

ORIGINAL

Rubric for evaluating teaching tasks: its contribution to the educational quality

Rúbrica para evaluar tareas docentes: su contribución a la calidad educativa

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ABSTRACT

Introduction: the quality education required for Sustainable Development implies supporting the development of cognitive skills. The objective of this work is to analyze the educational quality contribution of a rubric designed in the Department of Basic Biomedical Sciences, at the Salvador Allende School of Medical Sciences, to evaluate explanatory teaching tasks in the discipline of Biological Basis of Medicine.

Method: an instrumental, descriptive, mixed-methods approach was developed. A case study based on grounded theory was applied. Theoretical methods were used: analysis-synthesis, induction-deduction, historical-logical, and systems approach; empirical methods: document review and consultation, expert judgment, and focus group; and mathematical-statistical methods.

Results: the designed rubric is made up for four descriptors: describe and explain, corresponding to logical intellectual skills, as well as the correct use of the spanish language and self-assessment, concerning to self-training skills; which were accepted as to the relevance of their content. It was clarified that the designed rubric constitutes a methodologic tool that promotes and evaluates the metacognitive performance of students.

Conclusions: the rubric designed in the Department of Basic Biomedical Sciences, at the Salvador Allende School of Medical Sciences, to evaluate teaching tasks of the discipline Biological Basis of Medicine, contributes to the educational quality of the teaching-learning process by encouraging and appreciating metacognition, a cognitive skill required for self-regulation of learning. Its use is proposed in departmental research as an appreciative instrument of the development of self-regulation of learning.

Keywords: Medical Education; Quality Management; Educational Assessment; Task Analysis And Performance; Metacognitive Monitoring.

RESUMEN

Introducción: la calidad educativa que demanda el desarrollo sostenible implica contribuir al desarrollo de habilidades cognitivas. Este trabajo tiene el objetivo de analizar la contribución a la calidad educativa de una rúbrica diseñada en el departamento de Ciencias Básicas Biomédicas, de la Facultad de Ciencias Médicas Salvador Allende, para evaluar tareas docentes explicativas de la disciplina Bases Biológicas de la Medicina.

Método: se desarrolló una investigación instrumental, descriptiva, con enfoque mixto. Se aplicó el estudio de caso sustentado en la teoría fundamentada. Se usaron métodos teóricos: análisis-síntesis, inducción-deducción, histórico lógico y enfoque en sistema; empíricos: revisión y consulta documental, criterio de experto y grupo focal; y matemático-estadístico.

Resultados: la rúbrica diseñada está constituida por cuatro descriptores: describir y explicar, correspondientes a las habilidades lógico-intelectuales, así como el uso correcto de la lengua española y la autoevaluación, concernientes a las habilidades de auto-formación; los cuales fueron aceptados en cuanto a la pertinencia de su contenido. Se esclareció que la rúbrica diseñada constituye una herramienta metodológica promotora y calificativa del desempeño metacognitivo de los estudiantes.

Conclusiones: la rúbrica diseñada en el departamento de Ciencias Básicas Biomédicas, de la Facultad de Ciencias Médicas Salvador Allende, para evaluar tareas docentes explicativas en la disciplina Bases Biológicas de la Medicina, contribuye a la calidad educativa del proceso de enseñanza-aprendizaje al fomentar y apreciar la metacognición, una habilidad cognitiva requerida para la autorregulación del aprendizaje. Se propone su utilización en la investigación departamental como instrumento apreciativo del desarrollo de la autorregulación del aprendizaje.

Palabras clave: Educación Médica; Gestión de Calidad; Evaluación Educacional; Análisis Y Desempeño de Tareas; Monitoreo Metacognitivo.

INTRODUCTION

The constant variation in the conditions in which human life develops has made uncertainty a characteristic feature of thinking about development. This reality has meant that the university, as the social subsystem responsible for preparing professionals to act in favor of the progress of society, has been called upon to guarantee the relevance of its training activities. This social demand is specified in the fourth objective of the 2030 Agenda for Sustainable Development, which focuses on working towards educational quality, which implies providing students with the skills to face the challenges imposed by the circumstances in which human life takes place and which, therefore, affect the prospects for social development.

