



Role of Self-Evaluation and Self-Assessment in Medical Student and Resident Education

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Authors' contributions

This work was carried out in collaboration between all authors. All authors wrote this manuscript and managed the literature searches. All authors read and approved the final manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Self-evaluation is defined as learners judging the quality of their work, based on evidence and certain criteria, for the purpose of improvement. Self-evaluation consists of reassessment, and ensuring follow through of all required duties. The goal of self-evaluation is adaptation of learning techniques to foster improvement, accomplished through self-monitoring. Self-evaluation involves reflecting on an action. Self-assessment is the process of introspection focused on assessing aspects that comprise one's identity. Self-assessment profoundly impacts resident and student performance through enhanced self-efficacy and self-motivation. The following analysis focuses on research and practice related to medical student and resident self-evaluation. Although self-assessment and self-evaluation are mainstays of the medical profession, there is evidence suggesting that physicians have a limited ability to self-assess and self-evaluate. Professional development and competency evaluations focus on external assessment. Improving techniques for self-assessment and self-evaluation will improve performance when assessed externally. Therefore, medical students and medical residents need to learn to self-assess and self-evaluate in order to perform well when assessed externally. The aspects of self-rating, self-audit and self-administered examination of knowledge or clinical performance need to be better studied and explored.

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1. INTRODUCTION: SELF-EVALUATION – A VALUABLE TOOL TO DEVELOP COMPETENCY

Self-evaluation is the appraisal of your own work. It involves an honest judgment of completed tasks and the development of techniques to improve your work in the future. It requires continuous reassessment in order to ensure follow through of required duties. The overall aim of self-evaluation is to instill, within the learner, an approach to monitoring adjustments that have been made in order to improve the learning process. Self-evaluation involves reflecting on an action [1]. Self-assessment is the process of introspection focused on assessing aspects that comprise one's identity. It is one of the motives that drive self-evaluation, along with self-verification and self-enhancement. Self-assessment prompts people to seek information to clarify uncertainty within their self-concepts. People use self-assessment to enhance the certainty of self-knowledge [2]. In a self-evaluation, a medical student or resident responds to a series of questions that assists in the evaluation of his or her clinical or academic performance. This type of thought process serves as a guide directing focus towards the many aspects and nuances of academic and clinical performance. The medical student or resident is prompted to think about all of the components of performance necessary to accomplish the goals that allow them to progress in their professional development. Furthermore, self-evaluation opens up the conversation between a medical student or resident and the faculty during the evaluation of performance. The act of self-evaluation facilitates a review of goals, an assessment of progress, and a thoughtful consideration of areas for further growth [3].

A literature search on the subject of self-assessment and self-evaluation pertaining to resident and medical student education was done using primarily PubMed and Google Search. The goal of this review is to elucidate available literature and to present it in a concise manner. The subject is underdeveloped and underestimated. By doing this thorough review, the authors hope to revive and stimulate an interest in self-assessment and self-evaluation within the medical community.

2. ADVANTAGES OF SELF-ASSESSMENT

Standardized tests give us information about medical student and resident learning. While these tests are of value, they do not provide the appropriate insight with regard to quality of skills. There is clear evidence to support the value of self-evaluation [4,5]. Extensive research has been conducted pertaining to the impact of self-evaluation and self-assessment in relation to learning [6,7,8]. The methods of self-evaluation and self-assessment have not made enough impact within residency education, despite the fact that studies have shown strong educational merit, an example of which focuses on self-reporting of medical errors by physicians [9]. There is great potential for self-assessment by students and residents. The development of explicit criteria by the program, along with clear definitions of the evidence used to establish competency, could prove to be of enormous value to medical students and residents.

The very focus of this manuscript is a general assessment of usability and value of self-evaluation and self-assessment in medical education. In medical education, theoretical knowledge and practical skills cannot be adequately separated, as they are interdependent

upon each other. Self-assessment of knowledge and accuracy of skill performance is essential to the practice of medicine and self-directed, life-long, theoretical learning. In medicine, as in many other professions, individuals are now responsible for determining their own continuing professional development. Consequently, a successful training program demands awareness of remediable weaknesses through continual self-appraisal of skills and theoretical knowledge. Currently, most clinical or surgical skills have been taught in an apprentice style with little or no formal assessment. Doctors must set their own targets and goals and regularly assess their performance. In this type of setting, self-assessment becomes a fundamental skill that should be a part of both undergraduate and postgraduate education [10].

