

# Teacher feedback and student learning: A quantitative study

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## Abstract

**Introduction:** Feedback plays a significant role in informing students about the outcome of their assessments and contributes to their ongoing learning. The aim of this study was to investigate feedback currently given by clinical teachers to dental students throughout Europe.

**Methods:** This study used a piloted questionnaire, delivered on-line to members of the Association for Dental Education in Europe (ADEE). A largely quantitative approach was adopted with multiple-choice, single answer, open text boxes and Likert scale type questions. These data were collected via Google Forms, transferred to an excel spreadsheet and analysed using SPSS software Version 24.

**Results:** Data were collected from 223 questionnaires completed by respondents from 42 countries. Students received feedback following: (i) formative assessment (70%;  $n = 155$ ), (ii) summative assessment (88%;  $n = 196$ ) and (iii) informally at any time (85%;  $n = 188$ ). Feedback was delivered by different people including administrative staff (15%;  $n = 25$ ). Several methods were used to deliver feedback, including written, oral/spoken, email and individually or as a group. 85% ( $n = 184$ ) of teachers reported that their teaching had changed following feedback they had received from students.

**Conclusion:** The study showed a strong ethos of delivering feedback from teachers to dental students following both assessment and non-assessment related activities. Teachers should understand/appreciate the individualistic nature of feedback and the importance of cultivating a congenial environment for feedback delivery. Challenges remain in delivering them to a high standard and in a timely manner.

## KEYWORDS

feedback delivery, feedback methods, student learning

## 1 | INTRODUCTION

The literature suggests that "Feedback is an essential part of education and training programmes. It helps learners to maximise their potential at different stages of training, raise their awareness of strengths and areas for improvement and identify actions to be taken to improve performance".<sup>1</sup> In the context of education, feedback can be defined as "information provided by an agent regarding aspects of one's performance or understanding"<sup>2</sup> and is "the means by which

a student is able to gauge at each stage of the course how he or she is going in terms of the knowledge, understanding and skills that will determine his or her result in the course".<sup>3</sup> Van de ridder et al (2008) described feedback following clinical teaching should contain the following three elements: (i) feedback as information, (ii) feedback as a reaction, where information is included and (iii) feedback as a cycle, involving information and reaction.<sup>4</sup> At the conclusion of their review, van de Ridder et al also established an additional expectation on feedback in the context of clinical teaching that such feedback

should contain “specific information about the comparison between a trainee's observed performance and a target standard, given (by the teacher) with the intent to improve the trainee's performance.”

Feedback given to students following an assessment, or during practical teaching sessions, should provide valuable information, which enables the student to plan their future learning.<sup>5</sup> Research has suggested, “the brain responds flexibly to feedback, based on the learner's goals”.<sup>5</sup> The link between setting realistic goals and feedback can lead to increased motivation and self-efficacy of students.<sup>6</sup> However, goal setting allows students a greater opportunity to progress and attain a higher degree of success.<sup>7</sup> The use of goals enhances performance only when combined with a personal objective and feedback that confirms the achievement of the goal. Simply adopting a goal, whether easy or challenging, without knowledge of how one is doing through feedback, has no lasting motivational impact.<sup>8</sup> Neither the goal nor the feedback of performance alone influence changes in the level of motivation.

Feedback is relevant to clinical teaching and learning. Hattie & Timperley (2007) explored how different forms of feedback can have different influences and by designing a model of feedback they investigated the particular features and characteristics which made feedback effective.<sup>2</sup> Whilst not specifically looking at clinical teaching, they examined different methods whereby feedback could influence learning by asking three fundamental questions: (i) where am I going? (ii) how am I going? (iii) what am I doing next?

