

PERCEPTION OF TEACHING STRATEGIES AND STUDENTS' SELF-PERCEPTION OF SKILLS IN THE BIOLOGY SUBJECT

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ABSTRACT: The objective of this study was to describe the teaching strategies and students' self-perception of skills in the biology subject among high school students. The study was conducted at the 25 de Mayo Educational Unit, located in the canton of Portoviejo, Ecuador. The research used a mixed-methods approach and was exploratory, descriptive, and field-based. Data were collected through surveys administered to students, interviews with teachers, and a self-perception questionnaire on Biology skills administered to the students. A non-probabilistic sample was used. The results indicate that teachers do not prioritize implementing creative methodological strategies and that students demonstrate low achievement in the skills acquired through Biology learning. It is concluded that teachers should strengthen the methodological strategies they implement by motivating students and creating conditions conducive to meaningful learning. Although teachers acknowledge and report using strategies such as project-based learning, problem-based learning, collaborative learning, design thinking, and emerging technologies, students do not perceive these strategies as being used with the same frequency.

Keywords: Teaching strategies, self-perception of skills, biological skills, Biology education, inquiry-based learning, student perception.

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INTRODUCTION

Methodological strategies in traditional education are authoritarian, overly verbal, and focused on memorization, based on the principle of one-way knowledge transmission from teacher to student.

However, contemporary education focuses on participatory, reflective, dialectical teaching and learning processes, using digital resources and a direct link between theory and practice to solve everyday problems.

Contemporary teachers facilitate educational processes that place the student at the center, guiding them to discover their creative potential and build truly meaningful learning.

Learning focuses on helping students understand and apply their cognitive and socio-emotional skills in real-world situations to make decisions and build a successful and resilient future (Zamora Olivos et al., 2023).

Educating students in creative learning environments involves using tools that foster talent and guide them toward personal development suited to the learning needed for everyday performance.

Digital technologies have become indispensable in teaching, offering a range of possibilities for carrying out activities relevant to student-centered teaching and learning (Vélez Carreño et al., 2022).

Students are naturally receptive to new ideas and eager to make the most of their growing decision-making ability; their curiosity and interest lead to great openness to new possibilities (Rosales Llontop et al., 2020).

In this context, participatory methodologies, with instructional resources aligned with technology and creativity, help achieve learning objectives and required performance standards.

One of the objectives set forth for biology education in the National Curriculum for the Unified General High School level (Ministerio de Educación del Ecuador, 2016) states: to demonstrate scientific thinking skills in order to achieve intellectual flexibility; a critical

mindset; curiosity about life, living beings, and the environment; independent and team-based work that is collaborative and participatory; creativity in addressing challenges; and an interest in deepening acquired knowledge and continuing to learn throughout life, while acting with ethics and honesty.

The goal is to provide students with an education that fosters an awareness of life, develops personal and social skills, is grounded in science, and produces individuals committed to their ongoing learning and development.

The purpose of this study is to describe the relationship between teaching strategies and high school students' self-perception of their skills in biology.

DEVELOPMENT

Methodological Strategies

Methodological strategies are processes teachers use to improve teaching and learning. These strategies aim to help students understand, assimilate, and appreciate knowledge, and teachers use them in combination based on educational needs and in accordance with established objectives.

In this regard, Gutiérrez-Delgado et al. (2018) mention the application of instructional strategies, noting that teachers must take students' prior experiences into account in order to use them to design an appropriate and meaningful learning scenario, considering contextual elements to achieve the expected learning outcomes; and, when this happens, competencies are acquired and, above all, meaningful learning takes place (p. 45).

These strategies aim to help teachers use their analytical skills to choose the most appropriate and engaging methodology for their students.

Methodological Strategies That Foster Meaningful Learning

Practical experience confirms that the most effective strategies for achieving meaningful and functional learning are: developing projects that foster creativity and problem-solving;

integrating different areas of knowledge into a single project; working in small groups to promote collaboration and the exchange of ideas; conducting team activities that require the active participation of all members; and fostering shared responsibility and mutual support.

The use of games and playful activities also facilitates learning, as does the use of competitive and challenging elements to motivate students; the incorporation of game-based dynamics that allow for exploration and experimentation; the use of visual resources such as images, diagrams, and mind maps; and the creation of graphical representations to facilitate the understanding of concepts.

It is necessary to stimulate imagination and creativity through visual means; to present problem situations that require analysis and resolution; to foster critical thinking and decision-making; to integrate different perspectives and approaches to address a problem; to promote learning through direct experience; to carry out practical and experiential activities; and to reflect on and analyze experiences to derive meaningful lessons.

