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*RESEARCH ARTICLE*

# DIGITAL RUBRICS AND AUTOMATED LEARNING: "MEASURING SKILLS IN INTERNATIONAL BUSINESS PROJECTS

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## *Abstract*

Current research in higher education focuses on the transformation of assessment systems to enhance their objectivity, efficiency, and formative nature. There is a marked interest in the adoption of authentic and competency-based assessment, utilizing tools such as detailed rubrics to align learning with professional demands.Concurrently, the integration of Artificial Intelligence (AI) and learning analytics is being intensively explored to automate feedback, reduce faculty workload, and optimize pedagogical processes. The literature underscores that the success of these innovations depends on adequate change management, faculty professional development, and overcoming institutional barriers, as well as addressing the ethical challenges associated with the use of algorithms in assessment.



## Introduction:-

**STATEMENT OF THE PROBLEM:-**

Higher education in the 21st century faces the imperative to transcend traditional models of teaching and assessment, orienting itself toward the formation of professionals endowed with complex and adaptive competencies capable of responding to the dynamics of a globalized and technologically advanced environment. In this context, higher education institutions (HEIs) assume a crucial responsibility in designing and implementing formative processes that not only transmit theoretical knowledge but also cultivate practical skills, critical thinking, problem-solving abilities, and effective collaboration. Particularly in the field of Economic and Administrative Sciences, and specifically in programs such as the Bachelor's in International Business, the demand for graduates with a high level of applied skills in project management, global market analysis, internationalization strategy formulation, and adaptation to multicultural environments is increasingly pressing (Salas-Paredes, Gata-García, & Gata-García, 2021).

However, the prevailing learning assessment systems in many HEIs, often anchored in instruments that prioritize memorization and the reproduction of information, present significant limitations in comprehensively and authentically measuring the development of these essential competencies and skills. Conventional written examinations, for example, while useful for certain purposes, are often insufficient to appreciate a student's ability to

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apply knowledge in simulated or real-world scenarios, manage the uncertainty inherent in business projects, or demonstrate interpersonal and leadership skills (Villárdon-Gallego, 2020). This dissonance between the competencies demanded by the labor market and society and what traditional assessment methods manage to weigh constitutes a substantial challenge to the relevance and quality of higher education. Assessment, in this sense, should not be a mere act of grading but a continuous and formative process that drives meaningful learning and competency development (Panadero & Brown, 2017).

Thus, an urgent need arises to innovate in educational assessment methodologies and tools, leveraging the potential offered by Information and Communication Technologies (ICT) to design more sophisticated, efficient instruments aligned with 21st-century learning objectives. The transition to authentic assessment, which reflects the tasks and challenges of the professional world, requires approaches that allow for the observation and valuation of student performance in action, in contexts that simulate the complexity of professional practice (Crisp, 2021). In this landscape, the Bachelor's in International Business, as an academic program focused on preparing professionals to operate in an interconnected global sphere, demands assessment strategies that can capture the multidimensionality of the required skills, such as intercultural negotiation, country risk analysis, international logistics, and the formulation of business plans with a global projection.

The present study is situated in the Academic Unit of Accounting and Administration (UACyA) of the Autonomous University of Nayarit (UAN), an institution committed to the formation of professionals in various fields of knowledge. Within its educational offerings, the International Business program seeks to meet the demands of a dynamic professional field. However, as is the case in many institutions, there is an area of opportunity to strengthen assessment mechanisms, particularly concerning the objective and detailed measurement of specific skills that students develop through the creation of integrative or practical application projects, which are fundamental in this discipline. The assessment of such projects, which often involves multiple criteria and performance levels, can become complex, subjective, and time-consuming for faculty if adequate and systematized tools are not available.

In this context, digital rubrics emerge as an assessment instrument with considerable potential. A rubric, understood as a scoring guide that explicitly describes performance criteria and the different levels of quality for each, offers transparency for both the assessor and the assessed, promoting objectivity and facilitating formative feedback (Reddy & Andrade, 2010). By digitizing rubrics, advantages such as ease of distribution, streamlining of the grading process, and the possibility of generating systematic records of student performance are added.

Nevertheless, the application of rubrics, even digital ones, in large groups or in assessments requiring the analysis of multiple dimensions of a complex project can still represent a significant operational load for instructors. It is here that the integration of automated learning (often referred to as Machine Learning, a subfield of Artificial Intelligence or AI) with digital rubrics presents a promising avenue to optimize and enrich the assessment process. Automated learning can be trained with data from previous assessments conducted with rubrics to identify patterns, assist in the grading of certain project components, or even generate predictive analyses of student performance, allowing for earlier and more personalized pedagogical interventions (Spector & Ifenthaler, 2021). This technological synergy could not only lighten the faculty's workload but also improve the consistency of assessments and provide more detailed and agile feedback to students on their strengths and areas for improvement in developing key skills for international business. Recent literature underscores the transformative potential of AI in education, especially in the personalization of learning and assessment, while also warning of the need for an ethical and pedagogically sound implementation (Zawacki-Richter, Marín, Bond, & Gouverneur, 2019).

Therefore, the central problem this research seeks to address is the absence of an educational assessment model, specifically designed for the International Business program at UACyA-UAN, that effectively integrates digital rubrics and the capabilities of automated learning for the rigorous, efficient, and formative measurement of skills developed by undergraduate students through the execution of disciplinary projects. A lack of a system is perceived that not only assesses the final product (the project) but also offers detailed information about the process and the level of mastery of specific competencies, and which, in turn, provides clear and simple-to-implement solutions for faculty without creating confusion or an excessive technical burden. The assessment of practical skills and abilities, beyond declarative knowledge, is a crucial aspect that requires an innovative and technologically assisted approach.

The relevance of addressing this problem is supported on several fronts. First, a more precise and formative assessment of skills can directly contribute to improving the quality of learning and the preparation of future international business professionals, aligning their graduate profile with the demands of the work environment. Second, optimizing the assessment process through technology can free up faculty time that could be reinvested in other high-value pedagogical activities, such as personalized tutoring or the design of more enriching learning experiences. Third, the systematization of assessment data can generate valuable information for the institution itself, enabling continuous monitoring of competency development in its programs and informed decision-making for curricular improvement (Ifenthaler, 2022). Finally, a proposal of this nature aligns with global trends toward the digitalization of education and the incorporation of artificial intelligence as a support tool for teaching-learning processes.

Consequently, this research project will focus on the design, development, and validation of an assessment methodology based on digital rubrics and automated learning, aimed at measuring skills in projects developed by students of the Bachelor's in International Business. It is intended that this proposal be not only technically sound and pedagogically relevant but also applicable and scalable in the specific context of UACyA-UAN, laying the groundwork for future innovations in the institution's assessment practices and offering a model that may be useful for other programs and educational contexts with similar challenges. The research will be guided by the premise that a well-designed and technologically assisted assessment is a fundamental lever for enhancing learning and ensuring academic excellence.

