

DESIGNING RUBRICS TO ASSESS PEDAGOGICAL KNOWLEDGE OF PROSPECTIVES TEACHERS

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Abstract

This study is encompassed within a two-year project that was commissioned by the Chilean Ministry of Education and executed by the University of Concepción. This initiative concerned the elaboration of open questions stemming from cases studies and the rubrics for them to be corrected, amongst other products. The case was conceived as an assessment resource with the purpose of linking the theoretical insights acquired by students-teachers, throughout their undergraduate training process, with their future professional development and professional learning. The open questions triggered the analysis of the outlined case and demanded from respondents the association between theory and practice through a reflective process of interpretation and re-interpretation, accessing the possible points of view that guide decisions of those who are represented. Thereby, the rubrics should provide quality assessment information on the students' capacity to demonstrate their abilities to pose hypotheses and questions, to infer meanings and implicit information, to establish generalizations, to criticize models and strategies, to generate alternative didactics solutions. This paper reports on this stage of the project, namely, the devising of rubrics aimed at the assessment of the general pedagogical knowledge for prospective teachers. Two main methods were applied, i) Documental analysis, which had at its core the review of national standards that guide teacher training programmes. In this process, specific indicators were examined. This procedure came up with a categorization that comprised the content, the ability examined, and the theoretical difficulty level. ii) Expert panels, which congregated together higher education teachers and schoolteachers. These professionals were subdivided into three different groups for: writing, reviewing and external academics judges within an evolving process of reflection and improvement of the elaborated rubrics. The study's results state that, once determining content validity and construct validity, four interrelated notions emerged that should be the constituent elements within each rubric description level. This means, a descriptor should make reference to: the highest ability demonstrated within the answer, what actions might serve as evidence of those ability has been achieved, the core content which reflects the student's perspective or stance from which they elaborate their answer, what information from the case analysed was used to articulate their responses. This, in turn, allowed researchers to develop a writing scheme by integrating these four defined parameters. This approach was used as a theoretical frame in training assessors and in the design of all set of rubrics involved within the project.

Keywords: *Rubric, pedagogical knowledge, descriptor's components.*

1. Introduction

The assessment of prospective teachers has been at the centre of the national debate since a number of difficulties have arisen, which are linked to standardized measures, namely, the multiple-choice tests. These sorts of tests have been used as a prime method to assess teachers' professional competence and to promote the development of higher abilities (Villarroel et al., 2015)

Within this context, a Project was developed by the Chilean Ministry of Education in order to elaborate open questions stemming from case-studies or from pedagogical situations, thus providing the opportunity to integrate theory and practice through a reflexive process of interpretation and re-interpretation. This, in an attempt to gain insights into the possible points of view, that might drive the pedagogical decisions, of who were represented within the proposed cases (Mineduc, 2019). Therefore, through the analysis of real-life situations, pedagogical reflexivity can be evidenced as student-teachers must put into practice the pedagogical knowledge acquired throughout their initial teacher training. This means that prospective teachers should make explicit in their answers their capacity to build meanings that are in accordance to what they have previously learned (Mineduc, 2019).

As open questions entail answers that are not set in advance, its incorporation within national assessment procedures also brought up a new challenge, that is to design an assessment instrument that encompasses both, the respondents' performance and provides insights about the students-teacher higher order thinking abilities, which, in turns might inform on their capacity to reflect in depth. This issue becomes highly important as feedback on the initial teaching training processes is therefore required. In accordance with the aforementioned, teacher training standards can be used as a framework for this task, which comes across to all higher educational institutions.

Consistent with this idea of getting valuable information, from students' answers, that can be used as feedback to improve their pedagogical competences. The project comprises the elaboration of rubrics to evaluate teachers' performance. Rubrics are understood as assessment tools that set progressive levels of knowledge domains regarding an individual's attainment at a particular task (Díaz Barriga, 2005). Therefore, potential feedback might be grounded on these levels or descriptors, hence, it contributes to learning consistent with a formative approach.

Bruna et al. (2019) when commenting Allen & Tanner (2006) contribution, asserts that the rubric as an assessment instrument can be effective, not only because enables the assessor to judge a level of attainment by marking using grades or comments, against a predetermined description, but also, the rubric opens the opportunity for formative feedback to take place. By considering this idea, when devising rubrics there are certain elements that must be taken into account, namely, the attainment level descriptions - also referred to as descriptors, that explicitly detail under which criteria the work will be judged, thus outlining what it is the expected performance of the student regarding his or her task, ergo what constitutes a satisfactory or unsatisfactory answer, following the question that was answered and the analysed case.

