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Article

Obstacles to comprehension and retention: A comprehensive analysis of the factors that influence student learning

Obstáculos en la comprensión y retención: un análisis integral de los factores que influye en el aprendizaje estudiantil

Washington David Ramos Reyes*

Abstract

The study addresses the problem of the obstacles that affect the comprehension and retention of learning in students inside and outside the classroom, offering an analysis of the various factors that affect this educational process. Through a review, both internal elements, such as students' cognitive and emotional abilities, and external factors, including the surrounding educational and social environment, are examined, each element is analyzed to understand its individual impact and its interaction with other components. Multiple variables that contribute to these barriers are identified, highlighting the importance of understanding the complex interaction between these factors in order to design effective strategies that promote optimal student learning. The research seeks to provide a holistic understanding of the challenges faced by students in their learning process, also to inspire the creation of

MSc. Instituto Tecnológico Educativo Educación Edwards DemingTemmisario@gmail.com, https://orcid.org/0000-0002-4907-8699

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innovative and effective educational interventions that promote optimal learning for all students, regardless of their individual circumstances, recognizing the diversity of factors that may influence their ability to comprehend and retain information in the instructional process.

Keywords: Critical comprehension, information retention, student teaching, learning disabilities, teaching methods, academic environment.

Resumen

El estudio aborda la problemática de los obstáculos que afectan la comprensión y retención del aprendizaje en estudiantes dentro y fuera del aula, ofreciendo un análisis de los diversos factores que inciden en este proceso educativo. A través de una revisión, se examinan tanto los elementos internos, como las habilidades cognitivas y emocionales de los estudiantes, como los factores externos, incluyendo el entorno educativo y social que los rodea, cada elemento es analizado para comprender su impacto individual y su interacción con otros componentes. Se identifican múltiples variables que contribuyen a estos obstáculos, destacando la importancia de comprender la interacción compleja entre dichos factores para diseñar estrategias efectivas que promuevan un aprendizaje óptimo para el estudiante. La investigación busca proporcionar una comprensión holística de los desafíos que enfrentan los estudiantes en su proceso de aprendizaje, también inspirar la creación de intervenciones educativas innovadoras y efectivas que promuevan un aprendizaje óptimo para todos los estudiantes, independientemente de sus circunstancias individuales, reconociendo la diversidad de factores que pueden influir en su capacidad para comprender y retener la información en el proceso de enseñanza.

Palabras clave: Comprensión crítica, retención de información, enseñanza estudiantil, dificultad en el aprendizaje, métodos de enseñanza, ambiente académico.

Introduction

Effective comprehension and retention of study material are fundamental aspects of the student learning process, however, various obstacles can interfere with this crucial process. In academia, a thorough understanding of the factors that influence students'

ability to assimilate and retain information is of paramount importance, as this can have a significant impact on their academic performance and cognitive development. This changed as advances in the psychology of learning took place, for example, association, which for Gagné (1970) "is the simplest form of learned abilities, and which constitutes the foundation of other more complex types of those same abilities", went from a relationship between ideas to links between stimuli and responses. Therefore, this study focuses on an analysis of the various elements that constitute barriers to comprehension and retention, in order to provide a comprehensive view of this phenomenon.

The analysis of barriers to student learning comprehension and retention requires a multidimensional approach that considers both internal and external factors that influence this process. From the internal perspective, aspects such as students' cognitive abilities, their learning styles, as well as emotional factors that may influence their ability to process information effectively are explored. On the other hand, external factors are examined, such as the educational environment, teaching methods, access to educational resources and socioeconomic conditions, which also play a crucial role in learning comprehension and retention. In the early forms of the child's language learning, the parent extends his or her elocutions in such a way as to match his or her grammar and does not allow the child to discover as he or she is constantly presented with a model, regarding this Bruner (1974, 122) notes; "Within culture, the first form of learning essential for a person to become human is not discovery, but having a model. The constant presence of models and the constant response to the individual's successive responses, in a continuous two-person exchange, constitutes discovery learning guided by an accessible model".

By identifying and analyzing the factors that influence the comprehension and retention of study material, we seek to contribute to the development of effective educational strategies adapted to the individual needs of students, with the ultimate goal of improving the quality and impact of education at all academic levels.

Materials and methods

To conduct this literature review study on barriers to comprehension and retention in student learning, an academic literature search was conducted using electronic databases specialized in education,

psychology and pedagogy. Relevant search terms such as "comprehension," "retention," "student learning," "barriers," among others, were used to identify relevant studies published in scientific journals, books, technical reports, and other scholarly resources. Multiple academic databases, including PubMed, PsycINFO, ERIC, Scopus, and Web of Science, were searched extensively to ensure literature review. Institutional repositories, digital libraries, and websites of relevant educational and governmental organizations were also consulted for supplemental information.

