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THE CHALLENGES AND OPPORTUNITIES OF EVALUATION: FROM THEORY TO PRACTICE

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3. METHODOLOGY FOR DESIGNING AND CREATING RUBRICS TO ASSESS COMPETENCIES

by Claudia H. Aguayo-Hernández, María Jose Pineda-Garín, Soraya Huereca-Alonzo, Patricia Vázquez-Villegas*

Abstract: Questo articolo presenta una metodologia per progettare rubriche olistiche nel modello educativo Tec21 di un'università messicana. Adattabile ad altre istituzioni, assicura valutazioni affidabili e standardizzate, promuovendo la collaborazione. Le rubriche valutano competenze tramite comportamenti essenziali, con un glossario che ne aumenta l'affidabilità. La formazione dei docenti è cruciale, e l'uso combinato di rubriche olistiche e specifiche garantisce flessibilità e valutazioni eque.

Parole chiave: valutazione delle competenze, istruzione superiore, innovazione educativa, rubriche olistiche.

Abstract: A methodology for designing holistic rubrics to assess competencies in a Mexican university (Tec21) is presented. It ensures standardized and reliable evaluations, emphasizing collaboration and adaptability in other contexts. The rubrics focus on key behaviors, enabling

* Claudia H. Aguayo-Hernández, Tecnologico de Monterrey, claudia.aguayo@tec.mx, Leader of Assessment Processes, Vice Rectorate for Academic Affairs; María Jose Pineda Garín, Tecnologico de Monterrey, mpineda@tec.mx, Director of Curriculum Design and Assessment in the Vice Rectorate for Academic Affairs; Soraya Huereca Alonzo, Tecnologico de Monterrey, shuereca@tec.mx, Evaluation Coordinator, Vice Rectorate for Academic Affairs; Patricia Vázquez-Villegas, Tecnologico de Monterrey, paty.vazquez@tec.mx (corresponding author), Professor-Researcher at the Institute for the Future of Education.

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a comprehensive assessment of student performance. A glossary supports consistent interpretation and effective implementation after faculty training. The holistic and task-specific rubrics offer flexibility and promote fair, meaningful assessment practices.

Keywords: competency assessment, higher education, educational innovation, holistic rubrics.

Introduction

Higher education has transitioned from an exclusive privilege to a widely accessible system, influenced by various global and local factors. Contemporary academic institutions are increasingly tasked with maintaining their traditional educational missions while adapting to market-driven demands and navigating intricate governance structures (Nichols, 2024). One of the most pressing concerns in modern higher education is the paradox of rising educational attainment and increasing unemployment among graduates. In many regions, the swift expansion of universities and higher enrollment rates have not been met with a proportional increase in job opportunities, leading to a substantial disparity between the number of degree holders and the availability of employment.

This imbalance is primarily attributed to an oversupply of graduates, insufficient competency development, and ongoing concerns regarding the quality and relevance of education (Bala & Bala, 2024). The correlation between the growing number of graduates and rising unemployment rates, particularly among holders of bachelor's degrees, has been well-documented (Algül, 2024). Many graduates lack essential employability competencies, prompting policymakers and educators to advocate for curriculum reforms integrating competency-based learning strategies (Aselebe,

2022). Higher education institutions are increasingly pressured to equip students with both technical expertise and essential soft skills, which are critical for professional success in various industries.

A fundamental aspect of improving educational outcomes in higher education involves developing robust methods for assessing competencies. Competency-based evaluation approaches emphasize participatory and multidimensional assessment techniques, incorporating self-evaluation and co-evaluation to ensure that learning experiences apply to real-world scenarios (Jaramillo *et al.*, 2024). Additionally, transversal competencies that apply across different disciplines and job sectors are crucial for workforce readiness, requiring universities and colleges to establish diverse competency development strategies that support students adapting to dynamic labor markets (Cushen & Durkin, 2021).

