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ARTÍCULO DE REVISIÓN

Effective Peer-Feedback as a Strategy for Formative Assessment in Medical Education

ANGELIKA KUHLMANN LÜDEKE¹

Abstract

Modern medical education demands an array of new skills and competencies, necessary for quality patient care, in the always growing complexity of health care services. Traditional assessment methods have proven inadequate for the formative evaluation required at the workplace of these domains being incorporated into reforming curricula. Research by educational experts has shown effective peer feedback to be one of the adequate instruments to be used for assessment of formative nature. Numerous advantages of peer feedback have been documented in regard to competencies such as communication, professional behavior and self-reflection. Care must be taken when incorporating new educational strategies, developed in settings that differ in social and cultural contexts. Adaptations might be necessary and are done best if framed by guidelines derived from research. Collaborative construction of the instrument is desirable to enhance acceptance. Psychometric aspects of peer feedback have been demonstrated to be adequate, given enough sampling is provided.

Key words: Formative assessment, peer-feedback, effective feedback.

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Resumen

La educación médica actual exige una gama de nuevas habilidades y competencias, necesarias para la atención de alta calidad en salud. Constituye una necesidad moderna, dada la alta complejidad que implican los cuidados de pacientes y que se están incorporando en los nuevos currículos. La evaluación tradicional es inadecuada para examinar los aspectos formativos que exigen estos nuevos dominios. Trabajos de investigación han demostrado la retroalimentación efectiva entre pares como una herramienta adecuada para la evaluación con fines formativos. Adoptar estrategias educativas diseñadas para escenarios socioculturales diferentes al propio requiere un análisis previo, para determinar la necesidad de ajustes. Estas modificaciones asegurarán mejores resultados si se basan en las recomendaciones, producto de los trabajos de investigación disponibles. La construcción conjunta del instrumento entre docentes y estudiantes ha demostrado lograr mayor aceptación. Numerosos estudios demuestran resultados adecuados de validez y confiabilidad de la herramienta, si están provistos de suficiente muestreo.

Palabras clave: evaluación formativa, retroalimentación entre pares, retroalimentación efectiva.

Introduction

Worldwide, medical education is tending towards innovation in curricula, as consequence of the increasing complexity in the workplace and professional performance of the health sciences. Modern principles of education in medical schools aim at promoting student-centered, self-directed and collaborative

learning [1,2]. The main goal of higher education institutions in health professions is to shape competent and reflective practitioners to provide quality patient care. One of the major changes in curriculum redesign is the need to teach and assess a wide spectrum of competencies in the non-cognitive domain, in regard to, for example, behavior, attitude, interpersonal skills and communication skills [3].

Traditional assessment instruments have proven to be inadequate for the evaluation of these personal attributes that contribute to professional development of medical students. Introducing new assessment methods is needed when redesigning curricula and implementing modern instructional approaches that seek encouragement of more collaborative learning styles [2-4]. These new tendencies in learning are far more complex than the traditional, individualistic approach [4]. It is therefore necessary to consider available instruments elsewhere, with demonstrated benefits in fostering the acquisition of the complete spectrum of competencies required of future physicians, and determine if they can be adopted into programs undergoing educational changes [5].

Institutions must construct solid programs of assessment, which support the integrated development and growth of the learners. These programs must focus as much on the process as on the pro-

duct of learning and experience, whilst emphasizing the formative benefit of the assessment situations, rather than being centered only on the evaluative and summative aspects of the methods [6,7].

Formative Assessment

The formative purpose of assessment is to guide students in understanding their weaknesses in order to improve them, but also, to identify their strengths in order to further enhance their development and overall learning [8,9]. Formative components of assessment are as fundamental as summative ones, especially in the form of effective feedback, that has been demonstrated to be conducive to change, professional and personal growth and learning [7,8]. This new dimension of assessment, by means of feedback, helps students monitor their own learning process, clarify their goals, base their corrective actions, decrease reliance on self-validation by providing insight to the actual performance as perceived by others, and enhance their skills in communication, self-assessment and self-reflection [9-11].

In the available literature, several authors stress the importance of assessing the acquisition of the new competencies to convey students a clear message of the institution's values, and in so forth, explicitly emphasize the behavior expected of them throughout the program [12-15]. These skills need to be explicitly taught

and assessed for effective and collaborative professional competence [16].

For feedback to be effective, it must be provided in a respectful manner, on an ongoing basis, as soon as possible after a directly observed performance; it should be task-oriented, clear and specific, manageable and relevant to the receiver [17]. Formative assessment strategies serve their best outcomes when practiced in various educational activities and settings and by various raters (tutors, clinicians, peers, patients, other health-care providers and self) [18].

Students are expected to contribute actively to their own educational process, sharing responsibilities with the staff and their peers in terms of setting criteria, assessing self and others and providing feedback [6]. This supports a collaborative educational environment, providing reassurance, shaping values, documenting growth and benchmarking progress [9,18]. This form of formative evaluation must always be accompanied by specific suggestions for improvement and be supported by an adequate mentoring system [6,8]. In order to be effective, formative assessment must offer sufficient and timely opportunities for rehearsal, tailored according to individual needs and progress rates [8].