Once the relevant documents were collected, a literature selection and classification process was carried out, where the most relevant studies were identified and organized according to specific themes and sub-themes related to barriers to student learning comprehension and retention. A critical analysis of the selected papers was conducted to extract key information and synthesize the findings in a systematic way. In order to write a detailed report that included a comprehensive review of the literature, summarizing the main findings, identifying trends and discrepancies in the research, and suggesting areas of interest for future research in this field.

Results

In discovery learning, knowledge is not presented in a complete form; rather, the learner must reconstruct it, whether following a model or not, before meaningfully internalizing it into his or her cognitive structure. Other authors offer their perspectives on this approach, such as Glaser (1974), who focuses on the data and specifications of the development of procedures and materials. His operational plan includes several tasks: analyzing behavior and specifying a model considering individual differences, defining student characteristics prior to instruction, guiding the learner in their development and anticipating motivational effects, and preparing to measure and evaluate the competence achieved. In discovery learning, one seeks to "discover" a taught rule, concept or association, which differs from the discovery method itself. In this process, induction plays an important role in moving from the particular to the general, and the learner's understanding is verified by verbalizing the general property or providing another example. On the other hand, Shulman and Keislar (1974, p. 41) point out that "the discovery process can result from both inductive and deductive teachings."

In this type of learning, the probability of obtaining correct answers is low, since it is based mainly on trial and error, including negative cases, among others. For this reason, Wittrock (1974) argues that discovery is not the ideal approach if evaluated in terms of retention, transfer, activity and time. Furthermore, Wittrock argues that discovery learning is valuable in itself, as it develops the ability to discover, especially when combined with verbal information. According to him, teaching problem solving inductively and scientifically is crucial to students' development toward maturity. For those who do not favor discovery learning, such as Glaser (1974), this method boils down to a structured instructional sequence, in contrast to a less guided sequence where the individual adds his or her own structure. Glaser suggests that it is more effective to gain benefits from the experiences of others to avoid wasted time or demotivation in trying to solve problems. Gagné (1970, p. 2) defines learning as "a change in human dispositions or capacities, which persists over a period of time and which is not attributable to growth processes alone". This approach recognizes the human being as an active processor of information, as opposed to behaviorism, where the human being was considered passive and receptive.

The information processing theory postulates that learning involves the interaction between the variables of the subject and the environment. It is based on the analogy between the human mind and the functioning of computers, investigating how information is encoded, transformed, stored, retrieved and transmitted. The principles of Gagné's theory are based on the information processing model, which consists of phases from the stimulation of the receptors to the feedback that accompanies the subject's execution. These phases are supported by external stimuli that facilitate internal processes and promote learning.

This model makes it possible to orient learning toward specific goals and to plan it intentionally, including the acquisition of skills. Gagné integrates elements of behaviorism, such as reinforcement and task analysis, as well as concepts from Ausubel's information processing and intrinsic motivation theories to provide a solid foundation for instructional planning. Table 1 summarizes the outlines of learning according to Gagné's theory.

In addition, Morley and Robins (1995) propose that the media play an important role in the formation of social identity, especially the global media, as they provide cultural models that influence the way people think and behave. Electronic technology, such as the Internet,

has transformed the way social identities are constructed. New communication technologies are creating electronic spaces that allow individuals to construct their identities more fluidly and without boundaries.

In general, the authors agree that communication is fundamental for the construction of social identity. Communication enables the transmission of common meanings and values that allow us to understand the world around us and define who we are in relation to others. In addition, the media and new technologies are playing an increasingly important role in the construction of social identity, as they influence the adoption of values and messages by individuals.

Learning is an individual process that begins before birth and continues throughout life, progressively. In this process, the subject is fully involved, making use of his or her cognitive processes, emotions and personality. According to Serrano (1990, p. 53), learning is an active activity in which attention, memory, imagination and reasoning play a fundamental role. The learner elaborates and assimilates the knowledge he/she acquires, incorporating it into his/her mind in defined and coordinated structures.

Learning is conceived as an activity in which the individual learns spontaneously, through a set of interconnected, living and acting operations, rather than simply accumulating content. The teacher must interpret the content in terms of these operations, which are the basis of the notions that are intended to be taught. Although the child learns naturally through discovery in the early stages of life, in the school environment knowledge is mediated by the teacher, who must motivate the child during instruction.

