

Understanding self-assessment in undergraduate dental education

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Key points

Considers the importance of self-assessment in undergraduate dental education.

Discusses guidelines and identifies uses, benefits and flaws.

Aims to encourage students and teachers to become more involved in understanding the applications of self-assessment.

Considers teaching approaches that can help to develop students' self-assessment skills.

The clinical teaching of undergraduate dentistry is based on a curriculum of desired learning outcomes and competencies in all domains such that graduates can practice autonomously. This report will consider how self-assessment (SA) fits into the continuum of assessment and its use by students and teachers in undergraduate dental education. The purpose of the report is to identify the process of SA. The literature is explored and uses, pitfalls and perceived benefits considered.

'Where ignorance is bliss 'tis folly to be wise',
Thomas Grey, 1742.

Introduction

The clinical teaching of undergraduate dentistry is based on a curriculum of desired learning outcomes and competencies in all domains such that graduates can practice autonomously. This paper will consider how self-assessment (SA) fits into the continuum of assessment and its use by students and teachers in undergraduate dental education. It will also identify the process of SA. The literature is explored and uses, perceived benefits and pitfalls considered with examples from clinical teaching.

Assessment aims and methods

The main aims of assessment have been summarised as: to optimise the capabilities of learners by providing motivation and direction

for future learning; to protect the public by identifying incompetent clinicians, and to provide a basis for choosing applicants for advanced training.¹ Assessment is categorised as either formative, which helps to identify learning gaps, shape the future learning and promote reflection, or summative which is used to evaluate the learning, knowledge and competence at the end of a period of learning. Every assessment method has its own strengths and weaknesses so, to overcome these shortcomings, it is recommended that multiple observations are made over time using several different assessment methods. In selecting assessment methods there are five key criteria to consider:²

1. Reliability: the degree to which the measurement is accurate and reproducible
2. Validity: whether the assessment measures what it claims to measure
3. Impact on future learning and practice
4. Acceptability to learners and staff
5. Costs: to the individual learner, the institution, and society at large.

While assessment drives learning it is a misunderstood and controversial tool that should ideally address the learners' needs so that they can be self-directed.³ However the nature of any assessment can have undesirable effects, for example, encouraging surface learning in extrinsically motivated students who regard competency as a 'tick box exercise'.⁴

Assessment methods frequently utilise one-sided teacher assessment such as 'glance and grade' which can be subjective, inconsistent and misunderstood. Many assessment tasks don't embrace lifelong learning, critical thinking and reflection. Moreover self-evaluation encourages rote learning with the only objective that of passing the summative test. Some assessment systems do not allow students to improve their own learning because the assessments are considered to be an endpoint instead of a beginning or a step forward.⁵ Unsurprisingly, students don't consider the impact assessment could have on their learning.

Definitions of self-assessment

SA can be defined as involving learners in judging whether or not learner-identified standards have been met.⁶ It can also refer to involvement of learners in making conclusions about their own learning particularly about their achievements and the outcomes of their learning.⁷ SA is a way of increasing the role of students as active participants in their own learning and should be something more than an item added to the list of assessment criteria.⁶ Furthermore it can be perceived as 'a personal evaluation of one's professional attributes and abilities against perceived norms'.⁸ Consideration should be given to the scope of what is learned and the need for students to be accountable for their own learning. Through

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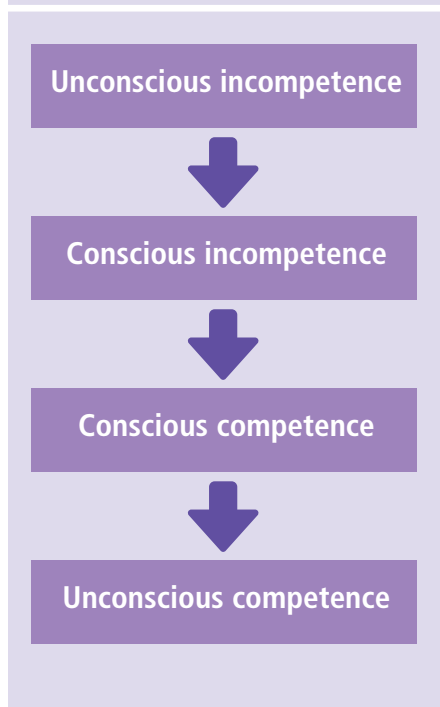
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Fig. 1 Evolution of learner self-concept during progression from novice to expert status



