

METHOD

Student Response System in Dental Students' Education. Using a Student Response System and Peer Discussion to Raise the Awareness of the Importance of Good Professional Communication Skills in Practice Periods

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In large lectures in education of dentists there is often less dialogue and communication between students and the instructors, and several studies have found that traditional lecturing in such lectures is ineffective in promoting student learning. This Design Based Research (DBR) and case presentation focus on how the use of Student Response Technology (SRS) and feedback can improve communication in large lectures in dentist education. The case presentation is based on lecturer's experiences and student responses from ten annual large lectures from the period 2010–2019 in the course "Practice Study" (3 ECTS) at University of Bergen where dentist students and their supervisors were gathered for an annual one-day seminar. The case presentation shows the importance of recognizing the factors that affect dentist students' nervousness and tension for the practice periods and where the use of SRS seems to contribute to raise the awareness among supervisors and students about such issues. This, and a focus on good communications skills among dentist students and their supervisors seems to be crucial to focus on before their practice period in The Public Dental Health Care. There are also a number of limitations in this case presentation, which will be handled in the further development of this DBR-project.

Keywords: Dentist students; student response system; communication skills; supervisors; practice periods

Introduction

This case presentation is a part of the project "Formative assessment in higher education" where Design Based Research (DBR) is applied to examine educational interventions based on "a series of approaches, with the intent of producing new theories, artifacts, and practices that account for and potentially impact learning and teaching in naturalistic settings" (Barab & Squire 2004, p. 2). This article builds on the current state of knowledge about formative assessment and Students response technology in lectures and focus especially on phase 3 in DBR which is the "Iterative cycles of testing and refinement of solutions in practice" (Reeves 2006). As a consequence of this, the article only describes the practical teaching method where student involvement and active learning in large lectures is essential.

The frames and the context for teaching activities determine much of the premises for how we carry out our teaching activities. For example, what can be realistic to do in small student groups can be completely unrealistic to do in large student classes. Cleveland (2002) and

Denker (2013) distinguish, therefore, between "small" classrooms (30 or fewer students), "medium" classrooms (40–100 students), "large" classrooms (100–150 students), and "mega classes" (200 students or more). In medium or large lectures in higher education there is often less dialogue and communication between students and the instructors, and several studies have found that traditional lecturing in such classes is ineffective in promoting student learning (Deslauriers, Schelew & Wieman, 2011). Student Response Systems (SRS) ("clickers") are digital tools that can be used to increase student activity in such large lecture settings. When using "clickers" in this case, students are asked to first discuss with their peers and then answer subject-related questions during lectures using the clickers. Lecturers typically follow up on the student answers and provide them with their own explanations. Our previous studies have found that such pedagogical approaches can be useful for creating opportunities for formative assessment, reflection on action (Schön 1983) and self-monitoring (Krumsvik & Ludvigsen 2012; Ludvigsen, Krumsvik & Furnes 2015). In a meta-analytic review of clicker-integrated instruction, Chien, Chang and Chang (2016) found that the majority of interventions with SRS's had positive effects on student learning.