Rubrics have become an increasingly prominent tool for structuring competency assessments in higher education, offering a systematic, transparent, and equitable approach to formative and summative evaluations. A rubric is an assessment tool that describes specific criteria and expected levels of performance for a task, allowing for the objective and transparent evaluation of learning outcomes or competencies. According to Goodrich Andrade (2000), a rubric is a scoring tool that "lists the important criteria for a task" and the levels of quality for each, allowing both students and teachers to understand the evaluation standards more clearly. Recent research in assessment, such as that of Brookhart (2013) and Jonsson and Panadero (2018), highlights the formative role of rubrics. These studies emphasize that, when well designed and properly implemented, rubrics not only support fair and consistent assessment but also promote autonomous learning and self-regulation by providing students with clear and detailed feedback.

In competency-based education, rubrics are used to

measure key competencies, including critical thinking, communication skills, and problem-solving abilities (Suhairom *et al.*, 2024). Their structured design allows for a more comprehensive evaluation of student performance across multiple dimensions, ensuring that assessment criteria encompass mastery of theoretical knowledge, application of methodologies and procedures, adaptability in diverse contexts, and adherence to professional ethics and values (Mejía Manzano *et al.*, 2024; Voorhies, 2023; Ragupathi & Lee, 2020; Cicek *et al.*, 2015; Griffin e Bateman, 2002; Perlman, 2003). Rubrics enhance the transparency and fairness of grading processes, promoting consistency in evaluation and increasing student motivation and engagement (Hadibarata *et al.*, 2024). However, despite these advantages, designing and implementing effective rubrics requires careful attention to authenticity and interdisciplinary considerations. The integration of digital tools has facilitated the development and application of rubrics, fostering a more participatory assessment process that includes both educators and students. Nonetheless, inconsistencies in rubric implementation persist, highlighting the ongoing need for educator training and professional development in competency evaluation (Velasco-Martínez & Hurtado, 2018).

Adopting a holistic approach to competency evaluation offers significant advantages in gaining a thorough and nuanced understanding of student abilities. It enables educators to assess outcomes, track progress, and measure engagement throughout the learning process. It fosters a more supportive learning environment that encourages growth and development beyond traditional assessment methods (Jannah e Widyanti, 2024; Chan & Luo, 2020; Rotthoff *et al.*, 2021; Wang, 2024; Golubiţchi, 2020). Holistic rubrics incorporate competency scales and behavioral descriptors to facilitate structured evaluation. Their design should prioritize clarity, relevance, and alignment with the competencies being

assessed to ensure fairness and consistency in the grading process. This methodological approach not only supports educators in their evaluation roles but also fosters student self-assessment and continuous improvement, enhancing learning experiences and preparing graduates more effectively for professional environments (Hadibarata *et al.*, 2024; Waghmare, 2022; Pratt, 2022; Rusman e Dirkx, 2017; Huang & Jong, 2020).

Background and objective

Tecnologico de Monterrey is a private, multi-campus university with a presence in various cities across Mexico, renowned for its commitment to continuous innovation. In 2019, the university introduced a new Educational Model known as Tec21, which emphasizes a competency-based approach to learning. This model aligns its curricular design, teaching methods, and evaluation processes with the principles of competency development (Tecnologico de Monterrey, 2018). Since implementing this educational model, significant insights have been gained regarding competency evaluation, resulting in enhancements to its design, improved guidance for instructors, and more effective assessment practices.

The institution guarantees that its students achieve a graduation profile upon completion of their program, regardless of the campus where they spent their academic careers. This implies that teachers' evaluations of students are calibrated based on the same criteria that demonstrate learning and the degree of achievement of competencies.

One initiative to enhance the model is the development of a methodology for designing generic rubrics through a holistic approach. This methodology is part of a comprehensive process that

includes thorough reviews and validations to ensure its relevance and consistency as an evaluation tool for assessing competencies. The work delineates the steps in creating rubrics to evaluate competencies within the institution's academic programs. Furthermore, it outlines the stages of review, feedback, adjustment, validation, and authorization necessary to create institutional evaluation instruments.