**Application Context: The International Business Program and its Faculty:-**

This academic research project is framed within the specific context of the Bachelor's in International Business program, offered at the Academic Unit of Accounting and Administration (UACyA) of the Autonomous University of Nayarit (UAN). This program is structured to be completed over a period of 8 semesters (four years) and consists of a total of 47 Learning Units. These units are organized into formative pathways that define the student's progression: "University Core Curriculum," "Area Core Curriculum," "Disciplinary-Professionalizing Training Area," and "Elective Training Area," configuring a robust and multifaceted curricular map.The study's universe and potential users of the proposed solution are the faculty members who teach in this bachelor's program, currently composed of 73 academics. This collective is characterized by a notable and valuable heterogeneity. In terms of academic qualifications, the group exhibits solid preparation, with 18 faculty members holding a Doctorate degree, 40 with a Master's degree, and 15 with a Bachelor's degree. This diversity of degrees is complemented by a rich variety of original professional backgrounds, including Lawyers, Administrators, Marketers, Accountants, IT Specialists, Economists, and Financial Experts.

This configuration of the program and its faculty is fundamental to the problem statement. On one hand, the breadth and specialization of the 47 Learning Units generate a considerable and diverse volume of academic work that requires assessment. On the other hand, the heterogeneity of the faculty, while representing an interdisciplinary strength, poses inherent challenges related to the standardization of evaluation criteria, consistency in feedback, and a potential gap in the adoption of new technological tools. It is in this scenario, with its structural strengths and operational complexities, that the need to explore technology-based solutions to optimize and support assessment processes is identified.

**General Objective:**To design a methodological model for educational assessment, based on the integration of digital rubrics and automated learning techniques, for the systematic and formative measurement of the skills developed by students of the Bachelor's in International Business at the Academic Unit of Accounting and Administration of the Autonomous University of Nayarit, through the development of disciplinary projects, in order to optimize the objectivity, efficiency, and feedback potential of the assessment process."

**Specific Objectives**:-To diagnose the current assessment practices and specific needs for measuring skills in projects within the Bachelor's in International Business program at UACyA-UAN.

To design the architecture of the methodological assessment model, specifying the structure of the digital rubrics, the performance criteria for key skills in international business projects, and the proposed mechanisms for integrating automated learning techniques into the grading and results analysis process.

To validate the relevance, coherence, and conceptual viability of the proposed methodological assessment model through the judgment of experts in the fields of education in administrative sciences, assessment methodologies, and

technologies applied to education.

**Research Questions:-**

- What are the characteristics, deficiencies, and needs of the current assessment practices for projects in the Bachelor's in International Business program that justify the development of a new methodological model?
- How can a methodological model, which integrates digital rubrics and automated learning, be structured to address the needs for objectivity, efficiency, and effective feedback in the assessment of projects within the International Business program?
- According to expert judgment, what is the relevance, coherence, and conceptual viability of the designed methodological model for enhancing objectivity and optimizing the assessment process at UACyA-UAN?

**Hypotheses:**

- H<sub>T1</sub>: The design of a methodological model that integrates digital rubrics and automated learning will allow for a more explicit and transparent definition of the evaluation criteria for international business projects, thereby improving students' understanding of performance expectations and fostering more effective self-assessment.
- H<sub>T2</sub>: The conceptual application of the proposed methodological model, by incorporating elements of automated learning for the analysis of assessment data, will offer the faculty of the Bachelor's in International Business program a tool to optimize the time spent on grading and to identify student performance patterns, facilitating more agile and specific feedback.
- H<sub>T3</sub>: The structure of the designed methodological model, by focusing on the systematic measurement of specific skills through detailed criteria in rubrics and the analytical potential of automated learning, will contribute to greater objectivity in the assessment of international business projects at UACyA-UAN, compared to methods that rely more heavily on the evaluator's subjective interpretation.

## Methodology/methods:-

This research will be developed under a mixed-methods approach, with an explanatory sequential design in its projection, although the current phase is primarily focused on the design and qualitative validation of the model. The objective is to construct and validate the conception of a methodological model for project assessment, laying the groundwork for its future implementation and empirical evaluation. It is important to note that this section aims to "detail the plan and procedures that will be followed to achieve the research objectives and test the formulated working hypotheses."

**Research Approach and Type:-**

- Mixed-Methods Approach: The research will adopt a mixed-methods approach, specifically an explanatory sequential design (EXPLAN).
- Phase 1 (Qualitative - QUAL): It will begin with a qualitative phase to diagnose in-depth the existing assessment practices, perceptions, and needs of the faculty and student body.
- Phase 2 (Constructive/Design): With the inputs from the first phase, the design of the methodological model will proceed, which is a process of theoretical and conceptual construction.
- Phase 3 (Qualitative/Quantitative - QUAL/QUAN): It will conclude with an expert validation phase that will combine qualitative assessments (judgments and recommendations) and quantitative measures (rating scales) to evaluate the proposal.

**Type of Research: Design-Based Research (DBR):**

The study is framed within Design-Based Research. This type of research is the most appropriate as it does not merely seek to describe a reality, but to develop an intervention (the methodological model) in a real context (UACyA-UAN), analyze it, and refine it iteratively, generating both practical knowledge for the institution and theoretical knowledge for the field of educational assessment.

**Study Phases:-**

**The methodology will be developed in three main phases, directly aligned with the specific objectives:**

- Phase I: Diagnosis and Needs Analysis (Corresponds to Specific Objective 1)

- The objective of this phase is to "obtain a detailed overview of the current assessment methods for projects in the Bachelor's in International Business, identifying strengths, weaknesses, and the specific needs of faculty and students for the measurement of skills."

- **Subjects/Participants:**
- Faculty, students, and relevant documents and information.

**Data Collection Techniques and Instruments:-**
1. Semi-structured interviews. 2. Documentary analysis. 3. Data Analysis (Phase I).

**Phase II: Design and Architecture of the Methodological Model (Corresponds to Specific Objective 2)**
The objective of this phase will be to enable the "construction of the conceptual and operational structure of the assessment model, integrating the components of digital rubrics and automated learning."

**Procedure:**
- Definition of Key Skills: Based on the results of Phase I and a literature review, a catalog of 5 to 7 fundamental skills for international business projects will be defined.
- Design of Digital Rubrics: For each skill, a detailed analytical rubric will be designed, specifying: a) Performance Criteria, b) Proficiency Levels, c) Descriptors of specific behaviors and characteristics, d) Data Input, e) Processing, f) Output, g) Assisted Grading, h) Analytical Dashboard, and i) Feedback Generation.

