

Students as Assessors: A Novel Idea on Formative Assessment

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Background & Aims of the Study: Formative assessment of a student's academic achievements is the basic step in any educational project. The aims of this research were: 1) To determine the feasibility of conducting a formative assessment for medical students with their participation and 2) To determine which methods are applicable for students' self-assessment.

Materials and Methods: Sixteen 5th-year medical students participated in this semi-experimental study. In each session, one of the students assessed the others about the last subject in the way he or she wanted. In the next session, the students received feedback by the assessor.

Results: Students used various methods to assess their classmates, including multiple-choice questions (MCQs), short open questions, random short-answer matching questions, or other methods and instruments such as using short message service (SMS), objective structured clinical examination (OSCE), broadcasting a voice clip containing the lesson abstract, or presenting questions with power point.

Conclusion: This research showed the feasibility of conducting a formative assessment for medical students with their participation.

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Background

Assessment of a student's academic achievements is the basic step in any educational project because it provides information about the success in attaining our specific teaching objectives. Educational experts highly recommend the use of formative assessment in addition to summative assessment (1). The concepts of formative and

summative roles of evaluation were initially proposed by Scriven (2). Formative assessment is a concrete and effective way to evaluate the curricula of students. The purpose of formative assessment is not accreditation; it provides direct feedback about learning and teaching processes, and may be beneficial for students and teachers (2, 3). Formative assessment is ideally conducted separately from grades or formal ratings. It can be used throughout the training period and relatively frequently (4). If

the purpose of the assessment is to foster better learning outcomes, it could be argued that formative assessment is the most important assessment practice (3).

Formative assessment comes in many forms and can vary from informal comments made at the end of a case presentation on a ward round to highly complex and formally structured computer-based learning tools (5). Some examples of the wide range of methods in different educational fields include online quizzes that were introduced into a large Medical Physiology class (6); a four-step model of debriefing in the emergency department (7); a quiz testing the important physiological concepts of growth and puberty that was designed using the format of the well-known television game “Who Wants to Be a Millionaire” (70); a wireless classroom communication system in physiology teaching (8); an online formative assessment material (5); a formal classroom assessment of clinical competencies (9); and a longitudinal bedside formative assessment (10). Thus, formative assessment can be defined as some form of self-assessment by the student, which will provide feedback to both the teacher and student. This strategy has been grasped with enthusiasm by designers of medical curricula as an apparent means of ensuring deeper learning and understanding (5). Another form of formative assessment is peer assessment. Peer assessment has been defined as “an arrangement in which individuals consider the amount, level, value, worth, quality, or success of the products or outcomes of learning of peers of similar status.” The overall effect of peer assessment is one of an enhanced learning experience, with greater understanding in addition to the development of critical and interpersonal skills owing to the nature of peer assessment itself (11).

Despite its benefits, very few successful peer assessment systems have been implemented. Researchers found student’s preferences for the use of peer evaluations that range from a strictly formative purpose with no

consequences for a peer to a summative purpose even if peer evaluations might prevent a student from entering a residency program (12).

The Epidemiology and Control of Diseases course at Qom University is held in the second semester of the 5th year. In this course formative assessment was only done using 1-2 quizzes. It is clear that this formative assessment is not sufficient. The objectives of this course are simple; therefore it is suitable for this research. Against this background, we have introduced formative assessment in the form of medical students as assessors.

Aims of the study:

The aims of this research were as follows: 1) To determine the feasibility of conducting a formative assessment for medical students with their participation and 2) To determine which methods are applicable for students' self-assessment.

Materials & Methods

Epidemiology and Control of Diseases course is taught for fifth-year medical students in Qom University of Medical Sciences. The component of its curriculum is notified to all medical universities in Iran by Ministry of Health and Medical Education. The contents of the course are planned for 16 sessions (Box 1).

Participants

Seventeen students were enrolled in the Epidemiology and Control of Diseases course. We oriented the students about the method and informed them that the outcomes of this process would be analyzed as a research study and that the data would be reported anonymously. All of them agreed to participation in this research. But we needed sixteen students because we had 16 topics. One of them did not choose independent topic voluntary.

Design

A subjects list was prepared by the teacher using Epidemiology and Control of Diseases course topics. In this study, we allowed

students to voluntarily select their topics from a list. It was decided that students would be free to choose their methods for formative assessment. Students consulted the teacher about their methods and the teacher directed them toward selecting appropriate methods according to educational objectives.

In each session, responsible student assessed others about the last subject in the way he or she wanted. Then, the teacher taught a new subject. In the next session, students received feedback by the assessor. A summative assessment was performed by the teacher at the end of the course.

The teacher attended all assessments and collected data.

The assessment

At the end of the course, students were asked to rank the methods by scoring from 0 to 10 and were asked about the advantages and disadvantages with regard to all assessment methods on anonymous forms. They were informed that this would not affect any aspect of their final assessment and accreditation.

