Identifying predictors of students' perception of and engagement with assessment feedback

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Abstract

Higher education students' perception of and level of engagement with the feedback they receive has gained increasing attention in the literature to identify areas which require educators' attention. However, predictors of students' perception and engagement have yet to be identified. To address this, a survey measuring students' views and practices regarding feedback was completed. Characteristics of the individual student (gender, age and whether English is their first language) the learning environment (student lives on or off campus) and course related variables (year of study of the course and whether the second subject was the same or a different discipline) were analysed to assess whether these variables predict students' perception and engagement with feedback. Multivariate analysis established that the only significant predictor variable was year of study of the course thus identifying a key predictor whilst ruling out numerous potential predictors. As the only significant predictor of students' relationship with feedback was their year of study, further analyses were conducted to establish which specific areas of perception of and engagement with feedback change as a function of this.

Keywords: HE assessment, Student learning, perception of feedback, engagement with feedback, predictors of satisfaction.

Identifying predictors of students' perception of and engagement with assessment feedback

In the higher education sector there has been considerable effort poured into investigating students' perception of and engagement with assessment feedback. Investigations relating to perceptions focus on how students appraise feedback and numerous problems have been documented in this area; findings consistently demonstrate overall students' perception of feedback is negative. Generally

speaking, students seem to want feedback (Higgins et al, 2002, Pokorny and Pickford, 2010) but are very critical of the type of feedback they receive on assessments (Hulme and Forshaw, 2009, Price et al, 2010, Yorke, 2003).

Causes of negative perceptions of feedback are often considered from either a structural or an individual level. Structural aspects include course constraints such as large student numbers, limited staff, limited opportunities for staff to provide feedback etcetera that constrains the quantity and quality of feedback provision. Gibbs and Simpson (2005) argue that resource constraints have led to a decline in assessments set and a decline in the quantity and quality of feedback provision. This combined with curricular changes directed towards more unitisation means that often the resulting effect is that students only receive feedback after the module has completed and so do not see the 'value' of being able to apply it to their next piece of work (Yorke, 2003). The concept that feedback should be reconceptualised as feed-forward to assist students in applying comments to future work has been proposed (Boud and Molloy, 2013, Hounsell et al, 2008, Sadler, 1989). However, empirical research has demonstrated students struggle to reflect on feedback (Price et al, 2011 and Sargeant et al, 2009) leading to difficulties in interpreting and applying feedback even when interventions incorporating feed-forward have been implemented (Duncan, 2007, Thorpe, 2000).

The other key component in the feedback process is students' engagement with feedback. There has been a greater push recently to assess students' engagement with feedback (Ali et al., 2015; Price et al., 2011; Rae and Cochrane, 2008) and staff perception of students' engagement with feedback (Carless, 2006). Findings have revealed that the picture can be as depressing as for perception of feedback. Some students do not bother with feedback and others scan it and then forget about it (Gibbs and Simpson, 2005; Jones and Gorra, 2013). Furthermore, there is evidence that when students do engage with feedback, this tends to be passive engagement such as the student reading tutor provided comments (Higgins et al, 2002). Although reading feedback and digesting it is considered engaging with feedback received, this type of engagement is still far from the active engagement lecturers expect of students (Handley and Williams, 2011; Price et al., 2011; Rae and Cochrane, 2008). In addition, passive engagement is certainly not enough to produce the type of self-regulated learners discussed in the literature (Gibbs and Simpson, 2005; Nicol and Macfarlane-Dick, 2006).

Although there is a plethora of previous research investigating students' feedback perceptions and engagement there has been little attention given to factors that may influence these. However, investigations of students' perception of and engagement with the university learning environment have identified both structural and individualistic factors to be influential. Research has identified predictors (as well as non-predictors) of perception of and engagement with features of the learning environment. For example, there is a strong positive association between students' perception of workload and the adoption of a surface rather than a deep learning approach (Lizzio et al, 2002; Ramsden and Entwistle, 1981; Meyer and Parsons, 1989) with perception of workload identified as a key predictor of which learning approach is chosen. Perceptions of good teaching quality and good teaching environment can predict deep approaches to studying and contrariwise perceptions of bad teaching influence students to adopt a surface learning approach (Lizzio et al., 2002).

