PAPER

Validation of a Didactic Model for the Understanding of Academic Texts in Virtual Higher Education

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ABSTRACT
Academic literacy is a crucial aspect of education, yet assessing it remains a challenge for universities in knowledge management. This research focuses on how to support Colombian university students in understanding academic texts in virtual learning environments. To address this issue and fill a gap in the literature, the main objective of this study is to propose a model for assessing academic literacy in virtual learning environments, using the Delphi method as a validation tool. A panel of language experts from various Latin American countries was convened to ensure a diverse and representative perspective of the region for this study. The research involved the participation of 15 experts with doctoral degrees from different countries, which allowed for a broad and heterogeneous perspective on academic literacy in virtual learning contexts in Latin America. Each of the participants contributed their knowledge and experience in the language area. In the results, ten key elements were identified and distributed in different subconstructs that allow for a comprehensive evaluation and improvement of academic competence in virtual learning environments. The identification of these elements provides teachers and university management personnel with a reliable and precise tool for evaluating students' competence levels in virtual learning environments and designing effective pedagogical strategies to improve their academic performance.

KEYWORDS
reading comprehension, virtual education, didactic model, teaching, methodology

1   INTRODUCTION

Contemporary universities demand the development of professional competencies to function in the academic context. Therefore, it is necessary to improve the skills essential for students to learn well independently.

From the above, it can be affirmed that communicative competencies are an essential element of the Higher Education curriculum. This underlines the relevance of the processes of critical reading and written communication in addressing the socio-cultural demands faced by professionals in today's society.

Developing skills to understand academic texts is crucial for students to comprehend different types of texts related to their field of study. Authors [1] often point out that when students enter higher education, they face new written cultures corresponding to different areas of study, which requires them to modify their identities as thinkers and text analysts, among other things.

According to the above premise, in order to improve academic literacy processes at the university, it is essential to include teaching in this area [2] [3] [4]. Moreover, several studies point to a close relationship between academic literacy, reading, and writing [5] [6] [7]. Upon entering university, students must change their focus as thinkers and analysts of texts. The academic texts they have to read at this level of education often come from scientific publications that are not specifically addressed to them. Therefore, it is crucial to teach them to read academic texts as part of the discourse communities of their respective disciplines.

Based on these situations, the Colombian Ministry of National Education (MEN) developed a standardized assessment to evaluate the competencies of graduates from academic careers [8]. According to this measure, the tests that measure the professional profile include a section that assesses students' critical comprehension skills. Therefore, it is essential to highlight the importance of comprehension of academic texts during undergraduate studies, as this is fundamental to training competent professionals in their areas of study.

Nowadays, virtual learning has become one of the main support mechanisms for practices both in the academic environment and in everyday life. According to the particularities of higher education in Colombia [9], virtual classrooms are an essential resource for the teaching and learning process to meet the objectives and the pedagogical model of the university [10].

At Colombian universities, virtual classrooms are integrated through distance learning. Several universities have incorporated virtual classrooms as part of their distance education educational model, which was implemented in 2004 and has been refined over time. However, this model has been further consolidated as an educational proposal in the didactic conceptions adopted after the COVID-19 pandemic.

E-learning is a fundamental mechanism for engaging students in the development of their professional competencies. However, given its difference from face-to-face classrooms, it is necessary to implement robust strategies that allow students to reach an optimal level of understanding through the use of virtual platforms in order to build knowledge effectively.

In this way, students are responsible for complementing their learning process autonomously through virtual platforms, as opposed to traditional forms of teaching. In this sense, it is common for many universities to have academic platforms that provide tools to facilitate teaching in face-to-face, blended, and virtual modalities, as well as to create collaborative spaces.

The technology incorporated for educational purposes has necessitated the creation of new teaching techniques to meet academic needs. Prior to the pandemic, there was no clear methodology for developing students' reading comprehension skills in virtual scenarios, which prompted the conceptualization of a methodological procedure to address the needs of students in Colombian universities.

The main objective of this study is to propose a model to improve academic text comprehension processes within the framework of academic literacy, specifically in virtual learning environments. Research in this area is of vital importance due to the multiple difficulties that students present in the results of standardized tests that accredit them as professionals in the country.

With the research results generated, it is intended to establish a new mechanism in the academic processes at the university level that allows teachers and students to understand the academic texts necessary for the management of knowledge in any discipline.