Ethics

This study was conducted in accordance with the Declaration of Helsinki and approved by Institutional Review Board of Qom University of Medical Sciences. Participants gave informed consent on the first day of the term.

Data analysis:

The means and standard deviations of scores of students about various forms of assessments calculated using SPSS version 16 (SPSS Inc., Chicago, IL, USA).

Results

Sixteen medical students from the fifth year participated in this study. They were 12 female and 4 males. Students used various methods to assess their classmates, including multiple choice questions (MCQs) (10 students), short open questions, random short-answer matching questions, or other methods and instruments such as using short message service (SMS), objective structured clinical examination (OSCE), broadcasting a voice clip containing the lesson abstract, or presenting questions with power point (Table 1).

Viewpoint of students about various forms of assessments by students

Topics, means and standard deviation of students' scores about various forms of assessments (0–10) obtained by the peers are shown in Table 2. According to final scoring for formative assessments, the mean scores ranged between 4.43 and 7.92. The highest mean and standard deviation (7.92 ± 1.69) was related to the topics of “Epidemiology and Control of Hypertension”. This topic was assessed using OSCE. The lowest mean and standard deviation (4.43 ± 3.36) was about the topics of “Epidemiology and Control of Typhoid Fever” that was assessed using random short-answer matching questions in English language.

Table 1 Description of formative assessments

No. of student	Assessment tools
1	Assessed other students with MCQs*, and then gave them new comments about the topic.
2	Gave the other students a standard booklet, and then assessed those using MCQs (open book).
3	Assessment was done using open questions and MCQs.
4	Told the other students that they are permitted to bring 10 lines of lesson with them at the time of the assessment. The questions were prepared in two distinct groups of open questions.
5	Prepared timed power points containing MCQs for two distinct groups of students.
6	Assessed the students in a play that one of the students was selected at first and they must answer one question, then that person selects another student and asked him/her a question.
7	Assessed the students using random short-answer matching questions in English language.
8	Divided the students into four groups and assessed them randomly by four groups of open questions and MCQs, which were prepared in different colored papers.
9	Assessed using open and MCQs prepared in painting.
10	Assessed the students using MCQs.
11	Assessed the students using MCQs and four additional funny questions.
12	Broadcasted a voice clip containing the lesson abstract, and then assessed the students using MCQs.
13	Sent four different messages (SMS)** containing questions to four groups of students. The students answered the questions using SMS and e-mail.
14	Assessed the students using OSCE***.
15	Divided the students into four groups. Each group prepared one question and answered three questions from other groups.
16	Assessed using open questions and MCQs with selective questions and painting.

*Multiple Choice Questions

** Short Message Service

***Objective Structured Clinical Examination

Table 2 Topics, means, and standard deviations of the summative results (0–10) obtained by the participants in formative

No. of student	Topic	Mean ± SD
1	Epidemiology and Control of Malaria	6.25 ± 1.98
2	Epidemiology and Control of Rabies	6.81 ± 2.42
3	Epidemiology and Control of Brucellosis	6.83 ± 1.94
4	Epidemiology and Control of Tuberculosis	6.63 ± 1.69
5	Epidemiology and Control of Leprosy	7.69 ± 1.22
6	Epidemiology and Control of Leishmaniasis	5.56 ± 1.72
7	Epidemiology and Control of Typhoid Fever	4.43 ± 3.36
8	Epidemiology and Control of Viral Hepatitis	6.57 ± 2.09
9	Epidemiology and Control of Giardiasis and Amoebiasis	5.94 ± 3.15
10	Epidemiology and Control of Soil-Transmitted Helminth Infections	5.13 ± 1.75
11	Epidemiology and Control of Cholera	6.38 ± 2.83
12	Epidemiology and Control of Sexually Transmitted Diseases	6.57 ± 1.69
13	Epidemiology and Control of Diabetes Mellitus	5.50 ± 2.07
14	Epidemiology and Control of Hypertension	7.92 ± 1.69
15	Epidemiology and Control of Diarrhea IDiseases	6.00 ± 1.78
16	Epidemiology and Control of Ischemic Heart Disease	7.50 ± 3.00

Discussion

Studies have suggested that formative assessment is a potentially powerful method to enhance the learning process (13, 14). Unfortunately, formative assessment does not appear to be used frequently in many educational settings in our university. This study revealed that a cohort of fifth-year undergraduate medical students performed different formative assessments in one course. We believe that one of the most attractive aspects of this method is to create variation in class space. Consequently, students become interested in more activity during the learning process. In this study, students reviewed all addressed contents during the term.

