Gamification as an educational tool for metacognition and self-regulated learning (SRL) on legal research competence

La gamificación como herramienta educativa para la metacognición y el aprendizaje autorregulado (AAR) en la competencia de investigación jurídica.

Hernán Quintero-Castrillón[1]
Sergio Arboleda University – Barranquilla, Colombia
hernan.quintero3@usa.edu.co

Isabella de la Espriella-Gómez[2]
Sergio Arboleda University – Barranquilla, Colombia
isabella.de01@usa.edu.co

Jesús-David Alfaro-Díaz[3]
Sergio Arboleda University – Barranquilla, Colombia
jesus.alfaro@usa.edu.co

Juan-José Luis Díaz-Rivas[4]
Sergio Arboleda University – Barranquilla, Colombia
juan.diaz16@usa.edu.co

Meylin-Heleana Ortiz-Torres[5]
Sergio Arboleda University – Barranquilla, Colombia
meylin.ortiz01@usa.edu.co

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1 Bachelor's degree in Education, History and Philosophy, specialist in Political Culture and Master's degree in Education. Director of the Philosophy and Humanities Department at USA Barranquilla.

2 Law student at Sergio Arboleda University. Wisdom Oak seedbed.

3 Industrial designer from the Universidad del Norte (Colombia). Master's degree in Innovation and Product Development from the Universidad Internacional Iberoamericana de Puerto Rico and the Universidad Europea del Atlántico. Director of the Digital Design programme.

4 Law student at Sergio Arboleda University. Wisdom Oak seedbed.

5 PhD candidate in Law at Sergio Arboleda University, Barranquilla campus. Lawyer and Master of Law from Universidad del Norte.

Abstract

This paper presents the ongoing progress of the research paper. The goal is evaluate a gamification tool that allows teachers as well as students through the teaching-learning process, learn and develop legal research competences that permit students to develop analyses based on the metacognition and self-regulated learning components. This study employs qualitative research approach and will be structured in two stages. The first stage, which will be developed through this paper, consists of documentary and bibliographical review, while the second will focus on case studies. The purpose is to analyze in greater depth the functioning of the pedagogical strategy and its impact on students. To this end, the didactic tool called "Pizzaber" will be designed, implemented, and evaluated, which will be applied within research seed groups and among law students from universities in the Colombian Caribbean region that belong to the Red de Grupos de Investigación Jurídica y Sociojurídica – Nodo Caribe (Network of Legal and Socio-Legal Research seeds- Caribbean Node)

Keywords

Gamification; metacognition; self-regulated learning; legal research competence.

Resumen

Este documento presenta el progreso de la investigación. El objetivo es evaluar una herramienta de gamificación que permite a docentes y estudiantes, a través del proceso de enseñanza-aprendizaje, adquirir y desarrollar competencias de investigación jurídica que les permitan elaborar análisis basados en la metacognición y el aprendizaje autorregulado. Este estudio emplea un enfoque de investigación cualitativa y se estructura en dos etapas. La primera etapa, que se desarrolla a lo largo de este documento, consiste en una revisión documental y bibliográfica, mientras que la segunda se centra en estudios de caso. El propósito es analizar con mayor profundidad el funcionamiento de la estrategia pedagógica y su impacto en los estudiantes. Para ello, se diseñará, implementará y evaluará la herramienta didáctica denominada "Pizzaber", la cual se aplicará en grupos de investigación y entre

estudiantes de derecho de universidades de la región Caribe colombiana pertenecientes a la Red de Grupos de Investigación Jurídica y Sociojurídica – Nodo Caribe.

Palabras clave

Gamificación; metacognición; aprendizaje autorregulado; competencia investigativa jurídica.

Introducción

Academic excellence is conceived as the guarantee of high levels of quality within the formative process of students. Within this framework, the student occupies a central role in the teaching-learning process, which is developed under a competency-based training model aimed at shaping individuals and professionals of integrity, with principles, values, and a high level of performance in scientific and cultural spheres. This gives rise to the question: how can students' academic excellence be achieved within a competency-based educational model? To address this question, it was decided to specifically evaluate the legal research competence of university students.