**Design of the instrument to be used, based on methodological needs.**

**Table1. General Information of the Expert Judge.**

| | |
|---|---|
| **Nombre (Opcional):** | |
| **Máximo Grado Académico:** | |
| **Área(s) de Especialidad Principal:** | ☐ Educación en Ciencias Administrativas<br>☐ Metodologías de Evaluación Educativa<br>☐ Tecnología Educativa / IA en Educación<br>☐ Docencia en Negocios Internacionales<br>☐ Otro (especificar): |
| **Años de Experiencia Profesional en su Área de Especialidad:** | |

**Own elaboration based on the proposed model and consulted sources. Created in Excel ®**

**Table3. "Dimension 1: RELEVANCE"**

*Dimensión 1: PERTINENCIA (Responde a la necesidad y es adecuado al contexto)*

| *Ítem* | Afirmación | *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|---|---|
| *P1* | El modelo responde a una necesidad real y significativa de evaluación en el programa de Negocios Internacionales. | | | | | |
| *P2* | Las destrezas que el modelo busca medir son relevantes para el perfil de egreso del licenciado en Negocios Internacionales. | | | | | |
| *P3* | La integración de tecnología (rúbricas digitales y aprendizaje automatizado) es una solución pertinente para los problemas de subjetividad y carga operativa descritos. | | | | | |
| *P4* | El modelo propuesto es apropiado para el contexto específico de la UACyA-UAN. | | | | | |

**Own elaboration based on the proposed model and consulted sources. Created inExcel ®**

**Table3. " Dimension 3: COHERENCE".**

*Dimensión 3: COHERENCIA (Existe una articulación lógica entre las partes del modelo)*

| Ítem | Afirmación | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| CO1 | Existe una conexión lógica y fundamentada entre el diagnóstico del problema y la solución que el modelo propone. | | | | | |
| CO2 | Los dos componentes principales (rúbricas digitales y aprendizaje automatizado) se integran de manera coherente para cumplir el objetivo general. | | | | | |
| CO3 | Los objetivos específicos de la investigación se alinean de forma lógica con la estructura y propósito del modelo. | | | | | |
| CO4 | Las hipótesis de trabajo del estudio son consistentes con lo que el modelo metodológico busca lograr. | | | | | |

**Own elaboration based on the proposed model and consulted sources. Created in Excel ®**

**Table4. "Dimension 2: CLARITY"**

*Dimensión 2: CLARIDAD (Los componentes y su propósito se entienden sin ambigüedad)*

| Ítem | Afirmación | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| C1 | La descripción general del modelo, sus objetivos y componentes, es clara y fácil de entender. | | | | | |
| C2 | La estructura propuesta para las rúbricas digitales (criterios, niveles, descriptores) está definida con precisión. | | | | | |
| C3 | El rol conceptual del aprendizaje automatizado (asistir, analizar, no reemplazar) se explica de forma comprensible. | | | | | |
| C4 | El flujo del proceso evaluativo que seguirían docentes y estudiantes es lógico y está claramente expuesto. | | | | | |

**Own elaboration based on the proposed model and consulted sources. Created in Excel ®**

**Table5. "Section IV: Validation Questionnaire in compliance with the evaluation of the qualitative part."**

*Sección IV: Cuestionario de Validación - Parte Cualitativa*

***Instrucciones:*** *Le solicitamos amablemente que responda las siguientes preguntas abiertas. Sus comentarios detallados son fundamentales para el enriquecimiento de la propuesta.*

| | |
|---|---|
| 1 | *Desde su perspectiva, ¿cuáles considera que son las tres principales FORTALEZAS del modelo metodológico propuesto?* |
| 2 | *Identifique las principales DEBILIDADES o áreas de mejora. ¿Qué aspecto del modelo le genera más dudas o considera que necesita un mayor desarrollo?* |
| 3 | *Enfocándose en el componente de las RÚBRICAS DIGITALES, ¿tiene alguna sugerencia para mejorar su diseño, estructura o los criterios de evaluación que se proponen?* |
| 4 | *En cuanto a la integración conceptual del APRENDIZAJE AUTOMATIZADO, ¿qué recomendaciones o precauciones considera cruciales para asegurar que su implementación sea ética y pedagógicamente sólida?* |
| 5 | *Pensando en la VIABILIDAD, ¿cuáles serían los mayores OBSTÁCULOS (técnicos, pedagógicos, institucionales, de capacitación) para la implementación exitosa de este modelo en la UACyA-UAN?* |
| 6 | *Por favor, ofrezca cualquier otra sugerencia o comentario general que considere relevante para el fortalecimiento de esta propuesta de investigación.* |

**Elaboracion propia con base en el modelo planteado y las fuentes consultadas. Realizado en Excel ®**

**Table6. "Dimension 4: VIABILITY"**

*Dimensión 4: VIABILIDAD (Es factible su implementación en la práctica)*

| Ítem | Afirmación | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| V1 | La implementación del modelo es técnicamente factible en una institución de educación superior como la UAN. | | | | | |
| V2 | El modelo parece ser pedagógicamente adaptable para los docentes, sin requerir una especialización técnica excesiva para su uso cotidiano. | | | | | |
| V3 | Los beneficios potenciales del modelo (objetividad, eficiencia, mejor retroalimentación) justifican el esfuerzo de su desarrollo e implementación. | | | | | |
| V4 | El modelo es conceptualmente escalable, es decir, podría adaptarse a otras asignaturas o programas académicos. | | | | | |

**Own elaboration based on the proposed model and consulted sources. Created in Excel ®**

**Second section of the proposed construct: "Qualitative Analysis (open-ended questions)" Methodological Process of the Analysis.**

1. Transcription and Organization: All responses from the 7 expert judges for each of the 6 open-ended questions will be compiled into a single document, organized by question.
2. Open Coding: A detailed reading of all responses will be conducted to identify key concepts and phrases (codes). For example, a comment such as "This model will save teachers a lot of time" would be coded as "Teacher efficiency."
3. Creation of Thematic Categories: Similar codes will be grouped into broader thematic categories. Below is a structure of hypothetical categories expected to be found, based on the research objective.
4. Synthesis and Interpretation: A narrative analysis will be written for each category, using anonymous textual quotes from the experts as evidence. The final interpretation will connect these themes to build a solid argument about the model's value.

**Development:-**

**Table7. "Results of Dimension 2: RELEVANCE".**

*Dimensión 1: PERTINENCIA*

| Ítem | Afirmación | Juez 1 | Juez 2 | Juez 3 | Juez 4 | Juez 5 | Juez 6 | Juez 7 | Media | D.E. |
|---|---|---|---|---|---|---|---|---|---|---|
| P1 | El modelo responde a una necesidad real... | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 4.86 | 0.38 |
| P2 | Las destrezas que busca medir son relevantes... | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 4.86 | 0.38 |
| P3 | La integración de tecnología es una solución pertinente... | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 4.86 | 0.38 |
| P4 | El modelo es apropiado para el contexto de la UACyA-UAN. | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 4.57 | 0.53 |
| | Media de la Dimensión | | | | | | | | 4.79 | |

**The following is developed:**

**Table8. "Results of Dimension 2: CLARITY".**

*Dimensión 2: CLARIDAD*

| Ítem | Afirmación | Juez 1 | Juez 2 | Juez 3 | Juez 4 | Juez 5 | Juez 6 | Juez 7 | Media | D.E. |
|---|---|---|---|---|---|---|---|---|---|---|
| C1 | La descripción general del modelo es clara... | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 4.71 | 0.49 |
| C2 | La estructura de las rúbricas está definida con precisión. | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4.71 | 0.49 |
| C3 | El rol del aprendizaje automatizado se explica... | 5 | 5 | 4 | 4 | 5 | 5 | 4 | 4.57 | 0.53 |
| C4 | El flujo del proceso evaluativo es lógico y claro. | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 4.86 | 0.38 |
| | Media de la Dimensión | | | | | | | | 4.71 | |