Active learning involves interaction with the environment and with other people, either individually or in groups, and requires cooperation or collaboration. These interactions generate experiences that modify the child's present and future behavior, since behavioral dispositions and the environment are not separate entities, but interact with each other. Bandura (1982) points out that personal and environmental determinants are potentialities that require activation to operate.

As the subject learns, he becomes capable of transforming his environment through a dialectical relationship, which in turn facilitates further learning. Socialized activities are beneficial for intellectual development, since they generate conflicts, different points of view and new problems to be solved. This implies that the

group retains its differences once the points of view of each member have been justified.

Teaching is understood as a communicative process involving an exchange of information between teachers and students, according to Zabalza (1990). Stenhouse (1991, p. 53) defines it as the strategies adopted by the school to plan and organize children's learning, emphasizing that it goes beyond mere instruction, since it seeks to systematically promote learning through various means. In our conception, teaching is a socio-communicative and cognitive activity that dynamizes meaningful learning in diverse environments, such as the classroom, the virtual classroom or global spaces, in a synchronous or asynchronous manner. It is essential to understand that teaching has no meaning if it does not generate learning, as indicated by Zabalza (1990), since its didactic meaning is found in its relationship with the learning process, which is not limited to the classroom or occurs only in direct interactions between two people.

In current teaching-learning environments, the debate on the usefulness of the different theories is reopened and integrative models that take advantage of the benefits of each current are proposed. De Pablos and Colás (1998) suggest reflecting on the incorporation of new technologies into the educational environment, emphasizing that their influence should not be limited to technical aspects, but should affect various human dimensions. From these integrated teaching models, the teacher makes reflective decisions on how to approach the various interactions, considering not only the technological resources available, but also the individual differences of the students.

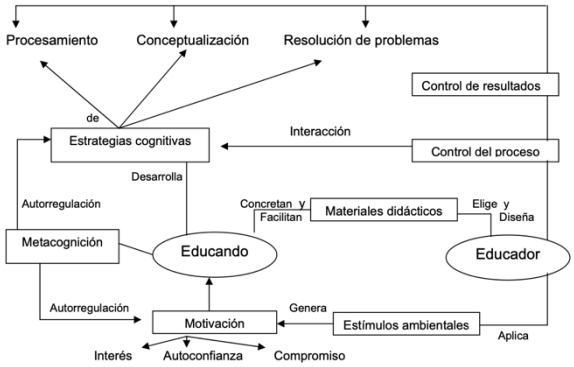
It is important to remember that teaching decisions are not merely technical, but involve value choices, as Ferreres (1999) points out, and must be based on a deep understanding of educational practice. It is essential to recognize that the image of the teacher as a technician is limited and that research findings cannot solve all teaching problems. From a heuristic perspective, the teacher is able to diagnose and address practical curriculum problems, while from a socio-critical approach, communicative action arises from understanding and agreement within an educational team. These are just some of the variables that influence the teaching-learning process, which we will explore through psychological theories to develop integrative models that harmonize principles and avoid conflicts arising from their separate application.

Ultimately, the improvement of teaching-learning processes does not depend only on sophisticated technologies, but on pedagogically sound proposals supported by integrative models that effectively take advantage of available technologies.

Two traditional approaches to understanding teaching have been explored. On the one hand, the associationist approach, which does not consider mental events in its theories due to the difficulty of observing and measuring these processes objectively. On the other hand, during the 1950s and 1960s, the cognitivist approach emerged, which recognizes the individual interacting with his or her environment through cognitive mental processes. This approach focuses on the mind, analyzing how the individual receives, assimilates, stores and remembers information. Some researchers, such as Vielma and Salas (2000), expanded this perspective to include the influences of the learning environment, both social, cultural and historical, giving rise to the constructivist perspective. These two approaches, the behaviorist and the cognitivist, differ in their emphasis on the internal and external factors of learning. While the cognitivist approach pays more attention to the learner's mental processes, the behaviorist approach focuses more on environmental factors. Although cognitive learning theories do not provide specific guidance on how to teach, they identify useful methods for particular situations.

Today, the integration of new technologies into the educational arena is leading to new ways of understanding these perspectives. As we observed in Figure 1, the influence is not limited to specific cognitive structures, but affects their overall functioning. In this section, we will present some of these models, without attempting to limit the scope of study on this topic.

