

Best Practices in Peer Assessment: Training Tomorrow's Physicians to Obtain and Provide Quality Feedback

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Abstract: Peer assessment, also known as peer feedback or peer evaluation, is a tool used in medical education for students to provide and receive constructive feedback. In undergraduate medical education, peer feedback is a method of assessment that is not used commonly; however, its use is on the rise. In this literature-based guide, we discuss the advantages of peer assessment, as well as tips for implementation (including training of students and faculty and assessment tools/instruments) and strategies to overcome barriers to its use. Effective utilization of peer feedback can provide educators with an opportunity to evaluate attributes that are often difficult to assess, including professionalism, teamwork, work habits, and communication skills. Constructive feedback can raise learner awareness about performance and guide future decisions and action plans for improvement. Overall, when used appropriately, peer feedback can be a valuable and effective addition to the arsenal of assessments in medical education.

Keywords: assessment, medical education, peer evaluation, peer feedback, undergraduate medical students

Introduction

Feedback is an essential element for medical student development and learning that provides valuable information to help students improve their performance and become effective physicians. Different teaching encounters necessitate different types of feedback and peer assessment is often a beneficial approach.¹ Peer assessment, sometimes referred to peer evaluation or peer feedback, can be defined as the process of medical students providing constructive comments to fellow students regarding a variety of competencies, including knowledge, clinical skills, and professionalism. It is often used in a formative (ungraded) manner to help students further develop their skills, in which feedback may include what their peers do well, as well as suggestions for improvement.²⁻⁴ While accreditation bodies mandate medical student formative feedback in undergraduate medical education (Liaison Committee on Medical Education, Standard 9.7: Formative Assessment and Feedback)⁵ and the literature reports many advantages to using peer feedback, it is underutilized overall.^{3,6-8} According to the Association of American Medical Colleges (AAMC), only 1.1–1.9% of national medical school assessment was classified as peer assessment between 2012 and 2016 (1.1% in 2012–13, 1.9% in 2015–2016), but the trend is that its use is becoming more common.⁹ Of the 140

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allopathic medical schools in the United States in 2013–14, only 72 reported using any peer assessment for formative feedback in clinical clerkships and 18 medical schools reported using it in a summative manner.¹⁰ The limited use of peer feedback in medical education may be one reason why many new physicians feel unprepared to provide effective feedback in various settings.^{11–13} In an effort to aid medical educators in preparing students to provide quality feedback as physicians, the aim of this “perspective” is to offer a literature-based guide for the use of peer feedback in medical education, including

1. Reasons to use peer assessment
2. Strategies for effective implementation, including
 - Primary Goals
 - Creating an Optimal Environment
 - Integration throughout the Curriculum and Timeline Considerations
 - Student and Faculty Training
 - Assessment Tools and Instruments
3. Suggestions for overcoming barriers to implementation

Reasons to Use Peer Assessment

Overall, the literature supports the use of peer feedback in medical education as it has many inherent advantages. Peer assessment can be insightful and instructive when peers provide thoughtful evaluations in a timely and confidential manner.^{3,14,15}

1. One reason why peer feedback is beneficial is because peers are often a credible source for assessment of standard behaviours,³ and when used effectively, peer assessment can encourage improvements in professionalism, teamwork, and communication skills.^{4,15} Assessment by peers is especially valuable since evaluation of teamwork, communication and professionalism are often difficult for faculty to assess.³ For example, at Oakland University William Beaumont School of Medicine (OUWB), with class sizes that average 125 students, it is often difficult for faculty to provide valuable feedback for soft skills, such as interpersonal skills or conflict resolution. Since students often work in small groups, they have the ability to provide meaningful assessments on the internal functions of the team, including communication, sharing of workload/responsibilities, and willingness/ability to engage in conflict resolution.¹⁶