Innovative Teaching Resources and Meaningful Learning

Teaching resources define the practical aspects and dynamics of the teaching and learning process, serving as bridges between theoretical knowledge and students' practical understanding.

Using creative resources in teaching helps capture students' interest, maintain their attention, facilitate understanding of concepts, and develop skills more effectively.

These include:

- Virtual Reality (VR) and Augmented Reality (AR)
- Interactive educational apps
- Virtual labs
- Multimedia resources
- Educational board games
- Social media and collaborative platforms

Teachers face various challenges in developing knowledge, competencies, and skills in their teaching practice through virtual technologies; furthermore, they must support students throughout their educational journey, particularly by providing guidance and fostering their emotional development.

This, combined with variations in the types and methods of support that teachers can provide—depending on students’ cognitive, attitudinal, and emotional conditions in relation to their professional training needs—means that, although students frequently use social media, they do not necessarily know how to use or are familiar with programs, platforms, and applications useful for their education, particularly specialized ones; Consequently, they face the challenge of mastering these technological skills, which are becoming increasingly essential (Bedoya Calvo & López Gómez, 2021).

Digital teaching resources are an innovative tool in the teaching-learning process for academic subjects, as they promote meaningful learning. Their use allows us to move beyond traditional approaches and advance toward new forms of teaching that maintain high levels of academic performance and, consequently, achieve the educational quality expected by the educational community. Teachers must receive training in the technological and pedagogical use of these tools, since not all digital resources serve the same function or have the same impact on the development of meaningful learning (Delgado-Cobeña et al., 2023).

Role-playing is among the most widely used and recommended methods, along with case studies, discussions, e-learning, and personalized learning—all tailored to the modules and instructional needs of students. While much of the learning takes place independently, a teacher’s guidance remains crucial; for this reason, individual activities are emphasized alongside group-based learning strategies. Among the most innovative and representative are Scrum projects and the use of digital platforms.

The former focuses on student learning based on personal interests and generates student-driven projects, while the latter uses digital tools for academic management (Bonilla et al., 2020).

Meaningful learning promotes the development of higher-order thinking skills that enable students to connect knowledge and continue learning. Ecuador's Curriculum Reform proposes new methodologies to ensure quality learning; however, in some cases, improper implementation has created gaps between educational levels (Silva Lazo, 2009).

Teachers view relevant learning as the framework that guides their methods and informs activity design to address content. Although they generally demonstrate a broad understanding of this concept, they acknowledge limited knowledge of students' prior knowledge and how new learning can foster reflection and the reconfiguration of those initial understandings. Furthermore, the digital tools that teachers use most frequently do not always match those that students spontaneously use for research. In addition, it was found that interaction and collaborative content creation between teachers and students using digital resources are highly motivating (Tuárez-Párraga & Loor-Colamarco, 2021).

Teachers and students perceive teaching-and-learning activities differently. Teachers' perceptions showed a more pronounced positive bias than students'. The differences in most (65%) activities were statistically significant; the findings reflect a global pattern in which a disparity between teachers' and students' views on teaching and learning is systematically reported (Mapulanga & Bwalya, 2024).

The findings reflect a global pattern in which a disparity between teachers' and students' perspectives on teaching and learning is systematically reported. However, these results must be interpreted in light of the study's limitations and the participants' subjectivity.

Skills for the Biology Course According to the Ministry of Education (2016)

The National Curriculum of the Ministerio de Educación del Ecuador (2016) established a set of skills for the biology course that students must achieve gradually over the three years of high school. This involves understanding the learning objectives, thematic content, and specific skills that students are expected to acquire and develop during their academic training. The main ones are outlined below:

- I identify the different levels of biological diversity—genes, species, and ecosystems—and explain their relevance to the preservation of life on the planet.

- I describe the world's biomes and interpret them as settings in which the evolution of biodiversity manifests itself in response to geographic and climatic factors.
- I compare the fundamental characteristics of biomolecules, their synthesis process, and the diversity of the polymers that compose them.
- I describe the nervous and endocrine systems in animals with varying degrees of complexity, explain their functional coordination in responding to and adapting to environmental stimuli, and use scientific models that demonstrate the evolution of these systems.
- I explain the functions of DNA as the carrier of genetic information that determines the characteristics of organisms and enables inheritance, relating it to chromosomes and genes.
- I understand the causes of DNA modifications that lead to genetic, chromosomal, and genomic alterations, and I identify their similarities and differences.
- Based on scientific studies, I recognize Ecuador's biodiversity; I analyze the evolutionary patterns of native and endemic species in various ecosystems and explain the reasons for the country's megadiversity.
- I understand the processes of fertilization, human conception, embryonic and fetal development, childbirth, and abortion, and I analyze human reproduction comprehensively.
- I identify the types of cellular organization in animals and plants, experimentally compare their differences, and establish similarities and differences among their organelles.

