THE UTILITY OF A PEER REVIEW APPLICATION IN INTERDISCIPLINARY TEAMWORK ARRANGEMENTS

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ABSTRACT

Project and challenge-based learning typically require students to navigate personal and professional relationships within a team, in order to collaboratively solve authentic problems. These collaborations are often interdisciplinary in nature – an arrangement that adds increased complexity to the team's functioning. This is due to distinctions in approaches, epistemologies, ethos or jargon. The ability to provide (and receive) appropriate and constructive feedback to peers, within the team, is a key skill that can enhance team functioning and ultimately, output. Furthermore, it is a competence that aids in lubricating social and work impediments that may be causing bottlenecks to creativity, or the manifestation of ideas. The aim of this study, set within three different interdisciplinary bachelor modules, is to determine to what extent the use of the 'Buddycheck' application for peer review, is appreciated by students and teachers. The application, hosted within the learning management system of the university, allows students to rank their peers' performance according to teacher-set criteria, as well as through flexible open-format feedback; in order to facilitate opportunities for enhanced communication and expectation alignment. We wish to ascertain to what degree team functioning is enhanced through the scaffolded communication opportunities, by highlighting and creating openings to discuss undesirable behaviours, through the feedback application. Preliminary results appear to favour this mode of feedback facilitation, albeit with certain caveats,

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detailed later. Since teamwork is universal in tertiary education, these insights may be helpful for educators attempting to further improve the evaluation of the process of their projects or challenges.

1 INTRODUCTION

Teachers implementing project and challenge-based education, use collaborative teamwork as a conduit to facilitate, and practically apply, some of their intended learning outcomes. Cooperative or collaborative learning in tertiary settings is well established, as the knowledge, skill and cognitive benefits surpass alternatives such as individualistic or competitive learning [1],[2]. However, students working in teams can experience encumbrances such as unfair distribution of work or group process deficiencies [3]. Specifically, poor communication and free riding are noted as common deficiencies. Peer feedback on process and behaviour - not to be confused with peer feedback on tangible contributions, such as quality of written submissions - can encourage students to become self-analysing reflective learners [4]. Therefore, a facilitation mechanism where giving and receiving constructive peer feedback on team process and behaviour, could plausibly assist in mediating the above issues. This could be by opening avenues to personal development and, hopefully, improvement of individual conduct. It must be noted however, that the perceived credibility of peer feedback is mixed; some researchers indicate it may act as a deterrent to negative behaviour; but timing and frequency are crucial[5] thus must be opportunely planned. Further, there has been doubt cast on whether students are completely honest when giving feedback [6], rather choosing to temper their complaints and protect the team dynamic and maintain the status quo [7]. From an instructor's perspective, gaining evaluative or developmental insights from the peer review reports can be a valuable resource to draw upon when allocating rewards or identifying key moments to intervene [8]. With the above factors in mind, a trial was implemented to discover: 1) to what extent the peer-review application 'Buddycheck' was seen as useful to enhance team functioning (i.e. facilitate communication discord, etc.) within student groups; and 2) to what extent information gleaned by tutors from the feedback application was considered useful for evaluative or developmental purposes.

2 METHODOLOGY

2.1 Case study setting

Three interdisciplinary modules (15 European Credits) working on either challenge-based (societally linked) or project-based (authentic) assignments, incorporated the peer-review application (PRA) into their processes. The PRA enables students to rank their peers (from one to five, with clear descriptors) on teacher-set criteria (e.g. work ethic, communication, etc.) and give open feedback (a tip and a top) for each of the team members, on their unique contribution. The peer feedback opportunities were offered mid-way, allowing students the opportunity to reflect and improve, as well as near the end of each module. On both occasions, students were prompted to complete the forms. Furthermore, students were offered feedback skills scaffolding, in the form of either information slides, videos or micro-workshops, in order to practise and improve their feedback abilities.

2.2 Case study instruments & data analysis

Instrumentation: digital surveys were sent to all students of the 3 modules (see *Table 1*). The pertinent part of the survey consisted of 4 agreement statements (Likert

scales). Furthermore, open-question answers from the PRA were collated. Tutor perspectives were gained from interviews or open question surveys. *Analysis*: open answers from the PRA and tutor perspectives underwent thematic analysis (separately), where recurring themes were grouped and defined (see *Table 2*). Poignant quotes of each theme are provided for reference to illustrate the range of student and tutor-themed perspectives, see results section.

Table 1. Summary of Cases and Data Sources.

