

Assessment of learning in health higher education

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ABSTRACT

Learning assessment is an important pedagogical component interconnected to teaching. Assessment supports the teacher in guiding the teaching-learning process. Based on its attributes, methods, and functions (formative, summative, and informative), assessment adds information about student performance and guides the decisions of educational institutions. This article presents basic concepts of learning assessment, integrating them historically within the context of education through pedagogical approaches, paradigms, and perspectives specifically within the health field in higher education. Reflecting on the historical changes in health higher education, it becomes evident that assessment needs to be recognized as a mechanism for regulating education while promoting and solidifying curricular restructuring.

Keywords: Educational evaluation, Learning, College education, Health education, Teacher.

INTRODUCTION

Higher education combines gaining knowledge, conducting scientific research, participating in social actions, and critically examining these interconnected activities. Universities are tasked with providing professional training, which is achieved through a structured learning process^{1,2}.

Emphasizing the learning process favors the completeness of the student's education, their growth, and development in the cognitive domain, from the perspective of human and professional skills, as well as within the attitudinal context, emphasizing the formation and enhancement of social and professional values¹. In a dialogical relationship, student learning emerges as an outcome of the teacher's teaching efforts and is the primary focus of assessment³.

Teaching encourages learning, which is then evaluated through assessment, creating a closely linked relationship. Learning varies from one person to another, influenced by factors like understanding level,

time to assimilate information, and learning styles. This variation allows for the development of teaching strategies that are better suited to each student's needs, providing improved opportunities for learning⁵⁻⁶.

Assessment supports the teaching-learning process. In addition to guiding the teacher's planning so that the teaching objectives are consistent with the activities and content, assessment is a potential indicator to the student about their strengths and weaknesses, and it stimulates reflection on learning outcomes³.

In higher education, assessment plays a critical role in the (re)formulation of curricula and the alignment of pedagogical practices. It is an activity connected to the objectives of the training process and, consequently, to the model of professional who is being trained⁵.

The objective of this article is to present and reflect on concepts of learning assessment, historically integrated within the context of education through pedagogical

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approaches, paradigms, and the specific perspectives of higher education in the health field.

PEDAGOGICAL APPROACHES AND PARADIGMS OF EDUCATION

The development of teaching, learning, and assessment methods during the

19th and 20th centuries includes different theories that each educational approach supports. Discussing these theories is important for understanding the impact of each pedagogical method. We'll look into the main features of four educational models: the traditional school, the new school, the technician school, and the critical school (Table 1).

METHOD	PERIOD	CHARACTERISTICS
TRADITIONAL PEDAGOGY	From the imperial period until the beginning of the Republic. It was the first to be established in Brazil.	Teacher as the center of the educational process, being the transmitter of knowledge, focused on technical-scientific knowledge; classes are predominantly expository, assessment values cognitive aspects and requires memorization and reproduction on the part of the student. Assessments focus on the product and do not value the student's journey ^{4,10} .
NEW SCHOOL	First half of the 20th century. Brazil: began in the first Vargas Era.	Teacher as a guide to knowledge; the teaching-learning process focuses on the active and creative student; the assessment aims at the student's improvement ^{4,10} .
TECHNICIST SCHOOL	United States: second half of the 20th century; Brazil: military dictatorship.	Discusses the principles of rationality, of the industrial and technological society. The teacher is seen as the holder of technical capacity and the ultimate authority to ensure the effectiveness of teaching. Educational technologies and audiovisual resources are highly valued and assessment is based on the student's productivity ¹⁰ .
CRITICAL SCHOOL	Brazil: 1980s	The teacher is the facilitator of the teaching-learning process; the student engages with their social, historical, and political aspects. The assessment aims to transcend conventional understanding and cultivate the student's critical awareness. Education is seen as a mechanism for social transformation ¹⁰ .

Table 1. Pedagogical Approaches and Their Characteristics

Multiple approaches can coexist in Brazilian education, with the predominance of one or another, given different cultural, historical, political, and epistemological realities. These multiple contexts direct the choices and perceptions of teachers in teaching, learning, and assessment^{7,9}.

Assessment becomes a complex phenomenon in the dynamics of the educational system. The focus should not be on assessment in isolation, but rather on how it is conceived within a culture that priori-

tizes quantitative results, and performance measured through grades^{5,10}.