2. A second reason why peer assessment is a valuable tool is because the feedback provided can help students be more cognizant of their own performance and give them the opportunity to further improve their skills and achieve better outcomes. For example, improving teamwork and communication skills early on can help students achieve higher levels of competency during residency, in which the Alliance for Academic Internal Medicine Undergraduate Medical Education Task Force suggests that certain Entrustable Professional Activities should include competencies that evaluate communication skills.¹⁷
3. Thirdly, medical students frequently perceive the amount of feedback they receive as insufficient.¹⁸ Peer feedback offers additional opportunities to increase the amount of feedback provided to students, to further help them develop and improve in areas where they may be deficient. It also gives students more opportunities to develop skills in providing effective feedback.^{3,18,19}
4. Perhaps the biggest strength is that peer assessment correlates well with future clinical and academic performance.³ Papinczak et al (2007) found that students who were committed to providing valid and helpful feedback to their peers were more accurate peer assessors themselves.²⁰ Lurie et al (2007) reported that peer assessment of work habits predicted medical student performance evaluation rankings and internship performance.²¹ Students who utilize peer assessment throughout the curriculum may be more proficient in providing feedback as well as more successful with teamwork and communication skills during their professional careers.²²

Strategies for Implementation

In this perspective, key strategies for implementing effective peer feedback in the undergraduate medical curriculum are showcased through an exploration of the current literature and the experiences at OUWB.

Primary Goals

Peer assessment can be utilized in a variety of ways to evaluate competency,¹⁴ but proper implementation is critical to the success of a good peer assessment plan. A successful program will clearly define the goals and anticipated outcomes.¹³ The overall goal of a peer assessment program is to enhance or maintain the quality of work/

performance by an individual or group.²³ It should become a standard component of the medical culture, with the long-term goal of improved patient care.⁶

Creating an Optimal Environment

Peer assessment must occur in an environment where peers have the ability to easily observe one another in order to give good quality feedback on observable skills and/or performances. There are a variety of attributes that could be assessed through peer assessment, however the most successful include teamwork skills, professional demeanour, work habits, and interpersonal behaviours³ (see Figure 1). In addition, the peer feedback must be completed in a setting in which students have the opportunity to develop skills in both giving and receiving feedback, through both training and practice.

Peer assessment systems must appear to be nonthreatening to students.⁶ Creating a safe environment can be achieved in several ways. For example, training and transparency are extremely important for a successful program. Cultivating a transparent environment, in which students are aware of all components of the process is vital and can impact students' willingness to participate.²⁴ Additionally, a successful peer assessment program is critically dependent upon trust. Efforts must be made to ensure the classroom setting allows students to build relationships based on trust, in which peer comments are no longer valid or

valued and the entire process is undermined if trust is not maintained.³

Integration Throughout the Curriculum & Timeline Considerations

Peer assessment programs are the most successful when feedback opportunities are frequent, timely, and consistent (often across multiple courses or clerkships), and for a duration of at least six months.²⁰ Professional competence cannot be meaningfully assessed with one single assessment, but the process of peer assessment can foster a reflective practice in the class.²⁵ When possible, feedback assessments should be provided periodically throughout a course.²⁶ In addition, follow-up mentoring or support from advisors should be offered in order to encourage reflection on the obtained feedback³ (see Figure 1). Lastly, it is critical that feedback be distributed in a timely manner. Overall, a successful program will result in the quality of student feedback improving over time, which can be measured by faculty feedback on peer assessment quality (see below: last paragraph of "student and faculty training").

As an example of implementation at our undergraduate medical school (Oakland University William Beaumont School of Medicine; OUWB), the peer assessment program is integrated into many different courses and activities. It is used as an assessment for Team-Based Learning (TBL) activities and is an important component of many

