Learning Through Successful Feedback: Digital Opportunities for Effective Feedback in Project-Based Architectural Education

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The study focuses on improving student feedback and assessment in Architectural Education, a subject area where constructive criticism is crucial and forms a part of the methodology of both teaching and practice. The UK National Student Survey consistently ranks assessment and feedback as one of the areas where students are least satisfied with their Higher Education Institutions, an issue which is prevalent within the subject area. This project aims to enhance assessment and feedback in Architecture courses by transforming the review (or crit) feedback practice by use of digital technologies enabling students to be able to effectively use and engage with feedback, as well as to raise student's awareness of the extent and quality of feedback they receive. Using an Action Research approach, this investigation documents the creation and development of a digital tool to replace the standard paper-based post-crit feedback. The successful testing and evaluation has shown that the tool can help to deliver effective feedback to large cohort groups and help improve student perception of feedback alongside other feedback and assessment methods. Whilst focusing on Architectural Education the paper is also relevant for other subjects which include project-based learning methods.

Key Words
Feedback, Assessment, Digital, Architecture, Crit, Project-Based Learning

Introduction

The research tracks the results of a five year project conducted at a single UK Higher Education Institution on the development and use of a digital feedback tool. This research sets out to detail, analyse and evaluate the longitudinal results in order to understand the effectiveness of the tool within the architectural educational context. This investigation focuses on the creation of a digital tool that aims to improve the efficiency, format and moderation of the review and feedback process, in particular within the crit (short for critique), a common educational scenario in university-based creative and project-based courses. Through analysis of the process we were able to understand deficiencies and strengths in the review or crit process, and its recording, which we were able to address with the design of the digital tool.

The seed for the project emerged from the idea that the use of a tablet computer to record reviews could provide better and more consistent feedback for the students. This resulted in the development of a bespoke iPad app to replace the paper-based system which was in operation. The iPad app is able to digitally record the crit notes and marks in real time, as well as being able to record voice memos and photographs to aid with moderation processes. This paper focuses on the development and the decisions made during this process of creating the app and will describe the methods used to develop and test the design in order to maximize its potential to develop student learning.

Background

In the UK university sector every student at undergraduate level in their graduating year is asked to complete the National Student Survey (NSS), a 27-question survey based on their experiences of their course at their institution. The stated goals of the NSS are to inform prospective student choices, provide data for the institution that helps to improve student experience and also to support public accountability (OFS, 2018). Each year the published results of the NSS survey are used to represent teaching quality in the compilation of the three most common league tables which rank both universities and individual subject areas (Turnbull, 2018).

The category of 'Assessment and Feedback' in the NSS questionnaire is currently is addressed by four of the 27 questions that make up the survey. An analysis of the last five years shows that nationally across all subjects and courses the assessment and feedback questions consistently score poorly in comparison with the other academic based questions on the survey which relate to 'satisfaction with the course content' and 'teaching' (HEFCE, 2017). The NSS has long highlighted a higher than average dissatisfaction amongst architecture students, and also other art and design courses, in their rating of assessment and feedback (Vaughan & Yorke, 2009). Further analysis shows that this trend is prevalent nationally across Architecture schools with the assessment and feedback category continuing to score lower than the other two categories in 48 of 49 Architecture schools across the UK (Guardian, 2018).

A further incentive for universities in the UK to improve their assessment and feedback, and the results given by students in the NSS, is that these questions also contribute to the recently introduced Teaching Excellent Framework (TEF). The TEF aims to assess excellence in teaching at universities with the published results (gold, silver or bronze) intending to help those considering higher education to choose where to apply (OFS, 2018). This shows that assessment and feedback on Architecture courses is important both for the student learning and for the reputation of the institution; it is in this context that this investigation focuses of the design and development of a Digital Tool that aims to improve feedback delivery.