This concept still prevails in Brazilian university education. The issue stems from

the tradition of assessment that is limited to verification of discrete results, undervaluing the student learning process. This reflects the dichotomy in the university setting between teaching and assessing, leading to a discrepancy between what is taught in class and what is intended to be assessed¹¹.

Traditional methods represent the prevailing mindset of traditional education, which promotes a segmented approach to knowledge. In this model, students often mimic their teachers without engaging in critical thinking or expressing their own insights.^{9,12,13}

On the other hand, new educational paradigms emphasize the importance of reflection within the learning process, advocating for knowledge to be built through a collaborative relationship between teacher and student. Here, the student actively participates in their own education¹³. The assessment of learning extends past mere observation, taking into account both subjective and objective conditions, the explicit and implicit goals of the curriculum, and the desired profile of the professional being developed. This approach offers a more comprehensive view of education¹⁴.

This work proposes to focus its theoretical framework on the assessment of learning in higher health education from presenting these aspects and educational assumptions, especially regarding evaluation.

HIGHER EDUCATION IN HEALTH

Higher education in health is continually transformed and reassessed. The training of professionals is evolving in response to changes in political, social, and technological contexts, necessitating new

guidelines and policies. These shifts are prompting a reevaluation and reflection on various educational practices and frameworks^{15,16}.

Historically, health education has been the subject of criticism, and some points of tension were clarified as the profile of the trained professional evolved and no longer corresponded to the established health context^{17,18}. The professional is central to adopting the new health care model; they serve as the interface between the system and the population. As policies evolve, professionals must also adapt, necessitating new perspectives to understand the required training profile^{19,20}.

The introduction of the Unified Health System (SUS) has put health education at the forefront of discussions that aim to shape policies and government actions through the Ministries of Health and Education. The establishment of a socialized health system acted as a catalyst, sparking various initiatives aimed at reforming health education^{19,21}.

It is important to mention the 1991 creation of the Interinstitutional Commission for the Evaluation of Medical Schools (Cinaem). Coordinated by the Brazilian Association of Medical Education (Abem), the movement suggested that the practice of teaching and assessment employed an outdated model, limited to cognitive aspects³³.

In the chronological sequence of events, the promulgation of the Law of Guidelines and Bases of National Education (LDB) in 1996 stands out, which proposed replacing the minimum curricula with the National Curriculum Guidelines (DCN) in 2001. For health courses, the DCN recommended necessary changes in the cur-

ricula of the courses, in the practice scenarios, and in the teaching-service-community relationship. Higher Education Institutions (HEIs) gained greater autonomy to define the Course Pedagogical Projects (PPC) and were empowered by the guidelines to direct health training to social issues and the purposes of SUS^{23,24}.

Resulting from political, cultural, and educational factors, especially from the New School movement, the DCN advocates for the formation of a generalist, humanist, critical, and reflective professional. Furthermore, these guidelines foresee the use of various methodologies aimed at monitoring and evaluating learning. The change brought about by the guidelines improved training by developing competencies among students^{24,25}.

According to the curriculum guidelines²⁴, competency is understood as:

The ability to mobilize knowledge, skills, and attitudes, utilizing available resources, and manifesting through initiatives and actions that result in performances capable of solving [...] the challenges of professional practice in the context of health care work [...] primarily in the scenarios of the Unified Health System (SUS).

The DCN encouraged reorienting the educational process and inserting active teaching-learning methodologies, valuing the progress and evolution of the student. This entire movement encompasses the principle of the inseparability of teaching-service-community, which promotes the student's interaction in practice, with dynamism and autonomy facilitated by active methodologies^{25,26}.

To complement the propositions of the DCN, the Ministries of Health and Education launched policies to reorient health training. Namely: The Program for Incentive to Curricular Changes in Medical Courses – Promed²⁷; the National Program for the Reorientation of Professional Training in Health – Pró-Saúde²⁸; and the Education through Work for Health Program – PET-Saúde²⁹. The proposals of these policies have directly influenced the training and practice of health professionals in Brazil²⁰.

Introducing these theoretical frameworks signifies advances in both health and education, and their recommendations pose significant challenges for HEIs: the responsibility to update the principles mandated by legislation through the development and (re)formulation of the PPCs. There must be an interface between the implementation of these policies within the realm of health care work and rethinking teaching-learning processes^{22,24}.

In effect since 2001 in health area courses, the DCN²⁴ have reinforced a model of education centered on the student. Medicine presented a new proposal for the reformulation of its guidelines in 2014³⁰. Pharmacy, nutrition, dentistry, and nursing are already working on new restructuring proposals for new DCN intending greater alignment of the graduate profile with the social perspective and the expanded view of health^{31,32,33}.

