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Using online peer feedback tools to improve undergraduate group interaction and assessment quality

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Abstract

In higher education, sophisticated online learning management systems offer educators unprecedented opportunity to design and implement assessment-specific feedback rubrics with relative ease. In 2022, Feedback Fruits, a flexible, online feedback tool, became available at Flinders University (Australia) with system migration to Canvas. This study evaluated the acceptability and impact of online peer feedback rubrics introduced to a group assessment in a 3rd year, undergraduate, medical science topic. In this study, online feedback participation rates were high (range 84.3-96%), with participants preference for anonymous feedback (77%). Mean peer evaluation scores improved for information sharing, task completion and discussion at final assessment; with feedback received ranked 'high' by 56.8% of students. Mean group evaluation scores improved for topic coverage, poster format and referencing at final assessment; with feedback received ranked 'high' by 59.1% of. students. In summary, online peer feedback improved student engagement and group assessment learning in this topic.

Keywords: *Feedback; peer; Feedback Fruits; assessment; quality.*

1. Introduction

In education, 'feedback' refers to a compilation of post-response information that communicates to the learner about their actual performance. Importantly, feedback from equal-status learners guides learning processes towards high-quality educational goals (Narciss, 2012) by progressively strengthening self-assessment (Kim-Godwin *et al*., 2013), metacognitive learning and deep course content analysis (Kwon *et al*., 2018); skills underpinning core graduate qualities in higher education.

The importance of feedback in tertiary education has been highlighted as topic delivery has shifted from face-to-face classes to primarily teaching via online learning management systems. In online settings, student connection (McVay Lynch, 2002), learning quality and community

of practice (Corgan *et al*., 2004) are enhanced through feedback-rich learning; with 'feedback paucity' often associated with online course withdrawal by students (Ertmer *et al*., 2007). However, the facilitation of adequate online feedback intensity by teaching staff alone has been reported as difficult (Dunlap, 2005) and, as such, alternative feedback mechanisms have developed over the past decade (Aviles *et al*., 2012). In fact, with the application and sophistication of learning management systems now commonplace, educators have an unprecedented opportunity to apply flexible and robust, online peer feedback rubrics with relative ease.

'Feedback Fruits' is an online learning tool offering flexible feedback rubric formats, student anonymity and auditing functionality. Feedback Fruits has been reported as an easy and excellent online student tool with staff assistance (van Popta *et al*., 2017), facilitating peer-to-peer communication (Schillings *et al*., 2020) and lowering peer feedback quantities for student learning uplift (Nicol, 2014). At Flinders University, Feedback Fruits became widely available in 2022 following migration of the University's online learning platform from Moodle (Moodle HQ) to Canvas (Infrastructure). The aim of this study was to design, implement and evaluate online, peer feedback rubrics introduced to a group assessment for 3rd year, undergraduate, medical science students.

2. Methods

2.1. Study Cohort and Demographics

Undergraduate, 3rd year Bachelor of Medical Science/Laboratory Medicine and Bachelor of Public Health students enrolled at Flinders University, Australia in Semester 2 of 2023 were eligible for the study. Student demographic data was accessed using the University's Intelligence Portal.

2.2. Group Assessment

The group assessment consisted of a research project, produced over 8 weeks. Submission comprised of a research poster and a 5-minute poster presentation. Randomly allocated groups (11) of 4-5 students, researched an infectious disease test/device. Research on the test/device performance was evaluated against 'ideal' REASSURED benchmarking criteria (Land *et al*. 2019). The assessment was worth 15% of the topic grade, with allocations for group marks (4%), individual marks (6%) and feedback activities (5%). Final grades were moderated in accordance with the University's assessment policy.

2.3. Assessment Feedback

2.3.1. Feedback Fruits Rubrics

Academics designed a 'peer-to-peer' (within-group) and a 'group-to-group' (across-group), analytic assessment feedback rubric for Feedback Fruits. The focus of the peer-to-peer feedback rubric was group interaction (Table 1). Students completed peer-to-peer feedback (0.5% of assessment mark) at draft and final poster submission.

Table 1. Indicative* Peer-to-Peer Feedback Rubric in Feedback Fruits

Interaction	Beginning (1)	Emerging (2)	Proficient (3)	Experienced (4)
Sharing information	No information shared	Minimal	Moderate	Maximal
Discussion Skills	No participation	Occasionally spoke when encouraged	Contributed most of the time	Consistently contributed
Listening Skills	Did not listen, acted autonomously	Occasionally listened	Listened most of the time	Actively listened to incorporate ideas
Task Completion	No task completion	Completed some assigned tasks	Completed most assigned tasks	Completed all assigned tasks

**Truncated peer responses shown. Numerical evaluation scores (1), (2), (3) or (4) were used for analysis.*

The focus of the group-to-group feedback rubric was topic coverage and formatting (Table 2). Students completed group-to-group feedback (0.5% of assessment mark) at draft and final poster submission.