**Own elaboration based on the proposed model and consulted sources. Created in Excel.**

**Table9. "Results of Dimension 3: COHERENCE".**

| Dimensión 3: COHERENCIA | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Ítem | Afirmación | Juez 1 | Juez 2 | Juez 3 | Juez 4 | Juez 5 | Juez 6 | Juez 7 | Media | D.E. |
| CO1 | Existe conexión lógica entre el problema y la solución. | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 0 |
| CO2 | Los componentes se integran de manera coherente. | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 4.71 | 0.49 |
| CO3 | Los objetivos se alinean con la estructura del modelo. | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 0 |
| CO4 | Las hipótesis son consistentes con el modelo. | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 4.86 | 0.38 |
| Media de la Dimensión | | | | | | | | | 4.89 | |

**Own elaboration based on the proposed model and consulted sources. Created in Excel.**

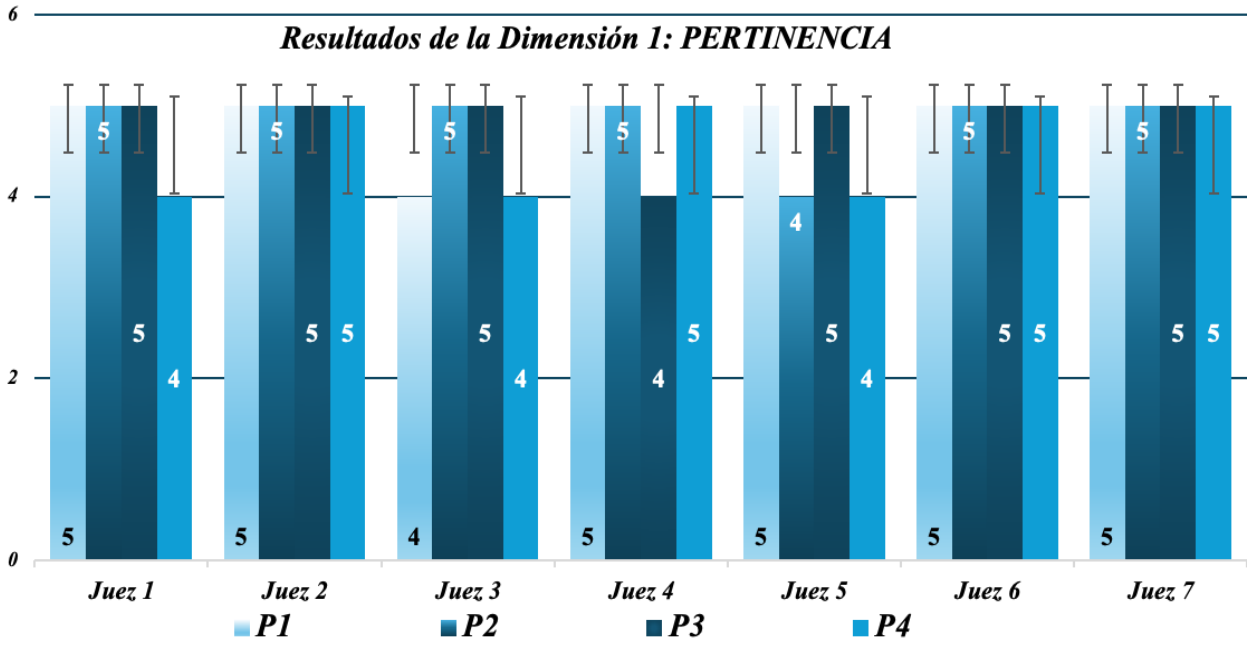
**Table10. "Results of Dimension 4: VIABILITY".**

| Dimensión 4: VIABILIDAD | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Ítem | Afirmación | Juez 1 | Juez 2 | Juez 3 | Juez 4 | Juez 5 | Juez 6 | Juez 7 | Media | D.E. |
| V1 | La implementación es técnicamente factible. | 4 | 5 | 3 | 4 | 4 | 4 | 5 | 4.14 | 0.69 |
| V2 | El modelo es pedagógicamente adaptable para los docentes. | 5 | 4 | 4 | 5 | 3 | 5 | 4 | 4.29 | 0.76 |
| V3 | Los beneficios potenciales justifican el esfuerzo. | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 4.86 | 0.38 |
| V4 | El modelo es conceptualmente escalable. | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 4.86 | 0.38 |
| Media de la Dimensión | | | | | | | | | 4.54 | |

**Own elaboration based on the proposed model and consulted sources. Created in Excel ®**

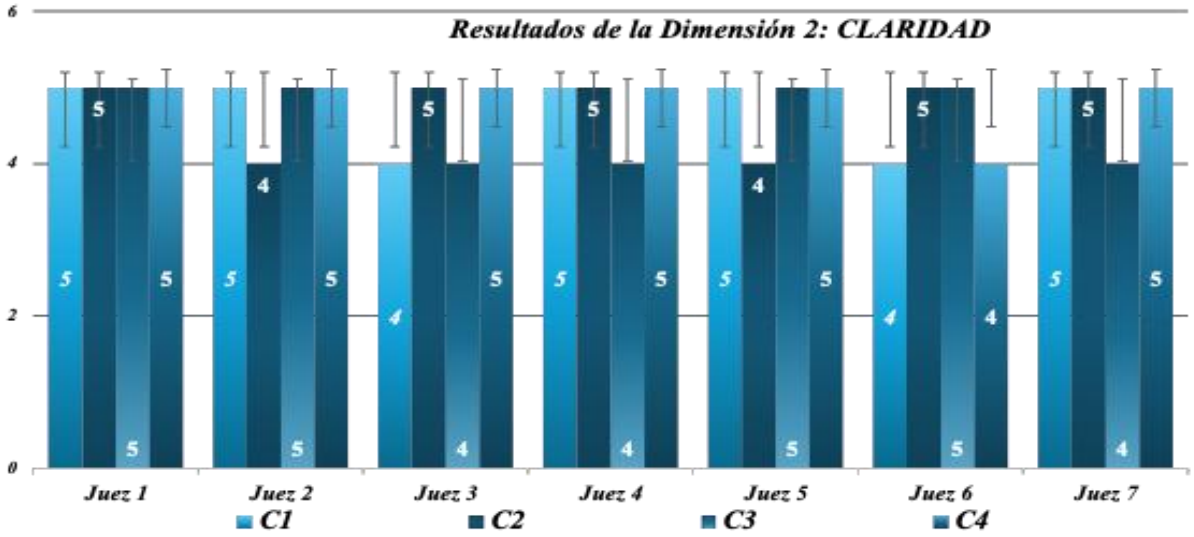
**Graphical representation by dimension:-**