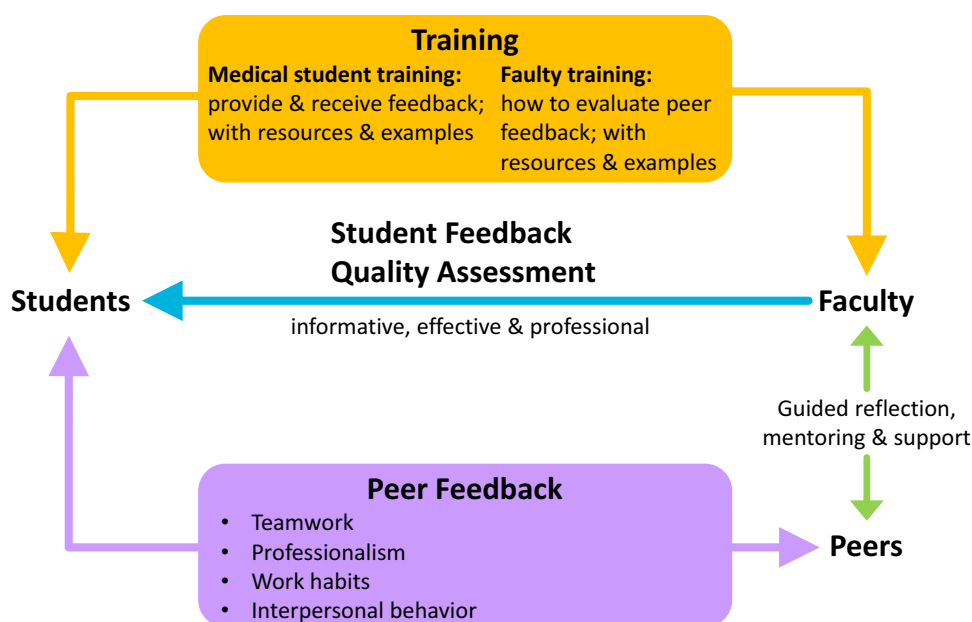


Figure 1 Peer assessment program goals and anticipated outcomes.

courses in the first two years of the undergraduate medical curriculum, including Anatomy, Doctoring courses, Medical Humanities and Clinical Bioethics (MHCB), and research courses (Embark²⁷). As stated by medical student Kitay⁶,

If we foster an environment in which peer feedback is a common, well-accepted practice, many of the fears associated with the practice will be assuaged, and students, physicians, and patients will all benefit.

Student and Faculty Training

The process of providing, receiving, and evaluating peer feedback is not intuitive; to be effective, these skills must be learned and practiced by both students and faculty (see Figure 1). In a systematic review examining the role of peer feedback in collaborative learning, a limited number of studies described student instructions for giving effective feedback.⁴ Training students how to provide effective feedback early in their careers may benefit their future roles as physicians, educators, and leaders, and give them the confidence and skills necessary to provide feedback in a clinical setting when optimal patient care is of utmost importance.⁶ In addition to decreasing student anxiety and making the goals clearer, adequate training can provide opportunities for both students and faculty to learn key strategies in providing effective feedback as well as improve feedback accuracy.^{4,28-31}

If a peer feedback program is unsuccessful, it is often because the individuals participating were inadequately prepared.⁶ A lack of appropriate training as students may lead to a deficiency in skills necessary for success as clinicians or faculty. For example, although peer review is commonplace for clinicians, it is rarely taught during medical school.^{9,31,32} Additionally, faculty members tend to lack formal training in providing effective feedback, in which they are uncomfortable providing criticism and feedback to medical students and may not intuitively know how to explain and translate their observations into meaningful feedback.^{33,34}

There are many potential approaches for teaching students how to effectively critique their peers.⁶ In the ideal curriculum, student training for effectively giving and receiving feedback should begin early in the first academic year. Interactive workshops are a useful mechanism to teach these skills, especially when they are designed for the learners' needs and opportunities are provided for discussion and skills practice.^{33,35} For example, early in the curriculum, New York

University (NYU) School of Medicine uses a workshop to teach first-year students about important peer feedback concepts, including the skills of giving and receiving effective feedback. In addition, NYU provides numerous opportunities for medical students to further develop their skills in preclinical years.³⁶ At OUWB, first-year medical students are taught the value of peer feedback during orientation week. All students are required to participate in a TBL activity that prepares them to give appropriate and valuable feedback and the format allows for rich intra- and inter-team discussions. Students are expected to prepare for the TBL with a reading assignment on the topic of how to make feedback helpful, based on Michaelsen and Schultheiss.³⁷ In addition, the readiness assurance tests, intersession material, and application questions focus on essential elements of peer feedback, as well as the mechanics of the OUWB peer feedback process. To aid the peer feedback process, students are provided with several helpful resources on the learning management system throughout the academic year.

