

REDESIGNING FEEDBACK TO ENHANCE STUDENT DEVELOPMENT

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ABSTRACT

Feedback is fundamental to the educational development of engineering students. Students have often transitioned from a more supervised and directed style of learning in Further Education to becoming independent self-directed learners in Higher Education. As independent learners, feedback is of key importance as it offers both guidance and reassurance. A failure to engage with feedback could therefore have detrimental impacts on the learning experience. Arguably, feedback is most needed by those students who achieve lower grades. However, there exists a gap in current knowledge regarding which students access feedback, and if and how this feedback is then used. This original study aims to understand the types of students who engage with feedback and what this engagement looks like. The grades and feedback engagement records of 577 level 6 students in one module over 5 years were analysed, followed by interviews with 21 of the same students. Finally, 3 workshops each consisting of 4 students were undertaken. The results reveal that the higher a student's grades the more likely they are to access and utilise feedback. However, the students who are arguably most in need of the feedback due to receiving lower grades are the one of the groups least likely to access and action the feedback. There is a dichotomy between the type of feedback students want and the type they receive, and students across all grade boundaries believe feedback to be largely generic with little relevance to future module success. This research provides original insight into feedback actions and preferences of students and proposes solutions to redesign feedback to enhance student development.

KEYWORDS

Pedagogy, Curriculum Design, Collaboration, Learners, Standards:1

INTRODUCTION

The marking of work and provision of student feedback are some of the most commonly undertaken tasks within Higher Education (Winstone and Boud, 2022). Feedback itself is often considered crucial in both curriculum design and delivery (Scott and Fortune, 2013) and has been described as sitting hand in hand with the process of assessment (Chalmers et al., 2018). Feedback itself, however, is often considered of key importance for student development (Winstone et al., 2017). This is arguably critical for undergraduates who have often transitioned from a more directed and supervised way of learning to that of an independent learner. A failure to engage with and action feedback could lead to failing to fully understand a concept or learn from mistakes made. Ultimately this could then lead to graduates entering careers not fully capable to adequately perform the demands placed upon them.

This is arguably very problematic as Engineering and wider Built Environment students are often in high demand upon graduation (Higginbotham, 2025) and are therefore often required to 'hit the ground running' when commencing a new role. To ensure graduates are prepared to meet the needs industry presents, Higher Education Institutes need to suitably prepare students for such professional demands with appropriate knowledge, understanding, and critical thinking skills. Such preparation is achieved through the design and development of the Higher Education curriculum of which feedback is a core ingredient (Khan and Law, 2015; Hooda et al., 2022).

However, despite the importance of feedback being long understood and how it plays a crucial role in the Higher Education environment and in influencing its stakeholders (Hooda et al., 2022), there is a current gap in knowledge around the applicability and use of feedback by students, the types of students who access feedback, and why some students action feedback and others do not. The aim of this study is to understand which students engage with feedback, why, and what this engagement looks like. Addressing this gap in knowledge will help better inform Higher Education student feedback practices and prepare Engineering and Built Environment students for professional roles as leading industry practitioners' post-graduation. This is of international significance given the global nature of the roles available, and the often-common feedback practices adopted internationally throughout Higher Education. First, this paper outlines the importance of feedback before introducing the Engineering and wider Built Environment industries as the context in which this research takes place. The research methodology is then discussed before the findings analysed and the results presented. The significance of the study for current and future graduates, and the impacts the findings have upon graduate's respective future industries is then outlined. Recommendations from this original study are then stated for both the future agenda of feedback and curriculum design research and for how HEI's should look to structure their practices and processes going forward to maximise student learning and development.

This research links to the CDIO Standards 3.0, specifically Design-Implement engineering (Standard 5) in that this research focuses on student feedback and how this can advance learning as student's progress from basic to more advanced learning topics as part of broader curriculum design. This research also aligns with Active Learning (Standard 5.0) in that it supports student learning and development, helping motivate students and considers habits of lifelong learning. Finally, Program Evaluation (Standard 12.0) is also informed as this research is structured around better understanding student feedback perceptions, which can in turn be used to consider methods of continuous improvement across modules and programmes.

CURRICULUM DESIGN IN BUILT ENVIRONMENT EDUCATION

Graduates of Built Environment courses from Higher Education Institutes are increasingly in demand given the growth of the Built Environment over recent decades. This is due to an increased industry demand combining with a pipeline of fewer skilled professionals (Mackenzie et al., 2000). To help prepare graduates to meet this need, Higher Education Institutes provide a comprehensive and robust learning environment aimed at increasing a student's employability and general skills for life (Brint, 2018). Yet previous research has identified significant gaps in the level of knowledge gained by Higher Education students and the industry requirements they are faced with post-graduation (Azapagic et al., 2005).