The provision of a grade or mark for a piece of work was reported as being more important to students than the feedback itself.<sup>9</sup> Students' perceptions of feedback in the study by Ansari & Usmani (2018)<sup>10</sup> indicated that clinical students were aware of the purpose of feedback, but the extent of this feedback was directly and positively related to their seniority. In general, senior clinical students attributed more value to feedback and were more of the view that feedback provided useful suggestions for future improvement, and limited feedback is a main reason for student frustration.

The aim of this study was to investigate the practice and perceptions of feedback, delivered by dental educator members of the Association for Dental Education in Europe (ADEE) to their dental students and how this feedback might benefit student learning.

## 2 | METHODOLOGY

Ethics approval was sought and granted by University College London (UCL) Research Ethics Committee (6552/001).

An appropriate questionnaire, which was informed by literature and which addressed the aim of this study, was developed. It was piloted, refined, finalised and then used to collect data from the potential pool of respondents. Questionnaires are a good research instrument for gathering data about abstract ideas or concepts that are otherwise difficult to quantify, such as opinions, perceptions, attitudes and beliefs.<sup>11</sup> This study investigated the extent and prevalence of these phenomena to inform practice, as was reflected in our approach.

**TABLE 1** Respondents' location and length of current employment

Region	Number (%)	Mean Length in years of current employment (SD)
UK	66 (30)	13.2 (8.5)
Western Europe	95 (43)	17.2 (11.4)
Eastern Europe	30 (13)	22.5 (8.1)
Rest of the World	32 (14)	14.0 (9.9)
Total	223 (100)	16.3 (10.4)

The target population for this study was members of the Association for Dental Education in Europe (ADEE). These dental educators were predominantly based in Europe and to a lesser extent Asia, Australia, North and South America. They were invited to take part in the study via their membership of ADEE. The questionnaire was distributed to member schools by ADEE head office with a request for them to disseminate the questionnaire to their academic staff.

A largely descriptive survey approach for data collection<sup>12,13</sup> was used in this study to ascertain trends in perceptions, opinions and beliefs to inform future studies. This approach to the questionnaire was based on previous studies where similar methodologies were used in comparable medical/dental publications.<sup>14</sup>

The questionnaire contained a mixture of multiple-choice, single answer, open text boxes and Likert scale type questions. It was developed with reference to the seven-point design process illustrated by Artino et al (2014).<sup>11</sup> The questionnaire was divided into three sections: (i) respondents' demographic information, (ii) how feedback was delivered to students and (iii) the respondents' own experience of receiving feedback from students. The questionnaire was piloted with 10 dental educators and their feedback was used to finalise the questionnaire.

The “Google Forms” ([docs.google.com/forms/](https://docs.google.com/forms/)) based questionnaire was distributed electronically via an email sent by the ADEE secretariat to the membership and included a definition of feedback: “Verbal, written or audio-visual information or statement of opinion of a person or persons' performance in a task, which is used as a basis for improvement”.<sup>15</sup> To optimise the response rate, a reminder email was sent after 2 weeks and the questionnaire remained open and accessible to the membership for 1 month.

Data were transferred to an excel spreadsheet and analysed using SPSS Version 24 (IBM SPSS Statistics for Windows, Version 24.0.: IBM Corp).<sup>16</sup> Descriptive statistics were presented as counts and percentages. Group comparisons of categorical variables were analysed by chi-squared test.

## 3 | RESULTS

Quantitative results are presented as either text, tables or graphs.

Responses ( $n = 223$ ) to the questionnaire were received from dental educators from 42 countries, both in Europe, Asia, Australia

and North and South America (see Table 1). The respondents to the questionnaire were from over 100 different universities and their positions included: Professors (39%;  $n = 84$ ), Readers/Associate Professors (14%;  $n = 31$ ), Senior Lecturers (15%;  $n = 33$ ) and Teaching Fellows (13%;  $n = 30$ ).

Table 1 illustrates the geographical diversity of the respondents to the questionnaire. The definition of Western and Eastern Europe follows that of the United Nations Regional Groups. The largest proportion of respondents were from the UK. For comparison, the respondents were classified into three broad geographic regions: UK, Europe and rest of the world.