**Ilustration 1. ""Graph referring to the results of Dimension 1: RELEVANCE" with Standard Deviation.**



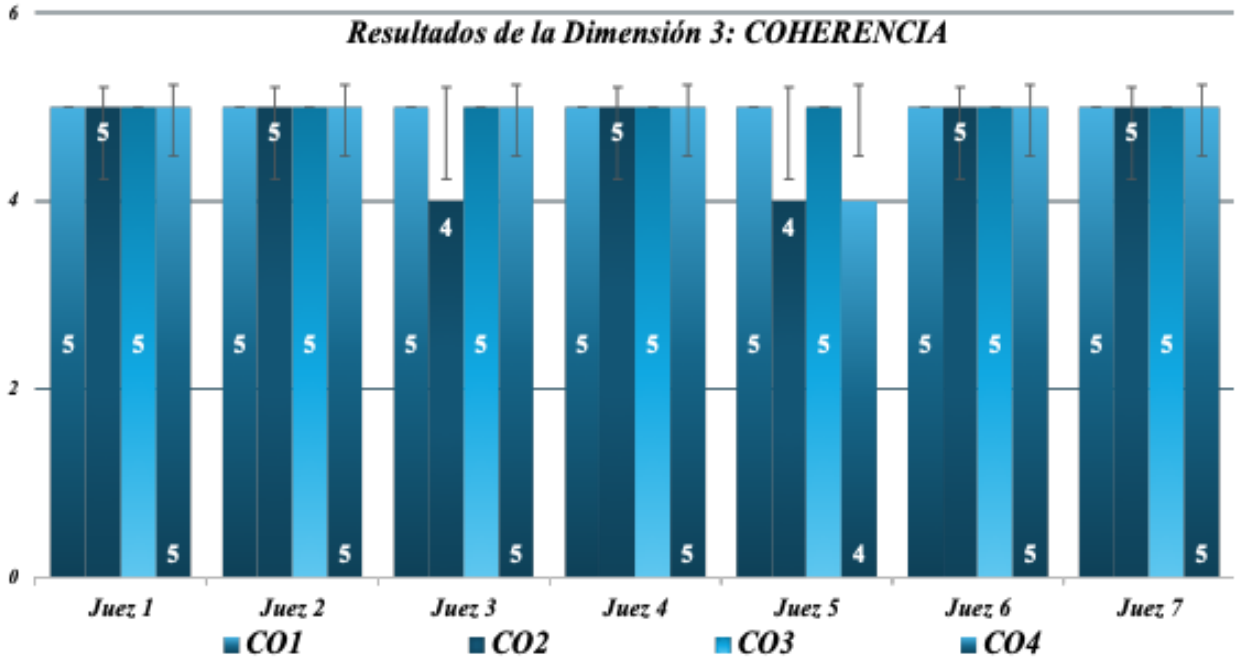

**Own elaboration based on the proposed model and consulted sources. Created in Excel ®**

**Ilustration 2. "Graph referring to the results of Dimension 2: CLARITY" with StanDeviation.**



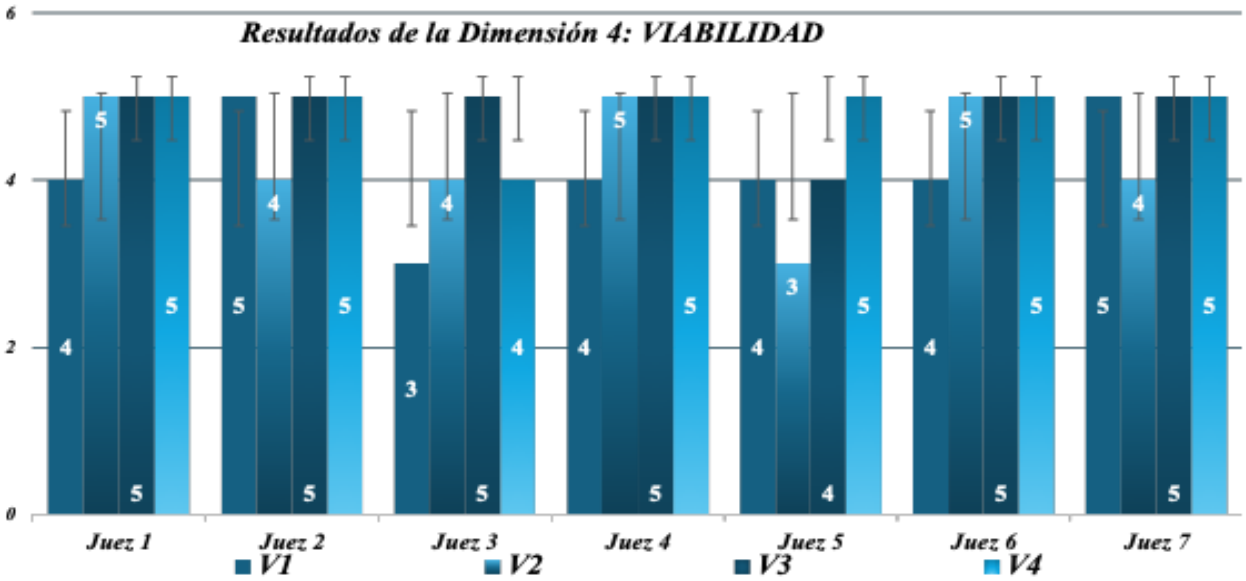

**Own elaboration based on the proposed model and consulted sources. Created in Excel ®**

**Ilustrtion 3. "Graph referring to the results of Dimension 3:COHERENCE " with Standard Deviation.**




**Own elaboration based on the proposed model and consulted sources. Created in Excel ®**

**Ilustrtion4. "Graph referring to the results of Dimension 4: VIABILITY" with Standard Deviation.**




**Own elaboration based on the proposed model and consulted sources. Created in Excel ®**

**Analysis by Dimension:-**

**Graph of the RELEVANCE Dimension:**

This dimension received an exceptionally high and consistent rating from the expert panel. The data analysis reveals a strong consensus that the proposed model is highly relevant and necessary. The graph (illustration 1) shows that experts consider the project not just an interesting theoretical proposal, but a direct and appropriate response to the evaluation challenges of the International Business program. The overall mean of 4.79 positions relevance as a very highly validated dimension. A detailed analysis of its items reveals strong support for the core of the project, with an important nuance. This can be interpreted as "the expert panel validates with a robust consensus that the model is fundamentally relevant." The only area that generates slight variability of opinion is its specific contextual adaptation, which suggests a key recommendation for the implementation phase.

**Graph of the CLARITY Dimension:**

The results for this dimension confirm that the research proposal was presented in an understandable, logical, and well-structured manner. The graph (illustration 2) illustrates that the methodology is presented with a high degree of clarity. The components, from the most general to the most specific and technical, were adequately understood by the expert panel, which validates the quality of the project's communication. With an overall mean of 4.71, the model is perceived as remarkably clear and well-communicated. The standard deviation allows us to identify which components were more and less clear to the experts. Stated as: "the proposal enjoys high overall clarity, especially in its logical structure." The variability of opinion is predictably concentrated in the more technical and specific aspects of the model, which does not diminish its validation but does inform which areas require more careful communication.

**Graph of the COHERENCE Dimension:**

This was, notably, the dimension with the highest and most unanimous rating, representing one of the project's greatest strengths. The Coherence graph (illustration 3) is the most solid proof of the project's academic rigor. It demonstrates that, in the experts' judgment, the research is built on solid logical foundations, where all its parts (problem, objectives, hypothesis, and method) are perfectly articulated with each other. This is, unequivocally, the strongest dimension of the project, with the highest overall mean (4.89) and extraordinary consensus, which denotes exceptional methodological robustness. Therefore, it is interpreted as "internal coherence is the greatest strength of the validated model." In other words, the unanimous agreement on its fundamental logic provides irrefutable support for the rigor and methodological design of the research.