Peer-Feedback

Peer-feedback is one of the novel methods of formative assessment available

in medical education and other health related professions. It has introduced the possibility of evaluating new, hard-to-measure, domain independent competencies that are required and expected of professional performance for high quality patient care [19]. Stakeholders, accreditation bodies, regulating agencies, professional societies and the public now demand the presence of an assessment program where formative components are a key issue [20].

Effective peer feedback is to be understood, on the basis of the educational theory of cognitive-constructivism, as the provision of meaningful, constructive information by peers about previous and directly observed performance, behavior and/or attitude in order to promote a desired change in the learner [9,21]. Peers are considered suitable as feedback providers since they are at a similar level of development, have no hierarchical power over each other and spend more time together on the same or similar tasks [22]. Epstein presents peers as credible sources in evaluating workplace behavior and their judgments have shown to correlate with future academic and clinical performance [9].

At the Mayo Clinic, researchers conducted a study on peer-evaluation in the Gross Anatomy course during a period of five years [23]. Their findings show this method helped students develop skills to judge performance of others, leading

to an increased consciousness of their own work and behavior. Another similar study demonstrated that students expressed a greater sense of responsibility and perceived an improvement in their academic achievement when evaluating their peers [24].

Advantages of Peer-Feedback

Numerous studies have demonstrated that the use of this tool for formative purposes is accompanied by a wide spectrum of positive gains for the educational development of students. Van der Vleuten's and Epstein's findings point towards promotion of professionalism, teamwork and communication skills [9,25]. It allows gaining insight into otherwise difficult aspects, such as interpersonal skills among peers and future colleagues, work habits, accountability, punctuality and preparedness [12,15,23].

Peer feedback provides an additional learning tool by exposing both the assessor and the assessed to skills of critical reflection and analysis of self and others, essential for the both training and future practice [16,23,26-28]. The action of assessing peers increases awareness of own aspects on which one will be assessed, and this, in turn, leads to critical reflection on own processes and products [16,29]; an increase in confidence in the ability to perform and a subsequent change towards improvement in performance

[16,27,30,31]. Providing students with the opportunity to compare their own view of themselves with the view of others who perform along them, results in deeper understanding of own roles and functions [32].

Additional reported benefits derived from studies on peer feedback over the past two decades include increase in learners' motivation and collaboration, an enhanced sense of commitment to the team and positive social interdependence, where the success of the team is considered directly linked or dependent on one's own success [33-37].

In terms of investments, peer feedback offers additional benefits as well. The acceptance of new educational strategies depends highly on the human and economic investments for institutions [38]. This instrument does not demand additional costs and/or resources, for an adequate implementation, other than proper training of staff and students in necessary skills of giving and receiving feedback [16,30,39].

Components of Effective Feedback

Content

Clear criteria on the content in which to frame the assessment for benchmarking purposes has to be in place [16]. The observed performance to be evaluated by peers must be compared to predetermined standards. Giver and receiver of

feedback must have a clear understanding of the criteria and areas on which to base their observations and the standards expected to be met.

Archer advocates that feedback should focus on the performance or task and not on the individual and should be clear and specific [21]. To be effective and useful, feedback must be considered relevant by the receiver, directly linked to specific goals and include suggestions for improvement [21].

Archer's concept is supported by the feedback intervention theory (FIT) by Kluger and De Nisi [33]. As stated in this theory, orientation of feedback must be placed in line with the gap identified between the current and the desired performance and should address suggestions for advancement in the development of the learner. Feedback with these characteristics is also referred to in the literature as *facilitative feedback*, meaning it should be useful for helping the recipients accomplish their own revision and reflection, conducive to self-regulation and change towards improvement [21]. Van den Bosshe, Segers and Jansen conducted a study that supports the FIT, in which they demonstrated that motivation in the learner, due to feedback received, depends on the way the assessed perceives the information, and the degree to which he/she is driven to make changes with the purpose of enhancing performance [40].

Context

Important aspects to be determined before implementing peer feedback are defining the setting and moment at which the assessors will conduct the observation and evaluation (immediate vs. delayed) and the method to be used for the provision of the feedback (verbal vs. written) [21,33,40].

Determining the frequency in which it will be carried out is also important. The study by Van den Bosshe et al. demonstrates that increasing the number of feedback providers had a greater benefit for students' learning than increasing the number of times of feedback provision [40]. Schönrock et al. found similar results in their research, where feedback from different perspectives provided more meaningful information on performance [14].

In terms of the context, it is fundamental as well to count with the support of the institutions' academic and administrative stakeholders, by means of providing enough time for the application of this instrument, training the participants in this complex skill and having a common and clear stance on consequences of undesired, repeated behavior, when encountered [41].