Teachers' participation as experts in their discipline is key to innovation and improvement. In designing and developing rubrics, teachers were involved in each stage, and each School made the rubrics its own to transfer them to each professor, who will use them to evaluate students on any campus of the Institution. All instructors use these tools to develop and assess the corresponding competencies across all training units offered on every campus.

Theoretical framework

Classroom assessment is the systematic process of collecting, analyzing, and interpreting information about student performance and learning in everyday educational environments (Shepard, 2006; Ravela *et al.*, 2019). Significant advancements in evaluation theories and their application within classroom settings have occurred in recent decades. However, these improvements alone have not completely tackled the need for enhanced evaluation practices, refined strategy design and development, and promoting cultural shifts within educational communities.

There are significant areas for improvement. Measuring the quality of education systems solely by the outcomes of standardized or large-scale tests is inadequate (Black & Wiliam, 2005). Teachers must reconceptualize the evaluation process and adopt contemporary assessment practices grounded in constructivist,

formative, and authentic approaches (EdCan, 2006). It is crucial to allocate time and resources to strengthen formative assessment (Box & Vernikova, 2019). Additional challenges include encouraging students to take co-responsibility for their assessment and feedback, developing comprehensive strategies, and ensuring alignment between formative and summative assessments (European University Association, 2020).

In 2012 and again in 2019, Mexico received feedback from the Organization for Economic Cooperation and Development (OECD), highlighting several pressing areas for reform. These included an overemphasis on exam-oriented teaching, the excessive use of multiple-choice tests, a limited focus on formative assessment by teachers, grading practices lacking pedagogical significance, and insufficient support for evaluation in the classroom (Santiago *et al.*, 2012).

Contemporary approaches, particularly the competency-based approach, enable assessment for learning, breaking the primacy of quantitative assessments with closed-response exams that only measure information retention and basic cognitive levels of knowledge and comprehension (Moreno, 2016; Mendiola *et al.*, 2020). Authentic assessment is based on performance observation strategies, which consider the interaction and interdependence between the student and the context (Tobón, 2004).

While evaluating mastery of conceptual and theoretical elements is important, accurate assessment measures students' abilities in scenarios that reflect real or simulated professional environments. This includes applying theoretical knowledge, skills, attitudes, and dispositions in problem-solving, decision-making, solution creation, and project management.

Rubrics are assessment tools that establish clear and specific criteria to assess student performance through evidence that demonstrates it. They include levels of learning achievement,

ranging from the most basic to the outstanding, and descriptors identify the student level based on the specified criteria. Rubrics provide a structured framework for evaluation, contributing to their objectivity and ensuring that it is fair, coherent, and transparent. They facilitate feedback and can guide students in improving their performance.

There are specific and generic rubrics, depending on whether they evaluate one or more tasks, respectively. They can also be classified as analytical and holistic; the former focuses on detailed criteria, while the latter evaluates performance with an integrated view (McTighe & Ferrara, 1998). Some authors (Tomas *et al.*, 2019; Kaldaras *et al.*, 2022; Hussain, 2020; Zlatkin-Troitschanskaia *et al.*, 2019; Yune *et al.*, 2018) have concluded in their research that the relevance of complementing analytical and holistic rubrics, or specific and generic rubrics, during the teaching-learning process is evident.

In assessing competencies, generic rubrics with a holistic approach allow the evaluator to consider the overall quality of the student's performance without breaking it down into specific aspects. This facilitates a smoother and less rigid evaluation, suitable for situations where the overall judgment is more relevant than the sum of individual parts. In addition, these rubrics help guide those evaluated by clearly understanding what is expected of competent performance, where the value lies in integrating various skills and promoting self-reflection and continuous development.

There is no single methodology for designing rubrics, nor is there a consensus regarding their elements. Dawson (2015) analyzes fourteen elements that can be present in a rubric, referring to items that identify them. Wiggins and McTighe (2005) propose a reverse design, consisting of three perfectly aligned stages. In the first step, the desired results are identified; in the second, the evidence that will enable evaluation is determined; and in the third, the learning

experiences are planned. This approach ensures that rubrics are aligned with learning outcomes, thereby improving consistency between what is expected and what is assessed.