Therefore, there is a need to establish key predictors of students' perception of and engagement with feedback. Feedback in this case refers to the written feedback students receive on submitted work, usually with an associated mark for the assignment. This will extend research into how students' perception of and engagement with the learning environment predicts learning outcomes. The variables to investigate relate to both the individual characteristics of students and course related variables that may predict their interaction style with feedback. These variables could predict differences in how students perceive and engage with feedback. Once variables have been assessed, there is a need to carry out more fine-grained analyses, which will provide insight into how the predictor variable(s) modify specific areas of perception and engagement with feedback.

The first variable considers any potential gender differences in perception of and engagement with feedback. A consistent finding is that females are more likely to internalise failures and negative evaluations but externalise success instead of attributing it to their own ability. Males exhibit the converse pattern (Dweck et al, 1978; Stipek and Gralinski, 1991). As feedback is provided on assessed work - usually with the mark for the work - it has a strong evaluative component that may be perceived differently depending on the gender of the student, thus affecting their perception of

feedback. Gender differences as well as similarities have been observed when measuring perception of and engagement with feedback provided in peer learning situations (Evans and Waring, 2011) indicating evidence for the argument that there may be gender differences in responsiveness to feedback.

Secondly, there is a literature base indicating that non-traditional students adapt differently to higher education compared to traditional students. Non-traditional students include mature students and students who are from an ethnic background. A number have argued that the challenge of adjusting is much more pronounced for non-traditional students (Zepke and Leach, 2010). In a critical appraisal of the literature, Sambell and Hubbard (2004) discuss a number of interconnected barriers. Non-traditional students often lack the cultural capital that traditional students have access to. It has been argued that this disadvantaged group are not as 'academically prepared' as their 'traditional' background peers (Gibbs and Simpson, 2004). This implies that educators can no longer expect students to adjust without intervention. Vulnerable groups such as non-traditional students need more guidance, additional opportunities to be assessed and more feedback on their work than is usually provided (Sambell and Hubbard, 2004). This results in a question of whether non-traditional students differ in their perception of and engagement with feedback.

Features of the campus environment such as living arrangements (whether a student lives on campus or off campus) can affect students' engagement with the university, including their interaction with faculty and wider academic support services (Inkelas et al., 2007). A central issue with feedback is limited dialogue between staff and students. This results in feedback being a one-way message - from tutor to student - with limited opportunity for interaction (Nicol, 2010). One of the key principles in the literature is to increase dialogue to allow students to engage with tutor provided feedback more effectively (Bloxham and Campbell, 2010; Higgins et al, 2002; Nicol, 2010; Nicol and Macfarlane-Dick, 2006). Therefore, the increased interaction with faculty observed when students live on campus (Inkelas et al, 2007) may result in opportunities for greater dialogue, which may in turn lead to perceptions that learning from feedback is a dialogical process.

The remaining two variables examined course features. Students' learning patterns change as they progress in their studies from earlier to later years. There are troubling patterns (Lieberman and Remedios, 2007). Students who begin their degree demonstrate stronger mastery goal orientations - defined as the desire to learn- but this declines for second, third and fourth year students who were significantly less likely to want to master their course. They were also much less likely to enjoy their course and be more focused on their grades. It was concluded that the pressure to achieve grades undermines enjoyment of the course (Lieberman and Remedios, 2007). Studies that have tracked students throughout the degree programme found that the amount of time students allocate to independent study decreased as students progressed on the course and that students allocate as little as 5% of their independent study time to non-assessed tasks in their final year of study (Innis and Shaw, 1997).

The other element to be explored is whether doing a dual (or combined honours degree) in the same discipline or a different discipline influences perception of and engagement with feedback. Inter-disciplinary learning is more difficult in a number of ways; students are faced with major challenges working across disciplines including different demands on reading, teaching and learning styles (Bradbeer, 1999). Assessment and feedback also differs between different disciplines, thus creating unique issues for combined honours students (Simonite, 2003). Students who choose similar subjects as combined honours should theoretically manage to integrate competing demands better than students who choose dissimilar subjects (Bradbeer, 1999). This indicates that perception of feedback may be different for students studying subjects in the same discipline when compared to students studying subjects in different disciplines.

There is therefore a need to establish how features relating to the individual student, their environment and course related features predict their relationship with their feedback.