This competence was selected because legal research is permanently applicable to law professionals, as it allows for the deepening and selection of relevant material from regulations and jurisprudence. It is a competence that enables the review of the different activities carried out by law students throughout their entire university life, reflected in their performance in dissemination projects, analyses, case studies, among others (Icfes, 2020).

Among law students, there are certain situations that warrant attention in order to rethink the teaching-learning process, which have been revealed in aspects such as motivation and academic performance during the post-pandemic stage. These highlight the need to reinforce learning with concrete results, to establish a greater connection with reality, to improve participation in processes with social impact, while maintaining a focus on institutional engagement and articulation with the business sector.

The central purpose of this research is to evaluate a gamification tool that contributes to strengthening the teaching-learning process for both teachers and stu-

dents, aimed at developing legal research competence. To this end, the process is structured in four stages: a) conducting a bibliographic review on gamification as a didactic resource for metacognition and self-regulated learning in the field of legal research; b) designing a pedagogical tool aimed at fostering these learning processes; c) implementing the tool with a focus on student learning within the framework of legal research competence; and d) evaluating the achievements and progress obtained in the teaching-learning process through the application of this tool by the academic community, with the purpose of generating feedback and promoting constant innovation in content and teaching strategies. In this way, the student becomes actively and continuously involved as the protagonist of their own formative process.

This paper specifically presents research progress related to the first phase of the ongoing research process. Special emphasis will be placed on the categories of metacognition and self-regulated learning, as it is considered that the student, in addition to being aware of their commitments and abilities, also possesses the capacity to successfully complete their work, maintaining control and direction over what they think, do, and feel, thus fostering greater motivation for their academic endeavors (Echeverría, 2020).

Methodology

This work has its methodological framework within the foundations of qualitative and documentary research, presenting the results of the first phase of the ongoing investigation. It focuses on the stage related to the bibliographic review and subsequent content analysis of the main works published in high-impact scientific journals, research books, and other products of new knowledge that address the categories under study, such as *"gamification," "metacognition," "self-regulated learning,"* and *"legal research."*

Research Advances

Gamification as a Didactic Tool

Gamification as a didactic tool is understood as the means, technique, or strategy through which the teaching-learning process is developed. Bohórquez and Otálora (2022) analyze techniques and strategies in education. Citing the Tecnológico de Monterrey (2010), they define a strategy as a procedure with a structured and planned design aimed at achieving a specific learning goal. Technique,

on the other hand, is part of the construction process of learning and represents a set of resources.

Gamification, as a tool, is a technological material resource composed of mechanics, components, and aesthetics. Mechanics, such as collaboration, competition, challenges, rewards, feedback, chance, transactions, and turns, are essential elements of gamification dynamics. Likewise, a variety of components are integrated, including avatars, collections, battles, content unlocking, teamwork, social graphics, badges, time limits, missions, levels, points, leaderboards, progress bars, gifts, and tutorials. The aesthetics encompass aspects such as emotions, storytelling, progression, relationships, and constraints.

Gamification as a tool, functions as a short-term teaching technique, as it brings together a set of resources or processes to achieve a specific competence. These processes are repetitive and follow an order aimed at activating prior knowledge. Biel and García (2016) identify a first type of gamification during this short-term period, referred to as superficial or content gamification. Gamification is also considered a long-term strategy since it involves three key stages: planning, implementation, and evaluation. Planning defines the structure and processes; implementation materializes the various techniques that configure it as a set of procedures; and evaluation assesses the student's ability to respond to different situations faced during the activities and procedures developed. Biel and García (2016) identify a second type of gamification during this long-term period, present throughout the course structure, referred to as structural or deep gamification.

Gamification as a strategy originates in fields very different from education. Authors such as Biel and García (2016) and Briceño (2022) highlight its origins in business, marketing, sales, personal development, and entertainment. Ortiz-Colón, Jordán, and Agredal (2018) point to attempts at gamification in various sectors, such as Nike+ (Nike), Fun Theory (Volkswagen), and the Weight Watchers program, among others.