Rubric design involves a thoughtful and structured process (Brookhart, 2013) that guides assessment and learning. Brookhart does not define a rigid method but emphasizes starting with identifying learning objectives. Moskal (2000) mentions that in addition to the learning objectives, among the first steps is to determine whether what is needed is an analytical or holistic rubric; To define the evaluation criteria and performance levels, this researcher recommends that there be few levels, enough so that there is an appropriate distinction between them. Since 1997, Popham has pointed out what should not be done when designing rubrics. He defined that there must be clear criteria. When it comes to rubrics, less is more, so he recommended considering the essential criteria for evaluation and, most importantly, guiding learning.

Literature review

Recent research has concentrated on methods for designing and utilizing rubrics. Some of these articles focus on methods for designing rubrics, while others define evaluation criteria or indicators. Teachers are best known for using specific rubrics to evaluate a specific task; however, generic rubrics are also relevant when evaluating integrated and authentic learning, competencies, or performances in a real or simulated situation.

An example of the latter is the work of Reid *et al.* (2023), who proposed the adaptive comparative judgment method to evaluate creativity and design holistically as a comprehensive measure of global performance. With another approach, Rynearson (2023) presented a method at a conference that uses individuals as a

reference for developing a generic and holistic rubric, with the recommendation to apply it in areas where the grade is highly subjective, such as a student's performance during the training process. For their part, Youn and Shen (2021) and Vargas *et al.* (2024) illustrate procedures for developing rubrics using a data-based approach to performance, in which they identify learning outcomes and analyze performances with real-world examples.

Other studies, such as Berciano *et al.* (2024), show four phases for developing rubrics, each with three steps. The phases involve theoretical review, creation, design, practice testing, and improvement. These authors concluded that a rubric developed through this process addresses essential aspects for analyzing the evaluated performance holistically and in a well-founded manner.

A detailed procedure, consisting of two stages (planning and design), is described by González *et al.* (2020). These authors consider the objectives, purpose, evaluator, dimensions, variables, and scale, among other elements. They decide whether to adopt a holistic or analytical approach, although they do not clearly distinguish when these approaches can be applied in a generic or specific manner.

The scientific production on the design of rubrics is vast, oriented from various perspectives, such as the theory of gamification (Corona & Real, 2019); or the Fink's taxonomy, which incorporates criteria of application, integration, human dimension, care, and metacognition in rubrics design (Dosmar & Nguyen, 2021). It also involves perceived efficacy frameworks to determine qualitative indicators in holistic, standardized, and detailed rubrics that guide formative and normative feedback (Rajaram, 2023). Work has also been done on scales for holistic rating in rubrics at the level of curricular programming (Pearce *et al.*, 2021).

The exploration of rubric design methodologies reveals a dynamic and multifaceted field of research, emphasizing the

importance of specific and generic rubrics in educational settings. The systematic review highlights innovative approaches that facilitate the assessment of competencies and performances and enhance the learning experience by providing precise and structured evaluation criteria. As educators increasingly seek to incorporate holistic assessments into their teaching practices, the findings underscore the necessity for ongoing development and refinement of rubric methodologies. Future research should continue to examine the effectiveness of these approaches in varied educational contexts to ensure that the rubric remains a vital tool for fostering meaningful student learning and evaluation.