Method

Participants

A total of 447 undergraduate combined honours psychology students from a UK university completed a questionnaire during core teaching sessions in the second semester of the academic year 2012/2013. The age of participants ranged from 18 to 39 years, with a mean of 20.31 years (SD = 2.55). The sample consisted of 194 first-year (85% of registered students), 125 second-year (71%) and 128 third-year (76%) respondents. The calculation for response rates are based on the number of students registered on the degree course; the actual response rate (how many people returned questionnaires administered to them) was above 90%. As the course did not attract many international students, we measured ethnic grouping by asking the question if English was their first language. Students were defined as mature students using the definition in the UK provided by UCAS (a student who is 21 or older when they start their degree). All students were enrolled on a combined degree and so to determine whether the second subject was in the same discipline as psychology the framework provided by the Higher Education Academy (UK) was used (HESA, 2013) to categorise the second subject as "same discipline" or "different discipline".

Design

A cross-sectional design was used. Six independent variables were analysed using multiple regression. These six variables were: gender (male or female), age (a mature or traditional age entrant), language aptitude (whether English is the student's first language), proximity to the institution (living on or off campus), year of study (first year, second year or third year) and discipline differences (whether the second subject on the combined honours degree is in the same or different discipline to psychology). There were two dependant variables recorded as outcome measures: "perception of feedback" and "engagement with feedback".

Materials

A questionnaire examined students' views of assessment and feedback (see questionnaire, at the end). The student experience was assessed through items covering students' expectations, engagement, motivation and ability to apply received feedback, as well as their perceptions regarding its purpose, effectiveness and quality. Questionnaire items were selected based on a review of the literature. The questionnaire used a 5-point likert scale to measure agreement/disagreement to questions probing perception of and engagement with assessment feedback. The 5-point scale represented strong agreement to strong disagreement with the midpoint of the scale (a value of 3) indicating the person neither agrees nor disagrees – that is, is in the middle). In order to decrease response bias, a mixture of positively and negatively phrased questions was included.

As the questionnaire covered a range of assessment and feedback-related topics, factor analysis was used to reduce the number of items (Fabrigar et al., 1999). Specifically, we wanted to extract questionnaire items that measured students' perception of feedback and items that measured how they engaged with received feedback, whilst removing items that measured areas not relating to those two constructs. Factor analysis is used for this purpose (Field, 2009) as the procedure allows for items which correlate with each other to be grouped together and measure an underlying variable, known as the latent variable (for example, perception of feedback). Items that do not correlate with those measuring the underlying variable (are removed thus producing a statistically validated scale measuring a specific construct. Factor analysis requires researcher judgement throughout the procedure (Field, 2009 as the method of rotation used to load questions onto each factor is chosen depending on whether the latent factors which emerge are allowed to correlate with each other or not. If there are theoretical grounds for believing the latent variables will correlate then the rotation method needs to be used to allow for correlation between factors. As there are strong grounds for believing that perception of learning influences engagement with learning (Butler and Winnie, 1995; Lizzio and Wilson, 2008) we chose a procedure that allows the underlying factors to correlate. Therefore, principal component analysis (PCA) was conducted on 36 items with oblique rotation (direct oblimin). As a procedure was chosen which allows for correlation between factors the result is that the same questionnaire item(s) can appear in more than one factor. According to Field (2009) this approach is

superior to procedures that prevent correlation (for example, orthogonal rotations) between latent variables. Alternative approaches lack validity because it is difficult to imagine research on human beings where similar psychological constructs do not correlate with each other (Field, 2009). Therefore, the resulting scales that emerge from the factor analysis procedure may share items across factors (that is, some of the same questionnaire items will appear for both perception of and engagement with feedback). This is consistent with theory (Field, 2009) as certain scale items can be interpreted as probing both perception of feedback received and how the student engages with feedback. In this case, two questions emerged in both factors and a star indicates these (see questionnaire at the end of this paper). These two questions can be used to measure both perception of and engagement with feedback.

The assumptions of factor analysis change depending on the adequacy of the sample size. The assumptions of factor analysis were met; we followed conservative criteria with our large sample size (Field, 2009). Factor loadings with an absolute value lower than .3 were suppressed and items were removed if they did not correlate at least .3 with other items (Field, 2009). The Kaiser–Meyer–Olkin measure verified the sampling adequacy for the analysis (KMO = .787), and all KMO values for individual items were well above the acceptable limit of .5. Bartlett's test of sphericity (χ^2 (595) = 2705.441, p <.001) indicated that correlations between items were sufficiently large for PCA. A two factor forced solution was chosen to reduce the number of items to the two constructs we were measuring, the major point of inflexion occurring at the third data point in the scree plot and overlap of loadings on numerous subsequent factors resulting in the same items spanning (Field 2009) numerous factors. Forced extraction of two factors explained 27% of variance.