Table 2. Indicative* Group-to-Group Feedback Rubric in Feedback Fruits

Poster Criteria	Beginning (1)	Emerging (2)	Proficient (3)	Experienced (4)	Highly Experienced (5)
Topic Coverage	Insufficient	Variable	Satisfactory	Complete	Advanced
Collaboration	Limited	Emerging	Satisfactory	Effective	Outstanding
Referencing	Limited	Variable	Satisfactory	Complete	Precise

**Truncated poster criteria descriptions shown. Numerical evaluation scores (1), (2), (3), (4) or (5) were used for analysis.*

2.3.2. Student Evaluation of Feedback using Canvas Quiz

Students evaluated feedback received at completion of the assessment using an online Canvas quiz (Table 3) worth 3% of the assessment mark. Open text commentary was reviewed by topic academics.

Table 3. Indicative* Evaluation of Feedback Rubric in Canvas quiz

Feedback Evaluation Catergory	Response
Peer-to-Peer and Group-to-group feedback value	Low/Medium/High
Assessment Changes Made	Open Text
Feedback Preference	Anonymous/Identified

**Truncated feedback evaluation categories shown.*

2.4. Student Feedback Process

Students accessed feedback rubrics with a Flinders Access Number (FAN) and password. Academics educated students in safe learning environments, trusted peer relationships and provided guidance on the use of Feedback Fruits and Canvas.

2.5. Data Extraction and Analysis

Deidentified data was extracted from Canvas for analysis. Numerical rankings were applied to peer-to-peer (Table 1) and group-to-group (Table 2) feedback responses to generate draft and final evaluation scores, analysed using two-sided, paired t-tests.

2.6. Ethics and Funding

The University Human Research Ethics Committee approved the study (HEL6549-6). Students could 'opt-out' from Feedback Fruits and completed online consent for the evaluation quiz. The study received no funding.

3. Results

3.1. Student Demographics and Participation

Fifty-one students participated in the study (overall enrolled student response rate of 94.4%). The majority were aged 20-24 years (85%), female (59%), non-Aboriginal or Torres Strait Islander (96%), held Australian citizenship (96%) and spoke English only at home (69%). Student feedback participation rates were high, irrespective of poster stage or feedback type (Table 4).

Table 4. Student Feedback Participation Rate

Poster Stage	Feedback type	Percentage (%) of students (n=51)
Draft	Group-to-group	84.3%
Draft	Peer-to-peer	86.3%
Final	Group-to-group	94.1%
Final	Peer-to-peer	88.2%
Final	Evaluation Quiz	96.1%

3.2. Impact of Peer-to-Peer Feedback

Mean peer evaluation scores significantly improved for information sharing (3.53 vs. 3.73), discussion skills (3.44 vs. 3.68), and task completion (3.68 vs. 3.83) at final assessment (from draft) but were not significantly different for listening skills (3.69 vs. 3.83; $p<0.070$) (Figure 1).

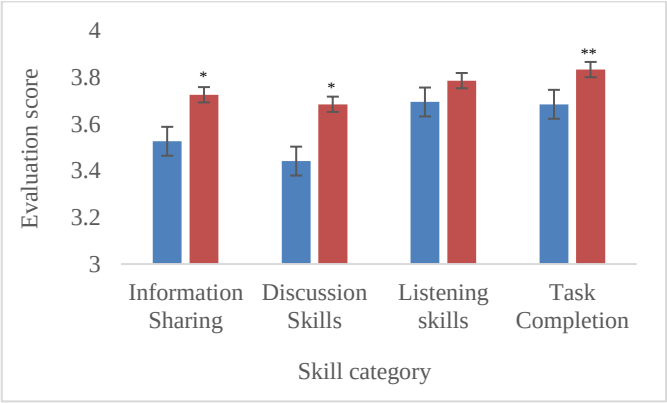

Figure 1: Mean evaluation score of group skill at draft (blue) and final (red) submission. Standard deviation (error bars) and significance ($p<0.005$, ** $p<0.008$) shown.*

3.3. Impact of Group-to-Group Feedback

Mean group evaluation scores significantly improved for topic coverage (4.15 vs. 4.69), formatting (3.95 vs. 4.58) and referencing (2.96 vs. 4.53) at final assessment (from draft) (Figure 2).