Learning assessment follows the same path of change as teaching methodologies. If curricula change, teaching and assessment strategies must also adapt. Teaching and learning are interdependent elements. To incorporate the defined competencies, the learning assessment must

be in step with the methodologies and the training path defined by the curricula³⁴.

Assessment of learning in higher education in health reflects a sum of individual institutional factors by including the profile of the teacher in their pedagogical options, the guidelines of the courses, and the identity of the institution itself, which is not detached from this relationship⁸.

As health education evolves, there's a need for a new approach to assessment. The emphasis is moving beyond simple pass or fail outcomes. The goal now is to achieve educational objectives, evaluating if the student has mastered the content (knowledge) and developed the necessary skills and attitudes. In other words, the focus is on whether they have built the competencies specified in the curriculum^{34,36}.

ASSESSMENT OF STUDENT LEARNING IN HEALTH UNDERGRADUATE PROGRAMS

The student, as the one being assessed, needs to know what is expected of them in an assessment based on defined criteria and should also receive feedback on their performance^{36,39}.

The teacher, as the evaluator, must ensure the progression and development of the student based on consistent and coherent evaluative practices with the course curriculum, institutional dynamics, and educational policies^{36,39}.

Assessment often reflects the contextual characteristics in which it is performed. In this sense, assessment can embrace the multidisciplinary nature of knowledge, with various purposes, functions, and goals be-

ing attributed to it⁶.

“Evidence of learning is collected in a planned and systematic manner, being used to issue a judgment on learning”⁴⁰. Therefore, the assessment of medical students, and it is believed that this also applies to other health courses, encompasses the process of acquisition and analysis of information to meet various educational purposes.

The information obtained in the evaluative process aims at taking specific measures and can serve different purposes or functions (“for what”). The main ones are: summative, which establishes decisions about the student's progress; formative, which fosters learning; informative or diagnostic, which proposes analysis of the assessment's repercussions for the improvement of the educational process⁴¹.

Assessment serves an informative or diagnostic role when the outcomes of a student's evaluation inform the quality of the educational process for Higher Education Institutions (HEIs). In this context, the emphasis isn't just on student performance but primarily on the competencies they have developed. This focus helps guide adjustments needed to enhance teaching. Importantly, diagnostic assessment aids in evaluating both the curriculum and the institution itself, providing valuable insights for improvement³⁹.

The intention of formative assessment is to document the status of the learning process, allowing the student to make necessary corrections throughout their training to achieve the objectives, and can propose solutions for possible improvements in teaching. Feedback is linked to this dynamic practice, as an indispensable

component of the dialogue between the student and the teacher³⁹⁻⁴¹.

Feedback should give meaning to the assessment as it promotes reflection and self-evaluation in the student and facilitates a closer relationship with the teacher. Consequently, feedback is considered the 'backbone' of formative assessment⁴⁰.

Formative assessment disputes the notion that evaluations should only occur at the conclusion as a final judgment. Rather, it advocates for its integration throughout the entire teaching and learning process. It is possible to conduct formative and summative assessments simultaneously. To effectively blend these assessments, teachers must clearly grasp their educational objectives. Even when employing traditional assessment techniques, teachers can guide the process to ensure students are actively involved in their learning experience^{39,40}.

In health higher education, summative assessment has already been established. Its intent is for the student to advance through stages to reach a target. Based on the results presented, decisions are made about the student's evolution in the course. There are various methods of summative assessment, such as exams with objective questions (multiple choice), essay questions, and oral tests with a predominance of knowledge assessment^{39,42}.

Formative assessment can occur using the same methods as summative assessment, however, in a broader context, it aims to encourage learning. Its perspective is one of continuity and monitoring, it does not focus on specific results^{39,40}.

Summative assessment is capable of assessing the acquisition of knowledge, skills, and attitudes, these data are essen-

tial for the process monitoring exercised by the formative. It is recommended that summative and formative assessments not occur exclusively, but that they complement each other⁴².

LEARNING ASSESSMENT METHODS

The educational journey of a student is designed to align with their preparation for professional practice. Deciding "what" to assess and "how" to assess naturally leads to defining the desired professional profile to be developed. The PPC serves as the foundation for outlining the educational goals and organizing the learning domains of the curriculum components⁴⁰.