Furthermore, authors such as Werbach and Hunter (2012), Hsin, Huang, and Soman (2013), Trejo-González (2021), Gaviria (2021), Gómez and García (2022), and Sarabia-Guevara and Bowen-Mendoza (2023) describe gamification as an educational strategy that employs game elements (dynamics, mechanics, and components) and game design techniques, using playful thinking to motivate, increase engagement, and promote learning among participants.

Gamification as an educational strategy has been applied in various subjects at both basic and higher education levels, including Spanish (Biel & García, 2016), foreign languages (Briceño, 2022; Trejo-González, 2021), mathematics (Encalada, 2021), history (Gómez & García, 2022), STEM education (Guzmán-Rivera, Escudero-Nahón, & Canchola-Magdaleno, 2020), physical education (Hernández & Mayorga, 2022), natural sciences (Mallitasig & Freire, 2020), computer science (Revelo-Sánchez, Collazos-Ordoñez, & Jiménez-Toledo, 2018), and engineering (Sarabia-Guevara & Bowen-Mendoza, 2023). It has also been used as an evaluation strategy (Morales, 2022). Analyses of gamification in education can be found in Calvo and López (2021) and Ortiz-Colón, Jordán, and Agredal (2018).

A key aspect justifying gamification as a didactic resource lies in the benefits it generates for each participant in the teaching-learning process. For teachers, it is reflected in the planning, execution, and evaluation of their pedagogical practices, while for students, it manifests in the learning experience and the way they develop their knowledge through gamification. Authors such as Trejo-González (2021), Briceño (2022), Calle-Carracedo (2022), García and Gómez (2022), Hernández and Mayorga (2022), and Agustín (2023) highlight the following benefits:

- Active learning. Teachers transfer the responsibility for learning to the students, turning them into active agents of knowledge. By creating a series of dynamics, mechanics, and components, the teacher involves the student as a decisive actor in their education.
- Methodological modernization. The use of technology through gamification implies methodological modernization. By implementing escape rooms, *Catedral 1221*, and other tools, teachers introduce technological or virtual elements into the knowledge construction process.
- Feedback. In gamification, feedback is specific and timely, provided instantly at the right moment for learning. Teachers aim to improve student performance by fostering metacognition and self-regulation. Various types of evaluation are presented, in which students participate as agents: self-assessment and peer assessment.
- Skill and competence development. Gamification fosters the acquisition of solid knowledge by strengthening skills, abilities, and competencies. Among the skills and abilities promoted are observation, comparison, and deduction, while in terms of competencies, it encourages attention, research, independent and collaborative work, organization and planning of activities, problem-

solving, adaptability, communication, and the assumption of commitments and responsibilities.

- Experiential learning. Interaction through gameplay fosters motivation, attention, and reinforcement of concepts learned in class, leading to meaningful construction for each student. It simulates real-life situations, providing practical application in the student's social and cultural context. Depending on the subject, critical, analytical, creative, and historical thinking can be developed.
- Meaningful learning. The game's content is closely related to the student's cognitive structure and abilities. Games are not arbitrary but correspond to what the students already know and what they need to learn. Gamification ensures that newly acquired information becomes potentially meaningful.

Gamification is a didactic tool for developing competencies. Villa (2020), building on the pedagogical framework of the University of Deusto, defines competence as *"the set of knowledge, abilities, skills, or proficiencies acquired, which lead to a high level of development and performance"* (p. 28). Furthermore, the author presents a classification of generic or transversal competencies, distinguishing between instrumental, interpersonal, and systemic competencies. These were adopted by universities across the continent through the Tuning Project in 2003.

In fact, García and García (2023) affirm that 21st-century educational systems define competence through three dimensions: *knowing how to be* (attitudinal and affective aspects), *knowing how to do* (procedural and practical aspects), and *knowing how to undertake* (developing new methods and adapting to change). López (2016) also explains that the concept of competence can be understood through three dimensions: cognitive abilities and conceptual knowledge (*knowing how to know*), practical abilities and procedural knowledge (*knowing how to do*), and motivations, emotions, values, and attitudinal knowledge (*knowing how to be*).