Case Study and Module Details	**Student Survey Response**	**(Feedback Skills) Scaffolding for Students**	**Peer-review Application (Open Question)**	**Survey (Likert)**	**Tutor Perspective**
Case 1: Mathematics & Computer Science *N=280* *Year:2020/21*	*N*=47 (17%)	Self-directed slides	*N*=155 (55%)	Yes	N/a (no tutors)
Case 2: Engineering, Design&Management *N=380* *Year:2021/22*	*N*=56 (15%)	Self-directed videos	n/a (No open question)	Yes	Survey
Case 3: Multiple Discipline Minor *N=42* *Year:2021/22*	*N*=12 (29%)	Micro-workshops	*N*=24 (57%)	Yes	Interview

3 RESULTS

Our findings are summarised below, in *Table 2*. It shows the range of perceptions about the PRA, for both students and tutors. The students from the different modules had a range of value perceptions for the PRA, but were mostly positively inclined. Tutors, too shared positive to mixed perceptions of the PRA.

Table 2. Summary Table Student & Tutor Perceptions of Peer-review Application

	Case1	**Case2**	**Case3**
Students' Themes			
Likert Survey			
Useful for team	*N*=33 (70%)	*N*=31 (54%)	*N*=11 (82%)
Impacted outcomes	*N*=32 (68%)	*N*=22 (39%)	*N*=7 (48%)
PRA Open Questions			
Positive Perception	*N*=77 (50%)	-	*N*=18 (75%)
Mixed/Neutral Perception	*N*=57 (37%)	-	*N*=4 (17%)
Negative Perception	*N*=11 (17%)	-	*N*=2 (8%)
Tutors' Themes			
Open Questions			
Positive Perception	-	*N*=7 (58%)	*N*=3 (50%)
Mixed Perception	-	*N*=4 (33%)	*N*=3 (50%)
Negative Perception	-	*N*=1 (8%)	0

Sample responses of the students and teachers illustrate the positive, neutral and negative perceptions, below. Generally, students had more positive than negative comments on the PRA.

Positive perception - Students

"I believe the BuddyCheck was useful in two ways. First of all, I was able to better formulate feedback for my teammates. The Buddycheck allowed me to think about the project on a

deeper level then I normally would be, working in a team. Providing my teammates with good feedback enables them to improve their work and keep the team going forward. Working on the project goes smoothly and the quality of the final product is much better when we as a team have a good understanding of each other's ideas. Secondly, I can better orientate myself with the feedback my team provides me with. That way I can work on improving my weak skills much better as they would be pointed out by my team members."

Neutral perception - Students

"I don't feel like it impacted team functioning much either way."

Negative Perception - Students

"I see no use in using Buddycheck, it doesn't hinder progress. However, it seems kind of redundant, either a team member is responding just fine, in which case it seems like an awful idea to indirectly tell them: "Hey, you're doing a bad job" I think that's really bad for group chemistry. If a group member isn't responding, that's a different story, but I would assume people would instantly message one of the project organizers about it, instead of saying it via here. In short, giving each other indirect feedback seems like a great way to create a toxic environment during the project. Encourage direct feedback and a good healthy group environment where problems are quickly sorted out instead of building up only to find out via this buddycheck system."

Positive remarks - Tutors

"Useful, helps for students to consider their own work / contribution in context of others, and helps me in assessing if my own impression of group members is correct."

Neutral remarks - Tutors

"Useful in theory, but it's not by definition a representation of the actual perception of student's peers within their group. Students might tend to be too optimistic or 'soft', to not lose fragile team dynamics."

Negative remarks - Tutors

"Not very good. Although it could be useful for the students, as tutor it was more of a hassle than actually helpful."

With regard to tutor perceptions, the majority found it a useful addition that helped them gain insights to their teams; some even used the information to guide or justify feedback. However, some tutors felt that the students held back from openly criticising their peers, even when clear offences were committed. This is despite student training and encouragement to provide constructive feedback.

4 CONCLUSIONS & DISCUSSION

We conclude that across the three studies, the PRA is considered a useful tool. Either as a starting point for a conversation about team behaviour, an option as a formal and relatively safe space to express oneself, or as a means to gain insight into how peers perceive one. With regard to the application alone, making a large impact on the team functioning, there is less conviction. Highlighting the need for further process support from educators. This can be in the form of targeted skills training; mediation meetings with tutors, and making the consequences of poor performance more explicit. To summarise, simply assigning the PRA to a course as a panacea to resolve team issues is unrealistic, rather this type of aid is more beneficial when used in conjunction with well-considered soft skills support and process scaffolding with a tutor. Further, there are indications that some students remain reluctant to be completely honest when sharing negative feedback; this is in line with other studies. Educators must therefore be cognisant of this when allocating points based on peer assessment. For tutors, the PRA is mostly considered useful to gain insight into the inner workings of the team, as a reference for intervention, as well as a resource for feedback.

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