The majority of respondents (88%;  $n = 196$ ) provided feedback to their students following a summative assessment, and 84% ( $n = 188$ ) reported providing feedback at any time.

Figure 1 shows the reported roles of the respondents. Although 223 responded to the questionnaire, some respondents selected more than one box, suggesting that they may be involved in several roles simultaneously within their respective institutions. Only 23% ( $n = 52$ ) of them reported having a single role. There were no notable regional variations in these roles.

Figure 2 illustrates that a vast majority of respondents provided feedback to their students. This feedback was provided following (i) formative assessment, (ii) summative assessment and (iii) informally. Nine respondents indicated that they provided feedback in other ways, including (i) only giving feedback to students who had failed, (ii) as feedforward particularly when supervising Master's students and (iii) following a personal request from students, and during supervision.

Feedback to students was overwhelmingly delivered by tutors (58%;  $n = 128$ ), with little regional variations with the exception that respondents from Eastern Europe gave less feedback following formal assessments compared to their counterparts from Western Europe (Figure 3).

When respondents were asked who delivered feedback to students, it was noted that feedback was mainly delivered by Tutors in all teaching environments. Most (91%;  $n = 202$ ) of the feedback delivered to students during Clinical Patient Teaching sessions was delivered by tutors. It is interesting to note that a small proportion of