In the field of practice, clinical work is dependent on good patient communication skills among the staff (Larsen, Nystrup & Risør 1999), and for dental students professional communication with patients and supervisors is an essential part of becoming a dentist (Den Norske Tannlegeforening 2015). Practice periods are an important arena for cultivating such communication skills between dental students and patients, as well as between dental students and supervisors from the practice field. Especially important is the professional communication between dental students and patients because dental anxiety is common among patients (Hill, Chadwick, Freeman, O'Sullivan & Murray 2009). A systematic review of communication skills in dental education shows that dentists' communication skills can reduce stress and dental anxiety among patients (Carey, Madill & Manogue 2010), and this is one of the reasons communication skills are implemented in the Act of Law (Lovdata 1999) and in the ethical guidelines for becoming a dentist in Norway (NTF's Ethical Rules 2015). However, dental students' communication skills have had less focus both in research and education (Memarpour, Bazrafkan & Zarei 2016), and this case presentation is positioned towards this gap in the literature as well as experiences from our courses over the last 10 years. The case presentation also takes into account that both a systematic review and a large-scale study reveals that dental students experience considerable amount of stress during their dental education and some of this is attached to clinical practice in practice periods (Elani et al. 2014). And with the awareness that between 70-80% of the dental students from 2010-2019 in this course have been female students, it is also worth noting that Basudan et al. (2017) reveals that female dental students are especially vulnerable for stress, anxiety and depression. Based on this current state of knowledge we have therefore also focused on such topics during these courses (from 2010–2019). And the dental students have during these years expressed that they were quite nervous and tense before the practice period because they did not have any first-hand experiences in dealing with “real patients” in The Public Dental Health Care. As one dental student said, “We have to master three challenges at the same time – we must establish a good communication with the patient and with our supervisors and at the same time fix the patient's teeth”. They also expressed that they were quite vulnerable to receiving negative feedback and critique from their supervisors if they were failing when treating the patients. Therefore, both this and previous research (O'Keefe, Wade, McAllister, Stupans, Miller, Burgess, LeCouteur, and Starr 2014) shows the importance of the supervisors' awareness of such kinds of clinical supervision of dental students.

Norwegian education of dentists and the universities have used several measures to increase professional communication skills throughout the 5-year dental education in order to prepare new dentists for the practice field, and such measures has gradually improved over the last 10 years through the course “Practice Study” (3 ETCS), which is mandatory in all universities in Norway. However, compared to

other obligatory course components, this is still a minor part of the dental education. As a consequence, this one-day seminar (at University of Bergen) before entering the 3-week practice period in The Public Dental Health Care is therefore an important opportunity for dental students, their supervisors, and course leaders to address and discuss the professional communication challenges that dental students might encounter when meeting with patients and supervisors during the practice periods.

With this background, this seminar aims to raise awareness among dental students and supervisors regarding the importance of good professional communication. This case presentation focuses on a plenary lecture where one attempts to identify what kind of professional communication skills dental students need (Carey et al. 2010; Memarpour et al. 2016), what supervisors should be aware of (O'Keefe et al. 2014), and how a formative assessment model (Hattie & Timperley 2007) and Johari's window (Luft & Ingham 1955) can function as analytical “lenses” in such communicative practices. The dental students will also recognize the factors that affect their nervousness and apprehension regarding the practice period and how to develop good professional communication strategies for practice periods in order to reduce such tension and establish good communication with patients and supervisors. The question, then, is how will SRSs affect dental students' communication in medium-large lectures as preparation for their practice periods? This topic will be examined in this case presentation from University of Bergen.

The activity

Preparation

Because experiences have shown that it is quite difficult to get dental students to speak up in plenary lectures, this activity applies an SRS to limit this problem. An SRS gives each student the opportunity to participate and express their thoughts anonymously throughout the lecture by using such digital tools. The lecturer (RJK) prepares the use of the SRS beforehand by creating video cases, plenary questions, and peer discussion questions that the dental students will communicate their understandings of through the SRS. The SRS is then integrated as part of the lecturer's PowerPoint presentation, which makes it “seamless” and easy to use during the plenary lecture.

Because technology density in Norwegian society is very high, this is normally not a threshold for these dental students because they have good technology access both in their spare time and at universities (DIKU 2019). The dental students in Norway also spend more time per week studying (47.7 hours) compared to students in other disciplines (average 34.4 hours per week) (NOKUT 2020), and they express an average level of satisfaction with how digital tools are used in their teaching (3 of 5 on a Likert scale), and over 20% prefer low levels of interaction during lectures (Skaar & Krumsvik 2015).

Before the plenary lecture, the dental students receive two web links by e-mail that they should put into their smartphones, tablets, or computers as preparation for the course. However, it is also possible that two or three

students might share one device if accessibility is a problem, so the course leader should plan for such scenarios if access is a challenge.