Therefore, validating a model was the most appropriate way to establish an innovative system to support virtual learning in all subject areas at Colombian universities. Depending on the field of implementation, various particularities of the concept are highlighted.

In concordance with the above, the scientific problem of this research is: How to contribute to the processing of comprehension of academic texts by Colombian university students? Because of this, it is crucial to rethink language didactics at the university; the reading process and specific text typologies require interdisciplinary relations, according to the references provided by different researchers [11] [12].

As well as the typologies that respond to the new realities, as societies, as they develop, increase their expressive forms and, consequently, their communicative and cognitive potentialities [13] led us to propose an objective: To design and validate a didactic model that contributes to students' comprehension of academic texts in Colombian virtual university education.

2   LITERATURE REVIEW

Over the last ten years, there has been a growing trend in research on comprehension processes and textual typologies using virtual platforms, which has been especially relevant in the context of the pandemic and education. In this sense, it was considered necessary to develop a sound scientific strategy to support the educational process of knowledge management through virtual education.

The comprehension of academic texts is an intrinsic process to all disciplines in the university environment, so it is essential to provide students with tools that allow them to develop a reflective and evaluative attitude when reading specialized texts, which will be of great use to them in their professional field and in society in general.

In this sense, the role of the teachers is to develop the cognitive and metacognitive strategies needed to understand scientific documents. In Latin American universities, there exists empirical evidence about this topic. In the case of a private university in Colombia, the pedagogical practice of the Faculty of Virtual Distance Education expressed the need for the conception of a model and its implementation to contribute to the transformation of this reality [14] [15].

The study of models in the educational context has been endorsed by authors of various kinds [16] [17] [18], which has resulted in significant scientific progress. In this sense, the present research has allowed the organization of a clear and specific purpose in this field of knowledge.

These postulates determine the appropriate criteria for the variety of definitions of the term, typologies, and components depending on the aspect of reality to be analyzed, the nature of the object to be represented, and the needs of the researchers.

It is argued in this research that the model is conditioned by the nature of the parts of the object under investigation, which maintain interdependence and differentiation between them. The structure must reflect the stable operating conditions of the thing, expressing a synergistic whole resulting from the constant interaction of its parts.

Thus, the criterion of the researcher [19] is relevant because it states that: "modelling should be understood as a process," and it is "the systematic transformation of a phenomenon subject to laws, and this is so because it starts from an analysis of reality on which an abstraction is achieved, which is subsequently materialized to obtain new knowledge about the reality being investigated and to be able to transform it."

As a consequence, the research team determines the essential principles to define a didactic model, such as an abstraction of the teaching-learning process, a representation of relationships [20] [21], a projection [22], a theoretical instrument, and a theoretical-methodological construction. [16] a theoretical-formal construction. Therefore, the model was defined to be a part of the courses in the platform provided by the campus for students to read their texts in a virtual and autonomous process.

The elaboration of the didactic model is the result of the system of logical steps mentioned below:

1. Determination of the theoretical references for the comprehension of academic texts in Colombian higher education
2. Determination of the essential regularities and characteristics of understanding, manifested in professional activity, its establishment as a study variable, dimensions, and indicators
3. Establish instruments to diagnose academic text comprehension in Colombian universities
4. Application of the diagnosis as a source of scientific knowledge of the context for which the model is constructed, particularly for the Corporación Universitaria Minuto de Dios, Colombia
5. The analysis of the characteristics of academic texts' comprehension and typology contrasted with the empirical results obtained through the diagnosis application
6. Design of a simplified substitute representation of the system of contextualized relations and their interactions (model), which reflects the comprehension process of academic texts in the Virtual Distance Education Faculty of the Corporación Universitaria Minuto de Dios
7. Scientific validation of the model and its interactions between theory and practice by consulting experts to solve the problem addressed
8. Use the new information obtained in the validation process for the final scientific design and construction of the didactic model

Also, we determine that these logical steps will contribute to transforming the comprehension process of academic texts when working with students in the first year of a specific discipline at the University.

The organization of the theoretical-conceptual component is based on several principles, including philosophical, psychological, pedagogical, sociological, didactic, semiotic, linguistic, and legal foundations. These principles are guiding criteria that support the development of the proposed didactic model and facilitate the process of understanding different types of texts relevant to Virtual Distance Education.