The *cognitive* domain encompasses the acquisition of theoretical knowledge by the student. The *psychomotor* domain refers to skills, to "doing," and the *affective* domain relates to the student's sensitivity, their posture, and their attitudes towards the circumstances of educational dynamics. The integration of these three domains composes competence in learning. Learning means acquiring skills and promoting competencies⁴³.

In light of the reformulation of health education, the use of active methodologies highlights the four basic pillars of education: learning to know (understanding and construction of knowledge), learning to do (mobilization of cognitive skills; "putting knowledge into practice"), learning to live together (coexistence and inter-professionalism), and learning to be (development of personal and professional identity), which encompasses the integration of the four pillars⁴⁴.

To assess competencies, the scholar George Miller proposed the following model in the 1990s: the student must know (knowledge); know how to do (characterize, report); show how to do (simulation) and do, which refers to reality (put into practice)⁴⁵.

Considering that learning is dynamic and procedural, there are various evalua-

tive methods to be applied. The choice of method is directed by the purpose of the assessment and will depend on what is being evaluated^{36,43}.

The proposal initially applied to medical schools but is adequately used in other health courses (see Figure 1).

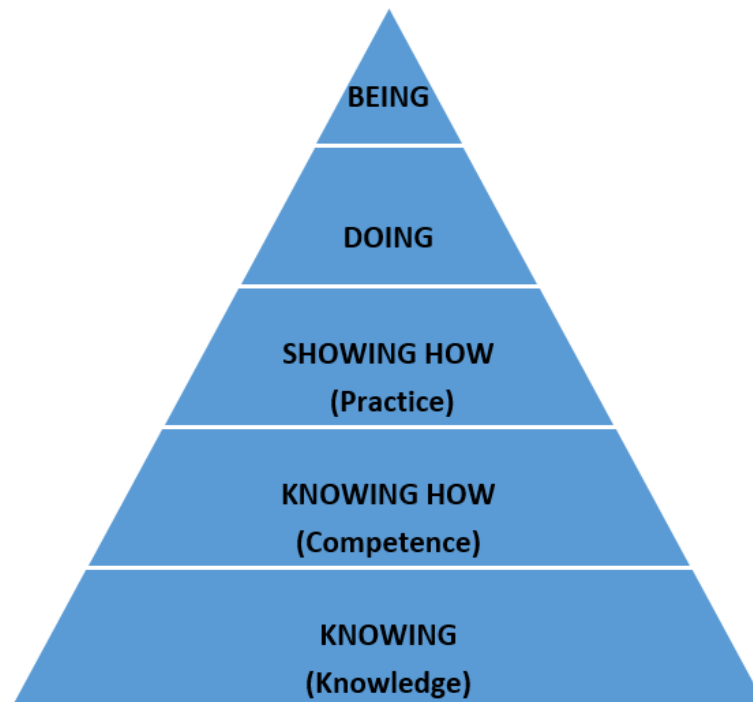


Figure 1. Representation of the modified version of Miller's pyramid.

The layer corresponding to knowing is linked to cognitive skills, suggesting utilizing exams with open questions, multiple-choice tests, essays or dissertations, and oral examinations. The methods are suitable for verifying acquired knowledge, the theoretical domain^{36,40,42,45}.

Knowing how to do also falls within the cognitive domain, but the expectation is to assess applied knowledge. In this regard, the same assessment methods as for

knowing are recommended, but contextualized exams should be used, such as clinical cases^{36,40,45}.

The 'showing' level focuses on assessing clinical skills and competencies through practical exams in simulated situations, utilizing the Objective Structured Clinical Examination (OSCE)^{36,40,45}.

Finally, the doing, which pertains to the assessment of professional performance, can include the workplace and

settings of real-world practice for students. Among the recommended methods are the Mini Clinical Evaluation Exercise (mini-CEX) and the 360-degree evaluation^{36,40,45}.

Miller's model has been widely used in medical education; however, a limitation has been identified in this approach. It is argued that the most accurate measure of professional behavior involves the integration of values and attitudes with skills and knowledge. Consequently, the addition of a fifth layer to the pyramid, representing 'being',⁴⁶ is suggested.

This level significantly contributes to developing professional identity and should be evaluated using existing assessment methods. The challenge of assessing 'being' is greater than that of 'doing.' Attitudes and values represent subjective elements, making reliable assessment difficult. This challenge is further complicated by the inherent individuality of identity and the student's personal interpretation of their professionalism⁴⁶.