From this perspective, gamification is configured as a didactic strategy aimed at strengthening student competencies. According to Agustín (2023), it is especially effective for the acquisition and development of specific competencies, particularly communication and social skills, collaborative work, and time management. In general, gamification develops the following areas of knowledge:

- Knowing how to know:
  - Encourages content development and student participation both inside and outside the classroom, leading to better results.

- Knowing how to do:
  - Fosters digital competence through the appropriation of technological resources and their application in the teaching-learning process.
- Knowing how to be:
  - Promotes motivation, creativity, spontaneity, enjoyment, effort, loyalty, and cooperation.
  - Encourages commitment to knowledge.
  - Supports continuous formative processes by cultivating attitudes, aptitudes, and human values.

Gamification as an Innovation Proposal: PizzaberPro

In recent years, the need for "gamification" in the classroom has been addressed, as well as how these dynamics have been absorbed and resolved according to the trends of a changing digital era that constantly evolves at a voracious speed, rarely allowing time to effectively analyze its consequences. Explanations about the relationship between games, education, and technology throughout history have tended to focus on the latter concept as innovation and invention, instead of on "technology in use" (Edgerton, 2008). There is a misconception that technology is an electronic device, when reality is that it goes back to the first tool that humans used to satisfy their most basic needs, such as eating or entertaining themselves. For example, our ancestors used a rock as an instrument, which they gradually perfected and transformed into a tool for their purposes, a tool that could already be considered technology, just as, in this case, a die, a game board, or game pieces can be.

Digital tools are always based on physical development. The most successful video game titles are based on real experience of movement and mechanics that operate in a space with X, Y, and Z axes, representing horizontality, depth, and height. All these mechanics were later transferred and translated into a digital environment and interaction, considering their success and study in the real physical medium.

For this ongoing research project, the intention is to begin with real, physical materiality, and later, based on a positive experience, move to a digital environment, complementing that frequent discussion, as illustrated in the journal Game Studies (Aarseth, 2017).

Now, the intention of the ongoing research is not to diminish the experience of digital games or to say that a social, enriching, and meaningful learning experience cannot be achieved through a digital interface; however, it is much easier to measure and control in a physical environment with a board game, an aspect already evaluated in experiences with similar approaches (Lange-Nielsen, 2011), such as the Playful Learning Conference (2017), where adults interested in games and game designers gathered to test experiences and obtain data that would help them develop better products (Lean, 2018).

It is pertinent to point out that the game under development is inspired by a casual dynamic that connects the student with something everyday — a social gathering — seeking to move away from the rigid perception of study as a mere question-and-answer activity, under the concept of sharing around a pizza. The process is inspired by studies on how redesigning games becomes a strong relationship between the desire to impact knowledge with meaningful experiences in disciplinary practices (Kim, 2020), where the designed artifacts acquire a complex meaning, allowing the player to communicate their desires, intentions, and objectives through transitional decisions based on previously acquired knowledge.

The aesthetic of the game revolves around this concept: symbolically, the player receives a round plate that must be filled with five (5) triangular pieces, representing pizza slices, which they receive each time they correctly answer a question in the game.

In theory, the game can and is encouraged to be played in teams, so that commitment and experience strengthen social construction, as expressed by Abbott (2018), generating a more immersive feeling among the members of the group. Each group of participants rolls a die, trying to land on colored spaces that are respectively linked to categories, each associated with a specific color. The player then receives a multiple-choice question corresponding to the competence being developed or strengthened, all mediated by the teacher or facilitator, who holds the question-and-answer booklet and distributes the pieces to players when they correctly answer each question. This mediation by the teacher produces significant growth in knowledge through instruction that students perceive as focused and personalized, as expressed in Phillips (2014).

There is no limitation regarding the categories in which each player or team can compete or, translated into the game, the colors they can obtain. The main objec-

tive is to collect the five (5) pieces before the other contestants. During the process, there are special spaces where contestants can receive power-ups or incentives, such as a general knowledge question, bonuses like taking pieces from an opposing team, or even earning two pieces for the next correct answer. This generates a change of strategy on the part of the players, who attempt to achieve their objectives in different ways, while encouraging the dynamics of the game and increasing the user's engagement with the experience (Lange-Nielsen, 2011).