Both constructs demonstrated good internal reliability with a Cronbach's alpha (α) score of .76 (13 items) for perception of feedback and an α score of .77 (15 items) for engagement with feedback. Analysis of individual scale items revealed removal of any items would not increase the reliability score for both constructs.

Procedure

The ethics committee at the university where the research was conducted granted ethical approval. Students were informed of the study during core teaching sessions. Students volunteering to take part in the survey were provided with a questionnaire that they self-completed and returned to the researcher before leaving the lecture theatre or seminar room. This helped to ensure a high response rate as almost all students who had attended the teaching sessions volunteered to take part in the survey.

Measures

As we measured more than two independent variables, multiple regression was used to establish whether six independent variables could predict students' perception of and engagement with feedback. This technique allows for a consideration of whether independent variables can predict variation in the dependant measures, so can be considered an extension of ANOVA. As well as determining whether multiple independent variables can significantly predict variance in the dependant variables, the technique also allows for a consideration of how much variance in the dependant variable each predictor variable can account for, thus allowing us to scrutinise the extent to which the regression model can explain the data.

For the fine-grained analysis a one-way between subjects ANOVA was conducted on questionnaire items to establish which specific areas of perception and engagement deteriorate as a function of year of study. Effect sizes (partial eta squared ηp^2) are also reported to distinguish which areas are having the most impact. Fine-grained analyses will identify which areas of perception and engagement need focus and complement the omnibus analysis that only allows us to observe group differences.

Results

Results indicate that year of study was a significant predictor of perception of feedback $F(6, 421) = 8.538$, $p<.001$, $R^2 = .10$. Year of study explained 10% of variance in perception of feedback. However, the remaining five predictors had no significant influence on the dependant measure of perception of feedback. For the dependant measure of engagement with feedback the analysis again revealed that the only significant predictor was year of study $F(6, 421) = 5.493$ $p < .001$, $R^2 = .06$. This independent variable explained 6% of variance in engagement with feedback.

Findings indicated that out of the potential range of variables that could theoretically predict perception of and engagement with assessment feedback, five predictor variables affected neither measure, and one variable, year of study, predicted a relatively small, but significant amount of variance in each dependant measure. As the same variables failed to predict students' relationship with feedback on both measures - but one could predict change in variance on both measures - findings indicate similar factors can predict, or fail to predict the relationship for each measure. Therefore, although year of study can explain changes in scores for each measure gender cannot. From this, one can infer that males and females are similar in how they perceive feedback and are similar with respect to their engagement practises with feedback. Conversely, irrespective of characteristics of the student, as the student body progresses further into their degree course their perception of feedback and engagement practises will change with their progression. On both measures, progression on the course is associated with deprecating scores for perception and engagement with feedback.

It is apparent that the students generally held a negative view of the feedback received (Table 1). Means were either in the ambivalent "neither agree or disagree category" (3 on a likert scale) for all three year groups or started in the ambivalent category for first year students but dropped as students' progress through the degree course to a "disagree" (2 on a likert scale).

<<Insert Table 1 here>>

The largest effect size was associated with the statement that feedback ‘felt like a one-way dialogue rather than a two-way process’ (Q5). This indicates that out of 13 questions measuring students' perception of feedback the area that deteriorates the most during the degree course is the perception that there is a lack of dialogue between staff and students. However, it was an item measuring practices crucial to learning (tutors providing examples of how to improve work) which scored in the lowest range. Statement twelve of the questionnaire which measured this aspect of feedback was the statement with the lowest mean score (the only item where students disagreed as early as the first year of study) and similar to the other items for each advancing year this disagreement increases.

Data that can be considered to refer to positive perceptions and engagement includes students agreeing that feedback was provided to aid learning (Q4, Table 2) and most agreed to looking at the comments on the feedback sheet (Q1) and inside the script (Q2). However, on the remaining measures there was limited agreement with questions probing positive aspects of feedback provision. Means were either in the ambivalent "neither agree or disagree category" (3 on a likert scale) for all three year groups or started in the ambivalent category for first year students but dropped as students' progress through the degree course to a "disagree" (2 on a likert scale).