It has been suggested that education geared towards sustainable development should go beyond the treatment of the specific content of the subjects studied and should also include the development of cognitive skills so that students can acquire the aptitudes necessary for their self-transformation into future agents of change, capable of acting in the face of the social effects of environmental problems,^(1,2) including those related to human health.⁽³⁾ Given the above, it is necessary to take action to manage teaching and learning in a way that meets these educational requirements.

The Curriculum E of the Degree in Medicine has been designed to promote the quality of education demanded by society. In this sense, encouraging autonomous learning is indicated as a fundamental objective to be achieved.^(4,5)

Framed within the scope of the medical degree programs, the Department of Basic Biomedical Sciences in the Salvador Allende Faculty of Medical Sciences at the University of Medical Sciences in Havana is conducting educational research aimed at developing a methodological proposal for the development of self-regulated learning (SRL) in students. This work forms part of that research, and its objective is to analyze the contribution to educational quality of a rubric designed in the Department of Basic Biomedical Sciences of the Salvador Allende Faculty of Medical Sciences in the discipline Biological Bases of Medicine to evaluate teaching tasks related to the logical-intellectual skill of explaining, which constitutes one of the deficiencies detected in the different types of evaluations and which is essential for the skills of interpreting and predicting as the basis of their contribution to the solution of health problems as part of future professional skills.

METHOD

Instrumental, descriptive research with a mixed approach was carried out. The object of study was the design of a rubric, limiting the field of action to its contribution to educational quality. The methodology used was the evaluative case study, based on constructivist grounded theory⁽⁶⁾, to understand the object of study and consider its conception as a tool for promoting educational quality.

The research was organized around the following question: What characteristics of the rubric design can contribute to educational quality in the teaching and learning of the BBM discipline? The research was carried out in three stages: (1) design of the rubric, (2) validation of the relevance of the content, and (3) analysis of its contribution to educational quality.

Theoretical methods were used: analysis-synthesis for information processing, induction-deduction in investigating the contribution to educational quality as an evaluation instrument, historical-logical when considering the object of study in relation to its relevance, and the system approach to reviewing the interaction between the structural components of the rubric.

In the case of empirical methods, the following were used: documentary review to manage theoretical-methodological information related to the research topic. Fourteen articles published in the last five years

were considered selected for their significant and direct contribution to the topic addressed and researched using the Google Scholar search engine; documentary consultation to obtain theoretical references for the analysis; consultation with experts to validate the relevance of the rubric's content and the focus group to clarify the contribution of the rubric to educational quality.

For the design of the rubric, the criteria of Neil⁽⁸⁾ about learning evaluation rubrics were taken into account, as well as the characterization made by Michelena Rivera *et al.*⁽⁹⁾ of the skills system for the medical degree, adjusted to the departmental methodological guidelines regarding the introduction of the implementation of explanatory teaching tasks evaluated with rubrics.⁽¹⁰⁾

The mathematical-statistical method was applied to calculate Aiken's V coefficient to assess the relevance of the content of the rubric. For this purpose, the software is available on the website Psicometrías. Psicometría, investigación y análisis de datos, which uses the statistical package SPSS (<https://www.psicometristas.com/calculadora-v-de-aiken/>), was used. The minimum values considered for the acceptance of the descriptors corresponding to the evaluative criteria of the rubric were a 95 % confidence interval, V coefficient > 0,8, and a lower limit of the confidence interval > 0,7.⁽¹¹⁾

The group of experts comprised eight professors from different Cuban medical science faculties directly linked to teaching in one of the five specialties of Basic Biomedical Sciences. All of them had the teaching category of Full or Assistant Professor, and 3 had the Consultant Professor category. The length of experience in medical teaching ranged from 15 to 50 years, with an average of 36,8 years. All of them had a Master's degree, and 3 of them had a PhD in Science. The scoring scale used to evaluate the contribution of the evaluative criteria to fulfilling the rubric's objective was: does not contribute = 1 point, contributes tiny = 2 points, contributes partially = 3 points, and contributes = 4 points.