reflective practice and SA students can contribute to formative assessment of learning and for learning. When SA is used summatively a professional should reflect on completed performances both specific and general which should preferably be measured against gold standards, what peers may do, consensus opinions or some minimally acceptable standard. Often there are no such standards that can be used as a reference. In a predictive role, SA leads to questions such as: ‘am I capable of dealing with this situation or challenge?’ ‘do I have the appropriate skill level to treat a presenting clinical problem?’ Concurrent SA acts as an ongoing monitoring process during the performance of a task. This form of SA should generate questions such as ‘is this coming out the way I expected?’ or ‘should I use a different approach?’ Accurate SA is a skill requiring deliberate training and practice.¹⁰ Dental students also need to reflect on their own behaviour to develop skills and competencies required as a clinician. Many assessment practices don’t address this important aspect of learning. The undergraduate dental curriculum has evolved to include SA skills as an integral part of a multifaceted approach to developing the graduate dentist who is safe to practice. A main objective of undergraduate dental education is to help students to develop into reflective practitioners.¹¹ As Sullivan and

Hall¹¹ suggest the SA process can promote reflection on personal performance, identify reactions to SA and evaluate the reliability of marking and identify reasons for discrepancies between scores of assessor and those being assessed. Through reflection, effective SA can help to determine learning goals and objectives that will have a positive impact on motivation. SA is a key desirable attribute of health professionals who are self-directed and have enquiring minds.¹²

Advantages of SA

The importance of SA in education is documented in the literature:¹³

1. The capacity to self-assess is essential for safe and effective practice.
2. It can be used to promote lifelong learning, a required GDC standard: ‘Maintain, develop and work within your professional knowledge and skills’¹⁴
3. As with other types of assessment, SA can be an effective learning tool.^{15,16}

Pitfalls of SA

Negative aspects found in some research include:

1. Students having difficulty in accurately grading their own performance so that they are unlikely to be able to correct, direct or identify their required learning^{9,17}
2. SA may reinforce students’ inaccurate perceptions. Good students tend to underrate themselves and weaker students overrate themselves. Several studies show that the ability of students to rate themselves improves in the light of feedback over time.^{7,18} Ericson *et al.*¹⁹ confirmed the need for an SA protocol in their study to compare students’ assessment of their own performance with those of their teachers when guidelines were used. They found that 88% of 41 students underscored their performance more frequently than they overscored it.
3. An overemphasis on the use of SA self-marking or grading may reduce the impact of SA as an effective learning process.^{19,6} SA needs to be considered to be a skill requiring clear goals and training with feedback²⁰ which can often be overlooked
4. Even when explicit criteria are given, students may be dissatisfied and left with:
 - Poor understanding of assessment criteria, aims and purpose of SA with inconsistent application and lack of fairness

- Uneasiness in taking responsibility for their SA and having to assess their performance in terms of areas for improvement linked with specific strategies
- Perceptions that tutor feedback was critical and not constructive.^{20,21}

Discussion

Metacognition or self-monitoring refers to the ability to know how well one is performing, when one is likely to be accurate in judgement and when one is likely to be in error.²² Research is consistent with the concept that incompetent individuals lack the metacognitive skills necessary for accurate SA²² and supports the need to develop appropriate involvement of students in their own teaching and learning. SA can assist this process and enable recognition of strengths and weaknesses, identified as a vital aspect of professional self-regulation.²³ When used in daily practice SA can promote introspection and create awareness of the operator’s own limited competence. This facilitates the change from unconscious incompetence to unconscious competence.²⁴ The self-concept continuum²⁴ depicted in Figure 1 illustrates how students see themselves at various stages of the competency development process. The unconscious incompetent stage is the expected starting point of competency development and could be misconstrued as unskilled and unaware because at this level students often don’t know what they don’t know.²⁴ Consequently, the student may therefore lack the ability to self-assess which prevents them from taking corrective action to rectify sub-standard performance.

SA is central to the direction of further learning activities and is a true indicator of the professional.²³ Schon¹⁰ described the reflective practitioner and Irby²³ stated that the process of reflection on action is critical for continued learning. This is underpinned by established outcomes of SA to improve students’ performance,^{26,27} increase their motivation to learn and change their attitude to learn from one of ‘how have I performed?’ to that of ‘how can I do better?’^{6,19} There are indications that students have difficulties identifying appropriate strategies for using standards to improve the link with gaps in their learning. Ostensibly, students do not learn the implicit or tacit knowledge of using assessment criteria without explicitly focused learning activities.²⁸ Boud demonstrated that SA is more accurate if the learner is involved in the definition

and development of guidelines to be used.²⁹ Moreover for SA to be effective in improving performance, a common understanding of the standards is needed as well as opportunities for discussion of any feedback given.²⁸ It appears that there is a vague understanding of why SA should be perceived as important but there are also problems of how and when it is used.