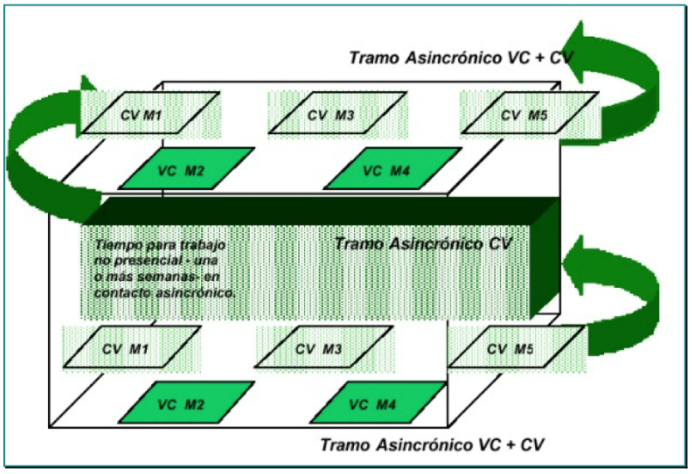
Figure 1. Diagram of the cognitivist pedagogical model (Sarramona, 2000).



As a result, some non-face-to-face modality proposals have emerged, one of which is presented by Santángelo (2000), which offers both synchronous and asynchronous operating options, based on the integrated and overlapping use of two technological platforms: multipoint videoconferencing (VC) through the Integrated Services Digital Network (ISDN) and a virtual campus (VC) in an Internet content production, distribution and management software.

An example of this model is the one proposed for the design of the distance learning system of the National Technological University in Argentina (Santángelo, 2000). This model (Figure 2) consists of two distinct components: a synchronous component of face-to-face activities in groups at different sites, combining VC through ISDN and a VC on the Internet. This synchronous component is divided into different moments (M1 to M5) and is supported by a tutor. The other component is asynchronous, with activities carried out in the VC on the Internet, using a Webtools user interface and supported by various types of materials (written, multimedia, videos), in addition to tutorials.

Figure 2. Model of a non face-to-face teaching system (Santángelo, 2000).



A descriptive overview of some teaching models has been sketched, in a general way and without claiming to be exhaustive. In this tour, we have explored from traditional projects, with their advantages and disadvantages, to current developments that make use of new technologies. Some of these models are still present in our educational centers, both formal and informal, while others are still out of reach due to various factors, including inadequate educational

policies or those imported from other contexts, as well as economic limitations.

Didactic activities, according to Porlán et al. (1988), are characteristic processes of the classroom-system that involve information flow and processing. These activities are oriented towards didactic goals, interactive to the extent that they involve communication between teachers, students and context, and organized in terms of the amount and type of information, format, transmission channels, time and treatment process, among other aspects.

These activities allow the subject to practice with the object of knowledge, thus facilitating cognitive restructuring. It is not simply a repetition of theory or mechanical memorization, but a reflective experience on the part of the subject (Gewerc, 2001).

To refer to both teaching and learning activities, we can use the term "instructional activities". Those activities that allow us to guide and adjust the classroom dynamics according to the objectives set and the methodological strategy employed are known as "regulatory activities". It is imperative to integrate inclusive projects as a complement to traditional educational practices, given their potential to enrich the conditions offered by the school environment (Medina, 2021; Villarreal et al., 2021). Specifically, these projects play a fundamental role in dissolving prejudices and apprehensions towards the educational institution by providing new resources, fostering positive coexistence and eliminating obstacles that may arise (Fernández, 2015; Medina, 2021). Likewise, they are oriented towards meeting the individual needs of all students, adapting educational activities in an inclusive manner (Fernandez, 2015; Medina, 2021). This active integration of inclusive projects not only promotes a more equitable school environment, but also strengthens the commitment to diversity and educational excellence.

It is essential that students are aware of the regulatory activities and participate in the definition of some of them to promote their responsibility for the proper development of the didactic unit. These activities should include guidelines to follow in case of eventualities and promote dialogue with the students to evaluate the classroom climate, the level of motivation, the difficulty of the activities, among other aspects, in order to introduce modifications that allow their understanding and improvement. In addition, these activities (Table 3) also affect the evaluation, since the synthesis activities at the end of the didactic unit allow us to evaluate the work done in

terms of knowledge, procedures, skills, values and attitudes assumed (Ander-Egg, 1983).

Evaluation should be considered as a continuous process of reflection and improvement of the educational practice, starting from its planning, during its development and at its end. Through evaluation, not only the amount of information memorized by the students is measured, but also other dimensions, such as contents, methodology used, means used and the teacher's attitude. This integral approach implies the participation of all the protagonists of the educational act (Porlán et al., 1988).

Diagnostic evaluation identifies the degree of adequacy of the students' cognitive schemas in relation to the pedagogical program. Formative evaluation allows for the improvement of both the teaching program and the teaching process itself, while summative evaluation certifies whether the educational objectives have been achieved.

It is essential that the evaluation process be aligned with the selected objectives, the curricular contents and the expected learning outcomes (Nieda and Macedo, 1997). Students learn and develop to the extent that they construct meanings around the curricular content presented.

