

# The use of post-exam feedback in oral radiology: A survey study of dental and dental hygienist schools in Europe

Eva Levring Jäghagen<sup>1</sup>  | Thomas de Lange<sup>2,3</sup>  | Gerald Torgersen<sup>4</sup>  |  
Anne Møystad<sup>4</sup>  | Jan Ahlqvist<sup>1</sup> 

<sup>1</sup>Oral and Maxillofacial Radiology, Department of Odontology, Umeå University, Umeå, Sweden

<sup>2</sup>Department of Education, University of Oslo, Oslo, Norway

<sup>3</sup>Department of Education, University of South-Eastern Norway, Notodden, Norway

<sup>4</sup>Faculty of Dentistry, Institute of Clinical Dentistry, University of Oslo, Oslo, Norway

## Correspondence

Eva Levring Jäghagen, Oral and Maxillofacial Radiology, Department of Odontology, Umeå University, SE- 901 87 Umeå, Sweden.  
Email: [eva.levring.jaghagen@umu.se](mailto:eva.levring.jaghagen@umu.se)

## Funding information

Faculty of Medicine, Umeå University; University of Oslo

## Abstract

**Introduction:** A combination of summative assessments and post-exam feedback can create a formative environment to support student learning. It remains unknown to what extent feedback sessions are conducted after exams in oral radiology courses for dental and dental hygienist students in Europe. This survey study aimed to explore whether post-exam feedback sessions were conducted, and if so, in what format.

**Materials and Methods:** A questionnaire was distributed to 76 dental schools in 26 countries and 34 dental hygienist schools in 14 countries in Europe. The questions addressed whether feedback was provided after exams in oral radiology, the feedback format, and whether feedback sessions were formalised or performed for other reasons.

**Results:** Questionnaire responses were received from 33 dental schools in 18 countries, and 20 dental hygienist schools in 11 countries. Information about grades was provided in 23–30% of the schools. Post-exam feedback sessions including opportunities for discussion was provided at 39% of the schools, all with guidelines stating that these sessions should be carried out. The remaining schools provided feedback either on request by individual students or as written examples of correct answers.

**Conclusion:** Almost one third of the dental schools announced grades without providing any post-exam feedback that could support learning. Two fifth utilised feedback sessions to assist students in gaining knowledge and sorting out misconceptions, all according to guidelines. Given the possible learning potential in post-exam feedback with opportunity to discuss, further studies of this format would be valuable, including the role and use of feedback guidelines.

## KEYWORDS

examination, feedback, learning outcomes, oral radiology, survey

## 1 | INTRODUCTION

Feedback is regarded as an important part in education because it impacts the student's willingness, desire, and capacity to learn.<sup>1</sup> In this study we argue that feedback also is relevant as a continuation after summative assessments, i.e., by facilitating feedback on exam results, here termed as post-exam feedback (PEF). PEF is considered as an extension of student learning by supporting enhancement of knowledge based on their exam results.<sup>1</sup> We are here taking the theoretical position where feedback is understood as a reciprocal and interactive exchange-process between learner and feedback provider, which includes the complexities of how feedback is co-constructed as a relational process.<sup>2,3</sup>

As a follow-up, many institutions provide the students with information presenting the correct answers to questions and/or grades for exams. In that scenario, the student receives information in one-way communication from the teacher to the student. Such information might facilitate clarification, but it rarely promotes deeper understanding.<sup>4</sup> Indeed, for students to acquire deeper understanding, more complex strategies are required.<sup>5</sup>

That kind of deeper understanding and knowledge development is often achieved through formative assessment practices, such as feedback, which is widely documented to be beneficial for student learning. In this respect, developing supportive post-exam feedback practices may be considered as a way to enhance student learning through all parts of formal education.<sup>6</sup>

For example, feedback can be conducted after a written exam to stimulate the students to identify and bridge knowledge gaps and misconceptions.