The project, which started in 2013, emerged from a number of factors that were felt could improve the feedback and marking experience for both the Architecture cohort and the tutors involved in the marking, particularly within large cohort groups. The development of the digital tool is still ongoing. The tool has developed through a number of testing scenarios including using a small group of students in a 'live' review session where feedback has been recorded in real-time as it is verbally delivered to students. Also, using much larger groups, the feedback tool has been used to assess submissions both with and without students being present. These trials have been a technical success and comment from assessor-users has helped focus the design of the tool (Figure 1).

A Review of Assessment Practices

Studies have shown that effective assessment can lead to significant learning gains (Black and William, 1998, Gibbs and Simpson, 2004, Cree, 2000, Ramsden, 2003). The most common type of assessment and feedback scenario in an architectural course on project-based learning modules is the crit, or review of work. The crit consists of a student verbally

presenting their design work and their ideas, usually with the aid of drawings and models, to a tutor (or tutors), visiting critics and also to their peers (Smith, 2011). It is primarily used as a tool to provide formative feedback and assessment although in different scenarios it can also used for summative assessment too. The crit, as described by Webster (2007, P.1), is universal in architectural education although exact methodologies vary from school to school.

"Architectural education has always prided itself on its use of the design studio as the location for project based reflective learning and the crit as a collective means of sharing and assessing student achievement."

It is relevant to note that the guide written by Webster highlights the importance of feedback, and in particular its timely release, yet offers no guidance on the type of feedback expected or how it should be delivered. Parnall and Sara describe the review process in their synopsis (2007) as;

"A cornerstone of architectural education around the world. The defence of ideas, drawings, and models in an open format before staff and peers is intended to be a foreground for healthy creative debate."

According to Parnell and Sara (2013, P.101) "*The crit forms the primary narrative through which critical design thinking in architectural education is operationalized.*" Good crit procedure will involve active conversations and exchange of ideas between all the parties present. However, Parnell and Sara (2013, P.101) state "*commonly, it centres around the binary role of tutor 'critiquing' and student 'defending' design work.*"

The review process is however criticised by Webster with a particular focus on the way the students experienced the behaviour the tutors involved who conformed to what they felt was expected of them, possibly picked up from their educations. (2005, P. 265).

"Far from being a celebration of student achievement, the review was experienced by the students as a frightening event in which staff used their power to coerce students into reproducing staff-centred constructions of architectural habitus."

Whilst there are clearly negative reactions to the crit format as an education tool and method of feedback, Smith (2011) through his student-based focus groups, highlights its positive aspects. These include the direct nature of the conversation between the student and tutor and the immediacy of the verbal feedback. Smith does however note that the positive comments were in significant minority.

Cowan (2005) states that it is now the norm for feedback and assessment to be carried out systematically, yet makes no mention of producing written feedback for any of the architecturally-based feedback scenarios detailed in his work. This is consistent with this author's own architectural education between 1998 and 2004 where no written feedback was either offered or expected across five years of education at two separate institutions. However, the extent of student dissatisfaction with the feedback processes currently being revealed by the National Student Survey (Price, 2010) has forced universities and lecturers to review their procedures (Kovacs *et al.*, 2010).

Williams *et al.* (2010) discuss in particular the difficulty in assessing creativity in Architecture, which could be applied to all courses with creative content. The study argues

that the problem emerges due to a lack of an accepted definition of creativity and therefore suggests a shared understanding of the creative processes is required. Others focus on similar aspects related to assessment and feedback of the design studio and the use of the crit for assessment (Goldschmidt *et al.* 2010; Çıkış and Çil 2009; Webster 2007). Goldschmidt *et al.* (2010) report on the experience of a crit across three case studies in a second year architectural studio. Through their analysis, they identify different techniques to undertaking crits as well as some common areas. Their study concludes by highlighting the need for extensive analysis into the use and experience of the crit setting in order to enable the creation of a "*major feedback instrument in the framework of a badly needed pedagogical basis for design education*" (Goldschmidt *et al.* 2010, P.285). This touches on the behavioral aspects of the crit and diversity of approaches by tutors (Goldschmidt *et al.* 2010). An issue that can be problematic for students when more than one tutor is involved in the marking process as is often unavoidable in larger cohort groups (Smith, 2011). This has also been identified in large cohort groups across the entire university sector (Chetwynd & Dobbyn, 2012).