Context

This annual one-day seminar (6 hours) consists of different plenary lectures and lunchtime with informal communication and meetings between dental students (between 42 and 48 students), and they meet their supervisors (between 18 and 24 supervisors) for the first time. This plenary lecture about pedagogy and professional communication focuses on the theoretical underpinnings of professional communication (Carey, et al. 2010), formative assessment (Hattie and Timperley 2007), and dental student supervision (O' Keefe, et al. 2014).

In the first part of the lecture, the main elements of these theoretical underpinnings are briefly explained, including pedagogy, professional communication, formative assessment, and dental student supervision. The pedagogical framework for the plenary lectures are explained to the dental students by using the following metaphors: "Chalk and talk" (theoretical introduction), "Telling and showing" (former dental students' opinions, *Joharis Window*¹), and "Learning by doing" (video cases, peer discussion, SRS).

Based on this theoretical introduction, we show two video cases from authentic situations to try to bridge some of the gaps between theory and practice. After the video clips are shown, there is peer discussion (3 minutes) around well-established video case questions (attached to the four theoretical underpinnings) that appear on a large screen at the front of the auditorium. After each of these peer discussions, the dental students respond to the video case questions anonymously by using the SRS ("clickers"), and the results from the 40–50 dental students are shown on the screen after 30–45 seconds (shown as statistics and bar charts). The intention is that these results can contribute to a *moment of contingency* defined as a moment "in which the direction of the instruction will depend on student responses" (Leahy, Lyon, Thompson & Wiliam, 2005, p. 6). Then the lecturer encourages the dental students and supervisors to comment on the results on the screen because these responses are highly relevant for their later meetings during this one-day seminar, but also for the upcoming practice periods.

To avoid only quantitative statistics and "surface discussions" in these video cases, the second video case includes a new digital SRS element. After the dental students respond with the SRS ("clickers") to a quite sensitive video case question (related to their experience of stress before practice) (see example [here](#)), they also communicate their worries and feelings with written textual responses through another SRS (Flinga). Here they can anonymously communicate more thoroughly and "qualitatively" why they answered as they did on the "quantitative" SRS ("clickers") video case question. While the dental students use their smartphone, tablet, or PC to communicate their worries and feelings (max. 5 min.), all of these answers appear "in situ" and live on the screen in the front of the auditorium in the form of text boxes dropping down from above.

In this way, the intention is that the whole audience can see all of the dental students' short narratives around this sensitive video case question, and Flinga seems to mediate and make explicit their *tacit knowledge* (Polanyi 1967) and inner thoughts (see example [here](#)). The intention with this is to create a new *moment of contingency*, and the lecturer goes through each and every one of the text-boxes and reads these for the whole audience and invites everyone to comment on the different answers from the dental students. At the end of this part, the lecturer urges the supervisors and dental student to follow with informal communication and "mini-conversations" about these responses during the one-hour lunch that immediately follows the end of the plenary lectures. During each supervisor's meeting with individual dental students (2 or 3 students in each group) during lunch and after lunch, the supervisors are encouraged to follow up on the answers from the dental students' video cases during the practice periods in the following weeks.

By communicating and visualizing all the answers generated by the dental students' video case questions, the lecturer tries to 1) bridge the gap between theory and practice, 2) establish a collective culture for communication and "sharing and caring" in the auditorium, 3) raise awareness around the tension and stress dental students feel before the practice periods, 4) prepare the supervisors for their individual meetings with the dental students later at the seminar, 5) and emphasize the importance for dental students to learn such professional communication strategies as mediated through technological devices and in face-to-face encounters in their future practice.

Debriefing

The course leader (KSK) of the dental education uses the lunchtime for debriefing where she circulate among the groups and have informal conversations (*reflection in action*, Schön 1983) with the dental students and supervisors about the content of the plenary lecture. However, this is just the first part of these reflection phases and where the next ones are the most important phases: The second debriefing takes in the practice period where the dental students are encouraged to communicate their *reflection in action* together with their supervisors in situ with the patients present. The third debriefing is a *reflection on action* (Schön 1983) through an individual practice report after the practice period where the dental students further elaborate on their experiences.