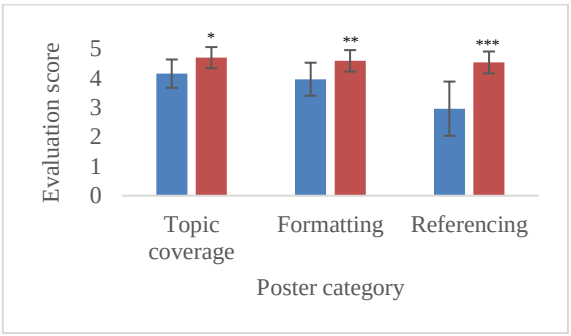

Figure 2: Mean evaluation score of poster categories at draft (blue) and final (red) submission. Standard deviation (error bars) and significance (p<0.005, **p<0.006, ***p<0.008) shown.*

3.4. Student Evaluation of Feedback

3.4.1. Value of Feedback

Peer-to-peer feedback value was considered 'high' by 56.8% (n=25) of students or 'medium' by 34.1% of students (n=15), with less than 10% (9.1%, n=4) rating the activity as 'low'. Similarly, group-to-group feedback value was considered 'high' by 59.1% (n=26) of students or 'medium' by 31.8% (n=14) of students, with less than 10% (9.1%, n=4) rating the activity as 'low'.

3.5.2. Assessment Changes Made

Students most frequently changed the poster layout (61.9% of students, n=26), content (28.5% of students, n=12) or both (7.1% of students, n=3) due to feedback received. Only one student changed topic coverage.

3.5.3. Feedback Preference

Most students (77.3%, n=34) preferred anonymous feedback as to identified feedback (22.7%, n =10).

4. Discussion

Process design that is consistent and considers the key factors supporting high-quality feedback has been deemed essential to provide students with an opportunity to view their own work through an objective lens (Topping, 2009). Academics facilitating online courses have a responsibility to deliver high-quality, supplementary peer feedback activities. In this study, assessment-specific, analytic feedback rubrics were implemented with guidance from Feedback Fruit best-practice documentation and Canvas training experts. Importantly in this study, factors

required to create safe and trusted learning environments for student understanding, such as consistent evaluation criteria and clear student instruction on the giving and receiving of constructive feedback, were able to be included in the feedback activity (Evans, 2015; Ohaja *et al*., 2013). Whilst the allocation of assessment grades for student feedback participation in this study may have artefactually elevated feedback participation rates, nearly 60% of students valued both the peer-to-peer and group-to-group feedback as 'high', and few (n=5) students who did not consent to their evaluation survey responses being included in this study. In addition, the open text feedback in this study reviewed by academic staff confirmed the use of highly objective peer commentary, although students knew their feedback was anonymous. This supports the delivery of safe and reciprocal guided peer feedback activities as achievable using Feedback Fruits and Canvas, with these conditions previously reported as highly advantageous to overall student learning (Nicol, 2014).

Previous studies have reported the benefits of peer feedback as overall skill improvement and enhanced interpersonal communication (Hodgson *et al*., 2014; Sethares & Morris, 2016). Group mean peer evaluation scores in this study significantly improved for information sharing, discussion skills and task completion, but not listening; however the authors acknowledge individual student trends within assessment groups may have been masked by calculated mean scores and the student sample size was limited. Study replication in 2024 may strengthen these findings, as the student cohort enrolment is estimated to at least double that of 2023, with inclusion of the topic as compulsory for Bachelor of Clinical Science students. Nonetheless, the reported improvement in mean evaluation scores were also supported by the frequency of changes in assessment layout, content or both, and the student open text commentary. Following group feedback one student remarked: *"I made sure to improve my communication with group members and increase my contribution"* and another commented: "*I needed to listen to others ideas more. This was something I have struggled with in the past"*. Whilst students demonstrated confidence in interpreting feedback and processing conflicting feedback a minority of students reported difficulty in understanding the feedback received, so further consideration for English as a second language (ESR) may be beneficial for future studies. Another improvement to future activities would include changes to the timing of draft and final assessment feedback, as highlighted by one student "*having the feedback earlier in the assessment…would give more opportunity for change*".

5. Conclusion

Online peer feedback improved student engagement and group assessment learning in this topic. More broadly, peer feedback in online learning environments can improve opportunities for student self-reflection and deliver educational quality improvements during the assessment process.

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