A number of scholars have made proposals to enable more effective feedback mainly in the context of the design studio tutorials and not the crit. Thomson (2007) discusses findings from a project conducted in a first year design studio. Thomson (2007, P.38) describes the project as having come about through student feedback explaining design crits as "*ambiguous, subjective and largely unqualified*" events "*from the student point of view.*" Thomson discusses how tutors may "*struggle to identify and clearly express criteria and standards for design projects.*" The study suggests the need for a constructive framework whereby shared understandings that embrace both the 'procedural' and 'declarative' knowledge of students are included.

It can be seen through this brief literature review that the crit forms an important part of the education of future architects and designers. The literature tends to focus on the adversarial nature of the review, particularly in relation to the verbal feedback given, how this is delivered and its potentially negative effect on student learning (De Graft Johnson, Sara *et al.*). Whilst also highlighting difficulties in defining assessment practices with regards to creativity (Williams *et al.*, 2010). Although much has been written about the pedagogical process of the review there appears to be a knowledge gap in the literature on formal feedback from these reviews, how they are recorded and digital practices in this pedagogical setting. There is little distinction or comparison of digital versus physical practices or studies that examine use of different techniques in particular domains. Instead most discussions focus on particular assessment practices within architectural education, for example peer review and e-portfolios, with emphasis in the research placed on student engagement. The use of 'e' or digital feedback is primarily seen to aid timely assessment and encourage rapid evaluation (Hassanpour *et al.*, 2010). There are also few papers on how different disciplinary settings engage with digital feedback and what issues might arise in terms of educators' views - the emphasis is consistently placed on student experiences. Further explorations on the use of digital feedback across diverse disciplines would enable an extended richer understanding of digital assessment practices and the role of feedback across disciplines.

Methodology

The research was conducted using a longitudinal case study approach which was undertaken at a single UK Higher Education Institution using first and second year architecture students

across two academic years. The study was undertaken using the 'Action Research' approach (Altrichter *et al*., 1993) which was used to both develop the tool and understand its effectiveness from both the learners' and teachers' perspectives. It was undertaken to understand these perspectives and use this process of collaborative participation, observation and reflection by learners and teachers to review and refine the tool. This method was important in being able to develop the tool in a cycle of action, reflection, data collection and interpretation. The project was monitored by a steering group which met in person three times during its life and was kept informed by more regular reports from the Project Leader. The steering group provided support to ensure the project was delivered, to monitor progress and help with the evaluation of the project.

The impact of the project on the learning experience of students was evaluated through a single focus group of students of second year students who volunteered to take part following an open call. The second year group was chosen due to their more extensive experience of feedback delivered in different formats. The focus group was conducted through a series of structured questions and the students were interviewed in a small group of four and the discussion was documented as both an audio recording and video. The focus group session discussed perceptions of feedback in design studio and were arranged around three themes: perception of feedback; usefulness of feedback and criteria used in feedback. Reflective interviews were also carried out with participating tutors following each use of the tool. These discussions were held to understand where potential improvements could be made, which could be turned into actions to feed into the constant development of the tool. At the end of the project semi-structured interviews were carried out with four participating tutors which focused on the same themes as developed above.

Ethics

Any staff or student feedback used within the study or this paper have been anonymised to ensure participants cannot be identified.

