



Quaderni di Comunità

Persone, Educazione e Welfare nella società 5.0

Community Notebook. People, Education and Welfare in the Society 5.0

HEAD '25

June 17-20, 2025

Valencia, Spain



QUADERNI DI COMUNITÀ

WORKSHOP PROCEEDINGS

EMPOWERING CHANGE:

Navigating Twin Transitions and Enhancing Civic
Engagement in Higher Education

Edited by Stefania Capogna and Maria Chiara De Angelis

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Persone, Educazione e Welfare
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Iscrizione presso il Registro Stampa del Tribunale di Roma
al n. 172/2021 del 20 ottobre 2021

Published by



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Persone, Educazione e Welfare nella società 5.0

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Eurilink University Press Srl
Via Gregorio VII, 601 - 00165 Roma
www.eurilink.it - ufficiostampa@eurilink.it
ISBN: 979 12 80164 99 5
ISSN: 2785-7697 (Print)
ISSN: 3035-2525 (Online)

Prima edizione, dicembre 2025
Progetto grafico di Eurilink



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APA 7th citation system:

Quaderni di Comunità. Persone, Educazione e Welfare nella Società 5.0 (Ed.) (2025). *Workshop Proceedings n. 6 of the 11th International Conference on Higher Education Advances (HEAd'25). Empowering Change Navigating Twin Transitions and Enhancing Civic Engagement in Higher Education.*

Please cite your contribution as follows:

Lenkauskaite E., Souza C.C (2025). ECO-FRIENDLY DIGITAL EDUCATIONAL PRACTICES THAT PROMOTE SUSTAINABILITY. In Quaderni di Comunità. Persone, Educazione e Welfare nella Società 5.0 (Ed.) (2025). Workshop Proceedings n. 6 of the 11th International Conference on Higher Education Advances (HEAd'25). Empowering Change Navigating Twin Transitions and Enhancing Civic Engagement in Higher Education.

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Milena Lombardi, Giada Marinensi, Oronzo Marraffa, Claudio Melchior, Rosanna Memoli, Barbara Morsello, Francesco Niglia, Francesco Pace, Emilia Palladino, Anna Parola, Daniela Pavoncello, Antonio Petagine, Marina Pettignano, Pietro Iacono Quarantino, Teresa Rinaldi, Veronica Roldan, Vanessa Russo, Diana Salzano, Riccardo Sebastiani, Luigi Somma, Eleonora Sparano, Nicola Strizzolo, Simone Tosoni, Isabella Valbusa, Andrea Zammitti, Francesco Zuccolo.

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Abbonamento annuale edizione cartacea (3 numeri)	€ 55,00
Abbonamento annuale edizione elettronica (3 numeri)	€ 25,00

ACKNOWLEDGMENT

The editors wish to sincerely thank the consortium of the Erasmus+ Project UP2YOU “Bottom-up sustainable and inclusive development” (Project Code 2023-1-ES01-KA220-HED-000160874) for their valuable input in the conceptual and collaborative development of this special issue.

We also extend our deepest appreciation to the Scientific Committee of the *11th International Conference on Higher Education Advances* (HEAd’25), held in Valencia from June 17 to 20, 2025, for their continuous support, insightful feedback, and commitment to advancing the academic dialogue on the transformation of higher education in the context of digital and green transitions.

Special thanks to Josep Domènech, General chair of the HEAD Conference, from the Universitat Politècnica de València, and Domenico Savio Brunetto, Workshops chair from Politecnico di Milano, for hosting the UP2YOU Workshop, “Navigating Twin Transitions and Enhancing Civic Engagement in Higher Education”, within the framework of the vibrant and welcoming academic community of Valencia.

This special issue, “Empowering Change. Navigating Twin Transitions and Enhancing Civic Engagement in Higher Education,” would not have been possible without their intellectual engagement, organizational efforts, and dedication to fostering international collaboration in higher education research.

Finally, heartfelt thanks go to all the colleagues who participate in these important discussion moments, generously sharing the progress of their knowledge and research.