No single parameter for the desired professional is anticipated. The teacher's role is to select of the most effective strategy for each situation, suggesting an adaptation of methods currently in use to assess "being", the development of professional identity, or professionalism^{36,46}. Assessment tools developed in medicine and other professions can serve as a basis for new methods as we move from an emphasis on "doing" to "being."⁴⁶ In this sense, instruments have been developed and validated for assessing professionalism, such as the Professionalism Mini-Evaluation Exercise (P-MEX), developed from the mini-CEX⁴⁷, which has been translated and adapted into Portuguese⁴⁸.

Regardless of the chosen method, it is important to meet the general attributes that confer value and credibility to the information gathered in the assessment. Attributes considered for a good assessment include: validity, reliability, feasibility, equivalence, acceptability, educational impact, and catalytic effect³⁷⁻³⁹.

Health assessment practices examine cognitive, psychomotor, and attitudinal skills. The connection between the information obtained through the applied assessment methods and the co-responsibility of the entire academic community for the impacts and decision-making systematizes the assessment in a programmatic dimension^{39,41}:

A set of diverse but coordinated actions that develop at different moments, composing a true program, aiming to fulfill, in the best possible way, the various functions of student assessment [...] an innovative way to apply traditional concepts, so that the functions of the assessment are fulfilled effectively (fitness-for-purpose). [...].

To contemplate the sphere of programmatic assessment, it is necessary that the evaluation methods conform to the consensus of what is regarded as a good assessment, since there is a desire to complete the assessment with quality. Programmatic assessment allows for long-term monitoring of student development and ensures the systematic organization of information³⁹.

Programmatic assessment aims to overcome the assessment model centered on cognitive domains that health courses still use. The proposal seeks to consolidate formative assessment, integrate formative

and summative, strengthen appropriate feedback, and make decision-making more assertive^{41,49}.

In traditional assessment models, evaluation practices are often disjointed, with assessment methods targeting specific subjects without considering integration or context. Teachers, or groups of teachers within a discipline, tend to work in isolation, making solo judgments about student performance. This approach results in a lack of interdisciplinary collaboration and communication between teachers, as well as between teachers and students. Furthermore, the data derived from these assessments is often interpreted subjectively^{38,39}.

The assessment should provide a framework for the student to exercise reflection, criticality, and self-evaluation. Furthermore, it contemplates support for teachers in teaching practices and in assessment planning and execution^{38,41}.

Considering that teaching and learning are connected, the difficulties mentioned by teachers when dealing with methodological and didactic aspects also include their limitations when conducting assessments. The practice often reflects rushed training: lecturing, assessing, and assigning grades to a group of passive students⁵.

Articulating the teaching to the assessment is not a natural teacher skill; it needs to be studied and developed. Therefore, teacher training, in defense of a continuous, institutionalized, and effective process, must be strengthened^{5,50}.

Teacher training focuses on enabling educators to effectively manage curricula and educational resources, and to serve as facilitators in helping students acquire key competencies for learning. Despite

this, many teachers are hesitant to transition from traditional assessment methods. This resistance can stem from a variety of factors, including a lack of knowledge, insecurity about implementing new techniques, trust in their current methods, the burden of additional responsibilities, or simply for the sake of convenience^{5,50}.

FINAL CONSIDERATIONS

In the context of higher education in health, there's a pressing need to practically apply the various learning assessment methods discussed, which are part of the broader innovation trend in this field. The shift from traditional, rote learning models to those that emphasize meaningful learning places the student at the heart of the educational process, with the teacher serving as a guide. This transition highlights the urgency of rethinking and implementing new paradigms in teaching and learning.

Looking back at the evolution of education, we see that assessment has traditionally been used as a diagnostic and monitoring tool. It helps teachers understand students' progress and challenges, enabling them to adjust their methods and reconsider their approaches and attitudes towards teaching.

Historically, health education has been dominated by traditional teaching and assessment methods, focusing mainly on theoretical knowledge. However, despite these ongoing challenges, the introduction of competency-based teaching and assessment has led to significant improvements. This includes the development of formative assessment and the implementation of programmatic assessment. As a result, assessment is now viewed as a tool to

guide and improve education, playing a key role in driving transformation within higher health education.

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MSNV, NMSCC, ERSP contributed substantially to the study design; participated in drafting the preliminary version, in reviewing and approving the final version. They are aware of the responsibility for the accuracy or completeness of any part of the study.

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