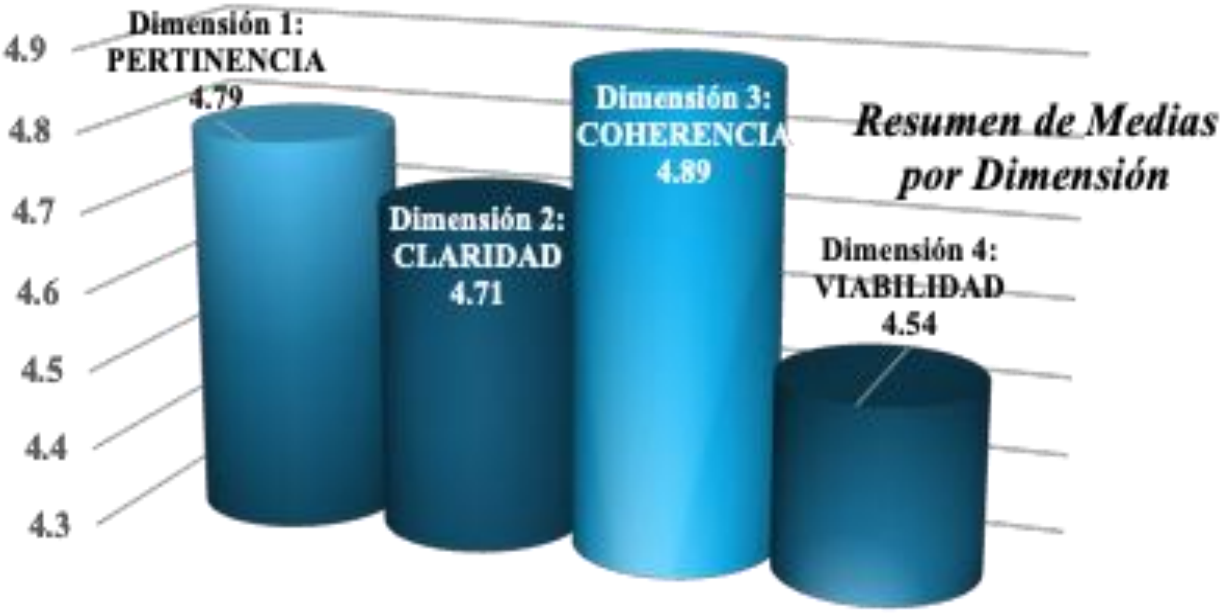
**Graph of the VIABILITY Dimension:**

This dimension shows the greatest dispersion in responses, which is natural and very valuable. It reflects a pragmatic view from the experts: although the model is ideal, its practical implementation entails challenges. The Viability graph (illustration 4) shows cautious optimism. The experts validate the "what" and the "why" of the model, but point out that the "how" (the implementation) will require careful planning, especially in the areas of technology and teacher training. This dimension presents the most nuanced and, analytically, the most interesting picture. The overall mean of 4.54 is high, but it is the lowest of the four, and the standard deviations reveal a clear debate on the practical aspects of implementation. This analysis is concluded as follows: "The viability of the model is validated from a strategic point of view (benefits and scalability), but it generates a constructive debate on the operational level. The results are not a criticism of the model, but a clear warning that successful implementation critically depends on securing technical resources and, fundamentally, on a robust change management and teacher trainingstrategy."

**Analysis of Results by Dimension: Interpretation of Means and Standard Deviations**

**Ilustration 5. "Graph of the summary of Means by Dimension".**

**Own elaboration based on the results of the proposed model and consulted sources. Created in Excel. ®**




**Interpretation of the Arithmetic Means, as well as the Standard Deviations:**

**Dimension 1: RELEVANCE (Dimension Mean: 4.79):**

The overall mean of 4.79 positions relevance as a very highly validated dimension. A detailed analysis of its items reveals strong support for the core of the project, with an important nuance. The following 2 key points are determined:

- High Consensus on Fundamental Relevance (P1, P2, P3): The first three items were rated almost identically, with a very high mean of 4.86 and a low standard deviation (S.D.) of 0.38. This indicates a strong and consistent agreement among the experts that the model responds to a real need, measures relevant skills, and uses technology appropriately. The low dispersion is key: there were no significant doubts about the importance and focus of the project.
- Slight Discrepancy in Contextual Applicability (P4): The item on the model's adequacy to the specific context of UACyA-UAN (P4) shows a slightly lower mean of 4.57 and the highest standard deviation of the dimension (0.53). This is very revealing: although the rating is still high, the greater dispersion suggests that some judges, while validating the model in theory, harbor certain reservations or consider that its practical success is conditioned on careful adaptation to the institution's specific culture and resources. From the above, it can be determined that "the expert panel validates with a robust consensus that the model is fundamentally relevant."

Despite the foregoing, the only area that generates slight variability of opinion is its specific contextual adaptation, which suggests a key recommendation for the implementation phase.

**Dimension 2: CLARITY (Dimension Mean: 4.71):**

With an overall mean of 4.71, the model is perceived as remarkably clear and well-communicated. The standard deviation allows us to identify which components were more and less clear to the experts.

- Maximum Clarity in the Process (C4): The flow of the evaluation process (C4) is the best-rated point and has the highest consensus, with a mean of 4.86 and an S.D. of 0.38. This indicates that the logical sequence of the model's steps was excellently and uniformly understood by the panel.
- Minor Debate on Technical Components (C1, C2, C3): The general description (C1) and the structure of the rubrics (C2) obtained an identical mean of 4.71 with an S.D. of 0.49, showing slightly more variability. However, the item that generates the most debate is the explanation of the role of automated learning (C3), with the lowest mean (4.57) and the highest S.D. (0.53). It is natural that the most technical and novel component generates a wider range of interpretations, signaling an area where future documentation or explanation could be even more detailed. With the above description, it is appreciated that the presented proposal "enjoys high overall clarity, especially in its logical structure." The variability of opinion is predictably concentrated in the more technical and specific aspects of the model, which does not diminish its validation but does inform which areas require more careful communication.

**Dimension 3: COHERENCE (Dimension Mean: 4.89):**

This is, unequivocally, the strongest dimension of the project, with the highest overall mean (4.89) and extraordinary consensus, which denotes exceptional methodological robustness.

- Absolute Agreement on the Central Logic (CO1, CO3): The items connecting the problem with the solution (CO1) and the objectives with the model (CO3) are the pillars of the validation. Both obtained a perfect mean of 5.00 with a standard deviation of 0.00. This result is statistically conclusive: it is an indicator of absolute and unanimous agreement among all judges. There was not a single doubt about the perfect alignment of these components.
- Solid Consensus on Integration and Consistency (CO2, CO4): The integration of the components (CO2) and the consistency of the hypotheses (CO4) also received excellent ratings (means of 4.71 and 4.86, respectively) and high consensus (S.D. of 0.49 and 0.38). It is concluded from these demonstrated figures that internal coherence is the greatest strength of the validated model. The unanimous agreement (among the panel of experts or evaluating judges) on its fundamental logic provides irrefutable support for the rigor and methodological design of the research.

**Dimension 4: VIABILITY (Dimension Mean: 4.54):**

This dimension presents the most nuanced and, analytically, the most interesting picture. The overall mean of 4.54 is high, but it is the lowest of the four, and the standard deviations reveal a clear debate on the practical aspects of implementation.