To ensure such students are suitably prepared, Higher Education courses are designed with a robust curriculum in an attempt to ensure the progression of students from one level to the next (Khan and Law, 2015). Curriculum design has been described as crucial for Higher Education effectiveness (Barnett and Cole, 2005) and is one of the reasons there has been a significant increase in Higher Education curriculum research over the past two decades (Hicks, 2018). However, curriculum development research has been described as often disconnected, especially within Built Environment programmes (Posillico et al., 2022). This research goes further and finds that if curriculum design does not have a rigorous oversight process in place then the design of any curriculum will tend to favour lecturer skills rather than any requirements of the student (Posillico et al., 2022). Effective curriculum design should consist of clear content that is co-created amongst key stakeholders and is focused upon both the current skills students need within Higher Education and the skills they will need in future (Khan and Law, 2015). Although it is important to note that curriculum development alone is arguably not enough to support the development of student learning and that a diverse and comprehensive approach is required to maximise student knowledge and development (Doyle, 2023). For example, one often adopted assumption is that curriculum development occurs with feedback mechanisms embedded from the outset, with one study concluding this is often not the case (Molloy et al., 2020). Yet feedback is often considered a significant component of curriculum design, and is described as essential in every learner's journey (Scott and Fortune, 2013). Therefore, a core component of effective curriculum design is ensuring suitable feedback mechanisms are embedded into programmes and modules.

THE IMPORTANCE OF FEEDBACK

In a Higher Education environment, feedback can be defined as information given from lecturers to students to aid their understanding and help enhance the future work standards (Scott, 2014). The role of 'sustainable' feedback takes this concept further and introduces elements such as the feedback being a dialogue, with a focus both on immediate student improvement and of the ability of the student to 'self-regulate' performance on future tasks (Careless et al., 2011). One study claimed that feedback is said to be of the utmost importance in student development and learning (Gibbs and Simpson, 2005) as how feedback is understood and applied has long been understood to be crucial to student development and understanding (Timperley, 2007). This is arguably why lecturers' express frustration when students demonstrate limited engagement with feedback (Price et al., 2011).

Assessment feedback itself is often divided into two main categories. Formative is where feedback is provided throughout assessment and is intended for improvement purposes. Summative feedback is for evaluation purposes usually at the end of an assessment when it has been submitted, evaluated, and a mark awarded. Studies have shown that postgraduate students are more likely to question the validity of feedback and understand their own role in response to it, whereas undergraduate students saw the purpose of feedback in regards to

directing improvement (Smith, 2022). It has been argued that it is summative feedback that receives the most attention from lecturers (Onasanya and Ajamu, 2024).

Due to the importance of feedback, the practices, experiences, and expectations of Higher Education stakeholders has been explored from numerous perspectives in recent years. This includes the feedback delivery mode (Henderson and Phillips, 2019), the dialogue created through the use of effective feedback between students and lecturers (Winstone et al., 2017) and how student development can be enhanced through increasing the quality of feedback delivered (Dunworth and Sanchez, 2016). More recently (and perhaps unsurprisingly) feedback studies have focused on the interaction between feedback and Artificial Intelligence (AI). This includes the risks of implementing AI in marking student submissions as it was found AI provided higher grades and more generic and contradictory feedback on student submissions compared to lecturers (Usher, 2025). Another study found that the use of AI in creating and administering feedback, whilst having some variability, was found to be largely accurate and effective saving lecturer time in feedback creation and allowing greater numbers of students to receive feedback from fewer academic staff (Venter et al., 2024). However, the use of AI in assessment and feedback generally is still arguably a grey area and studies have shown how the acceptable line of usage by both staff and students is still being decided upon and agreed due to its relatively recent evolution and rapidly increasing usage (Corbin et al., 2025).