Self-assessment skills do not come naturally and require training [11]. Learners are able to achieve the same evaluation of technical skills as their teachers [12], especially if the training includes explicit expectations [13]. The advantage of self-assessment is the additional learning gained from performing the act itself [14]. Specific training for reflection improves the ability to self-assess [15]. For example, in an obstetrics and gynecology rotation, reflection was taught using the medical literature and, subsequently, applied to clinical situations, improving the medical student's ability to evaluate their own performance [16]. In a general practice setting, reflection is about challenging cases, combined with reading journals and improving self-assessment skills [17]. Student performance on self-assessment activities usually matches their progress in clinical skill development [18]. In another study, dental surgery residents were able to identify areas of skill in which they required more experience and teaching [19]. When initial attempts at self-assessment by residents from different specialties were compared with subsequent attempts, training resulted in skill improvement, emphasizing the importance of explicit guidance to maximize effectiveness of self-assessment [20]. Furthermore, self-assessment may be more effective when combined with feedback [21].

3. CONCEPTIONS OF GOOD ASSESSMENT

Conceptions of good assessment are moving toward direct observation of performance rather than written tests [22]. In performance assessments, students are observed working with complex tasks [23] or dealing with real-life problems [24]. Educators' responses to these assessments are mixed. Mandated assessment programs may lead to educator resistance and doubts about usefulness of the data [25,26].

History has shown, when beliefs about teaching and learning theory conflict, conventional test practices return. In Briscoe's study, the conflict between the teaching and learning theory was centered on one educator's theory of how assessment influenced learning. For the educator, the motivational power of assessment resides in the fairness of objective procedures. When the educator tries to use performance assessment, he or she feels that objectivity is lost [27,28,29]. One of the most challenging conceptions of assessment is related to the changing role of the educator and the changing educational environment. The latter is an important consideration, as the educational environment is changing rapidly and dramatically becoming more complex and volatile. Educators may find themselves in an environment of conflicting and increasing demands.

Residents often enter residency training programs with varying levels of knowledge and skills. Their skills improve as training progresses. The knowledge and skills are acquired on the job and, therefore, are highly variable among residents and residency training programs. Residents often do not receive sufficient feedback concerning their performance. That

makes self-evaluation and self-assessment especially important [30]. Medical students could possibly utilize self-assessment and self-evaluation in the same way as medical residents. Medical student acquires initial clinical skills and fundamental knowledge in a similar fashion to medical residents. Accurate self-assessment of performance allows future physicians to understand their own strengths and weaknesses and know which areas to focus on in their medical education. Self-assessment is considered a component of establishing clinical competence in medical school. There is not enough research or literature on this topic. To improve our understanding of self-assessment and increase its effectiveness as a teaching tool for medical students, research should report self-assessment as both a correlation and a paired comparison, and conduct analyses of important moderators that can influence self-assessment accuracy [31].

4. SELF-EVALUATION FOSTERS LEARNING

Research indicates that self-evaluation and self-assessment play a major role in fostering learning. Self-evaluations encourage learners to set higher goals and commit more personal resources and effort to the acquisition of these goals [27]. The combination of goals and effort equates to achievement [12,14,17]. It is known that students' achievement results in self-judgment [32,33,34]. This same line of thinking can be applied to medical student and resident education.

In one study exemplary users of cooperative learning methods were interviewed [5]. When individual insights were analyzed, a generic four-stage procedure emerged for teaching students or residents their role in self-evaluation.

Stage 1- Involve students in *defining the criteria* that will be used to judge their performance. Workplace studies indicate that involving employees in making decisions about their work increases satisfaction and goal commitment.

Stage 2- Teach students how to *apply the criteria* to their own work. Since the goals are not entirely their own, students need to see examples of what they mean in practice. These models or examples help students understand specifically what the criteria mean to them.

Stage 3- Give students feedback on their self-evaluations. Educators need to help students/residents reassess their understanding by giving them feedback on their efforts to implement the criteria.

Stage 4- Help students/residents develop productive goals and action plans. The most difficult part of teaching students/residents how to evaluate their work consists of providing support as they use self-evaluative data to set new goals and levels of effort. Without educator help, students may be uncertain whether they have attained their goals.

The performance or outcome selected to acquaint the residents to the process should be one that they have had experience with. Then, the residents can be taken through the four-stage model. Choosing an outcome with some experimental base is important; as it would be difficult to have residents accept criteria for an outcome they had limited or no experience with.

Teaching self-evaluation also has benefits for educators. Participation in the process of teaching self-evaluation will foster increased confidence in the educators' skills. In one of the studies in which educators were involved in action research on student self-evaluation as a

mechanism for professional growth, it was found that educator self-efficacy was improved [35]. Educators who anticipate that they will be successful set higher goals for themselves and their students. Those educators are more willing to engage in instructional experiments, persist through obstacles to implementation, and have higher learner achievement [36]. The connection between educator and student is critical and essential. Reviewing recent literature on the subject, some tips can be recommended to get residents started with self-evaluation:

1. Define self-evaluation for them and yourself.
2. Make the benefits of self-evaluation visible.
3. Talk about the benefits of self-evaluation.
4. Confront residents' feeling and beliefs about self-evaluation. Directly deal with misconceptions.
5. Create short self-evaluation opportunities for your residents.
6. Choose a performance that you and your students/residents have had some experience with (e.g., oral presentations, research reports).
7. Expect a range of reactions from your students/residents as you help them to get better at self-evaluation. You may have different responses, from positive reactions as residents see this as a "fair" assessment, to negative reactions.
8. Trust your students/residents.