- Consensus on Value and Potential (V3, V4): The experts mostly agree and with a high degree of consensus (S.D. of 0.38) that the potential benefits justify the effort (V3) and that the model is conceptually scalable (V4), both with a high mean of 4.86. There is a clear agreement on the "why" and "what for" of the project.
- Significant Discrepancy in Practical Execution (V1, V2): In marked contrast, technical feasibility (V1) and pedagogical adaptability for teachers (V2) generate the greatest dispersion of opinions in the entire study. They have the lowest means (4.14 and 4.29) and, crucially, the highest standard deviations (0.69 and 0.76). This does not mean the model is not viable, but that its practical success is conditional. The experts are debating the real challenges: is the technological infrastructure available? and, above all, will the teachers receive the necessary training and support to adopt the model? Thus, it is found that "the viability of the model is validated from a strategic point of view (benefits and scalability), but it generates a constructive debate on the operational level." The results are not a criticism of the model, but a clear warning that successful implementation critically depends on securing technical resources and, fundamentally, on a robust change management and teacher training strategy.

**Second section of the proposed construct: "Qualitative Analysis (open-ended questions)."**
This framework was designed to guide the analysis of the experts' open-ended responses. The objective is to "systematically process their comments to extract key themes that support the conclusion about the model's importance and effectiveness." Following the "Methodological Process of the Analysis," the obtained data is interpreted:

**Qualitative Analysis of question 1: Main STRENGTHS of the model:**
The analysis of the expert judges' open-ended responses reveals a robust consensus regarding the structural and functional strengths of the proposed model. Far from being isolated perceptions, the validation panel's comments depict a system whose advantages operate synergistically. A recurring central point was the system's innovation and curricular relevance, highlighting its capacity to align the evaluation process with the complex competencies required by the graduate profile in International Business. The experts noted that the proposal transcends traditional memorization-based evaluation, focusing on applied skills essential in the contemporary professional context, a need that resonates with current educational paradigms advocating for a direct alignment between academic assessment and the competencies demanded in the globalized professional environment (Lopez-García & Pérez-Sánchez, 2021).

Beyond its thematic relevance, the experts identified the model's internal architecture as a key strength for transforming pedagogical practice. There was strong recognition of the system's potential to catalyze a substantial improvement in the feedback provided to students. This perception is intrinsically linked to another of the most celebrated virtues: the objectivity and standardization of the process. The judges indicated that by operating on explicit and unified criteria, the model significantly reduces variability and subjectivity among the different faculty members of the academic program. This standardization mechanism is fundamental, as Moreno-García (2020) points out, the use of detailed rubrics not only mitigates the inherent subjectivity of teacher evaluation but also constitutes the basis for formative feedback that is specific, actionable,and truly centered on student development, surpassing generic and unhelpful comments.

Finally, the model's design was recognized for its pragmatism in addressing one of the most significant barriers to implementing detailed evaluations: teacher time. The integration of an automated learning component was perceived not as a replacement for human judgment, but as a tool for efficiency and optimization, an assistant that pre-grades and generates analysis to free the educator from repetitive tasks. This approach aligns with recent research exploring the use of automated systems to manage the evaluative workload, allowing teachers to reinvest their time in higher-impact pedagogical interactions (Chen, Wang, & Zhang, 2022). Taken together, the experts' appraisals describe a model whose strengths are interconnected: its relevance responds to a clear need, its structure ensures an objective application that enhances feedback, and its technological component ensures the entire process is viable and efficient in daily teaching practice.

**Qualitative Analysis of question 2: WEAKNESSES or areas for improvement:**
Upon examining the areas for improvement identified by the validation panel, a notable point of convergence emerges. The experts' observations do not focus on inherent flaws in the model's conceptual design but rather project towards the critical factors for its practical and sustainable implementation. More than intrinsic weaknesses, the considerations point to a roadmap of essential prerequisites, highlighting first and foremost the need for a solid training plan. The judges emphasized the importance of a differentiated and robust training program for the entire faculty to ensure not only technical competence in using the tool but, fundamentally, a deep pedagogical adoption. This emphasis on professional development is consistent with academic literature, which posits that the successful integration of new evaluation technologies depends less on the tool itself and more on effective training that addresses the teaching staff's pedagogical beliefs and practices (Pérez-Lopez & Almendros, 2021).

In a complementary line, the panel expressed the need for greater clarification on the underlying technical aspects. Specifically, more detail was requested on the training process of the artificial intelligence algorithm, including the methodology for data collection and the quality criteria of the initial dataset. This concern, along with considerations about the adequacy of the institutional technological infrastructure, reflects a preoccupation with the system's viability and rigor at scale. Both observations are crucial, as the literature on the application of AI in education warns that the effectiveness and fairness of these systems are directly conditioned by the quality of the training data and the robustness of the supporting infrastructure (Vargas-Mendoza & Castillo-Ramírez, 2022). Therefore, the areas for improvement pointed out by the experts constitute a set of strategic recommendations for transitioning from a theoretically validated model to a successful and reliable implementation.

**Qualitative Analysis of question 3: Suggestions for the DIGITAL RUBRICS:**

The expert panel's suggestions concerning the digital rubrics focus on two strategic axes aimed at optimizing their relevance and acceptance: collaboration in design and flexibility in application. Firstly, the proposal to encourage active faculty involvement in the design process was consistently highlighted. The specific recommendation to form committees by areas of specialization to co-design and validate performance descriptors resonates deeply with the principles of change management in educational settings. This strategy not only ensures that the rubrics accurately reflect the competencies and nuances of each discipline but, crucially, promotes a sense of ownership and legitimacy among the end-users.

As various studies argue, when teachers actively participate in creating evaluation tools, resistance to innovation decreases, and commitment to faithful implementation significantly increases (García-Martínez & Valdés-Rojas, 2021). The second axis of suggestions focuses on the flexibility and adaptability of the rubrics themselves. The experts warned against the risk of an overly rigid system, recommending the incorporation of mechanisms that allow teachers controlled contextualization. The possibility of adding specific criteria or adjusting weightings according to the particular nature of a project was seen as a key element for preserving pedagogical autonomy and the authenticity of the evaluation. This approach balances the model's need for standardization with the recognition that learning is a situated and dynamic process. Research on authentic assessment supports this view, indicating that the most effective tools are those that, while standardized, allow a degree of adaptation to better align with specific learning tasks and the particular classroom context (Fuentes-Gomez & Herrero-Bosch, 2022). In summary, the experts' suggestions advocate for a governance model for the rubrics that is both participatory in its creation and flexible in its execution, thereby maximizing its potential as an instrument for pedagogical improvement.

**Qualitative Analysis of question 4: Recommendations on AUTOMATED LEARNING:**

The panel's recommendations on the automated learning component are articulated around two fundamental pillars for the responsible implementation of artificial intelligence: defining its role and guaranteeing its ethical operation. Firstly, the experts emphatically validated and stressed the importance of positioning AI as an "intelligent assistant." This conceptualization is crucial, as it frames the technology as a support tool designed to optimize processes and offer perspectives, without ever supplanting the judgment, experience, and pedagogical authority of the teacher. By validating this approach, the expert panel underscores that the model's value lies in its ability to increase faculty efficiency, not to replace their irreplaceable interpretative and formative work, a key principle in the literature on augmented intelligence in educational evaluation (Lopez-Paredes & Muñoz-Carril, 2023).