METHODOLOGY

This study employs a mixed-methods approach (qualitative-quantitative); the qualitative component explored teachers' and students' perceptions of teaching methodology, while the quantitative component collected and statistically analyzed real-world data.

The study was exploratory, descriptive, field-based, and phenomenological, aiming to characterize the educational phenomenon in its natural setting and interpret the experiences encountered.

The population consists of 335 students and 20 teachers at the institution; a non-probabilistic convenience sample (selected at the researcher's discretion) was used, comprising 103 third-year students in the Unified General High School program (with specializations in Science and Technical Studies) and 3 teachers in the Natural Sciences department who teach the course.

The study used primary-source research techniques, such as semi-structured interviews with teachers (qualitative), to explore methodological criteria, instructional planning, tools used, and teaching approaches from the teachers' perspective, focusing on key dimensions such as planning, the use of creative resources, assessment, and pedagogical limitations.

Student surveys (quantitative) were conducted on their learning contributions, the activities implemented, and how their biology teacher conducts class; in addition, students completed a 10-item self-assessment questionnaire on skills selected from the Ecuadorian Ministry of Education curriculum. The objective was to gather student opinions on the frequency and usefulness of the methodological strategies applied in the classroom. The questionnaire used multiple-choice questions to categorize how the activities contributed to learning and the teaching methods used by the teacher.

Among the interpretation criteria, levels such as "Satisfactory," "Average," and "Unsatisfactory" are proposed, along with the theoretical rationale, which was drawn from reliable sources such as Google Scholar, digital libraries, university repositories, documents, articles, and other media

For validation and reliability, three specialists with recognized expertise reviewed the instruments through pedagogical and methodological evaluation and assessed their adequacy, clarity, coherence, and relevance.

For the Self-Perceived Skills Questionnaire, we conducted a pilot test with a group of participants with similar characteristics. We calculated internal consistency using descriptive statistics.

The semi-structured interview protocol and the analysis procedure were conducted individually on the institutional campus, in a distraction-free space, with each session lasting approximately 30 to 45 minutes, following prior authorization for audio recording.

The quantitative analysis used descriptive statistics; quantitative data from the surveys and the self-perception questionnaire were organized in SPSS, yielding absolute and percentage frequencies.

The qualitative analysis used thematic content analysis in three phases: verbatim transcription of the audio recordings, open coding to identify units of meaning, and categorization and grouping of recurring patterns expressed by the teachers.

The study used methodological and source triangulation, comparing qualitative information (interviews) with quantitative data (surveys and a self-perception questionnaire) in light of the theoretical framework on didactics, perception, and self-perception.

Regarding Ethical Considerations, Scope, and Limitations, administrative authorization was obtained from the Ministry of Education of Ecuador and the University of San Gregorio in Portoviejo for voluntary participation, supported by informed consent from parents or legal guardians, thereby ensuring strict confidentiality.

Within the scope of this study, we assessed methodological practices and identified areas for improvement to design creative teaching strategies tailored to the context of high school education in rural and semi-urban areas of Manabí Province. One limitation of this study is that, because the sampling was non-probabilistic, it was restricted to a single institution: the “25 de Mayo” Educational Unit. The results are not statistically generalizable to the national level.

The methodological design and data collection presented in this article are part of a broader research project corresponding to the master’s thesis by María Dolores del Carmen Sánchez Sánchez (2024), titled “Creative Methodological Strategies for Meaningful Learning in

Biology,” which is housed in the institutional repository of the Universidad San Gregorio de Portoviejo. For this publication, we expanded the analyses and rigorously adapted them to conform to the structure of scientific dissemination.

RESULTS

Survey of Students

Table 1 shows that, based on multiple responses, 66% of students indicate that the activities used help maintain their interest and attention in the course; however, 3.9% acknowledge that these activities cause fatigue or exhaustion.

Table 1

How do the activities implemented by your biology teacher contribute to your learning?

<i>N.º</i>	<i>Alternatives</i>	<i>Frequency</i>	<i>Percentage</i>
1	Keep students interested and engaged	68	66%
2	Cause fatigue or tiredness	4	3.9%
3	Help students understand the subject	39	37.9%
4	Make students feel enthusiastic and happy	19	18.4%
5	Make students want to learn more	32	31.1%
6	Allow students to participate or contribute in class	37	35.9%

Note. Survey of high school students.

