

Online formative tests: opinion and adherence of healthcare students

Testes formativos on-line: opinião e adesão de estudantes da área da saúde

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ABSTRACT

Introduction: Formative assessment encourages students to take an active role in their learning. In terms of knowledge, tests become more accessible in the online environment, with immediate feedback, although student engagement remains a challenge.

Objectives: To evaluate the opinions and participation of undergraduate health sciences students in formative tests conducted in an online environment.

Methods: This is a study evaluating an educational intervention conducted from August 2023 to August 2024 with undergraduate students from a health sciences college. The formative tests were designed during the development of the modules in an online environment. Participants received a structured questionnaire by email, including sociodemographic variables and questions about access to, understanding of, and motivation to complete the formative tests, using a five-point Likert scale. The implementation of the tests and student participation were also evaluated through a review of the academic system, Lyceum. A mean ranking above 3 was considered the consensus criterion, and a t-test was used to compare means.

Results: Of the 141 students surveyed, 76.59% reported that formative tests were always made available in their courses. The assessment was considered technically adequate, with clear instructions and a sufficient number of questions. Students acknowledged that the tests helped them organize their studies and retain knowledge, although they did not feel motivated to complete them. An analysis of records in the academic system showed that test implementation varied across courses and semesters, with higher participation in courses that implemented the tests in more than three modules per semester ($p = 0.024$).

Conclusion: Students adapted well to the tests and the online environment, although they did not feel motivated to participate. Greater exposure to the tests was associated with higher student engagement. The study discusses the importance of shifting the evaluation paradigm to place greater emphasis on formative assessments as a strategy to improve engagement.

Keywords: Educational measurement; Learning; Educational technology.

RESUMO

Introdução: A avaliação formativa promove uma postura ativa dos estudantes sobre sua aprendizagem; na dimensão conhecimento, os testes se tornam mais acessíveis no ambiente on-line, com feedback imediato, embora a adesão ainda seja um desafio.

Objetivo: Este estudo teve como objetivo avaliar a opinião e adesão dos estudantes de graduação da área da saúde aos testes formativos em ambiente on-line.

Método: Trata-se de um estudo de avaliação de intervenção educacional realizado de agosto de 2023 a agosto de 2024, com estudantes de graduação de uma faculdade da área da saúde. Os testes formativos são planejados durante o desenvolvimento dos módulos em ambiente on-line. Os participantes receberam por e-mail formulário estruturado com variáveis sociodemográficas e perguntas sobre acesso, compreensão e estímulo aos testes formativos, utilizando escala de Likert de cinco pontos. Foi avaliada também a aplicação dos testes e adesão dos estudantes por meio de consulta ao sistema acadêmico Lyceum. O ranking médio acima de 3 foi considerado como critério de consenso, e utilizou-se o teste t para comparação de médias.

Resultado: Do total de 141 estudantes, 76,59% relataram que o teste formativo sempre era disponibilizado em seus cursos. A avaliação foi considerada tecnicamente adequada, com instruções claras e questões suficientes. Os estudantes reconheceram que os testes ajudavam na organização dos estudos e na retenção do conhecimento, embora não se sentissem estimulados para a sua realização. A análise dos registros no sistema acadêmico mostrou que a aplicação do teste foi variável entre cursos e períodos, sendo a adesão maior nos cursos que elaboraram os testes em mais de três módulos por período ($p = 0,024$).

Conclusão: Os estudantes mostraram-se bem-adaptados ao teste e ao ambiente on-line, embora não se sintam estimulados; uma maior exposição ao teste esteve associada a uma maior adesão dos estudantes. O estudo discute a importância de mudança do paradigma do processo avaliativo com mais ênfase nas avaliações formativas como estratégia de melhor adesão.

Palavras-chave: Avaliação Educacional; Aprendizagem; Tecnologia Educacional.

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INTRODUCTION

The assessment process entails a critical reflection on practice, with the aim of capturing progress and enabling decision-making and the monitoring of all learning. Assessment should not only help diagnose the current situation, but also provide information for the management and improvement of learning. It should also inform about the real effects of their interventions, reflecting the results of their behaviour and enabling self-regulation and improvement of the pedagogical approach¹⁻⁵.