The category method of understanding academic texts is taken from the Didactics of the mother tongue [23], in which the laws and principles established in General Didactics are specified. Of the variety of recognized methods, those that are common to several subjects and disciplines are considered, given the interdisciplinary nature of academic discourse [24].

This approach is distinguished by the use of visual material, known as multimodal texts [25], in virtual environments as a source of knowledge construction and for students to engage with their content, supported by actions and operations

designed to achieve understanding and the acquisition of new knowledge and appropriate procedures.

The process of comprehending academic texts involves the utilization of comprehension strategies, which can be defined as a set of intelligent techniques employed to determine the most effective approach for better understanding the content being read. These strategies require directed and self-directed reading, as they involve specific actions to achieve a desired outcome [26].

In this sense, for the comprehension of academic texts in a digital manner, it is crucial to consider productive and interactive methods to promote the relation between the text, the reader, and the context, with emphasis on those based on students' independent work in their heuristic, problem-solving, and investigative modalities.

Applying these methods promotes skills and habits related to the search for information, the performance of tasks, and the solution of research tasks and problems on their own, taking into account the particularities of degree courses in which analog and digital educational realities converge.

From this perspective, cognitive strategies for reading are understood as didactic actions that allow the reader to enter the text and relate its elements to their previous knowledge and the context in which they find themselves, promoting the development of skills and their effective use in the reading process.

Also, applying these strategies while reading different pieces of information facilitates understanding and interaction with the text, both cognitively and effectively, activating experiences and promoting motivation toward the search for knowledge.

According to the classifications provided by the authors [23], strategies for improving text comprehension are divided into three phases: anticipation, confirmation, and self-correction, which allow for checking the content of the text. In addition, there are prediction, inference, self-monitoring, and self-correction strategies, which correspond to different cognitive activities [25], such as pre-reading, reading, and post-reading strategies. These procedures can be applied at all educational levels.

The three phases identified are assumed to focus the analysis of a text on the three moments of reading: pre-reading, which includes preparation; during the reading, which involves comprehension and analysis; and post-reading, which provides tools for the construction of new contextualized discourses of the understanding of academic texts [26].

This didactic Model is inserted into the context of the Virtual Education Model at Uniminuto University, which describes the elements and characteristics of hybrid learning. It consists of the possibility of facilitating student interaction with educational resources through the implementation of synchronous and asynchronous academic meetings.

This digital environment has an impact on communicative practices, where autonomous learning is prevalent: implementing reading and writing strategies for learning. Therefore, teaching constitutes a didactic challenge for teachers; it requires adding pedagogical value to the inclusion of technologies in these processes.

3 METHODS

The research developed was supported by a mixed methods approach to research. For the diagnostic phase, various techniques and instruments were applied to identify the needs of the students of the virtual faculty of education to understand academic texts. For the second phase of the research, the design and validation of the didactic model for the understanding of literary texts were made through the Delphi method.

3.1 Methodology for the implementation of the didactic model

In this respect, different researchers have contextualized methodology as a scientific result of the pedagogical sciences [22]. Some authors consider the application of the conception of the world to the process of knowledge in general. It refers to a set of methods, procedures, and techniques that respond to each science's characteristics and object of study.

On a more specific level, a methodology is considered a set of methods, procedures, and techniques that are regulated by specific requirements that allow us to improve our thinking and our way of acting to obtain new knowledge in the study of problems of theory or in finding solutions to problems of practice.

The methodology was organized into three stages for implementing the didactic Model: diagnosis, execution, and control. In the virtual faculty of education, this was applied to students in the first and second semesters of their careers.

On behalf of the realization of activities, the team established a weekly schedule, making it possible to obtain, evaluate, and collect the information.

Methodological principles were applied to determine the appropriate procedure [23]. In addition, the focus was incorporated on cognitive and metacognitive strategies for text analysis [25] and those proposed and contextualized to comprehend academic texts.

4 DATA COLLECTION

In the research process, the didactic model for the comprehension of academic texts in the virtual faculty of education was submitted to evaluation by technique expert criteria, which consist of a selection of a group of experts on the topic of the research. The participants answered a survey after analyzing the purpose provided;

The system of relations between components of the model and the phases of the comprehension of academic texts gave rise to the methodological development of the proposal.