<<Insert Table 2 here>>

The data in Table 2 indicates that the only engagement practices which scored in the agree range consisted of reading feedback comments inside the script (Q2) and the summary feedback attached to the assignment (Q1). These engagement practices were consistent across all year groups, indicating that most students do collect and read tutor provided feedback. However, Q3 assessing whether students reflected on feedback scored an average of 3 in the first year and deteriorated significantly further by the third year of study. Items tapping into active engagement with feedback also failed to indicate strong engagement. When asked if they kept a record of their feedback to refer

to again in the future (Q9) student responses indicated ambivalence. There was increasing disagreement as students progressed in their degree course with final year students least likely to engage with feedback in this manner with scores close to the disagree range. This year group was the least likely to keep and refer to previous feedback when preparing future assignments (Q10) or to refer to previous feedback to identify areas where they have been told that they need to improve (Q14). These items (specifically item 9 and item 10) were also associated with the largest effect sizes indicating these areas where the strongest deterioration in engagement occurs. Q14, assessing whether students seek out educational resources to improve upon areas identified as needing improvement scored in the lowest range for engagement with feedback indicating students do not work with feedback in this manner. Unlike most of the other areas, there was no deterioration as a function of year of study.

Discussion and conclusions

The only independent variable that predicted perception of and engagement with assessment feedback was year of study. For each construct ratings deteriorated as students' progress in the course. Findings reveal that individual characteristics (gender, age, language aptitude), environmental characteristics (whether the student lives on or off campus) and whether the second subject of their combined degree is in the same or different discipline do not predict students' perception of and engagement with feedback but the course related variable year of study does.

A lack of dialogue between staff and students when providing feedback was the most negative area when assessing perception of feedback. This supports Nicol's (2010) argument that the dissatisfaction with written feedback is primarily due to impoverished dialogue. Increasing interaction between staff and students can be achieved in a number of ways. One of the simplest that might be appropriate for large cohorts of students is introducing interactive cover sheets in which students can ask a question that the marker will respond to in their feedback (Bloxham and Cambell, 2010). Structural changes such as the steep decline in number of formative assessments set to students and unitisation of modules (Gibbs and Simpson, 2004, 2005; Nicol, 2010) has resulted in students struggling to see the value of feedback being used to improve future work (Yorke, 2003). Therefore, the concept of feed-forward (Boud and Molly, 2013, Hounsell et al, 2008, Sadler, 1989) seems to be undermined by assessment procedures that are inconsistent with pedagogic criteria that feedback should meet. This is further confirmed by responses to the question where students did not agree to the statement that assignments were 'repeated enough times for assignment specific feedback to be useful' indicating that students do not feel able or confident enough to be able to apply feedback to future work.

The data indicate passive engagement that involves reading feedback comments. However, the question querying whether students reflect on feedback received dropped to the neither agree nor disagree category in the first year and deteriorated significantly further by the third year of study. This is especially troubling as reflecting on feedback comments is considered good feedback practice (Nicol and Macfarlane-Dick, 2006) and is a necessary pre-requisite for self-regulated learning. In addition to this reflection is at the heart of an engagement process whereby students are expected to engage with feedback more actively after a process of reflection. For example, Price et al (2011) argue that it is after a process of reflection that a student determines what they can do with feedback (including reject or misunderstand the provided feedback). Sargeant et al (2009) went further and concluded from their findings that reflection is the mediating link between receiving and using assessment feedback. Reflection was the process by which feedback was assimilated and was critical for deciding whether the recipient accepted feedback and whether it would be applied. This suggests that measures should be taken to ensure a process of reflection takes place after students have received their feedback (Sargeant et al., 2009) which in turn should improve their engagement with feedback.

When looking at active engagement on the part of students' responses in some cases were as unfavourable as scores measuring perception of feedback. Similar to perceptions of feedback students' engagement strategies (which were not strong to begin with) deteriorated as they progressed in their degree course suggesting that final year students were the most disengaged with feedback. Lack of engagement may partially explain poor perceptions of feedback as the two are theoretically related (Butler and Winne, 1995; Lizzio and Wilson, 2008). For example, a consistent finding in the literature is that students are not happy with the quantity of feedback they receive.