Designing an assessment that recognises learning domains requires knowing how to adjust assessment methods to the skills and competences to be evaluated. The criteria and consensus for good assessment in the training of health professionals, defined at the Ottawa conference in 2018, include elements of the educational effect – the extent to which assessment motivates those who perform it to prepare themselves in a way that brings educational benefits; and catalytic effect – the extent to which the assessment offers feedback to improve learning, reaffirming expectations that the assessment process should support sound decision-making and facilitate student progress^{1,3-5}. Feedback is a central factor in assessment; it is about gradually freeing students from dependence on the teacher, enabling them to understand standards and make reflective comparisons with their own performance^{1,6,7}.

Assessments are categorised along two main lines: summative and formative. In summative assessment, the aim is to describe and verify what the student has learnt and is capable of reproducing at the moment, with a view to prioritising, selecting, guiding and certifying. On the other hand, the purpose of formative assessment is to guide and identify the students' difficulties, with a view to helping them discover the processes that will enable them to progress in their learning. The perspective of summative assessment, therefore, seeks to synthesise the knowledge acquired, whereas formative assessment assists in the construction of learning, helping to improve this process².

Formative assessment, carried out regularly and periodically throughout the educational process, can help identify gaps in this process, helping place the student front and centre of their own learning, as well as reaffirming achievements⁷⁻⁹.

The feedback received in formative assessments stimulates reflection on the student's learning process, considering their specific characteristics and providing critical self-assessment by making it easier to identify their strengths and weaknesses^{10,11}.

Formative assessment should be part of the evaluation system in the various learning settings^{7,9,12}. In

the clinical context, the benefits of formative assessment relate to stimulating appropriate professional behaviour, encouraging clinical competence and the acquisition of information and reasoning^{8,12}.

In the assessment of knowledge through written tests, computerised formative testing can be an important ally in academic life, encouraging self-regulated study. The use of online formative tests with automated feedback can result in greater performance in summative assessment and academic training. The importance of integrating the formative test into health education to improve student performance has been emphasised^{9,12}.

Within this context, it is considered good practice in an evaluation system to plan formative assessments for each proposed summative assessment, making formative strategies with well-structured feedback an important catalyst for learning⁵.

Student adherence to formative assessments is a matter of interest in studies; low adherence is considered as possibly due to a lack of extrinsic motivation as a reward, even though it has been proven that formative assessment helps to improve the learning process. Students tend to prioritise summative assessment over formative assessment, which can benefit them as study support for summative assessments^{8,11,12}.

In the online environment in particular, the lack of strategies to encourage adherence to formative assessment has become a challenge in the educational sphere for teachers, even though the benefits can be recognised by students. Studies on adherence to online formative assessment remain scarce, especially in the health sector^{8,11,12}. Furthermore, there is little research that emphasises the challenges for professionals and students in these assessments in order to correct them and better adapt them to the learning space^{8,10}.

The aim of this study was to assess the opinion and adherence of undergraduate health students to formative tests in an online environment.

METHOD

Study to evaluate educational intervention carried out with undergraduate students from health courses, from August 2023 to August 2024. The intervention analysed was the application of online formative tests. These tests are planned at the institution for application during the development of modules in the Problem-Based Learning (PBL) methodology. There are an average of four modules in each course period, with at least one formative assessment per module. The questions may be open-ended, short answer, discursive or multiple choice and are applied in the online tutoring environment, the virtual learning environment used by the students. The test remains available on the platform for seven days, with the student able

to take it at their own convenience. All the teachers received training and instructional material to build the tests on the Moodle platform¹³. The sample was made up of students from Physical Education, Nursing, Medicine, Psychology, Nutrition, Dentistry, Pharmacy and Physiotherapy.

In the first stage of the study, a structured form was applied to the students, made up of two sections: the first section contained socio-demographic and academic data and information on access to the online environment; the second section was organised into questions relating to the student's opinion on the guidance received for taking the formative tests, adaptation and adherence to this form of assessment. The statements were organised on a five-point Likert scale. A pilot test was conducted with students who did not take part in the research to assess whether the form was understandable, with well-designed statements and instructions, so that any necessary adjustments could be made. The final instrument was emailed simultaneously to all the study participants via the LimeSurvey 2.0 research platform, along with a letter inviting them to take part in the research, including instructions on how to complete the questionnaire. The Informed Consent Form (ICF) was incorporated into the form and after accepting the terms, the participant had access to the questionnaire.