According to Sadler (2014) it is crucial that those descriptions go further than an automatized summary of aspects to be assessed, in fact the emphasis relies on how the drafting of the descriptors explicitly shows, in an integrated manner, the aforementioned elements within the student's work. Hence it gives way to a general judgment, which focuses on providing some orientation or insight into the abilities and knowledge domains that evidence the quality of the student's answer. It is important to note that a variety of levels of attainment are carefully described in rubrics, from the highest level required, as well as middle and lower levels.

In line with the previously stated, there are certain guidelines that are followed when constructing rubrics to assess answers to open-ended questions. These aim to ensure that descriptions of the four established levels of attainment, i.e., Optimal, Satisfactory, Basic, and Unsatisfactory, are consciously and consistently reached by those who formed the case and question development teams. Brookhart & Chen (2014) regarded this collaborative aspect of constructing rubrics as highly relevant to ensure the reliability of the instrument.

2. Design

The study follows a qualitative stance (Cohen et al., 2011; Mason, 2022; Silverman, 2011, Berg & Lune, 2019), using the documentary review technique. At a first stage, the National Standards of the Ministry of Education were examined due to their role at guiding initial teacher training programmes. Likewise, research on the design of rubrics to assess pedagogical competencies of student-teachers were also reviewed. Then, in a second stage, a hermeneutic analysis was conducted, which involved reading, analysing and interpreting texts according to the study's aims. This phase focused on determining the elements that should comprise the rubrics' descriptors. Thereafter, within the third stage, rubrics were collaboratively drafted within an iterative process that involved the participation of teachers from diverse educational levels and settings such as university lecturers, elementary and secondary teachers, special education teachers. Finally, a fourth stage involved the validation of these instruments along with external evaluators which enabled the rubrics to be enhanced.

3. Objectives

The study is driven by the following general aim:

- To describe a collaborative methodological approach to design rubrics that seek the assessment of students-teachers' pedagogical knowledge.

This prime purpose is delineated through the following specific objectives:

- To identify the core notions that define quality within prospective teachers' responses to open questions which are meant to reflect pedagogical knowledge.
- To define the parameters that should compose the descriptors to reflect different levels of attainments in assessing professional teaching competences.
- To devise a writing scheme for rubrics descriptors that allow assessors to make sense of what is being monitored but also provide valuable information that can be retrieved for effective feedback.

4. Methods

As previously stated in the design section, one of the methods used was documentary analysis. The analysis was centred on the review of National Standards that drive initial teacher training programmes, and on research on rubric design. The process resulted in determining the elements that are at the core of the rubric writing methodology, as well as the skills being examined and the level of the theoretical challenge.

In addition, a panel of experts was grouped, integrated by university lecturers and classroom teachers, who then worked collaboratively. They were divided into four sub-sections or groups, those being preschool, special, primary and secondary education; with the purpose of writing and enhancing the rubrics after the review by external experts.

5. Results and discussion

The results of the experts' observation regarding the drafted rubrics led to four intertwined notions that should be considered as constitutive elements of the achievement description that enables judging a student's response within the four different categories outlined by the assessment tool, namely: *optimal, satisfactory, basic and unsatisfactory*.

At a first stance, the groups with the responsibility of designing rubrics agreed to establish the descriptor corresponding to the highest level required in the question, which will be referred to as the "Optimal descriptor". Its structure encompasses four essential elements:

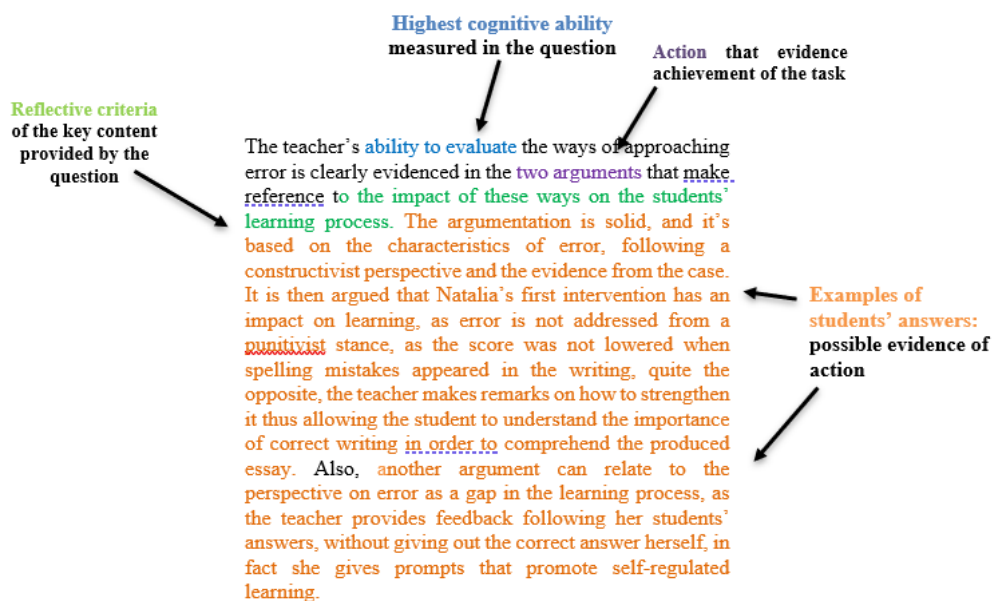
- 1) *The highest cognitive ability* measured in the question. To approach this, Marzano's taxonomy (2001) was adopted, particularly within its adjustment to the pedagogical competences established in accordance with the standards for the teaching profession (Mineduc, 2022). This pedagogical alignment was the result of a collaborative and consensual re-interpretation process that serves as a framework for the elaboration of the question as well as identifying the evidence to be assessed that is contained in the students' responses.
- 2) *The actions* that allow evidence of attainment on the cognitive ability previously defined, which must be coherent with the instruction on what it is expected the student should do and how should he or she structure his or her response. Some examples may include: If the assessed cognitive skill is "design" (within the level of Knowledge Utilisation), then the expected attainment (descriptor) could be expressed as "plan a didactic sequence...", "develop an activity (...)", "elaborate an instrument to measure (...)".
- 3) *The reflection criteria* involved in the question that guide the key content of the response and delimit its scope. These may include aspects, dimensions, factors, variables, amongst others. The criteria provided in advance within the question give way to different forms of answers that must be contained in the drafting of the descriptor and must be comparable or rather similar in terms of quality. The drafting of this section of the descriptor, considered a variety of possible correct students' answers or ways to structure them.
- 4) *Examples*. This descriptor's component relates to the exercise of including reasons that stem from the evidence contained within the case, specially, when the questions are oriented towards the *Knowledge-Utilisation* level of the taxonomy. For instance, the ability to judge, as illustrated in the following question: "Which of the two error-approach methods used by Natalia has a greater impact on student learning? Justify by providing two arguments based on evidence from the case". In both situations, introducing examples in the descriptor seeks to guide the assessors in the conceptual framework of the adopted approach when formulating the question.

It should be noted that the holistic rubrics that were elaborated by the teams took into account only one description for each of the four outlined attainment categories, this took place gradually from the *optimal* level to *unsatisfactory*. This *descriptor* should clearly evidence the logical and cohesive interrelation of the previously defined components, thus showing the quality of the expected response from a qualitative stance, which reminds the reader that this process is not just about a checklist to be used by the assessor (Sadler, 2014). This implies that the teacher-student’s answer must be addressed as a whole, and it should be compared to the described levels. Also, this allows for a detailed description on what prospect teachers should know and be able to do in order to show his or her level of attainment on a measured standard or competence, which can only be achieved through the consensus amongst rubric developers regarding which aspects are to be considered, aspects that are in turn grounded on their own experiences and teaching practices (Reddy, 2007). Baring this in mind it contributes towards the reliability and consistency of the designed instrument (Brookhart & Chen, 2014), given that it will be used in the context of national assessment of prospective teachers and not in the particular setting of those who drafted it.

In line with what has been discussed throughout this paper, it should be kept in mind that rubrics as tools or instruments are considered to be perfectible (Martínez, 2008), that is they can be improved and optimised in terms of the wording of the descriptors, modifications that are also coherent with their use in teaching practice.

In order to operationalise the drafting of the descriptors, it became crucial to acknowledge their textual nature, and as such, its main feature is being able to precise on the achievements in a specific task. This is why a writing scheme was taken into consideration. This was conceived as a sort of template that provided instructions on how to write a text in a coherent and cohesive way (Figueroa, Aillon & Fuentealba, 2014), thus articulating the four essential elements previously defined in this text, which can be distinguished through different colours in the following figure:

Figure 1. Writing scheme that illustrates the components of an Optimal Descriptor.



6. Conclusions

This project was developed following a standpoint that, on one side, enabled the definition of the components that would evidence the highest attainment level obtained in a cognitive task of high-order (i.e., designing, reflection, problem solving, etc), this was posed through a case based on real life situations that are experienced by teachers in the classroom (Martínez-Rizo & Mercado, 2015). On the other side, the project’s approach also involved drafting descriptors that could incorporate such components in an articulated way where these elements were not perceived as isolated items, but rather as a complex framework that accounts students’ achievement. This highest quality level descriptor then becomes a model for writing the remaining descriptors, which corresponds to the lower grading descriptors, by using a writing scheme.

In sum, rubrics as tools provided theoretical support that strengthened the development of professional competences of teacher trainers and schoolteachers. In this context, collaborative work showed to be particularly relevant considering that both actors were able to devise a deep and reflective praxis in relation to how the National Standards on teacher training are portrayed, and how they become present in the classroom teaching exercise to elaborate a descriptor that should guide assessment and monitoring of prospective teachers' process of achieving competences.

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