However, items tapping engagement practices which could result in changing perceptions of 'quantity' were not practiced by students (for example, an item which questioned whether students kept a record of feedback provided throughout the degree course). If students stored and collated their feedback and used it whilst working on future assignments their perception of quantity of feedback may also change as they can review the accumulated feedback rather than seeing a limited quantity of feedback per individual assignment. However, if students are unlikely to do this of their own accord - as our findings demonstrate - then some serious consideration needs to be given to how to get students to engage with feedback. Based on these findings of engagement practices and longitudinal studies demonstrating limited engagement with non-assessed tasks (Innis and Shaw, 1997) it seems unlikely the students are using their independent study time to implement strategies to compensate for the reduced feedback in their final year of study.

Findings reveal year of study was a significant predictor. However, it is important to acknowledge that this predictor accounted for a significant but small amount of total variance (10% for engagement 6% for perception). Thus, there is scope to uncover factors influencing student perception and engagement patterns. Consequently, future research should consider other variables that may or may not predict perceptions of and engagement with feedback among university students. Other potential areas that have yet to be investigated in the area of assessment feedback are personality of the student or motivation to learn from feedback. It would appear that investigations into the wider learning environment at university campuses (Lizzio et al, 2002; Meyer and Parsons, 1989; Ramsden and Entwistle, 1981) have systematically identified predictor variables and these research findings can be used to identify predictor variables in the area of assessment feedback. For example, Biggs (1989) identified that perceived workload affected the learning approach undertaken by the student. It is possible this predictor could therefore predict whether engagement strategies on the part of the students are shaped by perception of workload.

Secondly, although our sample size met stringent criteria for response rate to surveys and there was an extremely high participation rate by students ensuring representativeness the research was conducted at only one institution in one country (England). Further research is needed to establish whether the findings will differ depending on the student population attracted by different institutions as well as to establish whether the findings generalise to institutions outside of England. Additionally, we employed a cross-sectional research design. A longitudinal study tracking students through the degree programme would be useful.

The key messages are these:

- Students are particularly dissatisfied with the lack of dialogue in the feedback process and lack of personalised examples of how they could improve their work.
- Year of study significantly predicts students' perception of feedback and their engagement with feedback; the remaining five variables are not significant.
- Perception and engagement becomes increasingly negative as students' progress in their degree course.
- The significant predictor year of study accounts for a significant but relatively small amount of variance.
- The findings support the need to encourage deeper levels of engagement with feedback and the need for year–specific approaches to do so.

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Questionnaire

A) Perception of feedback scale

Q1) the feedback is always provided promptly at the expected time

Q2) I find the feedback helps me improve

3) I am happy with the amount of feedback I receive

4) I always agree with the feedback I receive

5) I feel the feedback is a one-way dialogue rather than a two-way process (RC)

6) I would like to receive more oral feedback on my work (RC)

7) I feel I need guidance on how to best use the feedback to improve (RC)

8) I tend to spend more time reading over feedback when I don't agree with the awarded mark

9) I often find the feedback comments upsetting (RC)

10) The feedback I receive is usually detailed enough for me to improve

11) The feedback always includes examples of 'good' and 'bad' bits in my work

12) The feedback always includes examples of how to improve my work

13) I feel assignments are repeated enough times for the assignment-specific feedback to be useful

B) Engagement with feedback scale

1) I always look over the written feedback in the summary box

2) I always look over the written comments on the script

3) I usually spend time reflecting on the feedback after I have read it

4) The purpose of the feedback is to help me learn how to improve

5) *[1]I find the feedback helps me improve

6) I approach teachers if I want additional feedback

7) *I would like to receive more oral feedback on my work

8) *I feel I need guidance on how to best use the feedback to improve

9) I keep a record of all my feedback and refer to this again in future

10) I look over previous feedback when preparing an assignment

11) I tend to spend more time reading over feedback when I get a low mark

12) I tend to focus more on things that need improvement rather than the things I have done satisfactorily

13) I make note of what I have done well and try to repeat this in future assignments

14) I make note of what I need to improve on to try and improve in this are for future assignments

15) I use other sources (e.g. books, online exercises) to improve on the areas that I have been told need improving

*Three questions emerged in both constructs (indicated by a * symbol next to the question) due to the direct oblimin procedure allowing for latent variables to correlate with each other (c.f. method). Factor analysis revealed they could be used to assess both perception of feedback and engagement with feedback. We provide both scales for teaching and research purposes.

Table1. Mean scores, standard deviations (in parentheses), and statistical significance and effect sizes for statements measuring perception of feedback as a function of year of study.