A large-scale study conducted by Jansen et al. (2025) involving 1,709 secondary school students revealed a strong relationship between the way feedback is delivered and improvements in student academic performance. The findings highlight the critical role that well-structured, constructive feedback plays in supporting learning, particularly in the development of students' writing abilities. Rather than serving merely as an evaluative tool, feedback was shown to function as an instructional strategy that actively promotes student engagement and skill acquisition. The study found that if students receive feedback on their writing that identifies their knowledge gap and includes direction on how this gap can be closed, a rewarding intrinsically motivated experience is triggered by knowledge acquisition (Jansen et al., 2025). Feedback has also been viewed from the perspective of educators gathering feedback from learners in an attempt to enhance their own future performance (Mandouit, 2016). An earlier study also sought to understand how lecturers received and actioned feedback from students and found such reactions can be across a broad spectrum of shame, blame, tame, or reframe (Arthur, 2009).

Feedback can therefore serve a multitude of purposes for all stakeholders involved. However, feedback itself has been found to often be insufficient to aid development, delivered inconsistently, difficult to comprehend by the intended recipient, and even sometimes found to be discouraging towards improvement (Winstone et al., 2017). There have been growing calls that a collaborative approach between students and lecturers is required to improve the efficiency and effectiveness of feedback (Nash and Winstone, 2017). However, one criticism of the studies on feedback to date includes the fact they often presuppose both lecturers and students share the same understanding of what feedback essentially is (Molloy et al., 2020). This can be potentially problematic if perspectives are mismatched in that such a mismatch will prevent both effective feedback delivery and effective feedback receipt. Effectively delivering timely feedback has therefore been described as of crucial importance for student development (Khan and Law, 2015). However, there is a lack of research currently around which students access feedback, and if and how this feedback is then actioned.

RESEARCH METHODOLOGY

The identified research gap is investigated through three distinct research phases. The first research phase is inductive as the research data gathered is used to generate the theories and ideas to describe behaviours, rather than utilising existing theories that are then tested by the research process (Bell et al., 2022). The first adopts the ontological perspective of objectivism, a natural science approach where social phenomena exist independent of the actions of social actors (Robson and McCartan, 2017). This phase advocates for a positivist approach that ultimately determines the ontological and epistemological position is best understood via quantitative data (Clark et al., 2021). The data for this first research phase is anonymised records of student grades and whether or not summative feedback was accessed by each student. The data covers a total of 577 Level 6 Built Environment students over a 5-year period (20-21 – 24-25). The data was collated, compared, and analysed using Microsoft Excel. Trends and patterns are identified which then informed the development of the second research package.

A constructivist ontological position is adopted in the second research phase. Constructivism implies phenomena are socially constructed between, subject to change, and so are therefore best understood via an interpretivist epistemological approach (Clark et al., 2021). This approach is best suited to the collection of qualitative data. The research phase consisted of twenty-one semi-structured interviews. Purposive sampling was adopted. This is where participants who are able to best inform the research are approached for inclusion (Robson and McCartan, 2017). The questions asked resulted from the analysis of the first research phase, and the twenty-one semi-structured interview participants were from the cohort of 577 phase one students. The interview questions were structured using narrative analysis, a method by which questions are framed around the request for stories, with information then extracted, and is a technique that has been used increasingly in recent Built Environment research (Watts et al., 2023). Thematic analysis was then undertaken of the interview results, with themes of similarity and areas of differences identified across all the interview responses. Analysis of the interviews resulted in the development of the framework of feedback best practice that was then discussed in three workshops, each consisting of four different students as part of the third and final research phase. These workshops consisted of presentations of the overall research findings to those in attendance at each session. The proposed recommendations of the study were highlighted and ideas for improving the quality of feedback were discussed with feedback sought on the recommendations from the workshop participants. A process of thematic analysis was again undertaken with the feedback and comments from those in the workshop recorded, coded, and analysed.

FINDINGS AND DISCUSSION

Analysis of the data gathered across all three research phases revealed the following four main themes:

The students most and least likely to access feedback

Table 1 reveals the total number of students reviewed as part of the first research phase and illustrate which categories they fall within regarding both grade received and whether they accessed and engaged with feedback.

	Grades Achieved					Total Students
	70+	60-69	50-59	40-49	<39	
Students who accessed feedback (no):	101	75	34	8	7	225
As a %	55.80%	36.23%	35.42%	15.38%	17.07%	38.99%
Students who DID NOT access feedback (no):	80	132	62	44	34	352
As a %	44.20%	63.77%	64.58%	84.62%	82.93%	61.01%
Total students:	181	207	96	52	41	577

Table 1: Total student submissions in research package 1

Table 1.0 reveals that overall, across all grade brackets, 61% of students did not access feedback regarding their submission. If feedback is crucial for development as argued by Khan and Law (2015), then the initial barrier to overcome is arguably getting students to access the feedback in the first instance. Figure 1 analyses the data for patterns and trends by grade achieved and illustrates a curve that emerges within the data indicating that broadly, the lower grade a student receives, the less likely they are to access and engage with the associated lecturer feedback.