In this way we apply the principles from the formative assessment part of the plenary lecture also as a foundation for the debriefing. Such "teach what we preach" pedagogy may give a deeper understanding of the importance of communicating constructive feedback in learning processes – both theoretically on campus, but also outside campus in the practice periods and as new dentists.

Through this plenary lecture in the one day seminar (as part of the practice study, 3 ECTS), the dental students seem to become more aware of the importance of giving feedback – by communicating their inner thoughts – to their supervisors, and the supervisors receive feedback by

becoming more aware of the tensions and stress that the dental students communicate anonymously through the SRS. This gives the supervisors important input regarding their role and helps dental students to “break the ice” in the supervisor-student relationship. Altogether, this may create a more fertile ground for professional communication not only for the rest of the one-day seminar, but also during the practice period.

Appraisal

From a critical point of view, there are a number of limitations in this case presentation. However, since we in this case presentation only focus on phase 3 in DBR (Iterative cycles of testing and refinement of solutions in practice, Reeves 2006), it is not within the scope of this article to examine all of these, since this is attached to phase 4. With this in mind, it is reasonable to say that this plenary lecture about professional communication has been successfully implemented in dental education throughout these 10 years (2010–2019) based on annual evaluations of the course (Klock, 2020). This is based on an iterative development process where DBR and accumulation of knowledge over time (throughout these 10 years), have gradually improved the teaching design. The combination of technology-enhanced learning, peer discussion, authentic video cases, and theoretical underpinnings has increased the interactivity and student engagement and changed the teacher's role from the “sage on the stage” to the “guide on the side” (Van Dusen, 2000, p. 14). However, the case presentation also shows the need for further development, where new cycles of DBR are necessary to achieve a broader and more sustainable perspective on dental students practice periods. This will include new cycles of all the 4 phases in DBR where the research design should include more Mixed Method Data about dental students' perception of stressors before, under and after the practice periods. As a consequence of this, the practical teaching method should also be expanded to include teaching sequences about professional communication and stressors, both before, under and after the practice periods (where student involvement and active learning must be essential in all these three study arenas).

We have also applied this activity in other educational programs for psychology students, teacher students, and philosophy students and in subject topics like ethics, language and argumentation, and the history of philosophy. This, along with the studies from Scott Barrett et al. (2006), Denker (2013), and Barbour (2013), shows that the activity can be easily integrated in other subject courses as well as in other dental student courses. Because dialogue, communication, and discussions in medium/large lectures (40+ students) are normally difficult to establish, this activity shows that SRSs increase the interactivity, make student participation and communication easier, and raise awareness around several important aspects of professional communication in the audience. The SRS applied in this activity is based on “easy-to-use” free trial versions of Flinga² and TurningPoint³ (which universities in Norway today normally already have or have similar SRS tools). However, it is also possible to only use the free trial

version of the SRSs (Flinga and Socrative⁴), so this is a low-cost activity.

We started this article with asking how SRSs will affect dental students' involvement and communication in medium-large lectures as preparation for their practice periods. Despite several limitations in this article, it reasonable to state that this activity gives the dental students a better understanding of the importance of good professional communication with their supervisors in practice periods. It enables them to identify the three principles of Hattie and Timperley's formative assessment model and Johari's Window as the basis for communication in supervision, and it helps them to communicate the factors that affect their tension regarding the practice period in new ways. As a whole, this activity makes the dental students more aware of good professional communication strategies for their practice periods in order to reduce tension and to prevent deconstructive feedback and misunderstandings in future practice periods and as dentists.

Notes

¹ See here: <https://www.communicationtheory.org/the-johari-window-model/>.

² See here: <https://demo.flinga.fi/s/DAB7PDH>.

³ See here: <https://www.turningtechnologies.com/response-options>.

⁴ See here: <https://www.socrative.com/>.

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Competing Interests

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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