was great, as we could talk about our experience when it was still a recent thing”. In addition, it was observed that students received and reacted positively to feedback from their peers and tutor and implemented any changes required without incident. Furthermore, an added advantage of TEAMMATES highlighted by the students recently and in light of the closure of the University due to the current SARS-CoV-2 pandemic, was the remote nature of the software: “TEAMMATES provided a useful avenue for remote feedback, especially since the University closed”.

Module	Cohort size	Feedback session	% student engagement
SEOSE: Essential Skills for Engineering and Applied Sciences	177	Formative 1	80.8%
		Formative 2	62.7%
		Summative	67.8%
SEOCE1: Foundation Chemistry 1	109	Formative 1	69.7%
		Formative 2	56.9%
		Summative	64.2%
SEOESF: Engineering a Sustainable Future	32	Formative 1	50.0%
		Formative 2	71.9%
		Summative	62.5%
SEOBBS: Biological and Biochemical Science Foundations	89	Formative 1	69.7%
		Formative 2	76.4%
		Summative	85.4%
SEOPS2: Physical Science and Engineering Foundation 2	118	Formative 1	49.2%
		Formative 2	46.6%
		Summative	44.1%
SEOPSY: Physics for Health Scientists	77	Formative 1	50.6%
		Formative 2	68.8%
		Summative	54.5%

Table 2: Student engagement with the TEAMMATES software in the different feedback session types for EAS FYP modules which employed the same feedback question templates.

### **Staff Perspective**

Colleagues who had implemented the TEAMMATES software into their modules were also asked for their opinions regarding its usage. As with the students, a variety of related benefits were highlighted by this. A major positive identified was that module tutors felt more able to alleviate student concerns with regards to group assessment: “I have found TEAMMATES to have a positive impact on the group work dynamic. I have found TEAMMATES to be a useful tool which helps provide students with a ‘peace of mind’ when conducting group work ... Students are pleased that their grades are protected and that they will not ‘carry’ other students during group work”. Additionally, staff recognised that a development of reflective skills had positive effects beyond the scope of the individualisation of assessment tasks and aided in improving tutor-student interactive experiences: “The feedback sessions ... have provided our students with the ability to reflect on their own, and their team mate’s, contributions during the project. This opportunity for reflection, in addition to the feedback that students are able to provide us as module tutors, has enabled richer and more meaningful discussions during supervision

meetings”, “The use of TEAMMATES has enabled me to better get to know some of my students who have felt able to start a dialogue with me via the software. This has allowed me to offer support to some students who I may not have otherwise been able to”. The TEAMMATES software was also found to be beneficial with regards to alerting staff to students who required additional support and when conflict situations required mediation: “In a few cases it was clear that some groups were struggling due to lack of support from other members. I was able to act upon their feedback and offer support”, “...students had a designated, private sounding board. The majority of students who engaged provided positive feedback about their group, others nudged each other to answer emails quicker or participate more in discussions”. A final aspect of TEAMMATES highlighted by colleagues with regards to module tutoring was that it allowed staff an additional avenue to gauge students’ engagement with their modules and the assessed task: “It was a clear indicator of whether or not the cohort were engaging with the module itself ... Without this information in the previous year, it was difficult to gauge each student’s engagement in more detail”. I received no negative staff comments on the integration of TEAMMATES into the modules. The reaction of staff members was overwhelmingly positive and there was a general consensus that the utilisation of TEAMMATES helped to develop an increased sense of ‘community’ within a module.

## **Future Work**

Whilst the integration of the TEAMMATES software into group-assessment-linked modules across the EAS FYP was successful, the intervention can possibly be improved upon to benefit students even more and further enhance their experience with this assessment type. Through consultation with students following the pilot study, a number of developmental areas were highlighted. Firstly, students expressed worries over the honesty of the ratings and feedback comments provided by their group peers: “whilst [we] received good feedback, [we] didn’t know if the feedback was genuine. Similarly, there may be an expectation that you will rate other students well. It is recommended that lecturers should encourage students to remain fair whilst rating on TEAMMATES”. Sridharan *et al* (2018b) proposed that there is a reluctance for students to provide an honest assessment of their peers, and this is more prevalent when these assessments are linked to module final grades. As such, whilst introducing future students to TEAMMATES and its linkage to their group assessment, there will be an emphasis on the importance of providing truthful, purposeful feedback both through their contribution ratings and comments. This will aim to ensure that the students understand that their group members can only possibly develop their skillsets and correct their behaviours if issues are highlighted. The students’ ability to provide quality feedback comments will also be assisted through the provision of additional taught sessions focussed on developing their peer- and self-assessment skills during the SEOSE module.

Another area of focus would be to improve the formative feedback. One method to address this would be to revise the rating scales for the formative feedback sessions, as it was suggested that: “TEAMMATES encourages students to become engaged as they have the motivation of high grades, to make the system more accurate it is recommended that a score-based system should be implemented where there is a score out of ten for each question”. Therefore, the intention for the next academic year is to link a simplified version of the grading criteria encountered in the summative feedback session into the formative feedback sessions as a replacement for the current rating options. Alongside making the rating process more ‘accurate’ for the students, it also means that they have encountered the grading criteria of a form prior to completion of the summative feedback session. Additionally, another priority to

improve the quality of the formative feedback would be to ensure that all students are made explicitly aware of the expectations around feedback comments. This would be achieved through the provision of more directed comment linked questions, for example, the potential utilisation of the short answer questions from summative feedback session to replace the 'Your feedback to this teammate (shown anonymously to the teammate)' element of formative feedback session. This would enable the students to provide more meaningful, useful feedforward comments for their peers. It would also provide a further means of counteracting the initial issue raised for development by students.

## Conclusion

Groupwork is an inevitability within Higher Education and is a very valuable transferable skill for students to develop. However, from the student perspective, groupwork is frequently viewed with a certain amount of negativity, which is often due to disparities in individual contributions within groups. This study has established that the TEAMMATES software is a viable option to improve groupwork management across a range of subjects and disciplines, as was demonstrated by its successful integration across a number of modules in the EAS FYP at Aston University. TEAMMATES software was well received by students and staff alike and positively endorsed by both groups. In addition, the introduction of this initiative within the EAS FYP had benefits beyond improving the effectiveness of group assessment individualisation, as it also significantly enhanced and supported student-tutor relationships. The benefits of TEAMMATES are now being recognised beyond EAS FYP and, since the initial pilot study, the usage of TEAMMATES has expanded into the wider College of Engineering and Physical Sciences at Aston University. Nevertheless, the full potential of TEAMMATES has yet to be realised at Aston University and I aim to significantly develop its use over the course of the 2020/21 academic year.

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