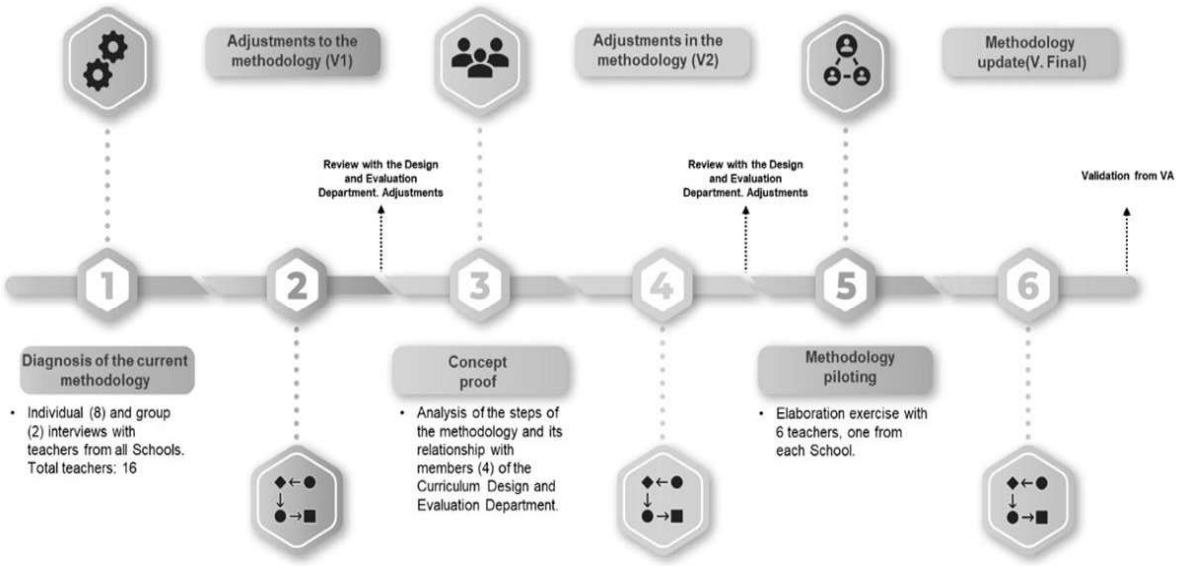
Materials and methods

The assessment in the Tec21 educational model uses an authentic approach. It leverages the didactic and instructional design of an environmental challenge that reflects professional practice. Competency achievement is shown through evidence that enables us to observe performances integrating knowledge, skills, dispositions, and attitudes in complex situations and tasks. Since the introduction of the Tec21 educational model, institutional instruments have been used to assess competencies. These instruments are designed in an academic community, collegially and collaboratively, and then used by all the teachers of the Institution who develop and evaluate each competence.

The present methodology (Figure 1) design work has two key reference periods in time: the first, since the beginning of the Tec educational model in 2019, when it was defined that the assessment instrument would focus on the specific dimensions of competence mastery level, using a dichotomous scale. The experience's results demonstrated that the limited feedback provided did not contribute

positively to the learning process.

Figure 1: Process for improving the methodology for developing rubrics



Source: authors

In 2022, a comprehensive rubric was established to evaluate performance across four distinct levels of achievement. This initiative aimed to provide a more nuanced understanding of student progress and outcomes. By 2023, the decision was made to revamp the curricula within professional academic programs. This update presented a valuable opportunity to assess the strengths and areas for improvement of the previously implemented rubric, allowing for a more effective approach to educational evaluation and enhancement.

From August 2023 to May 2024, the experience was analyzed through individual and group interviews with professors who designed and used generic rubrics to assess competencies. Proofs of concept and pilots were conducted using the methodology, with necessary adjustments made. Teachers considered rubrics useful tools for assessing students' competencies and providing feedback. Some mentioned that identifying students' achievement levels over a

broader range of options made it easier. Participating in the design of the rubrics facilitated their implementation. Additionally, the rubrics helped students understand the assessment parameters and become more accountable for their learning.

Despite the positive aspects, some difficulties in using rubrics have also been identified. One of the main problems is the complexity of the language and, in some rubrics, the length of the descriptors. Some teachers find descriptors repetitive and difficult to compare with one another. Others mentioned that language, while clear to them, is not easy for students who have difficulty understanding their level of proficiency. The length of descriptions can also be a problem, as some teachers struggle to follow them.