The portability of the iPad format and the potential for the large amounts of student data to be held on it meant that security and data-protection of student details was an important consideration. Using a double lock system, a password or fingerprint is required to get access to the iPad and then a second password and log-in is required to access the app; in this way the security of student details is ensured. The iPads are also equipped with the ability to remotely wipe data so, in the worst case if a device was stolen, it can be erased as soon as a theft is reported. As the system developed we worked with our university IT department to ensure compliance with all UK Data Protection legislation and University policy.

Case Study

The case study focuses on the first year Architecture cohort, however, the study included the use of the tool in both second year and fourth year reviews in order to create comparative data. The first year cohort is made up of students from five separate architectural programmes that study a shared first year studio syllabus which is made up of 60 credits split between two modules, 'Studio' and 'Technical Studio', but which are taught interchangeably resulting in a portfolio of work which is assessed for both modules. The total number of students on the

shared first year modules has fluctuated over the 5-year period of study but averages at around 225.

Over the course of the academic year, the first year students completed nine projects across the two modules which were assessed summatively by means of a crit. The size of the cohort, combined with the time required for review, a notional minimum of 20 minutes based on previous experience, meant that in order to fit each assessment into one day, with a review for each student, up to sixteen review groups were formed and each group was marked by a different tutor who marked up to fifteen students. The format required that students pin-up their work and then verbally present to the marking tutor who then asks questions and comments on the work, sometimes inviting participation from the other students in the group.

Prior to the introduction of the digital tool the review was recorded and transmitted, by a printed standardised A4 sheet that contains a prepared marking rubric, a space for comments and a grade. Brookhart (1999, P.91) describes a rubric as *"a coherent set of criteria for students' work that includes descriptions of levels of performance quality on the criteria."* The individual marking tutors were expected to fill out the sheet either during or after review and hand this back to the Module Leader at the end of the day. On the reverse side of the A4 sheet the students were encouraged to get an audience member to record details of the conversation. Once the Module Leader had compiled the sheets they were collated, copied and handed back to the students at a later session, sometimes up two weeks after the date of the review. The feedback generated from the reviews was summative as the main assessment point is through the submission of a full portfolio of work at the end of the summer semester where the portfolio was marked holistically and an overall portfolio grade was given.

Identifying the Problem

There were a number of concerns from the process outlined above both from the tutor and student perspective. These include the time taken to release the feedback, the perception that some markers were more critical than others and also that some feedback was considered by students as incomprehensible. The problems, which were identified through both observation and data analysis, are explained below.

Moderation and Consistency – The existing processes made a full and proper moderation of the work difficult, the extent of which was revealed in an analysis that was conducted on the marks given by different tutors for a design project where 16 tutors marked approximately 15 students each. The lowest marking tutor gave an average mark of 45.5% compared to the highest marker averaging 58.1%, a difference of 12.6%. The range of marks also differed greatly with one tutor marking between 30% and 72%, a variation of 42%, whereas another marked between 40% and 58%, a much smaller variation of 18%. It is important to note that a full moderation process is carried out at the end of the year on the entire portfolio (as outlined above), however, the summative feedback and grades which are given as the result of the reviews are considered very important by the student and for the student's development. It was common, following the release of feedback and marks, for students to enquire to the Module Leader about their grades particularly if the student feels they should have been marked higher. The completion of the marking rubric, and in particular the relationship of the selected criteria in the rubric to the final grade given by the marking the marking tutor, was sometimes inconsistent. Some instances revealed selected rubric grades that bore little relationship to the final overall grade and these were questioned by students

where the grades highlighted in the rubric appeared to suggest they had achieved higher marks than the final grade given.

Recording - The ratio of students to tutors, and space restrictions in the department, (following the review the work is taken down and replaced by another student) means that these assessments are not double marked during the reviews. As the review is not recorded, nor the work handed in, there was no practical way of moderating the grades until the end of year assessment where the originally presented work was collated into the portfolio.

Quality - The quality of feedback varied greatly between the tutors. Some of the tutors spend a lot of time making sure that the written feedback is neat, legible, understandable and a full account of the review discussion. Other feedback sheets had problems such as poor handwriting making it difficult to read or only very short written feedback compared with that given by others.