The second stage of the study consisted of analysing student adherence to the formative test in 2023.2 by consulting the Lyceum academic system on the number of students who took the test.

The data was processed and analysed using the statistical package R version 4.0. In order to analyse the students' opinions on the Likert scale, the criterion for consensus of agreement was a Mean Ranking (MR) above 3.0. Student's t-test was used to compare the average take-up of the test between the courses. A significance level of $p \leq 0.05$ was used. This study was approved by the Research Ethics Committee of the Faculdade Pernambucana de Saúde (FPS), under number 016380/2023.

RESULTS

A total of 141 students answered the survey form, 55 (39%) from the Medicine course, 23 (16.3%) from the Psychology course, 21 (14.8%) from the Nursing course, 18 (12.7%) from the Dentistry course, 9 (6.3%) from the Nutrition course, 7 (4.9%) from the Pharmacy course, 6 (4.2%) from the Physiotherapy course and 2 (1.4%) from the Physical Education course. With regard to the socio-demographic profile, 115 (81.56%) students were female and 26 (18.4%) male and the average age of those interviewed was 23.7 years (SD 5.92), with a median of 22 years. With regard to the digital tool most used to access the online tutoring environment, 102 (72.34%) students said they

used a computer, followed by 21 (14.89%) students who used a mobile phone and 18 (12.76%) students who used a tablet.

When asked if their course made the formative test available during the modules, 108 (76.59%) replied that it was made available the whole time, 27 (19.14%) replied that it was sometimes made available, and 6 (4.2%) replied that it was never made available.

The results of the students' opinions on formative assessment were grouped into three blocks: on the instructions and quality of formative assessment, on the student's attitude towards formative assessment and on the influence of formative testing on study.

Regarding the instructions and quality of the training tests, there was agreement that there were no technical problems (MR 3.3) and that the access time was sufficient (MR 3.2). Agreement was also shown when asked if they had received instructions on how to use the online formative assessment and how it works (RM 3.8). (Table 1)

Table 1. Health students' opinion of and adherence to online formative testing.

STATEMENTS	MR (SD)
<i>INSTRUCTIONS AND QUALITY OF THE FORMATIVE ASSESSMENT</i>	
Online formative assessment has no technical problems	3.3 (1.1)
I received instructions on how to use online formative assessment and how it works	3.8 (1.1)
The access time to the online formative assessment is sufficient.	3.3 (1.3)
The number of questions in the formative assessment is sufficient	3.4 (1.2)
I consider the comments on the formative assessment answers to be complete.	3.2 (1.3)
The online formative assessment is well-designed.	3.4 (1.1)
<i>STUDENT ATTITUDE</i>	
I feel motivated to undertake the formative assessment	2.9 (1.3)
Face-to-face formative assessment would be more stimulating.	2.3 (1.4)
The result of the formative assessment does not interfere in the module grade.	3.5 (1.2)
I always answer the online formative assessment questions.	3.6 (1.4)
I often answer the online formative assessment questions.	3.6 (1.3)
I never answer the online formative assessment questions.	1.9 (1.3)
I have adapted well to online formative assessment.	3.6 (1.2)

Continue...

Regarding the quality of the formative assessment, there was agreement that the number of questions in the formative assessment was sufficient (MR 3.3) and that the comments on the formative assessment answers were complete (MR 3.1). Students also agreed that the formative assessment was well-designed (RM 3.4).

Regarding students’ attitude towards the formative test, there was agreement when asked if they always answer the questions in the online formative assessment (MR 3.6) and if they often answer the questions in the online formative assessment (MR 3.5). Respondents disagreed when asked whether they feel encouraged to carry out formative assessment (MR 2.9) and whether face-to-face formative assessment would be more stimulating (MR 2.3).

With regard to the influence of the formative test on study, the interviewees agreed that the formative assessment of the module helps to organise study (MR 3.5) and helps to identify gaps in their study that require more attention (MR 3.8).