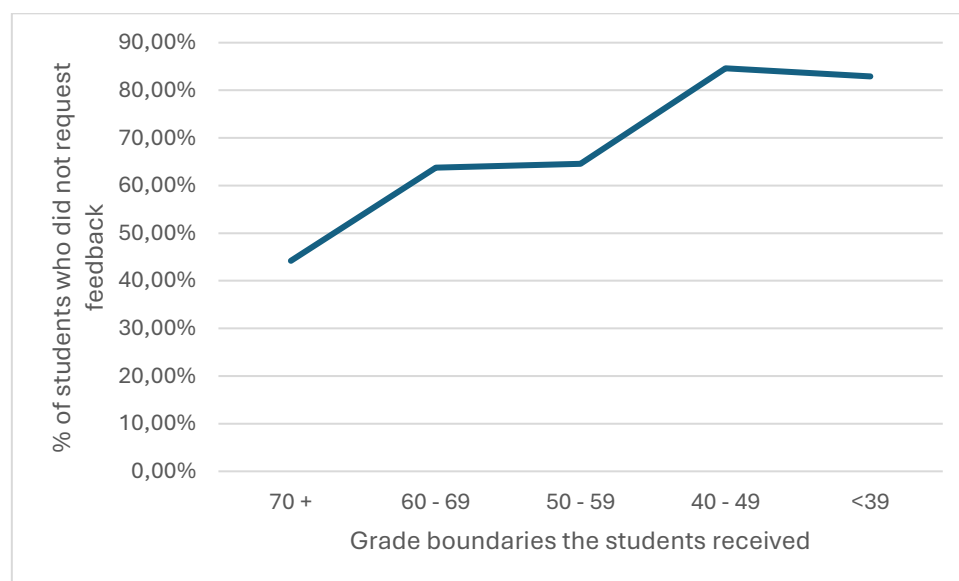


Figure 1: Students accessing feedback by grade received

This is arguably counter intuitive in that those students most in need of feedback (due to needing to improve their grades) are the ones least likely to access and engage with the feedback available. These results may not illustrate causation but there is a clear correlation that those who achieved the highest grades were the most likely to access feedback. These trends were also consistent across each of the five years analysed.

The dichotomy between the type of feedback students want and the type they receive.

When these results were explored within the interviews of the second research stage, one finding that emerged was the difference between the feedback students received and the feedback they actually wanted. Many participants who reported they did not access feedback themselves agreed in their reasons for not doing so, which can be summarised by one student who stated they:

“Every time feedback was mentioned [in class] ... it was how we will get it within 15 days of submission”

In response to being specifically asked to describe feedback, one student stated:

“It is the information we get at the end of the module”.

There was no discussion or awareness by this participant of formative feedback, and whilst they did not know the categories of feedback by name, summative feedback was the only type they were aware of and had any recollection of receiving.

A further student added:

“Lecturers do give feedback when we get our marks ... but it’s too late by then ... I want to know what I can do better before I submit”

This was consistent across all those interviewed and revealed that the results largely aligned with those in the literature that summative feedback receives the most attention from lecturers (Onasanya and Ajamu, 2024) as this is what is primarily discussed by lecturers to students when they are discussing feedback. However, these findings go further and reveal that despite lecturers having a tendency to focus upon summative feedback, it is formative feedback that students most desire. This is confirmed by a final student who articulated well a belief shared by those participants who reported they did not access feedback:

“What’s the point reading formative feedback...it’s too late for that assignment”

Feedback is often too generic with little relevance to future module success.

Analysis and comparison of the results of all three research phases revealed that students also felt feedback was often too generic, one student confirmed:

“I find it really hard to see exactly which bits [of my assignment] the different feedback comments relate to”

This was expanded upon by a fellow student who confirmed:

“All assignment requirements are different...how will one feedback help another [assignment]”.

One failure of feedback it appears, is that it often focuses upon what a student could have done differently in a past assignment, and has little focus on any transferable lessons that can be taken forward to future assignments and other modules.