Previous studies also suggest that feedback discussions provide good opportunities for students to develop new knowledge when the communication between teacher and student is based on a mutual understanding of the student's level of knowledge.<sup>3</sup> Here we argue that, to some degree, the level of knowledge can be deduced from the test results, while discursive approaches to feedback, based on exam performances, can also productively impact student understanding and future performance.<sup>7-9</sup>

Group discussions that include all students require a comfortable environment that allows all students to participate in the discussions, based on their individual knowledge. The main strategy of the discussion is to activate students to take charge of their own learning.<sup>3,10,11</sup>

Oral radiology is an example of a complex subject that requires the application of knowledge, skills, and judgement in different areas. Some examples of relevant areas include anatomy, radiophysics, radiation protection, judgement of indication to use radiation, ability to examine patients radiographically, quality assessment, and evaluation of the radiographs to determine pathology and possible differential diagnostics. The students are required to master these skills to perform radiography and apply radiology properly. Therefore, active post-exam feedback is likely to promote the development of further understanding and abilities beyond those tested in the exam. To date, it remains unknown to what extent post-exam

feedback is practiced in oral radiology education for dental and dental hygienist students in Europe. The present survey study aimed to explore whether post-exam feedback sessions, defined as feedback sessions after summative assessments, are conducted in Europe, and if so, the format of that feedback.

## 2 | MATERIALS AND METHODS

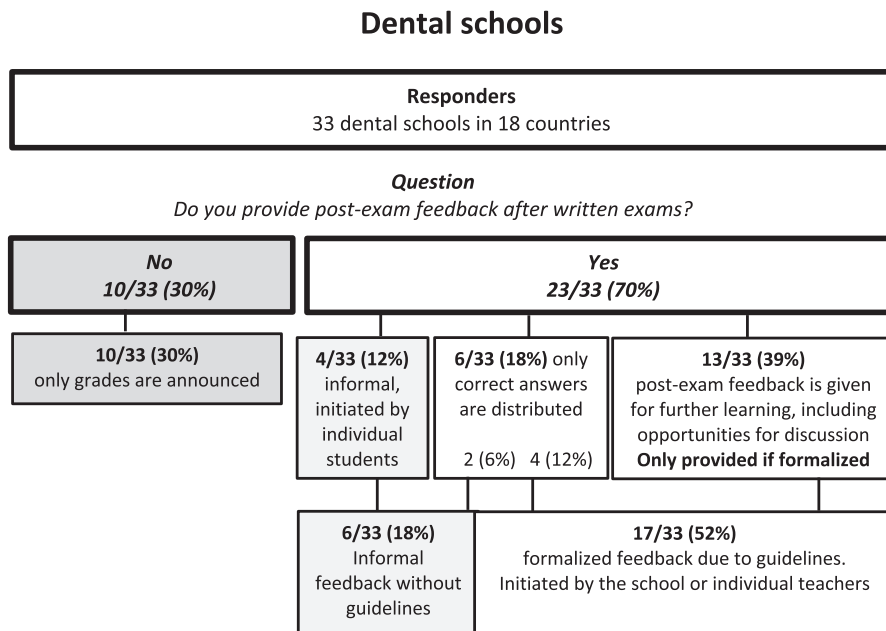
An invitation to an online questionnaire was distributed via email to 76 dental schools in 26 countries and to 34 dental hygienist schools in 14 countries in Europe in July 2020. An attempt was made to reach teachers with the best knowledge on how oral radiology education, examinations, and post-exam sessions were conducted at specific dental or dental hygienist schools by approaching teachers in oral radiology that were either known colleagues or identified as professors/teachers in oral radiology on the school website. When that information was not available, heads of education were contacted and asked to distribute the survey to the appropriate oral radiology teacher. Reminders were distributed after 2 months and after an additional 3 weeks.