There was also agreement when asked if the formative assessment helped with the types of questions that would be on the summative test (MR 3.5), if the answer key and reasoning for the questions made studying easier (MR 3.6) and if they used the formative assessment to revise content (MR 3.4). The students agreed that it was important to discuss the formative assessment questions in groups (MR 3.4) and that the online formative assessment helped them retain knowledge (MR 3.7). (Table 1)

The Lyceum academic system was consulted to try and ascertain how regularly the formative tests were used in the courses, as well as the students’ adherence to this assessment. Application was considered regular when it took place in more than half of the terms per course. Student adherence per test was analysed in two

Table 1. Continuation.

STATEMENTS	MR (SD)
<i>INFLUENCE OF THE FORMATIVE TEST ON STUDIES</i>	
Formative assessment in the module helps to organise study	3.6 (1.2)
Formative assessment in the module helps me with the types of questions that will be in the test.	3.5 (1.2)
Formative assessment helps me identify what I need to study further.	3.9 (1.1)
The answer keys and reasoning for the questions make it easier for me to study.	3.6 (1.2)
It would be important to discuss the formative assessment questions in groups.	3.5 (1.3)
Online formative assessment helps me retain knowledge.	3.7 (1.1)
I use formative assessment to revise content.	3.5 (1.3)

MR - Mean Average; SD - Standard Deviation
Prepared by the authors

tests chosen by drawing lots each term and corresponded to the percentage of students who completed the test.

Of the eight courses, four did not make formative assessments available on a regular basis. The nursing, physiotherapy, medicine and dentistry courses applied the formative tests in most periods, with average adherence ranging from 31.6 (16.7) to 56.7 (18.3) (Table 2).

When comparing the mean adherence rates by number of test applications in the term, it was observed that the courses that applied three or more tests reported a higher mean adherence rate (53.8%) compared to those that applied less than three tests (39.0%), indicating a significant difference between the means, $p= 0.024$ (Table 3).

Table 2. Average participation in online formative tests among the courses.

Course	Adhesion (%)		P value ^a
	Average (SD)	Median (Min - Max)	
Nursing	56.7 (18.3)	64.3 (30.55 - 73.0)	0,145
Physiotherapy	50.9 (14.0)	51.6 (35.3 - 66.7)	
Medicine	31.6 (16.7)	33.5 (8.4 - 53.0)	
Dentistry	44.5 (12.7)	42.3 (27.75 - 66.7)	

SD = Standard Deviation
^aF-test (ANOVA)
Prepared by the authors.

Table 3. Health students' adherence to online formative tests, by tests applied.

Average number of tests applied	Average adherence		P-value ^a
	Average (SD)	Median (Min - Max)	
≥ 3	53.8 (15.8)	59.1 (30.55 - 73.0)	0,024
< 3	39.0 (15.4)	37.6 (8.4 - 66.7)	

SD= Standard Deviation
Prepared by the authors
^aStudent's t-test.

DISCUSSION

Formative assessment guides teachers and students towards the groundwork for their studies, validating their active commitment to the construction of knowledge and can significantly affect learning^{1,4,5}. Much has been said in recent years about the need to implement a model that makes better use of formative assessment in the construction of learning, replacing the model based heavily on quantitative assessment of learning, which is responsible for defining progression criteria. The benefits are widely recognised, but problems such as student adherence and the way in which it is used need further study¹⁴⁻¹⁷.

The formative test applied at the research institution in an online environment has been part of the assessment system for all courses since 2019. The institution uses the ABP methodology and the formative test is made available on the Moodle platform during the modules, remaining available for an average of seven days and answered individually, with access to immediate feedback on the questions¹³.

Most of the interviewees felt that the test had been applied appropriately and their responses helped to highlight gaps in the process of implementing formative tests, such as the fact that some courses were not using them regularly.

Formative assessment can require more preparation time for teachers when compared to summative assessment, and the additional workload for formative assessment can be a limiting factor for student access to the resource^{8,15,17}. The strategy of making the formative test available online for a period of seven days and the possibility of answering it at an opportune moment can be seen as facilitating access, which is reflected in the students' agreement that the time taken to access the formative assessment is sufficient.

The disagreement of the students interviewed about face-to-face formative assessment being more stimulating corroborates their preference for online tests, described in the literature as a less stressful environment with faster feedback when compared to face-to-face assessment¹⁶⁻¹⁸. The preference for the online environment also becomes more evident when students agree that the platform made

available for the application of the formative test, as well as having adequate resources and time, does not present technical problems, excluding technical interferences in the realisation of the formative test.