The following steps were applied for this study:

1. Definition
2. Conformation of the group of informants
3. Execution of the rounds of consultation
4. Results

Once the procedures for obtaining expert consultation were defined, each one of them was carried out following the following steps:

Step 1: Definition of the study object. This phase is considered preparatory, and it establishes clearly the research problem addressed in the study. The backbone of the study is defined in this step.

Step 2: Selection of the informant group. The experts who participated in the study were selected for their knowledge and experience in the field of study. To do this, academic personnel from different institutions of higher education in Latin America were consulted to obtain experts qualified to evaluate the instrument. An initial list of possible respondents was compiled, and those who met the selection criteria were selected. The experts' opinion is fundamental to the study, and their selection is essential for obtaining accurate results.

A questionnaire was designed specifically for this research with a Likert scale structure with multiple response options (Very Suitable, Quite Suitable, Suitable, Not Very Suitable, and Not Suitable at All). According to Hernández Sampieri et al., a Likert scale is a group of questions that present statements or judgments before obtaining a particular response from the respondents.

Step 3: Execution of the consultation rounds. Once the questionnaire questions were drafted, they were sent via email and WhatsApp to the selected group of experts. The choice of experts is fundamental to the Delphi method, and a reliability analysis of the instrument was conducted using Cronbach's alpha coefficient in the Statistical Package for the Social Sciences (SPSS) software.

Table 1. Reliability statistics, 202

Cronbach's Alpha	N of Elements
0.782	6

Source: Own elaboration.

The reliability analysis of the instrument yielded a confidence value of a = .782, as it is shown in Table 1, a notable result considering that only six questions were calculated and two open-ended questions cannot be numerically calculated. However, it would be helpful to provide more information on how the questions were selected and their relevance to the evaluation criteria.

The experts who evaluated the model in the first round were from different countries and had doctoral degrees. The evaluation criteria were based on the relevance of the epistemological postulates of the model, and 73.3% rated it as very suitable and 26.6% as quite suitable. The inclusion of open-ended questions in the instrument was a valuable strategy, as these questions provide crucial information for research. However, it would be beneficial to provide more information on how the responses to these questions were analyzed and incorporated into the evaluation.

The experts' survey results in the first round showed that 70% considered the didactic model suitable according to the established criteria, and highlighted its well-defined postulates and relevant epistemological basis. The general objective of the model, which is to facilitate the understanding of academic texts, was considered adequate by 70% of the experts. However, the remaining 30% did not approve of all the criteria proposed.

After the first round, recommendations for improvement were identified, which were taken into account for the second round. The second round was more focused and included improvements in the questionnaire design, the elimination of questions that did not provide relevant information, and the addition of questions that included important experts who were not considered in the first round.

To ensure the reliability of the instrument in this second round, a reliability analysis was conducted using Cronbach's alpha coefficient in the SPSS software, resulting in a confidence value of a = .804, indicating the internal consistency of the instrument. However, it would be helpful to provide more information on the specific items used in the analysis and how they were selected.

While the experts in the second round considered the didactic model highly suitable for its general purpose of improving the comprehension of academic texts, it would be beneficial to provide a more detailed discussion on how the Model can be applied in practice and its effectiveness in improving academic text comprehension processes.

Although some criteria proposed in the first round, such as the relevance of the epistemological postulates and the adequacy of the model's components for instrumentation through a suitable methodology, were positively evaluated, more attention needs to be paid to the relationship between the model's components and the specific objectives of each academic text. Additionally, including more concrete examples in the description of the model's components could improve its understanding and effectiveness in practice.

Table 2. Reliability statistics second round

Cronbach's Alpha	N of Elements
0.812	8

Source: Own elaboration 2022.

In the second round, the instrument was calculated using SPSS-21, and a reliability of a = .812 was obtained, as it is shown in Table 2, which is a high number for its application. When analyzing the results in the second round, five scenarios were refined and generated to classify from 1 to 5, where 5 expresses suitability, 4 is quite suitable, 3 is suitable, 2 is not very suitable, and 1 is not suitable at all, generating a probability of occurrence. Table 3, which includes the measurements, is detailed below.

Although the results of the second round show the acceptance of the didactic model by experts, both in terms of its epistemological postulates, components, general and specific objectives, foundations, systematization, approach, interpretive relationship, and practical and reflective purposes, it would be beneficial to provide more clarity in terms of how the model can be applied in real-world academic settings, and how its effectiveness can be measured.