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4. INTEGRATING DIGITAL FEEDBACK TO ENHANCE SUSTAINABLE AND EQUITABLE PEER COLLABORATIVE SKILLS, FEEDBACK LITERACY AND REFLECTIVE PRACTICE IN UNDER-GRADUATE GROUPS: LEARNINGS FROM AUSTRALIAN CASE STUDIES

by Kirsty Emery*, Susan Matthews**

Abstract: Flinders University (Australia) transitioned to a new learning management system facilitating access to a suite of eco-friendly digital tools, sustained by renewable energy sources. In this study, we evaluated the effectiveness of online peer feedback tools on group assessment skill development, learning processes and self-reflection within two different undergraduate student cohorts. Consistent with current theoretical knowledge in this field, we demonstrated that the implementation of effective peer feedback requires consideration of four influential factors: student characteristics, environment, learning processes and learning outcomes. Importantly, these case studies highlight the ability to readily digitalise assessment and feedback processes for undergraduate student groups, reducing hard-copy resources and enabling equitable student access via laptops, smart phones or tablets at any time. At a broader educational level, digital feedback tools such as FeedbackFruits, can be scaled-up to deliver sustainable higher education practices fostering inclusive, future-ready learning environments for the acquisition of core graduate qualities.

Keywords: Digital feedback, sustainable, equitable, collaboration, reflective practice.

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Introduction

In Australia, higher education reform has been identified and prioritised as necessary to deliver a high-quality, integrated, sustainable and equitable system (Australian Universities Accord. 2023). By 2035, ten key higher education ‘system shifts’ have been proposed, with learning and teaching transformation focussed on enhancing the student experience and the use of technology (Australian Universities Accord. 2023). This transformation will enable activation of twin transition strategies; the process whereby digitalisation amplifies sustainable sector growth through reduced emissions (Dæhlen, M. 2023).

At a local level, Flinders University is well positioned to action its twin transition goals. The University’s strategic plan (Flinders University, 2025) acknowledges the pace of technological innovation for the ‘greening of’ and ‘greening by’ information technology systems. Situated in South Australia, a state known for leading the world in renewable energy (Parkinson, G. 2025), Flinders University’s main campuses are already largely powered by green, renewable energy sources. In addition, the university transitioned to a sophisticated learning management system (Canvas, Infrastructure) in 2022. This provided opportunity for campus academics to access a university-wide suite of eco-friendly, digital tools, aimed to enhance student online learning experience and reduce paper resources.

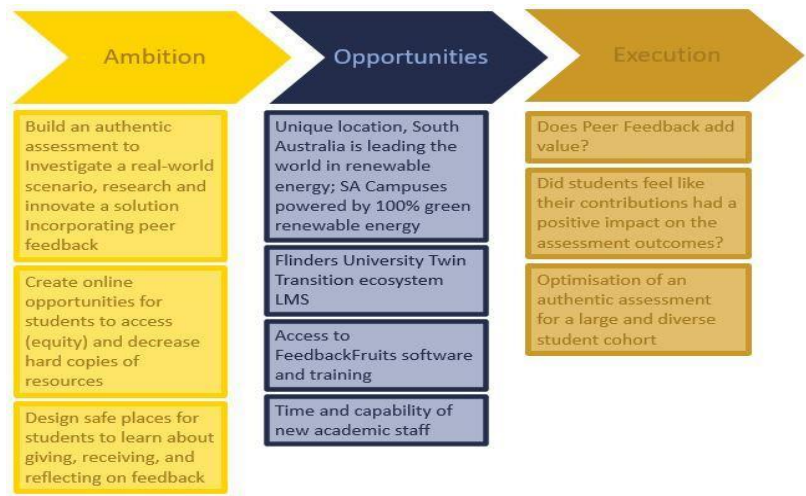
In this paper, we describe the application of a twin transition roadmap (PA consulting, 2022) used to begin digitisation to drive sustainability transition at Flinders University. We present two Case Studies where undergraduate students were provided with learning opportunities to give and receive online peer feedback during an authentic group research assessment in a specialist Medical Science topic and also perform self-assessment tasks. Conducted over

sequential years, Case Study 1 (2023) evaluated the use of peer feedback in a small, homogenous student cohort with academic staff using FeedbackFruits (FeedbackFruits, Netherlands) for the first time. Case Study 2 was performed the following year (2024), where course changes had led to the enrolment of a larger, culturally diverse student cohort. In Case Study 2, consideration of the individual student characteristics, environment, learning processes and learning outcomes was required prior to the optimisation and evaluation of feedback.

1. Twin Transition Roadmap

The twin transition roadmap (PA consulting, 2022) used in this design process consisted of three phases: 1) Ambition (Setting), 2) Opportunities (Selection) and 3) Execution (Figure 1).