The questions in the distributed survey regarded the use of post-exam feedback in educational institutions that provided dental and/or dental hygienist education. One question was whether the school provided guidelines stating that teachers should provide feedback to students after exams, independent on whether the exams were final or intermediate. When participants responded that post-exam feedback should be given, they were asked about the format and the specific reasons/motivation for giving feedback. For example, the feedback might have been restricted to present examples of correct answers or as extended feedback sessions actively stimulating the students to discuss questions and answers in order to bridge gaps in student knowledge and/or to provide information about the criteria used for both the scoring and subsequent performance assessments. The survey also asked if the feedback given was scheduled sessions for the whole class or for student groups; or if it was an informal setting, e.g., after request by individual students. For the present study, we compiled the answers and analysed them with descriptive statistics (Appendix A).

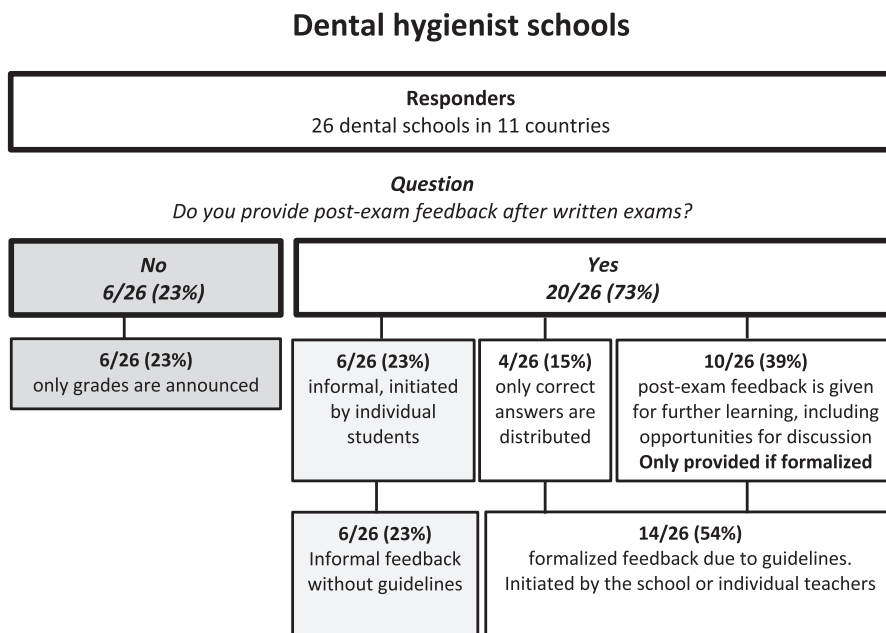
## 3 | RESULTS

Responses were received from 33 (43%) out of 76 invited dental schools (in 18 out of 26 invited countries; 69%, Figure 1) and 26 (76%) out of 34 invited dental hygienist schools (in 11 out of 14 invited countries; 79%, Figure 2). No feedback, except information about grades was provided in 10 (30%) of the 33 responding dental and in 6 (23%) of the 26 responding dental hygienist schools (Figures 1 and 2). In 13 (39%) of the responding 33 dental schools and 10 (39%) of the responding 26 dental hygienist schools, post-exam feedback sessions were provided with opportunities for the students to discuss questions and answers, and in all these schools there were guidelines

**FIGURE 1** Presence of post-exam feedback, type of feedback, and whether there are guidelines for performing post-exam feedback among dental schools.



**FIGURE 2** Presence of post-exam feedback, type of feedback, and whether there are guidelines for performing post-exam feedback among dental hygienist schools.



stating that post-exam feedback after written assessments should be carried out.

About half the dental schools (52%) and dental hygienist schools (54%) reported that they provided guidelines for formalised post-exam feedback. Among the dental and dental hygienist schools, 18% and 15%, respectively, provided feedback regarding correct answers or criteria for the scores and subsequent performance grading. In schools without guidelines, feedback was given informally in 4/33 (12%) of dental schools and 6/26 (23%) of dental hygienist schools. These informal sessions were mostly initiated by individual students that wanted feedback for their own exams and results. At 6 dental schools and 4 dental hygienist schools, the provided feedback was distribution of correct answers to questions and/or grading (Figures 1 and 2).