Complementarily, but with an equal level of criticality, the panel underlined the imperative need to ensure the transparency and bias mitigation of the algorithmic model. The demand to be able to audit the system to verify that it does not perpetuate or amplify pre-existing biases in the training data is an indispensable condition for ethical implementation. This recommendation aligns with a growing concern in the field of AI in education, which advocates for the "explainability" of models (Explainable AI), that is, the system's ability to justify its suggestions in a way that is understandable to the end-user (Chen & O'Neil, 2022). Therefore, the faculty's trust in the tool will directly depend on the clarity with which the system operates and the guarantees it offers in terms of fairness and evaluative justice. Together, these recommendations trace a clear path toward an AI that is technologically advanced, pedagogically respectful, and ethically sound.

**Qualitative Analysis of question 5: OBSTACLES to implementation:**

The analysis of obstacles to implementation, according to the experts' perspective, reveals a set of strategic challenges that transcend the purely technological and delve into organizational, financial, and human dimensions. The first and most prominent of these challenges is change management and potential cultural resistance. The panel warned that the introduction of a new evaluation technology, especially one incorporating artificial intelligence, may be perceived with skepticism or apprehension by a sector of the faculty. This resistance does not necessarily stem from an opposition to technology per se, but from a concern about the devaluation of teacher judgment or an alteration of consolidated pedagogical practices.

Therefore, the experts insisted on the need for a proactive communication strategy and an awareness program that frames the project as an improvement and a support, not as an imposition. This approach is consistent with the literature on educational innovation, which shows that the success of technology adoption critically depends on creating a culture of trust and participation (Ríos-Vega & Solano-Flores, 2022). A second highly relevant obstacle is long-term financial and technical sustainability. The experts expressed concern about the system's life plan beyond

the initial implementation phase. Questions about how maintenance, future software and infrastructure updates will be funded, and who will be responsible for this management were recurrent. This concern underscores the need for the project not to be an isolated effort but to be anchored in the institution's strategic and budgetary planning, ensuring its future viability and evolution (Morales & Brunner, 2021). It is concluded that, on a more operational level, "the panel recognized the initial workload as a significant practical barrier." The collaborative design of a large volume of rubrics and, fundamentally, the initial feeding of the AI model with high-quality data will represent a considerable effort for the pilot group of teachers involved. The experts suggested that the institution must not only recognize but also value and potentially incentivize this foundational work, as the quality of this initial phase will largely determine the effectiveness and reliability of the entire system. The proper management of this workload is, therefore, a critical factor for the success of the pilot and the morale of the project's pioneers (Esteve-Mon & Gisbert-Cervera, 2020).

**Qualitative Analysis of question 6: General Comments:**

In their final comments, the expert panel converged on a markedly positive overall assessment, transcending specific recommendations to articulate a vision for the project's future and relevance. The first generalized conclusion was the recognition of the initiative's high potential for impact and scalability. Despite the identified obstacles, the consensus was that the proposed system has the capacity not only to optimize but to fundamentally transform the evaluation culture at UACyA. The experts highlighted that, if successfully implemented, the project could serve as a benchmark innovation model, easily scalable to other degree programs within the economic-administrative area, and even to other faculties of the university, positioning the institution at the forefront of technology-based educational evaluation (Hernández-Sellés & Martínez-Abad, 2023).

Therefore, the panel concluded its evaluation with sincere congratulations and validation of the research effort. Unanimously, the final comments described the research as exceptionally relevant, methodologically sound, and necessary in the current context of higher education. The experts praised the depth of the analysis and the careful integration of the pedagogical and technological components. This validation was not merely protocolary; it translated into a clear encouragement for the research team to advance to the implementation phase, turning the solid theoretical proposal into a practical reality. The general feeling was that these types of projects are precisely what bridge the gap between cutting-edge educational research and the tangible improvement of teaching practices, providing significant and lasting value to the university community (Pérez-Mateo & Guitert-Catasús, 2021). The final synthesis would argue that, while the experts identify challenges mainly related to training and change management (Viability), there is an overwhelming consensus on the Relevance, Clarity, and Coherence of the model. The "weaknesses" and "obstacles" pointed out are not presented as flaws in the model, but as a roadmap of practical recommendations for successful implementation. Therefore, the expert judgment resoundingly validates that the model is an important, relevant, necessary, and potentially very effective solution for the evaluation of skills in the International Business program at UACyA-UAN.

## Conclusions and Discussions:-

This research culminated in the design and conceptual validation of a methodological model for project evaluation within the International Business degree program, successfully transitioning from problem identification to a validated solution. The initial diagnosis (Phase I) did more than simply identify issues; it confirmed the working hypotheses by revealing a pressing and systemic need for a paradigm shift. The current evaluation processes, heavily reliant on subjective and often disparate faculty criteria, were found to create inconsistencies that could impact equitable student assessment and hinder the collection of reliable data on competency attainment. Furthermore, the significant time investment required from faculty for these evaluations was identified not just as an issue of workload, but as a critical misallocation of valuable academic resources that could otherwise be directed towards mentoring and higher-impact pedagogical interactions.

In direct response to these documented shortcomings, the model developed in Phase II provides a robust and synergistic architecture. It is not merely a collection of tools, but an integrated system. The introduction of detailed digital rubrics directly confronts the challenges of subjectivity and lack of standardization, creating a common, transparent language for evaluation. This component ensures that all students are assessed against the same explicit performance descriptors. Complementing this, the model lays the groundwork for incorporating automated learning, which is strategically designed to address the critical issue of efficiency. This technological layer is conceptualized as an "intelligent assistant" to streamline the grading process, thereby liberating faculty from repetitive tasks and

enabling them to focus on providing rich, qualitative feedback. The subsequent expert judgment validation (Phase III) provided a resounding endorsement of the model's design and purpose.

The positive assessment of its relevance, coherence, and viability was not superficial; experts confirmed that the model addresses a genuine and significant problem (relevance), that its components are logically and methodologically sound (coherence), and that it possesses a high potential for successful implementation (viability). Crucially, the validation highlighted the model's capacity to be transformative: by making evaluation criteria transparent, it empowers students to better understand expectations; by streamlining feedback, it makes the process more agile and formative; and by enhancing objectivity, it strengthens the overall fairness and credibility of the academic program. Ultimately, these findings offer solid and unequivocal conceptual support for the initial working hypotheses. The research has successfully delivered more than a theoretical idea; it has produced a methodologically sound framework whose value and potential have been rigorously confirmed. The model is now positioned not merely as a promising academic intervention, but as a validated, strategic blueprint ready for the next logical phase of implementation and pilot testing within the specific context of UACyA-UAN.

## Recommendations for Uacya:-

**Based on the conceptual validation of the model, the following strategic actions are issued:**

1. Socialize the Model: Present the results and the validated methodological model to the entire faculty of the International Business program to encourage its adoption.
2. Implement a Pilot Test: Develop a functional prototype of the digital rubric system and apply it in a controlled group of 2 to 3 Learning Units to evaluate its operation in a real-world environment.
3. Allocate Resources for Technological Development: Earmark resources for the construction of the complete IT platform, including the data analysis modules based on automated learning.
4. Design a Training Program: Develop a faculty training plan focused on the effective use of the new model and the technological tool, ensuring a smooth transition.

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