The researchers participating in the focus group (n=5) had more than 25 years of experience in higher education. All held the academic category of Master's and the teaching category of Assistant Professor, and two of them held the category of Consultant Professor.

RESULTS AND DISCUSSION

Rubric design

From a conceptual point of view, the following parameters were considered in the design of the rubric:

- Type of rubric: analytical, generic, and with formative and diagnostic purposes.
- Context of its use: the teaching-learning process of the BBM discipline.
- Teaching situation to be transformed: limited critical analysis by students of their performance during the learning process.
- Learning activity in which it is inserted: explanatory teaching tasks
- Objective: to evaluate (self-evaluation and hetero-evaluation) the clarification of the relationship between situations related to medical practice in primary health care and the structural components or phenomena of the human organism directly linked to these situations.
- Field of action: the metacognitive performance of the students.

The rubric (table 1) included:

- 2 evaluation criteria: logical-intellectual and self-education skills. Both criteria consisted of two descriptors. In the first, the descriptors corresponded to the skills of describing and explaining and, in the second, to the correct use of the mother tongue and self-evaluation.
- The total score assigned to the task is 10 points. The descriptors are assigned 3 points (30 %) in the case of description, explanation, and self-assessment and 1 point (10 %) in the case of the correct use of the mother tongue.
- Each descriptor has a defined context in which it is evaluated and four levels of achievement: excellent, good, partial, and not achieved.
- The overall grade for the task is based on the following key: excellent (9-10 points), good (5,8-8,8 points), fair (3-3,5 points) and poor (< 3 points)

Table 1. Composition of the rubric

Evaluation criterion	Descriptor	Description			
Evaluation criterion 1 6 points Logical-intellectual skills	Descriptor 1 3 points	In the description of the object or phenomenon			
		Very good 3 points	Good 2 points	Partial 1 point	Not achieved 0 points
		It sets out all the characteristics that define it in an organized way	It displays all the characteristics that define it, but not in an organized way	They present some of the characteristics that define it, in an organized way or not	It does not exhibit any of the characteristics that define it

Description of the object or phenomenon of the human organism directly linked to the situation posed in the task.	Very good 3 points	In the explanation of relationships Good 2 points	Partial 1 point	Not achieved 0 points
	It clarifies all the existing links, in a precise way	It clarifies all the existing links, but not precisely	It clarifies some of the existing links, in a precise way	It does not clarify any of the existing links
Descriptor 2 3 points Explanation of the relationships between the characteristics that define the object or phenomenon involved and the situation posed	Very good 1 point	In the wording of the task Good 0,8 point	Partial 0,5 point	Not achieved 0 points
	Does not make grammatical or spelling mistakes	Does not make grammatical mistakes, but does make < 5 spelling mistakes	Makes < 5 grammatical mistakes without making spelling mistakes	Makes ≥ 5 grammatical and spelling mistakes
	Very good 3 points	In the self-assessment Good 2 points	Partial 1 point	Not achieved 0 points
	It recognizes all the difficulties presented and considers possible solutions to overcome them	It recognizes all the difficulties presented but does not consider possible solutions to overcome them	It recognizes some of the difficulties presented and considers possible solutions to overcome them	It does not recognize any of the difficulties presented

Validation of the relevance of the rubric content

The calculation of Aiken's V coefficient (table 2) based on the data obtained from the evaluation made by the group of experts on the relevance of the rubric content validated the four descriptors considered, as they exceeded the limit values established for their acceptance.