Abbreviated Question[1]	**First Year Students**	**Second Year Students**	**Third Year Students**	**p value effect size (ηp2)**
Q5) feedback is one-way dialogue (arc)	3.2 (.97)	3.7 (.84)	3.7 (.87)	$p < .001$ $\eta p^2 = .07$
Q1) feedback provided promptly	3.4 (.92)	3.3 (1.0)	2.8 (1.05)	$p < .001$ $\eta p^2 = .058$
Q3) happy with amount of feedback	3.3 (.94)	3.0 (1.04)	2.8 (1.05)	$p < .001$ $\eta p^2 = .053$
Q10) detailed enough	3.5 (.89)	3.2 (.97)	3.1 (.93)	$p < .001$ $\eta p^2 = .041$
Q11) includes example good & bad	3.6 (.93)	3.4 (1.0)	3.2 (1.0)	$p < .01$ $\eta p^2 = .034$
Q12) includes examples of how to improve	2.8 (1.1)	2.5 (1.1)	2.3 (.96)	$p < .001$ $\eta p^2 = .032$
Q9) find feedback upsetting (arc)	2.3 (.91)	2.7 (.96)	2.5 (.90)	$p < .01$ $\eta p^2 = .027$
Q2) feedback helps me improve	3.9 (.73)	3.8 (.78)	3.6 (.71)	$p < .01$ $\eta p^2 = .026$
Q4) agree with feedback	3.1 (.86)	2.9 (.91)	2.8(0.78)	$p < .01$ $\eta p^2 = .024$
Q7 guidance on how to use feedback (arc)	3.2 (1.05)	3.4 (1.02)	3.5 (.94)	$p = .017$
Q13) assignments are repeated	3.3 (.78)	3.4 (.81)	3.2 (.90)	$p = .044$
Q8) read feedback more when disagree with mark	3.6 (.91)	3.8 (.94)	3.7 (1.1)	$p = .173$
Q6 receive more oral feedback (arc)	3.6 (1.01)	3.8 (1.0)	3.8 (.98)	$p = .206$

Table2. Mean scores, standard deviations (in parentheses), statistical significance and effect sizes for statements measuring engagement with feedback as a function of year of study

Abbreviated Question	First Year Students	Second Year Students	Third Year Students	p value effect size (ηp2)
Q10) look over previous feedback	3.5 (1.0)	3.3 (1.1)	2.8 (1.1)	$p < .001$ $\eta p^2 = .075$
Q9) keep record of all my feedback and refer to this	3.8 (.98)	3.7 (1.0)	3.2 (1.1)	$p < .001$ $\eta p^2 = .054$
Q2) look over the written comments on the script	4.3 (.65)	4.4 (.68)	4.1 (.89)	$p < .01$ $\eta p^2 = .028$
Q5) feedback helps me improve	3.9 (.73)	3.8 (.78)	3.6 (.71)	$p < .01$ $\eta p^2 = .026$
Q14) make a note of what I need to improve	3.7 (.95)	3.8 (.89)	3.4 (1.0)	$p < .01$ $\eta p^2 = .025$
Q3) reflect on the feedback	3.7 (.77)	3.7 (.82)	3.4 (.89)	$p < .01$ $\eta p^2 = .024$
Q6) approach teachers for additional feedback	3.4 (.97)	3.3 (1.0)	3.0 (1.1)	$p < .01$ $\eta p^2 = .022$
Q8) need guidance on how to use the feedback	3.2 (1.0)	3.4 (1.0)	3.5 (.94)	$p = .017$
Q4) purpose of feedback is to help me learn	4.3 (.56)	4.1 (.78)	4.1 (.78)	$p = .017$
Q13) make a note of what I have done well	3.7 (.87)	3.6 (1.0)	3.4 (.95)	$p = .044$
Q11) spend more time reading over feedback when I get a low mark	3.9 (.89)	3.9 (.94)	3.7 (.96)	$p = .121$
Q12) focus more on what needs improving rather than things done ok	3.9 (.80)	3.8 (.83)	3.7 (.76)	$p = .121$
Q7) like to receive more oral feedback	3.7 (1.05)	3.8 (1.02)	3.8 (.94)	$p = .206$
Q1) look over the written feedback in the summary box	4.0 (.81)	4.2 (.81)	4.2 (.86)	$p = .267$
Q15) use other sources to improve	3.3 (1.0)	3.3 (1.0)	3.2 (1.1)	$p = .68$