5. SELF-ASSESSMENT MAY LEAD TO OVERINFLATING

Self-assessment and self-evaluation is vulnerable to overinflating the evaluation of one's work. This point is further elucidated when considering the following study. 97 students assessed the participation of their peers and their own participation. Teachers in the study also assessed students' participation. The researchers looked at the correlations between peer assessment and teacher assessments, and between self-assessment and teacher assessments. With the peer assessments, students were instructed to use a normal grade distribution—in other words they couldn't give everyone a 4 (the highest rating). Students didn't like using the normal grade distribution, but when they did, their assessments correlated highly with those given by the teacher. That was not the case with self-assessments. Even though these self assessments had no impact on the actual participation grade the students received, students still significantly over-evaluated themselves [37].

We know that physician activities of lifelong learning and continuing medical education are linked to the ability to assess his or her own learning needs and choose educational activities that meet these needs. Evidence suggests that physicians have a limited ability to accurately self-assess. Due to this limited ability, the processes currently used to undertake professional development and evaluate competence may need to focus more on external assessment. In their systematic review, Davis D. et al. found the worst accuracy in self-assessment among physicians who displayed the least skill and also those who were the most confident. These results suggest that those who are overconfident and lacking in skill tend to ignore self-evaluation and self-assessment placing their patients in danger. This further validates the importance of teaching medical residents and medical students the process of self-assessment and self-evaluation. This systematic review found that in a majority of the relevant studies, physicians do not appear to self-assess accurately. Poor correlations between physicians' self-rated assessments and external assessments were observed. The finding of limited accuracy in self-assessment was independent of level of training, specialty, the domain of self-assessment, or manner of comparison. These results are consistent with those found in other professions [38].

Research suggests that self-assessments of skill and character are often flawed because people tend to overrate themselves. Research in education, finds that students' assessments of their performance are often not in agreement with the assessments by their teachers and mentors. At times, medical students and residents seem unable to assess how well or poorly they perform a given task. Students and residents tend to be overconfident in newly learned skills. In order for to maximize learning and performance, medical students and residents need to be educated in the area of self-evaluation and self-assessment. Consideration must be given to the idea of repairing self-assessments that may be flawed rather than just ignoring them [39]. People tend to have overestimated views of their abilities. Overestimation may be due to the fact that the poorly skilled not only reach erroneous conclusions and make unfortunate choices, but their incompetence makes them unable to realize it [40].

Interestingly, academic self-efficacy is strongly related to performance, overall satisfaction and commitment to education [41]. Peer and self assessment may contribute an insightful perspective to a resident's or student's performance. Self-rating may provide valuable information regarding medical student/resident performance [42]. Risucci D et al. showed that ratings by supervising attendings were influenced primarily by the interpersonal skills of the residents and secondarily by ability. In contrast, self-ratings by the residents were apparently mainly influenced by their perceptions of their own ability [43].

The role of self-assessment in professional practice is changing. Once seen as an individualized activity, self-assessment in professional development is now viewed as externally informed through activities that enable integration of data from external sources. Personal conditions consistently influence learners' perceptions of the extent to which assessment activities were useful. Learners are not guaranteed to be accurate in their perceptions of which factors influence their efforts to improve performance. Learners' perceptions must be taken into account [44]. In the health professions, we expect trainees to engage in self-evaluation to advance their learning. Doctors usually take responsibility for diagnosing their own learning needs. Medical residents need to be expected to identify what they do not know when caring for patients to seek help. Medical school curriculum increasingly demonstrates a need for support of self-assessment and self-evaluation. The medical education community understands of self-evaluation and self-assessment will continue to advance as we continue to broaden our perception of best practices [45].

6. CONCLUSION

There is a need to engage medical students and residents in an activity or discussion that generates understanding of the importance of self-evaluation and self-assessment. This may be in the fashion of a simple activity, such as passing a recording sheet around a group in a round-table fashion, with each person contributing an idea as to why self-evaluation might be important. The ideas may then be collected and posted for reference whenever the students or residents engage in self-evaluation and self-assessment. Self-evaluation and self-assessment are directly connected to the quality of provided care. Although self-assessment and self-evaluation are mainstays of the medical profession, there is evidence suggesting that physicians have a limited ability to self-assess and self-evaluate. Professional development and competency evaluations focus on external assessment. Improving techniques for self-assessment and self-evaluation will improve performance when assessed externally. Therefore, medical students and medical residents need to learn to self-assess and self-evaluate in order to perform well when assessed externally. The aspects of self-

rating, self-audit and self-administered examination of knowledge or clinical performance need to be better studied and explored.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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