Figure 1: The twin transition roadmap for incorporating a new, authentic assessment into a medical science topic, detailing the three main phases, Ambition (Setting), Opportunities (Selection) and Execution



1.1 Ambition

In the described design process, the ambition was to create an authentic assessment that incorporated FeedbackFruits as an online process for paper reduction, increased student accessibility/equity and enhanced student engagement (e.g. peer collaboration and reflective practice). The assessment design involved student education on the safe use of feedback and feedback literacy, with the incorporation of peer feedback activities at the draft assessment submission and final assessment submission stages. This provided students with the opportunity to focus on: a) peer interactions within their allocated groups, b) specific assessment feedback and c) self-reflection.

1.2 Opportunities

The selected opportunities underpinning this study included the transition to a new learning management system at Flinders University, with unlimited access to intensive Canvas and FeedbackFruits training and technical support throughout the University-wide implementation. At a broader level, the University's commitment to using renewable energy sources, provided opportunity 'to green' the information system in use.

1.3 Execution

Execution of the twin transition roadmap included evaluation of the feedback utilised in two different student cohorts (Case Study 1 and 2), with the potential to scale up successful processes across disciplines and rural campuses of the University. Specifically, the evaluation aimed to determine peer feedback and

self-reflection activities added value to group interaction and assessment quality.

2. Case Study Methods

Undergraduate, students enrolled at Flinders University in Semester 2 of 2023 or 2024 were eligible for Case Study 1 or 2, respectively. In 2023, the point-of-care testing topic was only available as an elective unit for 3rd year medical science students. In 2024, the topic was compulsory (core) for 2nd year clinical science students as well as remaining an elective unit for 3rd year medical science students. Student demographic data was accessed using the University's Intelligence Portal.

In both Case Studies, the group assessment consisted of a research project, produced over 8 weeks. Assessment submission comprised of a research poster and a 5-minute, in-person poster presentation (Case Study 1) or a digital poster with 3-minute recorded video presentation submitted online (Case Study 2). In both Case Studies, student groups were randomly allocated and instructed to research one of six infectious diseases with a device/test evaluation performed against 'ideal' REASSURED benchmarking criteria for point-of-care testing (Land, K.J., *et al.*, 2019). In both Case Studies, the overall assessment was weighted at 15% of the topic grade, with group (4%), individual (6%) and feedback activity (5%) marks. Final grades were moderated in accordance with the University's assessment policy.

In Case Study 1, topic academics designed peer-to-peer and group-to-group assessment feedback rubrics for FeedbackFruits following customer training and technical support. The peer-to-peer feedback rubric focussed on group interaction (Table 1). The group-to-group feedback rubric focussed on topic coverage and formatting

(Table 2). Students completed peer-to-peer feedback at draft and final assessment (poster) submission. The same feedback rubrics were used in Case Study 2.

Table 1: Indicative Peer-to-Peer Feedback Rubric in FeedbackFruits*

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, 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.*

Table 2: Indicative Group-to-Group Feedback Rubric in FeedbackFruits*

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.*

Students evaluated feedback using an online Canvas quiz, which had an additional question in Case Study 2 (Table 3). In both Case

Studies, open text commentary provided by students was reviewed by topic academics.

Table 3: Indicative Evaluation of Feedback Rubric in FeedbackFruits*

Feedback Evaluation Category	Response Type
Peer-to-peer and group-to-group feedback value	Low/Medium/High
Assessment changes made to own group poster	Open text
Interaction changes made with own group	Open text
Feedback preference	Anonymous/Identified
Changes made to the poster your group reviewed^	Open text

**Truncated feedback evaluation categories shown. ^New question for Case Study 2.*

Students accessed feedback rubrics with a Flinders Access Number (FAN) and password. In both Case Studies, topic academics educated students in safe learning environments, trusted peer relationships, feedback literacy and provided guidance on the use of FeedbackFruits and Canvas.

At the end of each Semester, deidentified data was extracted from Canvas for analyses. Numerical rankings (Tables 1 and 2) were applied to peer-to-peer and group-to-group feedback responses to generate draft and final evaluation scores, analysed using two-sided, paired t-tests. The University Human Research Ethics Committee approved Case Study 1 (HEL6549-6) and Case Study 2 (HEL6549-9).