Self-Regulated Learning and Metacognition

Self-regulated learning consists of a process through which students are capable of setting learning objectives, planning the necessary actions to achieve them, monitoring their progress, adjusting their strategies, and evaluating the results obtained. In this process, students are aware of their own actions, thoughts, and emotions related to learning, and take measures to control and direct their learning process effectively.

Self-regulated learning involves the use of metacognitive strategies, such as planning, monitoring, and regulation; cognitive strategies, such as rehearsal, elaboration, and organization; and resource management strategies to handle aspects of the learning environment, such as time and study setting. Self-regulated students are able of adapting their study methods and learning strategies as needed, which allows them to improve their effectiveness and efficiency throughout the learning process (González et al., 2022).

Self-regulated learning is considered an essential competence in the educational field due to its active and multidimensional nature. This process requires students to plan, monitor, and actively control their thoughts, emotions, and actions to achieve their learning goals.

To carry out this approach, cognitive, metacognitive, and motivational skills are required, enabling students to effectively manage their own learning process. Furthermore, self-regulated learning implies a proactive attitude toward the acquisition of knowledge and the application of the skills needed to achieve specific objectives.

This competence is considered fundamental for both academic and professional success, as it empowers students to adapt to different educational and profession-

al environments and to face challenges with confidence and efficiency (Velasco & Cardeñoso, 2020).

According to González et al. (2022), self-regulated learning plays a crucial role in the educational field by allowing students to take an active role in their learning and academic growth process. Some ways in which self-regulated learning is related to education include:

1. Improvement of academic performance: Students who can regulate their learning tend to achieve better results in their studies, as they are more effective in planning, monitoring, and adjusting their study strategies.
2. Promotion of autonomy: This type of learning fosters autonomy and responsibility in students, enabling them to make informed decisions about how to effectively manage their learning process.
3. Development of metacognitive skills: Through self-regulated learning, students cultivate metacognitive skills such as reflection on their own learning process, self-evaluation, and the ability to regulate their own study behavior. These skills are essential for achieving deep and meaningful learning.
4. Adaptation to different educational environments: Students who develop self-regulated learning skills can effectively adjust to different contexts and learning scenarios, making it easier for them to face new academic challenges with confidence and efficiency.

Self-regulation of learning is an essential component in education, where students acquire the ability to monitor, manage, and direct their own learning processes. This approach enables them to set goals, evaluate progress, select appropriate strategies, manage motivation, and adjust their behavior to achieve academic success.

In the educational field, self-regulation of learning is directly related to student autonomy, the strengthening of metacognitive skills, and the use of effective learning strategies. Teachers play an essential role in fostering this self-regulation by providing clear instruction on these strategies and guiding students to learn autonomously (Hidalgo et al., 2021).

According to Luna and Álvarez (2020), self-regulation of learning encompasses a series of crucial skills that influence how students manage their own learning process. Within these competencies, self-regulation of the executive strategy stands out, which includes the ability to plan, organize, and control one's learning. Re-

search has shown a positive and moderate correlation between this dimension and academic self-efficacy, indicating that students who trust their ability to achieve success tend to be more effective at planning and organizing their study activities.

Another relevant dimension is self-regulation of cognition, which focuses on the control and management of cognitive processes during learning. Although a positive correlation has also been observed between this dimension and academic self-efficacy, this relationship is less pronounced than in the executive strategy. This suggests that academic self-efficacy may be more closely related to planning and organization skills than to the specific execution of cognitive processes during learning.

Additionally, self-regulation of motivation and affect is another crucial dimension, referring to the student's ability to regulate their emotional and motivational states during the learning process. Although the correlation with academic self-efficacy is positive but low, it indicates that confidence in one's academic abilities can influence how students manage their emotions and motivations during learning, though this relationship may be weaker compared to other dimensions.