The benefits of sharing the learning objectives with learners are now becoming widely known. Glover and Thomas (1999) emphasized the involvement of pupils in learning, indeed advocating “devolving power to the learners” (15). Many of the teachers strive to motivate their students to be self-directed learners (5). One of the main outcomes of this study was providing conditions for creativity, improving student participation in formative assessment related activities during the term, perhaps, because of the increased motivation resulting from ownership of assessment. Students are more amenable to accepting criticism from their peers than from their teachers. Furthermore, because of the teacher’s suggestions for improvement will be minimized, student’s self-esteem is enhanced. Thus, formative assessment develops student autonomy. They appear to benefit from interacting in a group where they developed their communication skills.

The data in the present study suggest that this method is flexible and designed to be administered by a variety of students in every educational situation and is feasible for the assessment of undergraduate medical students

in Iran in a busy teaching situation. But students require time in the class for formative assessment in the same way that they require time to deal with feedback about their evaluation.

Despite this, Palmer and Devitt showed that the strategies and materials provided by academic staff to students failed to motivate the mand also to make any meaningful difference to their ability to pass a standard summative assessment (5).

This study had some limitation. According to higher quality assessments, learners need to be aware of the meaning of the assessment criteria and its methods, in addition to their routine exposure in their examinations. Our students received their information about different methods of assessment mainly via their teacher and did not receive formal educational guidelines.

Further investigation is needed to statistically compare this formative assessment method with others.

Conclusion

We have presented a model of formative assessment with an emphasis on student participation. Students should be encouraged and assisted to set their own ideas for assessing and providing suitable feedback. This article suggests that teachers reconsider their own practice of formative assessment and adopt this approach to for formative assessment of undergraduate medical students.

Footnotes

The authors thank the students for active participation in this research.

Conflict of Interest:

The authors declared no conflict of interest.

References

1. Carrillo-de-la-Pen[~]a MT, Baille's E, Caseras X, Martínez A, Ortet G, Pérez J. Formative assessment and academic achievement in pre-graduate students of health sciences. *Adv Health Sci Educ Theory Pract* 2009;14(1):61-7.
2. Puddy RW, Boles RE, Dreyer ML, Maikranz J, Roberts MC, Vernberg EM. Demonstrating Support for the Formative and Summative Assessment Paradigm in a School-Based Intensive Mental Health Program. *J Child Fam Stud* 2008;17(2):253-63.
3. Velan GM, Jones P, McNeil HP, Kumar RK. Integrated online formative assessments in the biomedical sciences for medical students: benefits for learning. *BMC Med Educ* 2008;8:52.
4. Rudolph JW, Simon R, Raemer DB, Eppich WJ. Debriefing as Formative Assessment: Closing Performance Gaps in Medical Education. *Acad Emerg Med* 2008;15(11):1010-16.
5. Palmer EJ, Devitt PG. Limitations of student-driven formative assessment in a clinical clerkship. A randomised controlled trial. *BMC Med Educ* 2008;8:18-29.
6. Kibble J. Use of unsupervised online quizzes as formative assessment in a medical physiology course: effects of incentives on student participation and performance. *Adv Physiol Educ* 2007;31(3):253-60.
7. Hudson JN, Bristow DR. Formative assessment can be fun as well as educational. *Adv Physiol Educ* 2006;30(1):33-7.
8. Paschal CB. Formative assessment in physiology teaching using a wireless classroom communication system. *Advan Physiol Educ* 2002;26(1-4):299-308.
9. Gray CS, Hildreth AJ, Fisher C, Brown A, Jones A, Turner R, et al. Towards a Formative Assessment of Classroom Competencies (FACCs) for postgraduate medical trainees. *BMC Med Educ* 2008;8:61.
10. Burch VC, Seggie JL, Gary NE. Formative assessment promotes learning in undergraduate clinical clerkships. *S Afr Med J* 2006;96(5):430-3.
11. Satterthwaite JD, Grey NJ. Peer-group assessment of pre-clinical operative skills in restorative dentistry and comparison with experienced assessors. *Eur J Dent Educ* 2008;12(2):99-102.
12. Arnold L, Shue CK, Kritt B, Ginsburg S, Stern DT. Medical Students Views on Peer Assessment of Professionalism. *J Gen Intern Med* 2005;20(9):819-24.
13. Cliff W, Freeman S, Hansen PA, Kibble JD, Peat M, Wenderoth MP. Is formative assessment an effective way to improve learning? A symposium at Experimental Biology 2008. *Adv Physiol Educ* 2008;32(4):337-8.
14. Townsend AH, McIlvenny S, Miller CJ, Dunn EV. The use of an objective structured clinical examination (OSCE) for formative and summative assessment in a general practice clinical attachment and its relationship to final medical school examination performance. *Med Educ* 2001;35(9):841-6.
15. Harris L. Employing formative assessment in the classroom. *Improv Sch* 2007;10(3):249-260.