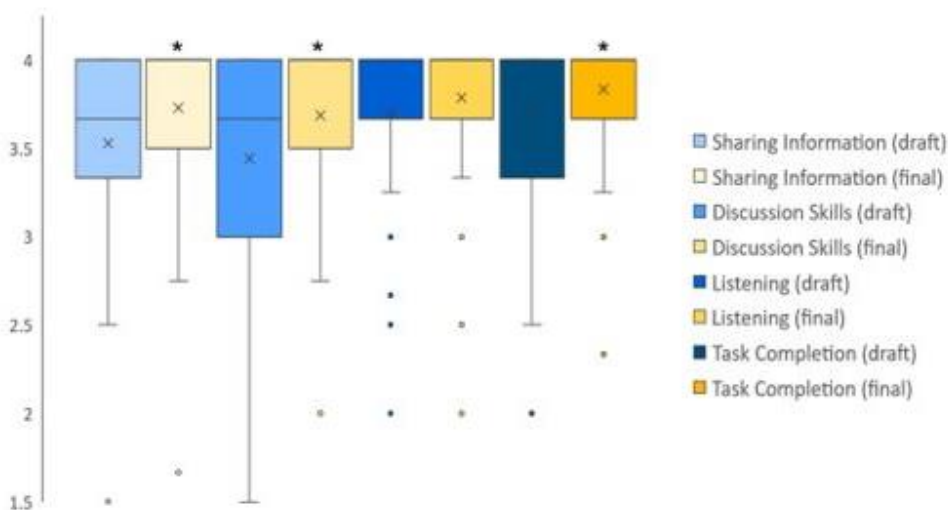
3. Case Study 1

The student cohort consisted of 51 students with an overall enrolled student response rate of 94.4%. The cohort was generally

considered homogenous, with most students enrolled as Australian citizens (96%), of non-Aboriginal or Torres Strait Islander descent (96%), aged 20-24 years (85%) and speaking English at home (69%).

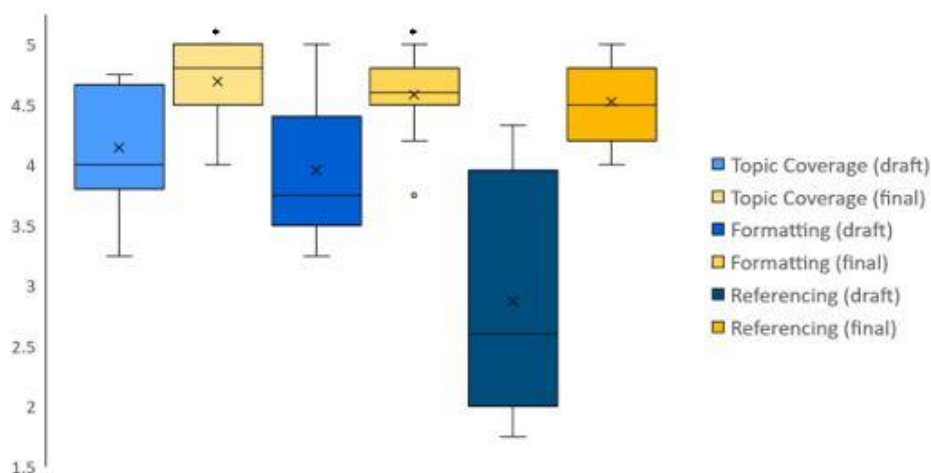
In this cohort, mean peer evaluation scores significantly improved for information sharing (3.53 vs. 3.73), discussion skills (3.44 vs. 3.68), and task completion (3.68 vs. 3.83) at final assessment (from draft), but were not significantly different for listening skills (3.69 vs. 3.83; $p < 0.070$) (Figure 2).

Figure 2: Box plot of evaluation scores by skills category; sharing information, discussion skills, listening or task completion for draft and final poster submission. Within each box, mean (cross) and median (horizontal black line) evaluation scores are shown. Boxes extend from the 25th to the 75th percentile of each peer's distribution of values; vertical extending lines denote the minimum values within 1.5 interquartile range of the 25th percentile of each peer group; outliers (dots) represent evaluation scores outside of range of adjacent values (i.e. outliers). Significant ($p < 0.05$) differences between paired draft and final mean evaluation scores are denoted by an asterisk (*)



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 3).