Design and Development

The initial stages of the design and development of the digital tool, which took place between 2013 – 2015, assumed an acceptance of the status quo in how reviews would be conducted and the investigation initially focused at looking for small improvements and adjustments that could help improve the current situation. Searches were conducted for solutions that already existed but there was not a single app that was able to do what was required, nor was any potential facility available as part of Blackboard, the Virtual Learning Environment (VLE) used at the institution. Further study revealed software called Filemaker Pro that claimed in its advertising, *"Is there a business task or process that you'd like to easily manage? Are you still using paper forms?"* (Filemaker, 2013) and also had a companion 'app', called Filemaker Go, which allowed the user to transfer the computational processes onto an iPad. It is this software that was used to develop the digital tool.

The original design intention was to replicate the paper marking sheet, with the additional feature of adding photographs which was enabled by using the tablet. The initial approach was to provide as close as possible user experience for the marker as they would have with the typical A4 sheet. It was important to engender a sense of familiarity and develop a system that could be picked up by a tutor who has never used the system before and does not take complex instructions or training to operate.

The initial development of the software focused on replicating the marking rubric which worked with touch technology. We produced an effective working prototype which was revealed to other educators in the department, generally to very positive feedback, which led to discussions on potential further features including how the work would be distributed. The process started with the assumption that distribution to students would be done by printed sheets manually distributed by the tutors, however, it became apparent that a better way may be to distribute the sheets to the students email accounts as often feedback sheets are not collected. Using the email database available to staff, it was possible to add this functionality enabling a mass email but tailored to individuals which contained the individual feedback attached as a PDF file.

In November 2013 a single test of the tool on a student who had missed their initial review date was conducted with the student's express permission (Figure 2 & Figure 3). The successful test demonstrated that the tool was capable of professionally presented feedback

that contained photographs of the work which may, in turn, benefit the moderation process, in comparison to the use of hand-written examples.

In December 2014 the tool was used to record feedback during individual reviews held for nine fourth year Architectural & Environmental Engineering students. The particular group was selected due to:

- The small nature of the trial study when compared with a first year group.
- At this point we only had a limited number of iPads.
- The advanced year group meant that they could better understand the verbal feedback given at the review should the trial not work as expected.

The use of the tool was successful with full feedback issued by email a day after the review. The results of the review precipitated a number of changes in the format of the feedback. The Module Leader requested the inclusion of a general feedback section that gave overall feedback on the review and was issued to everybody. The subsequent informal discussions with these students was positive about the accessibility of the digital delivery of this feedback, which, they noted, encouraged them to study it in more detail and take more account of the general feedback included with their individual feedback reports.

In June 2015, the tool was used for a First Year assessment that was conducted on portfolios without the students being present. As this was our first trial of the tool in a larger group, with five Lecturers marking 208 pieces of work it was considered that although the sense of occasion and dialogue with the student was lost, any issues with using the tool for a large number of assessments could be addressed. Following the number of successful trials and therefore proof of concept, the department invested further in iPads to undertake the marking of larger first year assessments for the 2015 - 2016 academic year and onwards. It has been used for all first year assessments up to the current day and is also used in a number of other marking scenarios on a more ad-hoc basis.

Behavioral Change of Assessors

Further reflection and discussion with academics facilitated the creation of a number of features which required a significant behavioral shift from the marker and/or module leader using the tool as opposed to replicating the paper version.

As each student assessment is recorded it is saved, in real-time, into a database of marks for that particular assessment. Each of the contributing tutors is able interrogate their own marks against that of their peers in a unique visual way as well as looking at average marks, top to bottom and deviation (Figure 4). Using this record the tutor, and module leader, can use the tool to moderate marks before they are issued to students.