## 4 | DISCUSSION

The results from this questionnaire showed broad variation regarding the use of post-exam feedback. Despite the potential for learning, almost one third of the dental schools and one fourth of the dental hygienist schools did not provide any form of post-exam feedback, only grades were provided without examples of correct answers and without the possibility to discuss knowledge gaps or misconceptions with the teacher. This means that support in learning ends for students who passed the exam. It also means that students who did not pass will get no further learning support by the teachers, and no information about their shortcomings or what to improve.

However, four out of 10 dental and dental hygienist schools utilised feedback sessions to assist students in continuous learning and sorting out misconceptions. All these schools had guidelines stating that formalised feedback sessions should be carried out. Our hypothesis is therefore that guidelines support the institution, the teachers, and the students to schedule and prioritise post-exam feedback sessions.

Among both dental and dental hygienist schools with guidelines, approximately three out of four declared that their guidelines for post-exam feedback aimed at increasing student learning, in addition to presenting results and grades. In schools without guidelines, four out of 16 dental schools and half of the dental hygienist schools provided informal post-exam feedback, initiated by individual students. Those schools provided feedback to respond to queries and/or results that were perceived as ambiguous by the students after an exam, irrespective of the result. These findings pointed out that both students and teachers wanted to provide and receive feedback to gain knowledge and to sort out misconceptions to support student learning.

It is difficult to conclude to what extent the survey results can be generalised. One question was whether the school had general guidelines requiring that teachers should provide feedback to students after exams. It is therefore reasonable to presume that those results can be generalised to other subjects than oral radiology within the dental and dental hygienist schools. Further, the response rates in this survey, among both schools and countries are considered as acceptable within social sciences regarding survey-studies, like the present investigation.<sup>12</sup> Among the institutions that provided both dental and dental hygienist programs, the results were similar for both programs. Among the schools with a dental hygienist program, but no dental program, the rate of providing guidelines for post-exam feedback was slightly higher (55.5%) than that observed for all the schools included in the present study. However, the number of schools with dental hygienist programs alone was sparse ( $n = 9$ ); therefore, this difference might be due to chance.

It should be noted that this survey did not address how post-exam feedback sessions were performed, except that they were roughly divided into individual feedback, feedback providing exam results and grades alone, and feedback in groups, offering the opportunity to discuss questions and answers to increase student knowledge. The way feedback sessions are conducted can vary, and the effect they have on continued learning varies. To determine how to organise post-exam feedback sessions for the optimal effect, one should consider the following points: there are differences in the level of knowledge among students; and teachers and students may have different views on knowledge and knowledge development, transitions between courses (i.e., alignment), building learning on previous knowledge/learning experiences, etc.

Previous studies on post-exam feedback have shown that feedback can promote and support students in future learning and in preparation for exams.<sup>13</sup> Moreover, when the feedback includes more detailed explanations of correct and incorrect answers, the student's performance in final exams increases, compared with

students that only receive the correct answers.<sup>14</sup> Although post-exam feedback has been an issue of debate, Spencer (2017) concluded that there is no rationale for avoiding examination reviews. Students desire to receive the correct answers, understanding why some answers are incorrect is beneficial for future decision making.<sup>15</sup> Future studies should investigate why post-exam feedback is not provided at many schools, how this could be developed and what impact it could have on learning. Further, the students view on how to conduct and optimise post-exam feedback would be valuable to explore.

## 5 | CONCLUSIONS

This study indicates that among European dental and dental hygienist schools, there is a large potential for development of post-exam feedback after summative assessment. Guidelines appear to increase the use of post-exam feedback sessions with possibility for discussions aiming to support students in their continuous learning.