Finally, self-regulation of the environment and context also plays a key role in the learning process. This dimension refers to the student's ability to adapt to and control their educational environment. A positive but slight correlation has been found with academic self-efficacy, suggesting that students who have confidence in their academic abilities may be more effective in adapting and utilizing their environment to support their learning process. Regarding self-regulated learning and metacognition, these aspects are reflected in the cognitive dimension of the learning process. This dimension, widely addressed in the academic literature, indicates that self-regulated learning influences in a significant way the development of both cognitive and metacognitive skills of students. Metacognition, understood as the capacity to supervise, control, and regulate one's own processes of thinking and learning, maintains a close connection with the self-regulation of learning.

Research indicates that students who apply strategies of self-regulated learning not only achieve better academic performance but also develop a greater awareness of their learning methods. This allows them to make more informed and appropriate decisions regarding the way to approach their tasks and solve problems with greater efficiency.

In conclusion, the practice of self-regulated learning fosters the development of metacognitive skills, which contributes significantly to the improvement of the learning process of students (Rosales et al., 2023).

The transition toward a more self-regulated approach in learning reinforces and complements the importance of metacognition in education. As pointed out by González et al. (2022), self-regulated learning is reflected in the ability of students to define objectives, design strategies, supervise their progress, and modify their learning methods according to the needs they identify. This process not only underlines the relevance of being aware of one's own cognitive processes but also highlights the necessity of actively intervening in these processes to optimize learning. Self-regulation, therefore, acts as a bridge between metacognitive awareness and direct action, allowing students not only to understand how they learn, but also to take concrete actions to improve that learning.

In this sense, the metacognitive, cognitive, and resource management strategies mentioned by Velasco and Cardeñoso (2020) are fundamental for the effective self-regulation of learning. The capacity to plan, monitor, and regulate, not only the cognitive process but also the learning environment, reflects a synergy between metacognition and self-regulation that is essential for academic success. This dynamic highlights the importance of the active role that students must assume in their educational process, adjusting their study methods and learning strategies to overcome challenges and fulfill their academic goals. Consequently, promoting self-regulation and metacognition in the educational context not only contributes to short-term academic achievement but also provides students with essential competences to adapt and learn continuously throughout their life.

The concept of metacognition has experienced a notable evolution from its first definitions to its current use in educational and formative fields. It is understood as the ability to reflect on one's own processes of thinking and learning, constituting a fundamental component to enhance the development of effective learning strategies. This text examines the nature of metacognition and its relevance in the educational field, supported by relevant research and theories.

Metacognition is understood as the capacity to know and regulate one's own cognitive processes (Flavell, 1976; Swanson, 1990). Flavell, considered as one of the forerunners in this field, points out that it involves both knowledge about one's own cognition and the monitoring and regulation of these processes in relation to

the information that is managed, generally oriented toward a specific goal. This definition highlights the dual nature of metacognition: on the one hand, the awareness and understanding of one's own mental processes, and on the other, the ability to intervene actively in them in order to optimize learning and problem solving.

From a historical perspective, the evolution of the concept of metacognition has gone through different stages, starting with research focused on memory and expanding towards a broader understanding that includes different aspects of thinking and learning (Tulving & Madigan, 1969; Flavell, 1971). Metacognition is related not only to the knowledge one has about their own cognitive processes, but also to the capacity to regulate and control these processes in the pursuit of specific objectives.

The evolution of the concept of metacognition shows a growing recognition of its relevance in cognitive psychology and education. While at its beginnings it was mainly focused on the understanding of memory, current research has expanded its scope to include processes such as attention, reading comprehension, problem solving, and strategic learning. This expansion underlines the fundamental role of metacognition in the self-regulation of learning, since it allows individuals not only to become aware of their cognitive processes, but also to intervene actively to improve their performance.

Metacognition is composed of two fundamental elements: metacognitive knowledge and metacognitive regulation. Metacognitive knowledge refers to the awareness that a person has about themselves as a learner, which includes the understanding of their own abilities, strategies, and cognitive processes. This knowledge includes declarative aspects, which indicate when and why to apply certain strategies; Procedural aspects, related to how to carry them out: and, conditional aspects, which allow the evaluation of the effectiveness of these strategies in different contexts.