To facilitate student learning, it is necessary to understand both the logical structure of the discipline and the psychological structure that students have established among the concepts. In addition, it is important to observe how students manipulate the teaching materials and apply the acquired knowledge to assess whether they have achieved the teaching objectives and whether corrections in the applied methodology are necessary.

The evaluation should be systematized to take advantage of the information obtained and thus decide how to provide help adjusted to the construction processes carried out by the students (Díaz Barriga and Hernández Rojas, 1998).

Discussion

In conclusion, the discovery learning approach emphasizes the importance of individuals internalizing knowledge through active reconstruction, either by following a model or exploring autonomously. Although this method can promote the development of discovery skills, its effectiveness in terms of retention, transfer

and learning time is questioned by some authors. However, discovery learning remains valuable for its ability to foster deep understanding and inductive, scientific problem-solving skills.

On the other hand, the teaching process is seen as a communicative and cognitive activity that promotes meaningful learning through various media and environments. Integrated teaching models, which take advantage of different pedagogical currents and technologies, allow for intentional planning and flexible adaptation to the individual needs of students. In addition, assessment is understood as a continuous process of reflection and improvement that must be aligned with learning objectives and based on a deep understanding of educational practice.

In summary, both discovery learning and integrated approaches to teaching and assessment emphasize the importance of an active, reflective and adaptive process to facilitate students' holistic development and promote meaningful learning in diverse educational contexts.

In this sense, it has been pointed out that professional ethics in university education is a fundamental reference; it implies considering professional values, their application in a reflective and critical manner; in short, promoting in the student the values of the profession he/she is going to perform, and his/her commitment to society.

Thus, the first task of teaching will be that the university student has this basic and fundamental knowledge of what ethics is for -first- as a science, to immediately understand that professional ethics serves to cement those values that will serve him in the future, in his actions as a professional. Complementarily, thanks to the social principles of our University, the law student must also understand that the profession he has chosen to study has this priority.

In this line, we would agree with Hortal when he proposes the teaching of professional ethics as “an aid to systematic reflection on the specific service, the main obligations and the possible ethical conflicts with which those who aspire to responsibly and lucidly assume the exercise of their profession for the benefit of society will have to face”. Thus, we must consider the two dimensions inherent to it. On the one hand, the teleological dimension, i.e., the purpose or objective of professional practice, and, on the other, the pragmatic dimension, which, subordinated to the former, relates to the code of

ethics. The latter is proposed as a structured guide to those aspects relating to the professional's relations with himself/herself, with the institution carrying out the activity and with society as a whole.

There is no doubt that nowadays, in emerging societies such as ours, whoever prepares for a future profession, in public universities, the absorption of this behavioral knowledge is very necessary, since in the face of an ethical behavior, absent of any principle, such as justice, equity, will have no excuse for society to point out such acts. As it can be observed, it is not a simple pedagogical incorporation, as if it were one more subject, but it must be implemented properly systematized, so that the student absorbs it in a meridian way.

In this sense, it should also be kept in mind that for a complete academic formation of a student, it is not only necessary to have a vast knowledge of the different branches of Law, which includes the great effort that is materialized by constantly innovating the subjects and syllabuses according to the world development of this science; such learning should be guided by the guidelines of conduct of the future professional, and this is precisely what the implementation of professional ethics as a branch to be taught is going to deal with. Also, these proposals for the incorporation of ethics as a subject of study cannot be ignored from the point of view of our universities, since they have the moral duty (because they owe it to our society) to form, from the academic point of view, a professional who not only has a solid knowledge of Law, but also clear values and an unwavering social conscience.

Finally, bearing in mind what it means (the field of ethics) the concept that is held in our environment, of the law professional who graduates, with a kind of prejudice for university study centers such as ours, also makes it a pragmatic necessity that the preparation of their students is integrated.

In this context, our proposal, which has been detailed from the point of view of the generalities in the field of the limits of professional ethics, also involves the participation of several actors, including the will of the respective authorities, focusing on the awareness (of this need) that the teacher must have, to finally reach the student. It is not a minor undertaking, therefore, it should be carried out without ignoring the other aspects to be kept in mind.

Through the present analysis carried out in previous lines, about our sustains on the need in public universities, to impart as a subject of study, professional ethics, it can be concluded that it is of convenience and necessity such implementations, since it constitutes

for whoever obtains a university degree from these houses of study, to have a behavioral tool that only professional ethics is in capacity to give it. Likewise, the way in which its study has been incorporated comprises -mainly- of the conviction of its necessity on the part of the respective authorities.

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