Figure 3: Box plot of evaluation scores by poster category; topic coverage, formatting or referencing for draft and final poster submission. Within each box, mean (cross) and median (horizontal black line) evaluation scores are shown. Boxes extend from the 25th to the 75th percentile of each group's distribution of values; vertical extending lines denote the minimum (lower) or maximum (upper) values within 1.5 interquartile range of the 25th or 75th percentile of each group, respectively; outliers (dots) represent evaluation scores outside of range of adjacent values. Significant ($p < 0.05$) differences between paired draft and final mean evaluation scores are denoted by an asterisk (*)



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'.

Students most frequently changed the poster layout (61.9%

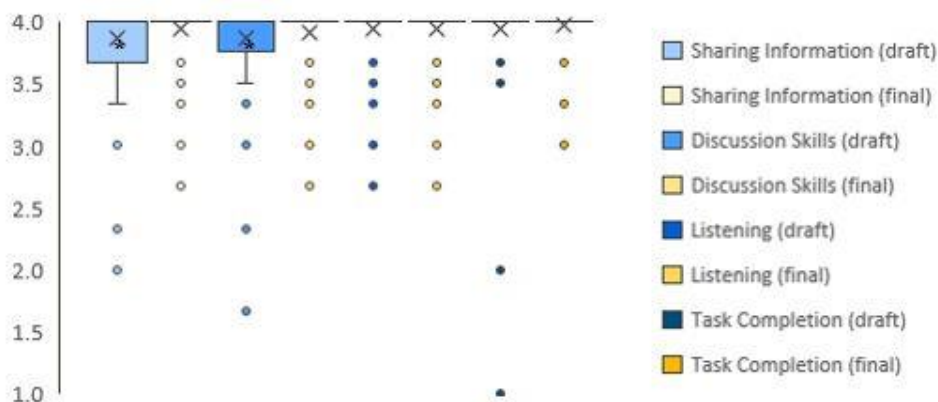
of students, n=26), content (28.5% of students, n=12) or both (7.1% of students, n=3) due to feedback received. Only one student changed topic coverage. Most students (77.3%, n=34) preferred anonymous feedback as to identified feedback (22.7%, n =10).

4. Case Study 2

Compared to Case study 1, the student cohort was large (n=116) and included a higher proportion of international students (32% non-Australian citizens) and students who spoke non-English languages at home (44%). Similar to the student cohort in Case Study 1, most (79%) students were aged 20-24 years and female (58%). None identified as Aboriginal or Torres Strait Islander. Student feedback participation rates were high (>95%), irrespective of assessment stage or activity type.

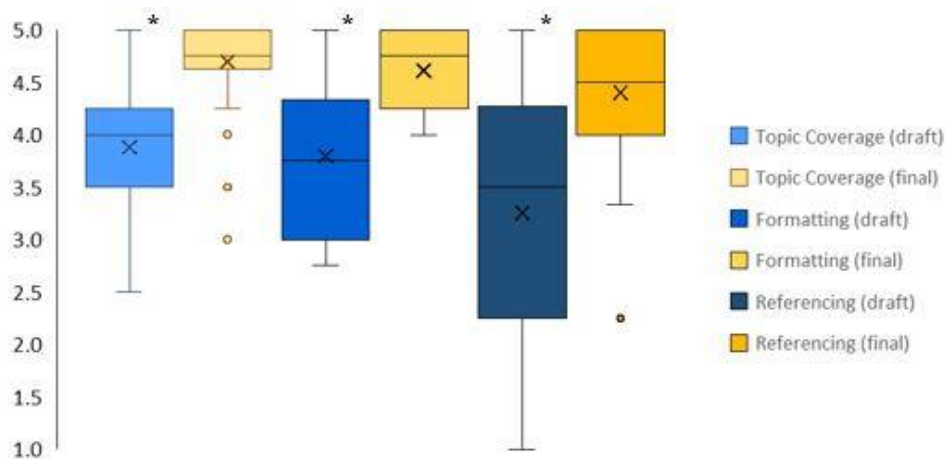
Mean peer evaluation scores significantly ($p<0.05$) improved for information sharing (3.86 vs 3.93) and discussion skills (3.86 vs 3.91) at final assessment (from draft) but were not significantly different for task completion (3.94 vs 3.96; $p=0.21$) or listening skills (3.94 vs. 3.94; $p=0.44$) (Figure 4).