The creation of an audio recording of a review which has the potential to address some of the concerns highlighted in the literature relating to the adversarial nature of the review as participants, particularly tutors, are likely to be more careful about the way they verbally respond to the student's work if they know that it will be recorded.

A 'flag' feature was added that allowed a tutor to highlight a particular student's work for the attention of the Module Leader. This was designed for tutors to be able to give indications such as 'Second Opinion Required' and 'More Help With Drawing Required' which create

an alert that further action may need to be taken. This was designed to enable a smoother moderation process and help the Module Leader to understand some of the key issues emerging without having to read every piece of feedback.

The addition of a 'traffic-light' system that showed, in real time, the completeness of the marking sheet. A series of traffic lights turned amber once individual sections, such as the rubric or the photographs, had been completed. Once all the sections had been completed the set of 'lights' turned green denoting that the sheet was complete. This function had a number of benefits; ensuring that all the marking tutors provided a similar level of feedback; alerting the Module Leader to incomplete sheets and also ensuring, via a computer script, that incomplete feedback could not be emailed to any student.

General comments could be added into the feedback from a selection of pre-selected phrases where markers found themselves repeating themselves.

The completion of the rubric calculated a mark band of a minimum and maximum percentage based on how the rubric has been filled out and its associated mark boundaries. The tutor is then able to select a percentage mark that fell within that calculated range ensuring a consistent approach to generating final marks. In a subsequent discussion with a student concerning the feedback the Module Leader observed that there was now a strategy which he was able to convey to those who questioned the system whereas before there was no way of telling the students how the marks were generated from the rubric (or vice versa).

Although these innovations required a behavioral change for the marker, it was very important that these features were integrated seamlessly into the marking experience. The usability and interface needed to remain simple to facilitate the uptake of use as experience showed that unless the whole experience remained easy to use then uptake of additional features was poor. Once the marking is completed the software generates a .pdf version for the student which contains the full feedback information over a number of pages (Figure 5, Figure 6 & Figure 7).

Discussion

Student Feedback

The focus group and informal discussions with the volunteer student group was carried out with 2nd Year students early in the 2016 – 2017 academic year in order to research the perception of the first full year of the digital tools use in the first year studio in the preceding year. The subsequent feedback discussion with students was positive about the accessibility of the digital delivery of this feedback, which, they noted, encouraged them to study it in more detail and take more account of the general feedback included with their individual feedback reports. The following comments are taken from the student opinion:

- "The feedback is more comprehensive and includes photographs, voice recordings and legible notes."

- "The ability to link a comment to a specific picture of the presentation has proved to be particularly helpful, as it is normally easy to forget which aspects of the work comments relate to."

- "Quicker feedback; compared to the usual one to two weeks, feedback is received within a couple of days."

- "It is more useful to have a digital copy rather than a physical copy, which is easier to lose."

- "There seems to be more agreeable feedback from different tutors; maybe this is due to the more organised and legible format of the feedback form."

The reaction from the students was overwhelmingly positive. However, there was one negative which caused a little initial confusion, which was that some students do not regularly check their emails and were not used to receiving feedback in this way. It was generally agreed in discussion with tutors that requiring students to engage with their emails in this way was not an overall negative outcome, could help them with better email discipline and the release of the feedback by email was flagged to them on their VLE and verbally during lectures.

Tutor Feedback

The tutor feedback through the reflective discussions and semi-structured interviews, as with that from the students, has been mainly positive. The assessors had different levels of success in adjusting to the digital tool generally in line with their own levels of digital literacy with one comment stating *"It took some getting used to at first because its different to just writing notes."* Another partial criticism is that a number of tutors have noted their desire to draw diagrams as part of the feedback as an aide memoire to the overall discussion. This is not possible on the current iteration of the tool, however, may be possible through further development.