To ensure that students understand the mechanisms for providing constructive feedback, it is important to assess the feedback quality. Faculty members or other experts can evaluate the peer feedback that students provide to ensure it is informative, effective, and professional (see Figure 1). While faculty can be valuable resources to help students improve the quality of their feedback, to be beneficial faculty must also be trained on effective feedback techniques. For example, OUWB faculty volunteers evaluate the quality of student peer feedback based on the criteria that students learn during the orientation week TBL. Faculty members are expected to provide the same quality of feedback to the students that the students are expected to provide to their peers. As it is not an intuitive process, faculty are provided with similar training and are expected to read the Michaelsen and Schultheiss assignment.³⁷ In addition, faculty members are provided with opportunities to practice evaluating feedback quality through interactive TBL-based instructional workshops and may review any areas of confusion with more experienced faculty.

Assessment Tools and Instruments

There are many approaches and available instruments for providing peer feedback, a subset of which are summarized in Table 1.^{23,38-47} Since every educational environment is different, instructors should consider customizing a peer feedback process that fits the needs of both faculty and students.²⁶ For example, in a study by Dannefer et al

Table I Selected Approaches and Available Instruments for Providing Peer Feedback. *This is not an all-inclusive list but provides a variety of examples of published instruments used for peer assessment*

Assessment Topic	Participants Assessed	Characteristics Evaluated with Peer Assessment Instrument	Reference
Professionalism	1 st -year medical students	Honesty & integrity, accountability, responsibility, respectful & non-judgmental behaviour, compassion & empathy, maturity, skillful communication, confidentiality & privacy in all patient affairs, self-directed learning & appraisal skills	Cottrell et al. (2006). ⁴²
	3 rd -year medical students	Self-motivation, independent learning, interpersonal relationships, dependability, & integrity	Kovach et al. (2009) ⁴⁵
Leadership	1 st -year medical students	Altruism, compassion, respect, integrity, responsibility, commitment to excellence & self-reflection	Chen et al. (2009) ⁴⁴
Contribution to Team Performance	Medical students using Team-Based Learning (TBL)	General TBL competency (termed the University of Texas - Austin Method)	Team-Based Learning Collaborative (TBLC) (2013) ⁴⁷
	Medical students using TBL	Cooperative learning skills, self-directed learning, interpersonal skills (termed the Koles Method)	Team-Based Learning Collaborative (TBLC) (2013) ⁴⁷
Performance in a Problem-Based Learning tutorial	3 rd -year medical students	Problem-solving, independent learning and group participation	Sullivan et al. (1999) ³⁹
	1 st -year medical students	Responsibility & respect, information processing, communication, critical analysis, and self-awareness	Papinczak et al. (2007) ⁴³
Performance in a Community Setting	Medical students	Effort, quality of community interaction, leadership, and subject-matter contributions	Magzoub et al. (1998) ³⁸
Communication Skills	1 st semester medical students	Ability to build rapport, listening skills, language, interview style and interview structure	Perera et al. (2010) ⁴⁶
Clinical Competence	4 th -year medical students	Competence as a student and competence as a future doctor	Dijcks et al. (2003) ⁴⁰

(2005), the medical school's position on professional competence in the curriculum guided the development of the peer assessment instrument.²⁵ This reinforced the dependence of professional competence on the interconnected importance of characteristics related to work habits and interpersonal skills. At OUWB, peer evaluation is used throughout the curriculum and each course/activity has customized evaluation criteria based on objectives and desired outcomes.

Student input is a valuable resource when designing peer assessments.¹⁴ Cestone et al (2008) found that students often take more ownership and become more invested in outcomes when they are involved in the development of peer assessment criteria.²⁶ In fact, student involvement with defining the assessment criteria may foster peer assessment validity.^{26,48}

Although there are many published instruments available, many lack validity, reliability, and reproducibility.²³ According to Norcini (2003), there are three major factors that contribute to the reliability of peer assessments: the number of relevant performances observed, the number of peers involved, and the number of aspects of competence being evaluated.¹⁴ In many cases, course directors should adapt or create their own instruments to meet the educational needs of the course.²³