Figure 4: Box plot of evaluation scores by category; sharing information, discussion skills, listening or task completion for draft and final poster submission. Within each box, mean (cross) evaluation scores are shown. Boxes extend from the 25th to the 75th percentile; vertical extending lines denote the minimum values within 1.5 interquartile range of the 25th percentile of each peer group; outliers (dots) represent evaluation scores outside of range of adjacent values. Significant ($p < 0.05$) differences between paired (draft and final) mean evaluation scores are denoted by an asterisk (*)



Mean group evaluation scores significantly ($p < 0.01$) improved for topic coverage (3.88 vs. 4.70), formatting (3.79 vs. 4.61) and referencing (3.25 vs. 4.40) at final assessment (from draft) (Figure 5).

Figure 5: Box plot of evaluation scores by poster category; topic coverage, formatting or referencing for draft and final poster submission. Within each box, mean (cross) and median (horizontal black line) evaluation scores are shown. Boxes extend from the 25th to the 75th percentile; vertical extending lines denote the minimum (lower) or maximum (upper) values within 1.5 interquartile range of the 25th or 75th percentile of each group, respectively; outliers (dots) represent evaluation scores outside of range of adjacent values. Significant ($p < 0.05$) differences between paired (draft and final) mean evaluation scores are denoted by an asterisk (*)



Peer-to-peer feedback value was ranked 'high' by 58.7% (n=54), 'medium' by 26.1% (n=24) and 'low' by 15.2% (n=14) of students. The group-to-group feedback value was considered 'high' by 62.0% (n=57) or 'medium' by 33.7% (n=31) of students, with less than 10% (4.4%, n=4) rating the activity value as 'low'.

Students most frequently reported changing the uniformity of the poster (91.9%, n=79) due to the feedback received. Post-feedback, referencing and topic coverage changes were only reported by 40.7% (n=35) and 37.2% (n=32) students, respectively.

As in Case Study 1, most students (79.3%, n=73) preferred anonymous feedback. In Case Study 2, students most frequently reported changes to the uniformity of the poster their group had

reviewed (91%, n=67) due to the feedback their group provided, but there were 25 students who misinterpreted this question.

5. Discussion

In theory, the effective implementation of online feedback in higher education requires consideration of influential factors categorised in four domains: 1) student characteristics (demographics, academic background, psychological), 2) environment (learning platform, setting), 3) learning processes (content, feedback design) and 4) learning (cognitive, behavioural, affective) outcomes (Kerman *et al.*, 2024). Contributing to a gap in real-world educational practice, the presented Case Studies utilised the key steps of evidence-based conceptual frameworks to verify the effectiveness of online peer feedback activities in two different student cohorts. Academic staff optimised feedback processes by gaining insight into the student's demographic and academic backgrounds and offered comprehensive training and education in the delivery and receipt of safe and effective feedback, noting this was easier to achieve in the smaller, homogenous student cohort (Case Study 1). Whilst Case Study 2 had a larger, culturally diverse student cohort with individual characteristics that may have influenced feedback literacy and experience, topic academics applied the learnings from Case Study 1 to identify the students pre-existing knowledge, skills and attitudes toward peer feedback and preference for anonymous feedback. In addition, the FeedbackFruits instructional class presentations were simplified and students were provided with in-class, step-by-step guidance for the feedback activities in Case Study 2. This allowed students to maximise their participation and reflect on the feedback process. Despite this intensive assistance, one of the key feedback questions was

misinterpreted by approximately 20% of students, suggesting further consideration of the feedback learning process may be required to improve learning outcomes for all students.

Whilst it is acknowledged that some students may have participated in feedback activities largely to improve their topic mark, the tasks in both Case Studies were designed such that significant time and effort for completion (approximately 4.5 hours over 3 sessions) was required and the marks allocated for feedback activities within the assessment were minimal.

The topic academics prior experience to the content learning environment, good understanding of the learning platform and rapid access to technical support assisted the feedback task clarity and workflow for students in Case Study 2, which was critical in servicing the larger class. This enabled changes within FeedbackFruits associated with software updates to be quickly rectified and highlighted the importance of regularly pre-testing assessment rubrics prior to activation in an online environment.

Conclusion

Importantly, these case studies showcase the agility of an Australian higher education institution to digitalise assessment and feedback processes within an undergraduate topic to reduce hard-copy resources and enable equitable student access via laptops, smart phones or tablets at any time. At a broader educational level, online tools such as FeedbackFruits can be scaled-up for sustainable higher education practices that foster inclusive, future-ready learning environments for the acquisition of core graduate qualities.

Declarations

Conflict of interest and funding: The Author have no financial interests to disclose. The author declare that no funds, grants, or other support were received during the preparation of this manuscript.

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