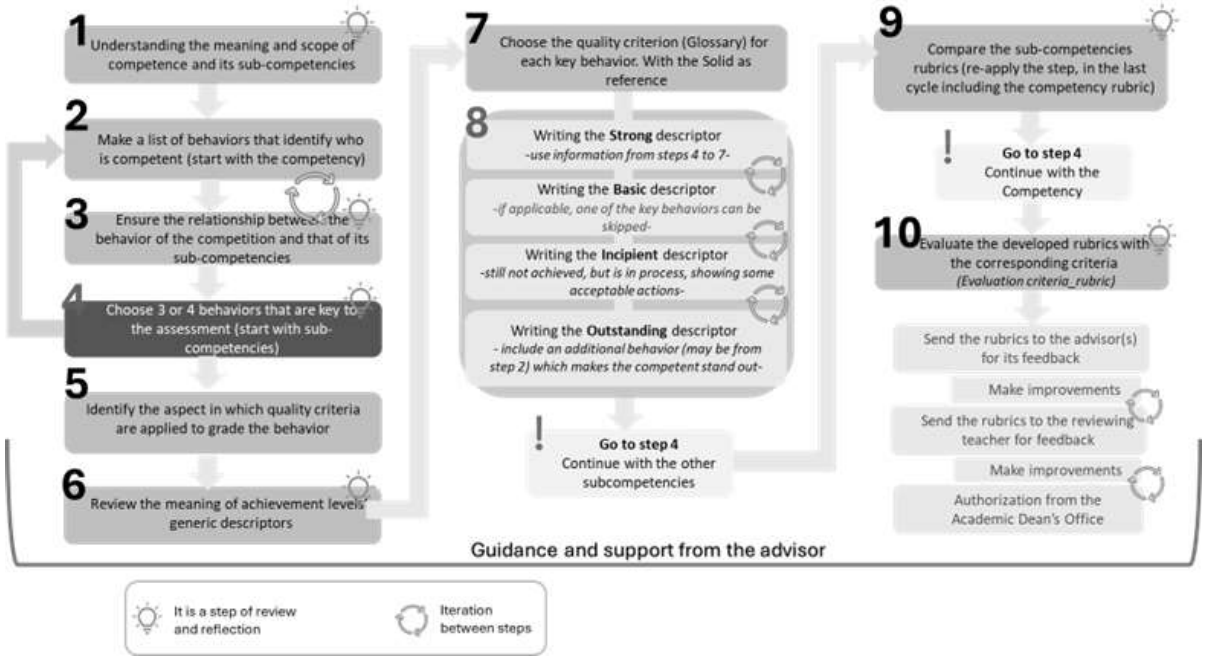
Another important challenge is subjectivity in qualitative assessment; although teachers accept that biases do not disappear, they try to minimize them. Sometimes, students do not fit neatly into descriptions of achievement levels. Additionally, some teachers emphasize the importance of considering other aspects, such as mastery of theory and exam preparation, especially in disciplines where knowledge and memorization are crucial. A discrepancy has also been observed between grades and achievement levels, as students receive high grades without demonstrating competencies. This highlights the importance of training teachers in the evaluation process, particularly in using the rubric. Finally, collegial assessment is complicated when teachers are not experts in all the competencies they are assessing.

Results

The upcoming curricular update, scheduled for implementation in 2026, presents a valuable opportunity to enhance the competency assessment process through the use of

holistic rubrics. After a thorough analysis of the relevant data and a careful examination of the distinctive features of the 2026 curricula, a comprehensive 10-step methodology for designing these rubrics has been established (refer to Figure 2). This methodology aims to ensure that the assessment process is effective and aligned with the overall educational goals of the new curriculum.

Figure 2: Rubric design methodology 2026



Source: authors

The methodology is a framework for a deeply reflective and iterative thinking process, enabling individuals to reassess their understanding and approaches. This ongoing cycle encourages continuous improvement and innovation by allowing for the exploration of different perspectives and the refinement of ideas.

The diagram outlines a structured process for creating rubrics to evaluate competencies and sub-competencies. The process begins with understanding the scope of the primary

competency and its related sub-competencies (Step 1). Once the scope is clear, a list of observable behaviors is generated to identify what defines a competent individual, starting with the primary competency (Step 2). Next, it is crucial to ensure a clear connection between the primary competence's behaviors and those of its sub-competencies (Step 3). This foundational work provides a solid framework for selecting the key behaviors, typically 3 to 4, essential for assessing each sub-competency (Step 4).