Metacognitive regulation, for its part, refers to the ability to plan, monitor, and evaluate one's own learning process. This involves designing strategies to face specific tasks, continuously tracking progress toward established goals, and assessing the effectiveness of the strategies used. Through this regulation, individuals can make real-time adjustments to their learning methods, which contributes to improving both academic performance and problem-solving abilities.

Metacognitive research has shown that teaching and fostering metacognitive skills can have a significant impact on learning. Metacognitive instruction, which includes teaching students to reflect on their own learning process, set clear goals, and self-assess their understanding and strategies, can enhance academic performance and promote deeper and longer lasting learning.

Modern education, therefore, increasingly recognizes the importance of metacognition as a key skill for both academic success and everyday life. Educators are implementing strategies to promote metacognitive awareness and self-regulation among students, preparing them not only to overcome academic challenges, but also to become autonomous and effective lifelong learners. This transition toward educational approaches that value and promote metacognition reflects a paradigm shift toward recognizing learning as an active, self-regulated, and reflective process.

The relevance of metacognition in education is considerable. It facilitates autonomous and effective learning by enabling students to understand their own learning strategies, recognize their strengths and weaknesses, and adapt their study methods to improve their academic performance. Metacognition fosters a reflective attitude toward learning, where students focus not only on the content to be learned, but also on how they learn, continuously evaluating and adjusting their strategies as necessary.

Metacognition also plays a crucial role in problem-solving and academic performance. By being aware of their cognitive processes, students can approach intellectual tasks more strategically, selecting and applying the most appropriate strategies for each situation. This is especially relevant in complex areas such as mathematics, where performance depends not only on domain-specific knowledge, but also on the ability to apply that knowledge effectively.

Metacognition, by significantly influencing problem-solving and academic execution, becomes a powerful tool for deep and strategic learning. As Resnick and Collins (1996) point out, “the ability to think and learn depends on the type of knowledge.” This statement highlights the importance of not only possessing domain-specific knowledge but also the ability to reflect on how that knowledge is used in varied contexts. In the case of mathematics, for example, academic success is enhanced by the student’s ability to evaluate and adapt their learning and problem-solving strategies according to the specific demands of each task.

Metacognition enables students to develop a richer and more flexible understanding of mathematical concepts, facilitating their application in a variety of situations. This metacognitive process is crucial "to construct for each individual" the expert knowledge necessary to effectively address complex problems, as suggested by Resnick and Collins (1996). By fostering metacognition, students are encouraged to become aware of their thought processes, allowing them to recognize when a particular strategy is effective and when it may be necessary to change approaches.

In this context, teaching and learning mathematics greatly benefit from an approach that explicitly integrates metacognition. By teaching students to "think about their thinking," educators equip them with the tools needed to tackle mathematical challenges with confidence and competence. This involves not only teaching formulas and procedures, but also promoting a reflective attitude toward learning, where students learn to question their understanding and adjust their strategies accordingly.

Therefore, the incorporation of metacognition within the mathematics curriculum emerges as an innovative approach that not only improves academic performance but also prepares students to face both mathematical and non-mathematical problems more effectively in the future. By developing metacognitive skills, students gain the ability to apply their mathematical knowledge more effectively, resulting in better problem-solving and more meaningful, lasting learning.

In conclusion, metacognition is a fundamental component of effective learning. By fostering awareness and control over one's own thought processes, metacognition allows both students and educators to optimize the learning process, adapting it to individual needs and promoting deeper, long-lasting learning. Education should, therefore, incorporate practices that stimulate metacognitive development, preparing students not only to face academic challenges, but also to be autonomous learners throughout their lives.

Considerations

- It is necessary to rethink the activities generated within the framework of the exercise of the research competence, due to its daily usefulness in the work of both law students and lawyers. For this reason, it is pertinent to generate innovation in the teaching process, paying special attention to the components of metacognition and self-regulated learning.

- Based on all the mentioned afore, gamification gains importance as a didactic tool in the application of legal research competence. As previously stated, it is possible to review the strategies currently used in the teaching-learning process in order to innovate these evaluation mechanisms.
- From the ongoing project, it is expected that the implementation of *"Pizzaber"* as an example of gamification will allow for the analysis of the tool's use in group contexts that apply the factors of metacognition and self-regulated learning.

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