It was commented that the accessibility of the feedback as a digital archive was also beneficial to the tutors as it was more easily accessible to review students work before future reviews or as part of an overall academic assessment of progress. It was also commented that the tool has "*become an integral part organising the first year with the tool being important in helping to monitor student engagement."* Most importantly there was agreement that the quality and consistency of feedback offered improved in terms of detail and individual relevance as a result of the behavioural changes that the tool engendered. It was also noted that it specifically helped to improve the feedback delivered by non full-time staff who regularly are involved in the first year marking process. Anecdotally it appears that improvements have been made in the agreement of marks between tutors although a further study would be required to confirm this as better briefing and improved rubrics may also be responsible for this.

Conclusion and Recommendations for Further Development

Following the pilot study the digital tool is now embedded with the first year studio teaching and continues to be improved and altered to meet changes in assessments and marking practices. There are a number of further pieces of investigation, research and development that would be useful to carry out outlined below:

The tool does not currently connect with the VLE, Blackboard. It would make the tool more effective, and transferable between disciplines, if it was able to feed marks into this and transmit feedback through this medium or that the application was developed to enable direct student engagement.

- The student – to – student aspect of the feedback, which was outlined at the beginning of this report, has not been fully addressed and is currently still completed using a refined paper version. It would help student engagement and feedback literacy, if students were able to complete their part of the feedback process in the same way as the tutors so there was also a permanent record of their reflective thoughts. An effective solution may be to implement a system where once the student fills in their section the tutor feedback is released to them.
- The marking rubric, and the flexibility of this as a marking tool in creative situations, has come in question a number of times during this study, as has the way these are being used across the department. A further study may look at how these can be used better and more consistently across all years of study.
- One major disadvantage of the system is the hardware and software set-up cost. The programming of the software and design of the user interface was completed, self-taught, by the author whilst undertaking full teaching duties. However, if a professional was sought to do this programming work it would come at considerable outlay with additional ongoing costs for managing the tool and adjusting it for different marking scenarios. These costs are potentially barriers to further implementation which although initially considerable, through time can provide value for money depending on frequency of use. The current system, using the propriety Filemaker software does not allow for sharing of code or turning the system into an 'open source' development tool.
- The testing and evaluation of the digital tool was successful although it has highlighted areas in which improvements could be made. Although not all of the tutors were universally happy with being made to create their feedback in this way, they did agree that the solution worked well and would be prepared to use it again. The tool did have a transformative effect on the behaviour of the tutors in relation to feedback and in the larger cohorts helped to produce more comprehensive and consistent feedback across the board. The tool has been very successful in helping to organise and moderate large cohorts where marking is being carried out by more than one tutor. It also helps to give confidence to a Module Leader that the marking is not released until fairly moderated.

The testing has shown that there is a place for such a digital tool alongside other feedback and assessment methods. The tool has helped to provide better understanding between learners and teachers on the purpose, quality and format of feedback to aid more effective academic development. It provides timely and rapid feedback for all students, accessible on mobile devices and has delivered improved standards and consistency of feedback.

Alongside the immediate gains as outlined above the project has helped encourage a culture of assessment for feedback and not for marks acquisition. It should be possible for students to be happy with their feedback even if they are not happy with their grades and recent National Student Survey results for our courses results suggest inroads are being made in this direction. The digital tool is certainly not wholly responsible for these figures, however, it has played a part, as well as providing a platform for discussions and improvement on feedback within the department between tutors. In 2014 our NSS feedback category scores were 71%

satisfaction, which placed us in the middle quartile of 45 participating schools. In the last three published results the course has had the best feedback satisfaction scores of any participating architecture school with scores of 94.2% in 2017, 92.7% in 2018 and 92.3% in the latest table (Guardian, 2018). It is apparent from the study, and the work undertaken, that specialised digital feedback tools can be developed to address specific education needs. The evidence presented suggests that a digital tool, such as the one developed in this study, has both the potential to positively effect important performance indicators for the institution and contribute to a better learning experience for students studying architectural courses, as well as other creative courses where presentations form part of the assessment.

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