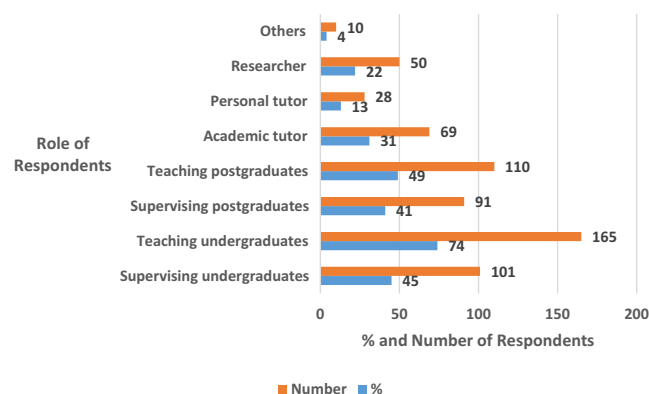


FIGURE 1 The roles respondents held within their dental school

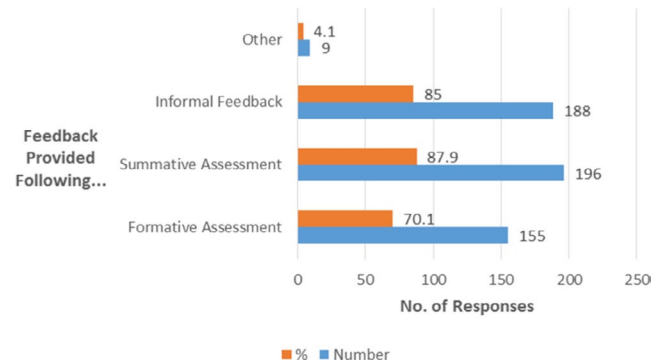


FIGURE 2 When feedback is provided to students

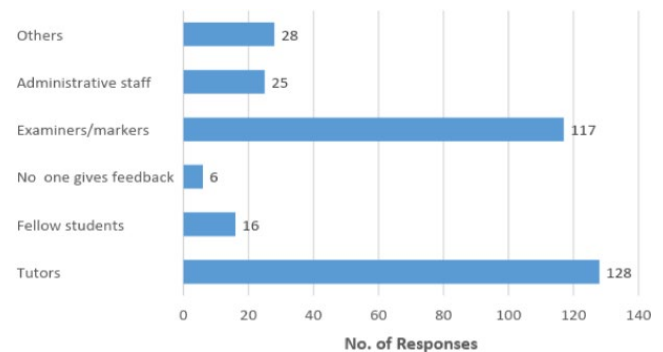
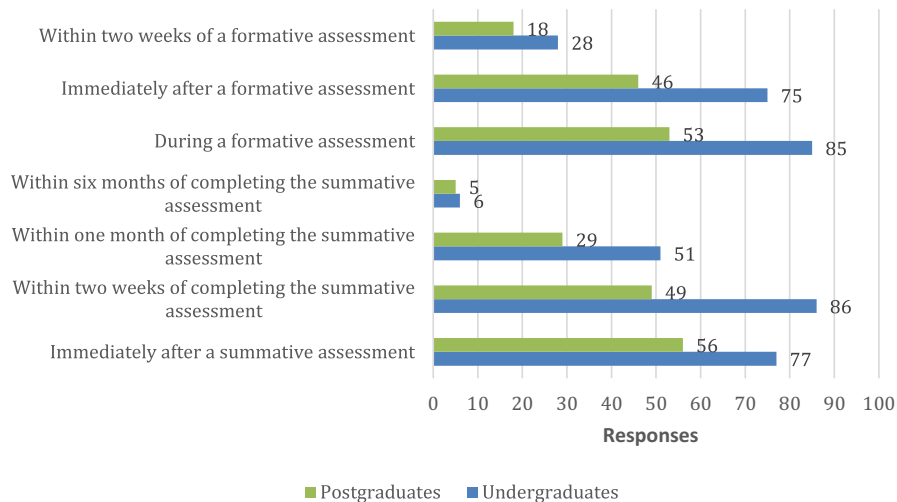


FIGURE 3 Who delivers feedback to students

schools rely on administrative staff to deliver feedback in all teaching environments (Clinical Patient Teaching (4%;  $n = 8$ ), Phantom Head Laboratory Teaching (3%;  $n = 7$ ), Seminar Teaching (4%;  $n = 8$ ) and Tutorials (3%,  $n = 6$ ).

Figure 4 illustrates that feedback was delivered less frequently to postgraduate students than to undergraduates. Overall, 86% ( $n = 189$ ) of undergraduate students received timely feedback compared to 61% ( $n = 134$ ) of postgraduate students ( $\chi^2 = 37.29$ ;  $p < .001$ ). A larger proportion of postgraduate students received feedback immediately after a summative assessment, and it is reassuring to see that very few undergraduate or postgraduate students had to wait as long as 6 months to receive feedback. No further differences were noted between postgraduate and undergraduate students as to when the feedback was given.

Tutors most frequently delivered feedback following chairside clinical teaching sessions with patients for both undergraduate ( $\chi^2 = 522$ ;  $p < .001$ ) and postgraduate ( $\chi^2 = 304$ ;  $p < .001$ ) students. There were clear differences in how tutors considered feedback given to undergraduate compared to postgraduate students. Postgraduate students received a large proportion of their feedback face to face as individuals (54%;  $n = 120$ ). However, it is also interesting that 22% ( $n = 50$ ) of respondents reported not giving feedback to their postgraduate students. Feedback delivered by letter is the



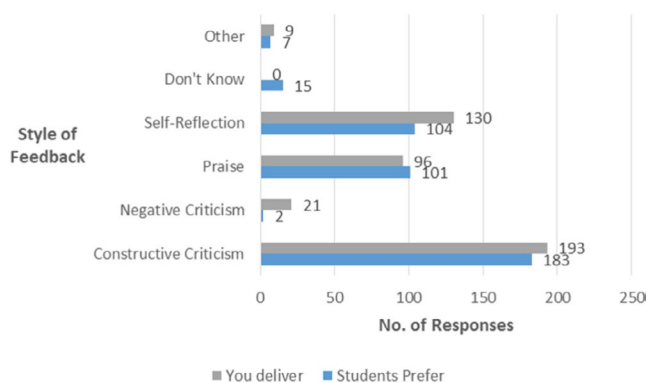
**FIGURE 4** The timing of feedback delivery to students

least favoured method of delivery of feedback, whereas the use of software applications and email are popular.