At OUWB, several different courses utilize peer feedback and each course creates or adapts their own customized assessment instrument based on the course goals and objectives. For example, the Anatomy course and TBL activities both utilize a modified Koles method,⁴⁷ in which both quantitative and qualitative feedback are collected. Students rate their peers quantitatively in general

categories (such as timeliness and engagement) as well as categories more unique to the course (such as how well-prepared students are for anatomy dissection, or how prepared they are to discuss the readiness assurance test for TBL activities). In both cases, the qualitative feedback requires students to describe a peer's most valuable contribution to the team and the most important way they could more effectively help the team. In an effort to ensure that students take TBL peer feedback assignments more seriously, faculty evaluate the quality of feedback provided by students in terms of feedback being valuable, effective, and professional (see Figure 1). Students may be asked to resubmit feedback if faculty evaluators do not feel a sincere effort was made. Peer feedback is also required in other courses at OUWB, including Embark (a required scholarly concentration program that provides a mentored introduction to research and scholarship). During the second year of medical school, students present their research projects in a short oral presentation. Peers provide constructive qualitative written feedback to assigned members of their class, specifically one thing that the presenter did well, and one thing that the presenter could improve upon and how that improvement could be achieved. MHCB (Humanities and Bioethics course) has required students to provide feedback to one randomly assigned peer each week for required video reflection assignments. For this course, the peer feedback must include substantive suggestions for areas of improvement in order for the student to receive full credit. In some cases, peer feedback is a summative (graded) portion of the course grade, while in other cases it is used for formative (ungraded) purposes. In all cases, students are provided with a rubric before the start of the course to ensure that expectations are clearly communicated.

Barriers for Implementation

Medical student peer assessment often provides quality feedback; however, it is important to acknowledge some important limitations.

1. Some of the biggest barriers to a good peer feedback system are seen when implementation is not clear and the process is not standardized. For example, at OUWB, unclear instructions caused confusion about the expectations for providing feedback, in which several students provided feedback for their teammates in regards to their efforts in the anatomy lab rather than TBL activities. Faculty

learned from this experience and more clearly defined the evaluation criteria, therefore eliminating the confusion and giving students the opportunity to improve their skills specific to TBL. In addition, while evaluation criteria and overall objectives may vary, making the actual process more standardized across the curriculum will benefit students. For example, at OUWB the peer feedback assignments for TBL, Anatomy Lab, and other courses use similar open-ended questions, in which students are expected to give feedback for their peers about valuable contributions and areas to improve to further their team's effectiveness. The more standardized questions allow students more opportunities to perfect their skills in giving and receiving feedback. Overall, effective feedback occurs when the purpose is clear to both the learners and the facilitators.⁴⁹ In addition, there must be an appropriate time and a place for the feedback sessions, including guided reflection and/or mentoring and support sessions (see Figure 1).⁴⁹

2. Another potential limitation of peer feedback includes differences in perception among evaluators: even when experienced evaluators view the same event, feedback often differs.⁵⁰ In this context, inexperienced learners may not provide accurate peer feedback without proper training and with practice. Furthermore, immature students may interpret feedback received as inappropriate or hurtful, again solidifying the importance of proper training (for both the provider as well as the receiver of the feedback) and building an atmosphere of trust with confidentiality and debriefing sessions.^{3,25} To help minimize this potential drawback at OUWB, faculty use inappropriate feedback as a teaching opportunity, in which faculty meet with the student(s) to discuss their feedback and offer advice on how to provide more professional and effective peer evaluations in the future.
3. It is important to note that medical student peer feedback should not be used to assess everything. It is ideally used to assess competence in areas such as teamwork, professional demeanour, work habits, and interpersonal behaviour (Figure 1).³

Conclusion

Utilization of peer feedback is beneficial as it can provide educators with an opportunity to evaluate attributes that are often difficult to assess, including professionalism, teamwork,

work habits, and communication skills. It is especially useful as formative assessment to facilitate student learning in a non-punitive environment and allow students to further develop their skills in these areas. While there are a variety of published instruments available, many programs choose to individualize their instruments to the specific needs and objectives of their institution. To provide an optimal learning experience, both students and faculty should be trained on the appropriate use of peer feedback. Overall, when used appropriately, peer feedback can be a valuable and effective addition to the arsenal of assessments in medical education.

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