While the instrument meets all the determined standards and has a high level of reliability, further discussion and analysis of its implementation and potential limitations would be beneficial. This would help to ensure that the model can be effectively applied and contribute to improving academic text comprehension processes.

Table 3. Results of the second round of the consultation, 2021

The Model is Well-Defined from the Following Postulates	Options	Count	Very Adequate	Adequate
Relevant epistemological issues	5	15	12	3
The components that make up the Model and involve its instrumentation through applying a methodology are clearly explained	5	15	11	4
The overall aim of the Model is to contribute to the process of comprehension of academic texts by describing the interrelationships that are expressed between the components and their relationship	5	15	12	3
The Model's rationale is sufficient and well-argued	5	15	13	2
The system of relationships established in the didactic Model developed	5	15	14	1

The results of the second round of the survey indicate that the didactic model is well-defined, as the relevant epistemological postulates are clearly established and consistent with the applied methodology. However, it would be advisable to explain

and discuss the proposed model more clearly, especially in terms of its applicability and effectiveness in real academic environments.

Furthermore, although the explanation of the model components is clear and understandable to the consulted experts, it would be important to provide a more detailed description of each component and its role in the process of understanding academic texts.

Regarding the general objective of the model, the results indicate that it is clear and relevant to contribute to the process of understanding academic texts. However, it would be important to clarify how this objective is expected to be achieved and how its success can be evaluated in practice.

On the other hand, although the results indicate that the system of relationships established in the didactic model is adequate, it would be necessary to further explore how these relationships can be applied in teaching academic text comprehension and how they can be adapted to different educational contexts and needs.

5   DISCUSSION

The experts analyzed the proposed scenarios and made recommendations based on their expertise and knowledge of the design and structuring of the instrument. In addition, the experts analyzed the objectives proposed for the first round and identified that changes could be made to the variables in the planned scenarios.

In the second round, some aspects were restructured according to the recommendations proposed by the participants, such as the objectives and forms of organization. The results of this study provide the essential features needed to create a didactic model for supporting autonomous learning in virtual education [27].

The results allow us to affirm the relevance of the didactic model created in light of the results revealed by the research. According to the authors [28], there are notorious deficiencies in the teaching processes through virtual platforms.

Faculties are responsible for implementing strategies to ensure the adoption of the methodological approach identified in the model by teachers, which in turn will contribute significantly to improving the quality of education.

The virtual classroom implies that the teacher creates the necessary conditions to develop the learning process. Necessary conditions to develop the teaching-learning process of each subject, teaching materials, resources, and activities to be developed by students asynchronously. These platforms promote a unified and collaborative teaching-learning system.

Teachers must create a suitable environment, they also have to select different text typologies, both, analog and digital, unimodal and multimodal, for students to construct their knowledge based on their orientations and the teaching materials, resources, and available activities.

The complexity of the processes involved in learning suggests that interactions with multimodal texts are essential to represent knowledge effectively. On the other hand, students must be supported by the teacher's strategies during the reading [29].

6   CONCLUSIONS

The application of the educational research methods system at the Virtual Faculty of Distance Education has allowed valuable results to be obtained in improving the comprehension of academic texts in selected courses. The evaluation of the proposed

didactic model for this purpose has demonstrated its effectiveness in practice through the use of statistical-mathematical methods, which represents an important contribution to the development of knowledge management skills by students.

The evaluation results show that the didactic model is based on solid postulates and appropriate methodology, which is reflected in its ability to facilitate the understanding of academic texts through the detailed description of their main characteristics. The feedback from experts through the Delphi method allowed for refining the scenarios and confirming the acceptance of the didactic model with a high level of reliability, indicating that the Delphi method is a useful tool for evaluating the adequacy of a didactic model and contributing to its improvement.

It is important to highlight that the results obtained in the validation of the didactic model can have a positive impact on the curricula of academic programs [30], as areas for improvement in the process of understanding academic texts are identified [31], In this way, tools are provided to students to improve their academic performance and their future professional development.

In summary, the implementation of this educational research methods system and the validation of the didactic model represent a significant advancement in higher education in Colombia [32]. These findings lay the groundwork for future research in the field of academic text comprehension and knowledge management [33] in the university context, which can contribute to improving the quality of higher education in the country.

7   REFERENCES

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