Table 2. Scores, Aiken's V coefficient (V) and lower limit of the confidence interval (LI) for each descriptor (p = 95 %)

Descriptors	Scores	V	LI
1	4-4-3-3-4-4-4-4	0,92	0,74
2	4-4-3-3-4-4-4-4	0,92	0,74
3	4-4-3-4-4-4-4-4	0,96	0,80
4	4-4-4-3-4-4-4-4	0,96	0,80

Analysis of its contribution to educational quality

The analysis of the conformation of the rubric based on the documentation consulted by the focus group led to the elucidation of the contribution of the rubric to educational quality based on the recognition of the following characteristics:

- Due to the analytical nature of the rubric, it serves as a guide for active learning to understand and explain phenomena, a skill required by health professionals for decision-making in the face of problems that arise in medical practice.⁽¹²⁾
- It is emerging as a strategy to improve learning based on the development of metacognition^(13,14,15,16) by encouraging students' critical reflection on their behavior in the learning activity and the possible alternatives to overcome the difficulties identified, an action concerning metacognitive performance. In this sense:
 - a. It is in line with the fact that metacognitive analysis is recognized as a cognitive product that proves the understanding of the learning outcome about the process followed to obtain it, thus fostering the development of autonomy in students.^(17,18)
 - b. It stipulates metacognition as a cognitive skill conceived within the content of the BBM discipline that should be an aspect considered in the professional training process.⁽¹⁹⁾
 - c. It works on the metacognitive dimension considered to have the most excellent favorable effect on self-regulated learning.⁽²⁰⁾

- It has as its background the references on the existence of difficulties in the metacognitive performance of students studying the BBM discipline⁽²¹⁾ and a satisfactory assessment of the educational impact of the use of the rubric in a teaching task of a specific subject of the BBM discipline, as it is recognized as a guide for the development of the task, which makes it possible to gain clarity about the achievements and difficulties in the realization of the task.⁽²²⁾
- As an instrument for self-assessment and peer assessment, it is in line with the current method of dynamic measurement of RMA, in which skill is simultaneously promoted and measured through the use of reflective self-reporting instruments to monitor the performance of specific tasks^(23,24) thus offering an appreciative resource for the development of RMA, through the manifestation of students' metacognitive performance.⁽²⁵⁾

Research aimed at providing a basis for action in favor of educational quality implicitly involves the tributary action of intervention aimed at contributing to society through the training of young people⁽²⁶⁾, and its purpose should be oriented towards the adaptive change demanded by contemporary reality.⁽²⁷⁾

The research carried out is part of the work aimed at responding to the need for a reformulation of evaluation methods in medical teaching as part of the actions aimed at improving the quality of teaching-learning based on its adjustment to the training needs of the time in which we live,^(28,29) specifically, with the use of rubrics as an evaluative instrument in the training process of health professionals.^(30,31,32)

In this work, unlike a rubric proposal developed by Ricardo et al.⁽³³⁾ to evaluate the participation of students in a workshop class in the BBM discipline, we agree with the idea of its use for the evaluation of manuscripts⁽³⁴⁾ with attention to the incorporation of the metacognitive perspective as a strategy to improve the performance of students in a task,⁽²⁵⁾ which constitutes an innovative treatment of evaluation that approaches the intention expressed by Lifshitz et al.⁽³⁵⁾ when they express "...now the aim is for learning to be meaningful, to be understood, to be explained and to include metacognition."

One limitation of the research is that not all the department teachers who would use the generic rubric were consulted about its understanding and usefulness.

The research contributed two contributions: from a theoretical point of view, it supported a teaching innovation consisting of a methodological tool to promote educational quality, and, in a practical sense, it contributed a prototype of an evaluative instrument applicable to the different subjects that make up the BBM discipline.

CONCLUSIONS

The rubric designed in the Department of Basic Biomedical Sciences of the Salvador Allende Faculty of Medical Sciences to evaluate explanatory teaching tasks in the discipline Biological Basis of Medicine contributes to the educational quality of the teaching-learning process by fostering and appreciating metacognition, a cognitive skill required for ARA. Its use is proposed in departmental research as an appreciative instrument for developing learning self-regulation.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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