In the clinical setting, concomitant feedback is integral to the process of reflection and experiential learning. It is well recognised that feedback is most effective when given as close to completion of the procedure as possible³⁰ but often limited by time constraints. There may be ambiguity and obvious confusion in the headings of the categories of SA, that is, 'ability of the student'. In the author's opinion, ideally there should be a discussion to guide the students' assessment and the mark agreed between both parties to prevent development of over-confidence and under-confidence. Work on over-confidence has shown that people are more mis-calibrated when they face difficult tasks, ones for which they fail to possess the requisite knowledge, than they are for easy tasks, ones for which they do possess that knowledge.²² As much emphasis should also be focused on effective training of teachers who, with the use of careful questioning techniques and timely feedback, can develop students SA skills. Teachers should consider themselves as facilitators of learning to include promotion of SA rather than by merely imparting knowledge. As teachers we may all have different teaching approaches with no consensus on what is right. Furthermore the guidelines for using SA are open to interpretation. Time set aside after each clinical intervention may optimise the students teaching and learning encounter. Asking students for an appraisal of their own performance before offering feedback has the potential to develop self-reflective skills, a competence essential for autonomous practice.³⁰ In this way the students can determine strengths and weaknesses and develop insight into training needs.

Using self-assessment

Rather than just an assessment tool for grading students, SA should be considered as a pedagogic tool that can be used throughout the undergraduate education and across all learning domains. SA is a complicated, multifaceted, multipurpose tool that involves a number of interacting cognitive processes. It functions as an 'M tool' – as a monitor, a

mentor, or a motivator through processes such as evaluation, inference and prediction.³¹

It is well documented that the quality of impressions sent to commercial dental laboratories is often poor and a cause for concern;^{32,33,34} all the more problematic for students as impression taking could be one of the first clinical encounters they have to face. A tacit learning strategy was used in which students observe and then implement explicit guidelines that include assessment of the impression quality. Following a checklist, students more readily develop SA skills in all domains as they are able to observe interaction with the patient and dexterity improves as they have a better understanding of 'what they need to do to get it right'.

In teaching facebow record taking the procedure was explained and demonstrated to a student pair. One of the students was then observed repeating the procedure on their partner. Once completed successfully with guidance, this competent student is supervised in a teaching role as they instruct another pair of students. Involvement in this aspect of peer learning is an additional way in which understanding can be more easily checked and students' self-appraisal developed so that they feel more confident in undertaking tasks that in many cases were formerly challenging. Collaborative learning can also be used in think-pair-share (TPS) seminars which encourage student involvement, discussion, critical thinking, reflection and therefore SA. For example, following a presentation on 'the management of the gag problem' a TPS seminar is given to the students, who are asked, working in pairs, how they would manage a patient who cannot understand the English language, has a marked gag reflex and needs to have impressions taken.

Students have been asked to document a reflective account of IAN block injections after their initial guidance and first attempt. A revision of anatomical landmarks using an unlabelled drawing of the pterygomandibular space and surrounding structures was used to revise relevant anatomy. A demonstration on the direct technique for giving an IAN block followed. Written stepwise information on the procedure was given before each student, under guidance, gave an IAN block to their partner and then swapped roles. Uncertainties, pitfalls and need for clarification were then highlighted. In the author's opinion this form of peer learning was an excellent way of developing SA.

In another teaching scenario the student was asked to take a history from a patient presenting with dental pain. Their findings were then presented and, with questioning, a diagnosis and treatment plan was determined. As a check on the student's understanding and decision making they were observed presenting this as a case study to another student. The discussion that ensued and the questions generated in this peer learning were found to help their reflective skills following timely feedback. The teaching of SA should encourage objectivity none more so than when shade taking. After a presentation to a group of students a series of questions followed to elicit an assessment of their understanding before they then take the shade of one another's upper central incisors. Immediate feedback can then be given to develop both confidence and competence – essential elements of SA.

Conclusion

The ability to assess one's own learning needs is fundamental to self-directed lifelong learning and continued competence.²⁰ SA is a skill and will remain underdeveloped unless it is explicitly considered.⁹ In the author's opinion, training in its use by both students and teachers, with discussion on agreed guidelines is an essential aspect of teaching and learning. SA should be a collaborative process involving teacher and student through reciprocal feedback developing reflective skills. SA, as it is currently used in dental undergraduate teaching and learning, can be a misunderstood misnomer.

'There are three things very hard: steel, a diamond and to know one's self',
Benjamin Franklin, 1750.

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