However, interestingly, there was a difference in opinion amongst those interviewed between the students who did and those who did not report to have accessed and engaged with feedback. All those who reportedly do engage stated they understand the purpose and forms of feedback. Arguably, feedback helps all students improve, especially those most in need of improvement whose grades could be significantly enhanced, but the participants who did not regularly access feedback did not appear to agree. This builds on findings in the literature

regarding the understanding of feedback (Molloy et al., 2020) in that those who report a lack of understanding are those who don't fully engage with the feedback. However, all participants who stated they did regularly access feedback all espoused the benefits they experienced as a result. One student reported how feedback had helped them:

"Increase their grade" from one module to the next.

Other students reported that accessing and engaging with feedback avoided them making the same mistakes twice and they felt allowed them to gain higher grades in future modules.

Feedback as a monologue and not a dialogue

One key theme that arose in the final research package when best practice feedback frameworks were being discussed was the need for feedback to be delivered with the intention of a dialogue and not simply as a monologue. This theme has been mentioned in feedback literature for many years (see Careless et al., 2011; Winstone et al., 2017) but this research goes further and seeks to provide actionable solutions to dialogue creation.

The results of the workshops revealed that students heavily favoured a re-designed curriculum approach to feedback delivery that emphasized a focus on formative dialogues over summative monologies in order to enhance student development. Whilst the importance of feedback is not perceived by some students, notably those who do not engage with feedback when available, this redesign will serve to both further develop the student who do engage with feedback, and get many of those students who currently do not engage with feedback to begin to do so. Arguably it is only through engagement with feedback that students can begin to truly develop their learning and understanding of concepts, and so overcoming the feedback engagement barriers some students typify is the first step of any successful student feedback delivery framework.

ONCLUSION

This study has demonstrated that feedback plays a critical role in supporting the transition of engineering and Built Environment students toward independent, self-directed learning. However, the findings reveal a persistent and concerning disparity in feedback engagement across performance groups. Students achieving higher grades were significantly more likely to access, interpret, and apply feedback, while those receiving lower grades, who arguably stand to benefit the most from feedback engagement, were among the least likely to engage. This highlights a systemic challenge within current feedback practices, whereby existing approaches may unintentionally reinforce achievement gaps rather than mitigate them.

The research identified a clear mismatch between the type of feedback students desire and the feedback they typically receive. Participants across all grade boundaries reported that feedback was often perceived as generic, lacking specificity and clear relevance to future assessments or module progression. This perception reduces its perceived value and contributes to disengagement, particularly among lower-performing students who may already lack confidence or clarity regarding academic expectations. These findings emphasise the need for a re-evaluation of feedback design and delivery within engineering education. The importance of feedback should be stressed to all students. Formative feedback should be provided to allow students to develop knowledge within a module and then summative feedback should be linked to transferable skills and knowledge for application in future learning. It is recommended that in pedagogical practice all feedback should be entered into by lecturers as a dialogue and students given the opportunity to respond and not simply delivered as a monologue as this can serve to hinder reflection and prevent the feedback being fully utilised. Recommendations for future research include a

focus on the development of best practice feedback models that span modules with multiple assessments, and cross different educational levels. Such framework models should then be tested beyond Built Environment students and once broadly established, should be rolled out as part of Higher Education lecturers ongoing learning and development. It is also recommended that feedback literacy be explored further from the perspective of academics, and so academic preferences and

Limitations of this research include that the students were all level 6, and broader perspectives of students from level 4, 5 and 7 would all be welcome to further illuminate the feedback processes and preferences at other stages of the educational journey. The study is also limited to students from within the Built Environment and understanding the feedback mechanisms from across discipline areas would be beneficial for gaining a greater appreciation of potential lessons to be shared across diverse student populations and teaching styles. Finally, whilst the sample size is significant, benefit would be gained from a much larger and more diverse sample size to allow for greater understanding and confidence in the datasets.

This research furthers knowledge around the CDIO Standard Design-Implement engineering (Standard 5) in that students progressing from level 6 to level 7 studies, there is potentially going to be a knowledge gap around how grades were achieved, and what aspects were good and which needed improving upon as for many students only the module grades were reviewed and not the detailed feedback. For Active Learning (Standard 5.0) this research reveals students are currently more concerned with the end result (grade) rather than the learning process. This is something that needs to be addressed in future curriculum and module design to encourage students to focus more on the process of learning as well as the end result. The findings of this research also contribute to Program Evaluation (Standard 12.0) as the perceptions of student feedback are explored and insights gained into how and why feedback is utilised by some students and why it is not by utilised others.

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Artificial intelligence usage declaration

Artificial Intelligence (AI) platforms were not used for any part of this research project and paper development.

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BIOGRAPHICAL INFORMATION

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