These results suggest that the instructions received were followed and may have contributed to recognising the quality of the tests. Feeling well adapted to the online environment and valuing the feedback received is a positive factor when implementing any assessment strategy using technological resources¹⁹⁻²¹.

Studies point to better monitoring of the learning process with the use of formative assessment²²⁻²⁴, corroborating the interviewees' agreement that the formative test helps to identify learning gaps and that the answer key and reasoning for the questions facilitate studying. The immediate feedback after answering the questions was seen as a facilitating factor for the students. Although there is agreement that discussing formative questions in groups can be more beneficial, this resource takes even more time than immediate feedback and has been described as a factor that hinders its applicability^{19,23}.

Encouraging students to undergo formative assessment is one of the biggest challenges. This attitude is helped by the understanding of the importance of this assessment, the assessment culture at the institution and the assessment models experienced before and after starting undergraduate training. With regard to institutional culture, in addition to students, the involvement and knowledge of teachers about formative assessment plays a crucial role in the results^{17,25,26}. Encouraging students to take part in this type of assessment still represented a barrier to be overcome in this study.

The study looks at some aspects of formative tests from the students' perspective. However, the number of students who responded to the form may not reflect their overall opinion, which is a limitation. It is reasonable to consider the possibility that non-responders have a less favourable opinion of formative tests than that expressed by participants. On the other hand, it is possible to assume that the students who agreed to take part in the survey felt stimulated by the topic and were interested in answering the form. In addition, the analysis of the tests carried

out on the academic system confirmed certain aspects of the answers provided by the students. The results of this analysis in relation to the frequency distribution of formative assessments and their take-up, for example, reinforced the information pointed out by students that formative tests are not used regularly by all courses.

The benefits of formative tests have been demonstrated and were also recognised by the students who took part in the study. However, to feel such benefits, not only the students but also the entire teaching staff need to adhere to the assessment.

To this end, in addition to strengthening teacher development strategies, it is also important to employ technological resources that improve and facilitate the faster application and preparation of tests and ensure monitoring of the results. These and other factors are seen as facilitating the implementation of formative assessments on a routine and frequent basis. However, it is the changed perception of the assessment in the minds of all those involved in the teaching and learning process that is likely to favour adherence and its benefits^{19,21,23}.

A recent study with medical students on student adherence to and perceptions of formative tests highlighted the fact that although they said they understood the beneficial role of formative assessment, only 4% of a total of 107 were committed to actively sitting these tests. Furthermore, it was underlined that this same small group of students proved to be more assiduous throughout the learning process, suggesting the possibility of intrinsic motivation and maturity in recognising the benefits of formative assessment as fundamental criteria for this consistent participation²⁷.

In this study, the analysis of the application of formative tests in the academic system showed that exposure to a greater number of formative assessments was associated with greater adherence. The repeated use of formative assessments is an area of interest in recent research addressing students' perceptions of their benefits^{20,21,28}. Although more studies are needed to confirm this association with adherence, it is a plausible argument, since repeated exposure can translate its importance within the assessment plan, improving its design, as well as making it possible to better observe its effects on learning.

CONCLUSION

This study seeks to contribute to knowledge about the challenges related to the implementation of online formative tests in undergraduate health courses. The results showed a predominantly positive perception of this type of assessment among the participants, who are health students, with emphasis on the clarity of the guidelines, the suitability of the platform and the contribution to organising their studies,

even though many reported feeling a lack of motivation to answer them. Analysis of the data extracted from the academic system indicated that greater exposure to formative tests was associated with greater student adherence to this assessment model.

CONTRIBUTION OF THE AUTHORS

Taciana Barbosa Duque, Reneide Muniz da Silva, João Paulo de Barros Oliveira, Midian Macedo Dantas, Renata Nunes Carneiro de Albuquerque: all contributed equally to the writing and approval of the final version of the manuscript

CONFLICT OF INTEREST

We declare no conflict of interest.

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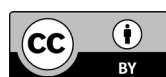
DECLARATION OF DATA AVAILABILITY

Research data is available in the body of the document.

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