Several styles can be employed to deliver feedback, some of which were highlighted in Figure 5. The majority of teachers considered that they use and students prefer “constructive criticism” when feedback is delivered to them. However, it is interesting to note that 9% ( $n = 21$ ) of teachers claimed to deliver feedback in the form of “negative criticism” despite only two believing that this would be what their students wanted.

Although this study focussed predominantly on the views that teachers had about feedback, questions were also asked about how feedback from students to teachers was collected. A significant majority of students gave their teachers feedback on an annual basis which was delivered on-line (48%;  $n = 107$ ), with no evidence of daily feedback from students to teachers.

The impact of feedback from students to teachers can be seen in Figure 6. Most (86%;  $n = 184$ ) of the respondents indicated that their teaching had changed as a result of feedback from students. Just over 14% ( $n = 31$ ) of the teachers indicated no change in their teaching following feedback from students.



**FIGURE 5** Style of feedback teachers used and what they thought students prefer

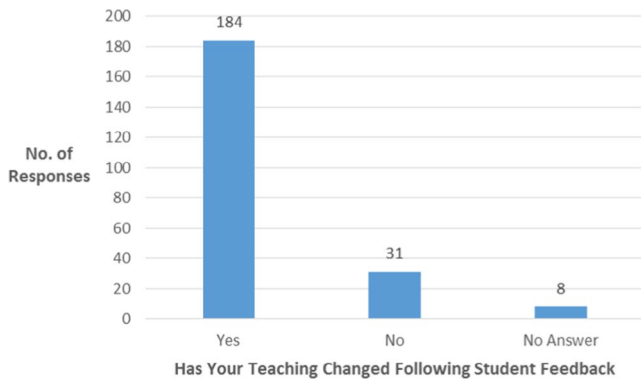
## 4 | DISCUSSION

Data were collected from the questionnaires completed by 223 dental educator respondents across 42 mainly European countries.

Most of the questions related to teacher feedback delivered to students and most respondents indicated that such feedback was provided to both undergraduate and postgraduate students following both assessment and non-assessment related activities. It was encouraging to see that non-assessment related informal feedback was delivered as often as formal feedback following either formative or summative assessments. This would suggest that there is a strong ethos of delivering feedback to dental students from the respondents and that feedback “is embedded in education, training and daily professional activities”.<sup>17</sup> It was noted that non-teaching staff such as fellow students and administrators were also reported to be delivering feedback to students. It was not clear from the results whether administrative staff were instructed by academic/clinical teachers to give feedback to the students or whether they did so from their own initiatives. Although some might question the appropriateness of the two scenarios above, however, putting this in the context of a healthcare environment, it was the firm belief of Hardavella et al (2017) that anyone in a multidisciplinary team who understood the issues could give feedback effectively. Such feedback would present an excellent opportunity in this context “to give a clear direction of travel to improving behaviours, attitude and skills in clinical practice”.<sup>17</sup>

It is reassuring to note that feedback to undergraduate and postgraduate dental students was delivered in a very timely fashion ranging from during, to immediately after, and from 2 to 4 weeks following, formative and summative assessments. Our findings are in agreement with Hattie and Timperley (2007)<sup>2</sup> who emphasised the importance of the timeliness of feedback delivery, where the above example is one.