Implementation Procedure

Consensus on aspects of implementation and conduction procedures has not been

reached among experts in the field. The reason might be that these are more sensitive to learners personal characteristics such as cultural upbringing [22]. In this respect, further research is needed to gain deeper insight into the most effective way of providing the information obtained: confidential vs. anonymous; public (within the group) vs. face-to-face in private with the tutor; oral vs. written [42]. Arnold et al. present other issues which might influence students' participation, such as who receives or has access to the information provided and the consequences for the recipient, especially if negative feedback is involved [22].

Conjunctive Construction

When implementing peer feedback with formative assessment purposes, the design of an appropriate and successful format would be one constructed in active conjunction and negotiation among staff and learners [43]. This provides a sense of ownership and participation of students and teachers, thus promoting a positive perception in all parties involved and ensuring the best possibility of acceptance, compliance and permanence.

Studies have demonstrated that the effect of an assessment method on learning is greatly influenced by the way students perceive the method [25,43]. Therefore, it is important to obtain the opinion and preferences of students (and teachers as well) on the different

aspects (content, context and implementation) involved, when constructing new instruments for formative evaluation. Following the recommendations available in the literature, based on the best evidence, promotes the permanence of new methods within the assessment program of an institution, integrating it holistically into the system, and in so forth, considering it an essential component of the educational process [25].

Considerations and Precautions

Most of the findings in the available literature are based on studies conducted in western or Anglo-Saxon educational environments. This points to the importance of determining if they are transferable and applicable to other settings with diverse social and cultural characteristics. Countries in South America, as in other continents, are struggling to keep up with modern trends in medical education, within an era of globalization [44]. Institutions of higher education worldwide are implementing new curricular models, accepted by international principles of medical education and following innovative instructional designs, but it must be kept in mind that these new ways of educating have been developed in western, highly developed countries. Efforts to introduce these modern education styles in settings under very different situation do not always acknowledge the implications and consequences that these changes might bring about; the success and failure rates frequently are depended

on these issues [45]. Educational premises on which these innovations are founded are not always independent of cultural and social conditions, inherent to the setting where they are going to be applied [46].

Taking care in an appropriate approach will increase the probabilities of success in implementing innovations, instead of introducing them rigidly and without the proper considerations warranted. Changes to be introduced must not be assumed as an assured success only due to globalization pressures, since formative assessment methods, especially, are highly sensitive to contextual factors [42,44]. Reflection on cultural characteristics and social structures is necessary when introducing learning environments that require collaboration skills and sensitive instruments of assessment such as peer feedback.

Psychometric Factors

Psychometric aspects of evaluation methods must always be regarded with care before decision making, and even more so with formative assessment; this modality has been traditionally disregarded as subjective, due to their lack of standardization. Empirical research in numerous cases has demonstrated good validity and reliability scores [47-49]. Davis and Archer, Epstein and Van der Vleuten et al. have shown that psychometric values of formative assessment methods such as peer feedback are ad-

equate, given sufficient sampling across contexts and assessors are available [9,25,32].

The study by Van der Vleuten, Norman and De Graaf demonstrates that reliability and objectivity are not the same [50]. Therefore, as inherently subjective as this type of assessment might be, it does not define the method as being unreliable. This important finding justifies the inclusion into an assessment program of methods such as peer feedback, based on judgment of what the authors call “experts”, which include, among other information sources, peers who possess knowledge regarding the educational performance and behavior at the workplace.

Epstein’s research demonstrates that peers are considered to be credible sources regarding workplace based performance, if enough sampling is provided [9]. Adequate sampling across assessors and proper triangulation of the information from different sources should be provided. This approach aids in overcoming the inherent subjectivity that characterizes individual assessments and increasing reliability of the instrument [25,32]. These authors share the opinion that no assessment method is inherently reliable and/or valid; these psychometric measures are more dependent on the way the instrument is used, rather than on the instrument per se.

Reliability is a psychometric aspect that can be improved by extending opportunities of direct observation and contact time; peers will be able to assess sustained performance over long periods of time [51,52]. Another advantage offered by peer feedback is that observation is embedded in authentic scenarios of every-day practice. If applied to the concept of validity in Van der Vleuten and Schuwirth, where validity of an instrument is highly determined by the wide sampling across context and authentic practice sites, peer-assessment can be considered as a method fulfilling these requirements [53].

Conclusions

Over two decades of results based on evidence have demonstrated the importance and need of incorporating instruments that foster and evaluate the new, additional skills and competencies demanded nowadays of health care providers. These aspects have traditionally tended to be left out of the formal education programs. Within international medical education experts, peer feedback is considered one of the appropriate methods, in which assessment programs with formative purposes should be embedded.

It is up to the institutions introducing modern curricula to examine their individual circumstances and determine to what extent stakeholders and staff

members are interested and willing to bring about the necessary changes that formative assessment requires. Adopting new strategies in education requires a thorough analysis of the changes these might need to undergo, in order to incorporate them as coherent instruments for a given context.

Enough literature is available in this field in regard to guidelines that support the most effective construction and implementation of formative assessment in the form of peer feedback. Following these guidelines and shaping the method to specific contextual characteristics helps ensure the best possible outcome with any type of innovation in education, including assessment.

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