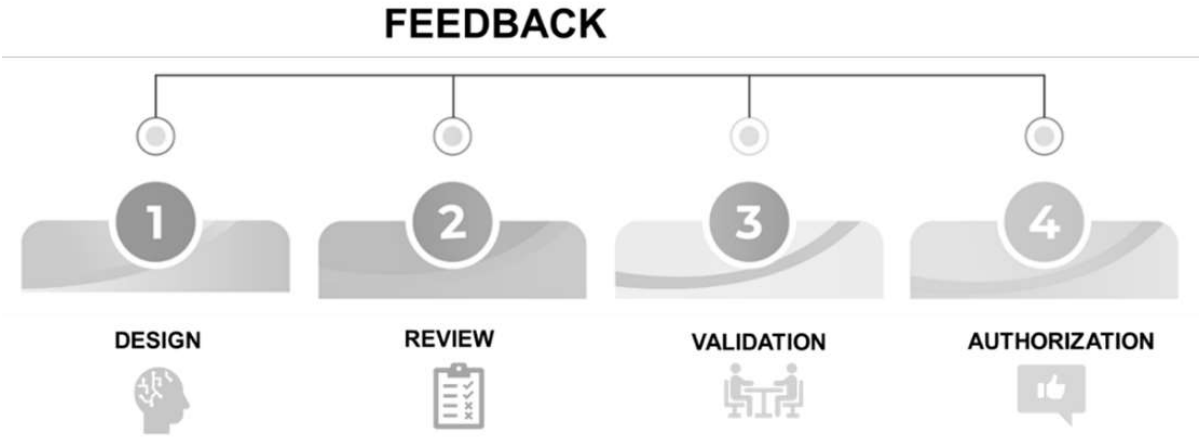
After identifying the key behaviors, the following steps involve specifying where the quality criteria will be applied to evaluate each behavior (Step 5). Reviewing the meaning of generic descriptors related to achievement levels, such as "Basic," "Solid," and "Outstanding," is important to maintain consistency in the assessment (Step 6). With this foundation, the process moves towards selecting the quality criteria for each key behavior, using the "Solid" level as a reference point (Step 7). In this step, there is a resource that is essential to consult: the Glossary of Criteria defines the quality of each key behavior and distinguishes the four degrees of achievement on the evaluation scale from one another. Then, the descriptors for each level of achievement are written based on the guidelines established in the previous steps (Step 8).

The final stages of the process involve comparing and refining the rubrics created for the sub-competencies (Step 9), which may require iterative adjustments to ensure alignment with the overall competency. After this comparison, the rubrics are evaluated against the established criteria, and feedback is sought from advisors (instructional designers with a background in education, evaluation experts) and reviewers (experts in the disciplinary area who are part of the program's academic community) (Step 10). Improvements are made based on this feedback before formal authorization is obtained from the office of the Academic Dean. Throughout the process, steps for review and reflection are

indicated, as well as points where iteration between steps is encouraged to improve accuracy and clarity in rubric development.

Following the collaborative development of rubrics, they undergo a thorough process of revisions and validations. This process incorporates insights from multiple perspectives, which serves to enhance their overall validity and reliability. Such an approach ensures that the rubrics are not only well-structured but also effectively aligned with their intended assessment objectives. The iterative feedback and evaluation phases are critical in refining them, enabling them to serve their purpose more effectively in educational settings. This systematic review process is illustrated in Figure 3.

Figure 3: Institutional rubrics elaboration process



Source: authors

Discussion

Creating a methodology for designing and developing rubrics to evaluate competencies requires integrating various strategies and frameworks from different disciplines. A common theme in literature

is the emphasis on creating valid and reliable rubrics that accurately assess the intended competencies. For instance, rubrics have been developed to assess specific skills in different fields, highlighting the importance of structured evaluation tools in enhancing educational outcomes (Davis *et al.*, 2024; Tutor *et al.*, 2023).