Despite advances in technologies to facilitate communication with students, the overwhelmingly most popular approach for delivering feedback remains the oral/spoken method delivered to either individuals or groups, face to face. This would suggest



**FIGURE 6** Influence of feedback from students on teaching

that direct human interaction is preferred by students particularly when they predominantly attend face to face on-site programmes of study, where there is regular contact between teachers and students.<sup>17</sup>

The respondents reported that constructive, self-reflective and complimentary styles of feedback were used most often, which closely mirrored what they as teachers believed students would prefer. This was in line with the findings of Omer and Abdularhim (2017) who reported on making constructive feedback count.<sup>18</sup> Although not as popular, use of negative criticism as a style of feedback was reported by some respondent teachers despite them thinking that this approach would not be popular or most appropriate with their students. Anecdotally it is most likely that teachers will use a variety of styles for delivering feedback to students. Another possible variable would be how individual teachers may define and interpret the terminology used for the different styles of feedback delivery in slightly different manners.

Also, the questionnaire inquired about feedback delivered to teachers from the students. It is reassuring to see evidence of this student derived feedback, which was collected using a variety of methods, including more formally initiated electronic and paper-based methods, often requested on an annual basis. It is also encouraging to see opportunities for students to deliver feedback that is more ongoing to their teachers using both direct oral spoken and other electronic approaches. In the current study, 83% of the teacher respondents reported that their teaching changed as a result of the feedback they received from students. This suggests that teachers take student feedback seriously and will modify their teaching accordingly. This 360 degree approach to the dissemination of feedback is increasingly considered to be good practice.<sup>19</sup> Teachers need to make students aware of the importance of both formal and informal types of feedback, as part of an all-embracing approach to good feedback practice.

The lack of a specific and universally agreed definition of feedback is likely to contribute to differing perceptions of what feedback really is. This divergence of opinion could be contributing to why teachers noted that whilst students would perceive some oral/verbal comments from them as feedback, others might perceive similar oral/verbal comments as just normal social conversations, with no

particular educational benefits. Teachers “should understand and be trained to deliver proper feedback”.<sup>20</sup> There are many definitions of feedback, which contributes to variations on how feedback comments could be perceived. It is therefore desirable for educators to develop a consensus definition of feedback which everyone can agree upon, although this is beyond the scope of this study.

There appear to be significant differences in the way educators deliver feedback to undergraduates and postgraduates, echoing Boud and Molloy.<sup>20</sup> Feedback delivered to postgraduate students is more likely to be face-to-face and oral/spoken. This is understandable; the smaller number of postgraduate students makes this more feasible. What was perhaps surprising was that a significant number of teachers 22.4% ( $n = 50$ ) felt it was unnecessary to give feedback to postgraduate students. Those educators who did provide feedback to postgraduates did so in a reasonably timely fashion and following summative and formative assessments.

It was also interesting to note that one-third of feedback to students was delivered by non-teaching staff. This finding is in contrast to that of Fotheringham,<sup>21</sup> who suggested that: “Feedback is best delivered by a credible source or an expert from personal observation.”

Regarding the experience of tutors in how to teach reflective practice, many respondents commented on their lack of experience, in both delivering and receiving feedback, which had influenced their current thinking. When delivering feedback following a summative assessment, for example, it is conceivable that different tutors will interpret the assessment in slightly different ways; but as with a model answer to an essay, feedback needs to: (i) be consistent, (ii) set the student achievable targets, (iii) develop good reflective practice in students and (iv) be professional.<sup>21</sup>

A majority of respondents reported that they delivered mainly positive criticism and that this style of feedback is what they preferred to receive. When this style of feedback was referred to in the questionnaire, no account of the possible influences of any cultural differences, age or gender of the students was considered,<sup>22</sup> and the respondents did not identify this to be an issue. However, other studies<sup>23–25</sup> indicated some variances including the need to develop the individual through setting personal goals, the desire to develop self-regulated learners through feedback and encouraging positive motivational beliefs and self-esteem, which appeared to be important factors and lead to the need for feedback to be tailored to individual students. Several studies have alluded to different styles of feedback,<sup>26,27</sup> but it appears from this study that tutors were not aware of this.