## ACKNOWLEDGEMENTS

This study was supported by Umeå University, Sweden, and the University of Oslo, Norway. The authors wish to thank Magnus Johansson for administering the online survey, and we thank the survey participants throughout Europe.

## CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

## DATA AVAILABILITY STATEMENT

Data is not available since the responders are anonymized

## ORCID

Eva Levring Jäghagen  <https://orcid.org/0000-0001-8807-3500>

Thomas de Lange  <https://orcid.org/0000-0003-2815-4266>

Gerald Torgersen  <https://orcid.org/0000-0001-8335-7053>

Anne Møystad  <https://orcid.org/0000-0002-7229-0401>

Jan Ahlqvist  <https://orcid.org/0000-0002-9599-5615>

## REFERENCES

1. Dylan W. What is assessment for learning? *Stud Educ Eval.* 2011;37:3-14.
2. Lipnevich AA, Panadero E. A review of feedback models and theories: descriptions, definitions, and conclusions. *Front Educ.* 2021;6:1-29.
3. Carless D, Boud D. The development of student feedback literacy: enabling uptake of feedback. *Assess Eval High Educ.* 2018;43(8):1315-1325.
4. Malecka B, Boud D, Carless D. Eliciting, processing and enacting feedback: mechanisms for embedding student feedback literacy within the curriculum. *Teach High Educ.* 2020;27:908-922.
5. Elshout-Mohr M. Feedback in self-instruction. *Eur Educ.* 1994;26(2):58-73.
6. Boud D, Molloy E. Rethinking models of feedback for learning: the challenge of design. *Assess Eval High Educ.* 2013;38(6):698-712.

7. Shute VJ. Focus on formative feedback. *Rev Educ Res*. 2008;78(1):153-189.
8. Sadler DR. Formative assessment and the design of instructional systems. *Instr Sci*. 1989;18:119-144.
9. Ramaprasad A. On the definition of feedback. *Behav Sci*. 1983;28(1):4-13.
10. Boud D. Sustainable assessment: rethinking assessment for the learning society. *Stud Contin Educ*. 2000;22(2):151-167.
11. Boud D, Falchikov N. Aligning assessment with long-term learning. *Assess Eval High Educ*. 2006;31(4):399-413.
12. Bryman A. *Social Research Methods*. Oxford University Press; 2016.
13. Favero TG, Hendricks N. Student exam analysis (debriefing) promotes positive changes in exam preparation and learning. *Adv Psychol Educ*. 2016;40:323-328.
14. Wojcikowski K, Kirk L. Immediate detailed feedback to test-enhanced learning: an effective online educational tool. *Med Teacher*. 2013;35(11):915-919.
15. Spencer C. Postexamination reviews: a faculty inquiry. *Teach Learn Nurs*. 2017;12(4):304-306.

**How to cite this article:** Levring Jäghagen E, de Lange T, Torgersen G, Møystad A, Ahlqvist J. The use of post-exam feedback in oral radiology: A survey study of dental and dental hygienist schools in Europe. *Eur J Dent Educ*. 2023;00:1-5. doi:[10.1111/eje.12897](https://doi.org/10.1111/eje.12897)

## APPENDIX A

The United Nations definition of European countries (44) constituted the basis for the study. After excluding countries without dental and/or dental hygienist education and countries in which we did not manage to find suitable contact persons, the following 26 countries were approached regarding dental education: Albania, Belarus, Belgium, Czech Republic, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Latvia, Lithuania,

Netherlands, Norway, Poland, Portugal, Russia, Slovakia, Spain, Sweden Switzerland, United Kingdom, and Ukraine. Response was received from 18 countries.

Schools in the following 14 countries were approached regarding dental hygienist education: Denmark, Finland, Latvia, Malta, Netherlands, Norway, Poland, Portugal, Russia, Slovakia, Spain, Sweden Switzerland, and United Kingdom. Response was received from 11 countries.