There is a need for simple yet effective rubrics in peer evaluations (Thite *et al.*, 2024), underscoring their role in formative and summative assessments (García-Ros *et al.*, 2024). Technology can streamline rubric development, making the process more efficient and aligned with actual student responses (Hong & You, 2024). Developing competency frameworks provides a structured approach to identifying key competencies and roles, which can be translated into rubric criteria (Hecke *et al.*, 2024). Additionally, integrating digital competence frameworks into rubric design highlights the importance of aligning assessment tools with contemporary educational needs, ensuring they are relevant and applicable in digitally mediated environments (González-Mujico, 2023).

Our methodology ensures that our tools are practical and, theoretically, sound, providing a robust foundation for designing rubrics that effectively measure and enhance competency development in diverse educational settings. It also highlights the adaptability of rubrics to various academic contexts, making them a comprehensive tool for assessing complex, interdisciplinary learning outcomes. While developed within the context of the Tec21 educational model, the rubric design methodology is versatile. It can be implemented by other educational institutions seeking standardized rubrics that bring consistency and reliability to teacher evaluations.

This adaptability allows institutions to create approved rubrics that ensure fair and accurate assessments across various programs, providing a robust framework that aligns with their

unique educational goals. One of the defining aspects of this methodology is its focus on collaboration and collegiality throughout the entire design and development process. By involving educators and academic stakeholders from the outset, the methodology fosters a shared responsibility and commitment to quality evaluation, creating a culture of continuous improvement that benefits both teachers and students.

The methodology has been carefully crafted to develop generic rubrics that adopt a holistic approach to assessing competencies. This design focuses on identifying crucial behaviors that are indicative of a learner's understanding and application of skills. By utilizing this framework, educators gain the ability to evaluate student performance comprehensively. Rather than merely assessing isolated skills, rubrics encourage an analysis of how these skills are interconnected and applied within relevant professional contexts. This integrated perspective can help educators better understand the complexities of student learning, as well as how different competencies can work together to foster overall professional development. By emphasizing both the individual components and their collaborative applications, the rubrics aim to provide a more thorough picture of student capabilities and readiness for real-world challenges.

Additionally, the inclusion of a detailed glossary serves as an essential tool that enhances the integrity of the rubric, fostering a consistent understanding among evaluators. This glossary will provide clear definitions and explanations of the criteria and descriptors embedded within the rubric. By doing so, it empowers evaluators to conduct fair and informed assessments, ensuring that everyone adheres to a common standard, regardless of the evaluator or context. Moving forward, this comprehensive glossary will be an integral part of all future work.

Conclusion

Building on the preceding discussions, this conclusion aims to synthesize the key findings of the article and highlight their added value in relation to institutional policy development. The findings highlight the need for: (1) a design methodology that is contextually aligned with the adopted evaluation model; (2) a participatory development process involving both experts and academic authorities, fostering a sense of ownership among faculty; (3) mechanisms to actively listen to faculty perspectives through a bottom-up approach; and (4) a complementary top-down strategy that ensures coherence, sustainability, and institutional legitimacy. These will offer guidance for more inclusive, relevant, and effective academic evaluation policies.

Further research is needed to refine and validate the use and impact of these rubrics in competency-based education. Examining how these rubrics perform in diverse contexts can provide valuable insights that foster continuous improvement, ensuring they remain relevant and effective as educational tools. Teacher training is essential for effectively implementing these rubrics, particularly considering that the holistic approach of generic rubrics differs from the analytical rubrics with which educators may be more familiar. A clear understanding of the scope, purpose, and application across various tasks will enable teachers to make more consistent and comprehensive assessments of student performance.

Generic rubrics complement specific rubrics and other assessment tools that educators can customize to suit their students' particular evidence or activities. This adaptability enables instructors to leverage the rubric framework effectively, tailoring it to specific tasks and thus offering a balanced approach to both general and detailed evaluation. Moreover, implementing a top-down

strategy that standardizes rubric design and usage can cultivate a positive evaluation culture within the institution. By establishing uniform procedures and expectations around assessment, this approach encourages consistent practices, ensuring that evaluation becomes a constructive and integral element of the learning experience.

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