The results of this study suggest that feedback should be delivered in a timely fashion to be effective, relevant and motivating. It is of little value for feedback on a summative assessment to be delivered to students either just before or even after the next assessment is due. This endorses the literature<sup>2,27</sup> that students need to be allowed to reflect on the feedback that they have received and to act upon this feedback to facilitate genuine progress.

This high proportion of teachers is reported to have changed their teaching methods as a result of feedback from students. This is encouraging but it did not tell us in what way their teaching changed,

whether the teachers were comfortable with the changes, and their reflections on the changes.

Questionnaire-based studies are often limited by the range of questions possible and the detail that can be collected from the respondents. The acquisition of qualitative data was beyond the scope of this study, but such additional information would allow further investigation about feedback delivery and its influence on learning. Further in-depth investigations on the merits of the individual styles of feedback were beyond the scope of this study, but further investigation would require greater clarity regarding the definitions of the terminologies used.

The questionnaire was distributed by the ADEE Head Office to the member schools with the request that the schools distribute the questionnaire to their academic staff. The exact number of academics who received the questionnaire could not be definitely or practically determined. An unknown response rate was an accepted limitation of this study although the trends reported from the respondents were clear. The questionnaire was only delivered in English, and therefore, an opportunity for different interpretations was possible due to language barriers.

In summary, feedback is an essential tool to facilitate student learning. It needs to be specific to address the individual's learning needs, in a style or form for it to be effective, and at an appropriate frequency for it to help enhance learning. Feedback also should be delivered in a format that allows students to be aware of when it is being delivered, so that both teachers and students can work together to promote further student learning.<sup>2</sup> Consideration should be given to the degree of support provided to, and the availability of training for, teachers to assist them to deliver effective and efficient quality feedback to their students.

## 5 | CONCLUSIONS

This study has highlighted the diversity of teacher perceptions relating to the feedback delivered to dental students. The teacher respondents have indicated that there are several methods for delivering high quality, relevant and timely feedback to their students.

It was encouraging to note that students have been receiving feedback about their performance from a variety of sources and not exclusively from their teachers. Teachers generally felt that feedback had been delivered to students in a timely fashion relative to their assessments, and this timeliness helped to address their learning needs.

Individual face-to-face oral/spoken feedback delivered by teachers to their students is considered to be the most popular approach. Most teachers prefer to deliver constructive criticism, followed by self-reflection and praise, whilst negative criticism is the least popular approach for giving feedback.

In addition to recognising the value of bespoke individual feedback to students, teachers also accept the importance of receiving feedback from students to improve their teaching.

Feedback is provided for both undergraduate and postgraduate students following assessment and non-assessment related activities.

## ACKNOWLEDGEMENTS

The authors would like to acknowledge the considerable contributions made by all those teachers from the constituent schools of the Association for Dental Education in Europe (ADEE) for generously responding to the questionnaire, which forms the basis of this work. Without their co-operation and generous contributions, this work would not have been possible. We also thank the administrative team at ADEE for their help with distributing the questionnaire to the respondents.

## CONFLICT OF INTEREST

There are no conflicts of interest reported for any of the authors. None of the authors received any payment or inducement at all. This article has only been offered to this journal and will not be offered to other journals in the future.

## DATA AVAILABILITY STATEMENT

Availability of data: Template for data availability statement; Data openly available in a public repository that does not issue DOIs: The data that support the findings of this study are openly available in [bt internet.com] at [URL], reference number [ADEE SIG]; Data available on request due to privacy/ethical restrictions: The data that support the findings of this study are available on request from the corresponding author: The data are not publicly available due to privacy or ethical restrictions. Data available on request from the authors: The data that support the findings of this study are available from the corresponding author upon reasonable request; Data available in article supplementary material: The data that supports the findings of this study are available in the supplementary material of this article.

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**How to cite this article:** Leung A, Fine P, Blizard R, Tonni I, Louca C. Teacher feedback and student learning: A quantitative study. *Eur J Dent Educ.* 2020;00:1-7. <https://doi.org/10.1111/eje.12637>