Regarding understanding of the subject matter, only 38% responded to this item, which is concerning, given that it refers to the contribution of the strategies used by the teacher in the course. One of the teacher’s roles is to facilitate classroom learning through teaching and learning strategies, using a playful approach that fosters students’ reasoning, engagement, and contributions.

The results in Table 2 show the students' multiple responses: 68% of biology teachers use lectures in their classes, while 63% cited the use of question-and-answer sessions and 62% cited group work, indicating that traditional teaching methods are preferred over reflective and creative participation activities—such as brainstorming and reflective workshops—which were chosen less frequently.

Table 2

How does your biology teacher conduct class?

<i>N.º</i>	<i>Alternatives</i>	<i>Frequency</i>	<i>Percentage</i>
1	Teacher-led presentation	70	68%
2	Cooperative group projects	40	38.8%
3	Group assignments	62	60.2%
4	Q&A	63	61.2%
5	Brainstorming	24	23.3%
6	Reflective workshops	24	23.3%
7	Interactive videos	20	19.4%
8	Textbook analysis	45	43.7%
9	Lab activities	7	6.8%

Note. Survey of high school students.

Results of the Teacher Survey

Regarding the question: How do creative strategies contribute to the student teaching and learning process? Teachers indicate that these strategies help maintain students' interest and attention, as well as foster the development of critical thinking by giving students the opportunity to form expectations, share viewpoints and experiences, and propose innovative ideas based on the connection between theoretical concepts, the use of imagination, and creativity—all of which are characteristic of reflective teaching processes that address contemporary issues. Biology is a science dedicated to studying the diversity of life and its evolution—a particularly relevant topic, given that Ecuador is recognized worldwide for its extraordinary biodiversity. Therefore, educators must implement strategies that strengthen

their teaching practice in educational institutions. In this context, the application of the flipped classroom method as a strategy for teaching biology is influenced by four factors: the teacher, the subject (biology), the teaching method (flipped classroom), and the student (Veliz-Bravo & Rangel-Donoso, 2022).

Regarding the question: What creative strategies facilitate teaching and learning processes, and how is their effectiveness demonstrated among students?

Teachers report that project-based learning—where students learn by researching and solving real-world problems or creating tangible products—is effective; problem-based learning is a strategy in which students solve challenging situations that require research, discussion, and the application of knowledge; collaborative learning, where students learn in small groups by sharing responsibilities and reflections; design thinking, a strategy focused on creativity and empathy to solve complex problems; and the integration of emerging technologies through the use of interactive digital tools to explore concepts in an immersive way.

In summary, creative strategies stimulate curiosity, autonomy, collaboration, and critical thinking, and their effectiveness is demonstrated through authentic assessments, observation of student engagement and participation, reflective self- and peer-assessments, and improvements in academic outcomes and students' attitudes toward learning.

In response to the question: Why do you believe that the methodological strategies you use in the classroom are effective for teaching and learning biology?

Teachers believe meaningful learning is fostered by connecting new knowledge to students' prior knowledge, enabling them to understand, apply, and transfer what they have learned to real-world contexts. Interest and motivation are sparked because when students feel engaged, they learn more deeply. Effective strategies generate curiosity, challenge, and purpose.

Active participation is encouraged: students are no longer passive recipients but active participants in their own learning; they interact, take part in discussions and experiments, and create real-world examples and situations—all signs of effectiveness. Competencies—not just knowledge—are developed, enabling students to learn how to do, how to live together, and how to be, rather than merely memorizing; cognitive, social, and emotional skills are

enhanced. It adapts to diversity by catering to different learning styles, paces, and needs, and it fosters inclusion and educational equity.

Evidence of learning is generated; results can be observed, measured, or assessed through student work, performance, or reflections. It also integrates reflection and feedback, promoting metacognition as students reflect on their learning process. Likewise, ongoing feedback improves processes and outcomes.

This approach reflects a teaching philosophy consistent with contemporary education principles, centered on the student and their needs, with a vision of instructional and pedagogical management oriented toward critical and reflective participation that leads to meaningful learning.

Results of the Self-Perception Matrix for Specific Skills Applied to Students

According to the results of the self-perception questionnaire on the development of specific skills in the Biology course (see Table 3), most students fall into the “moderate” and “somewhat unsatisfactory” categories.

Overall, the results show a predominance of the “moderately satisfactory” level of self-perception in the assessed skills, with an average of 51.36%, followed by the “unsatisfactory” level at 26.31% and the “satisfactory” level at 22.33%. The highest levels of “moderately satisfactory” self-perception were recorded in the identification of levels of biological diversity (66.02%), biomes (59.22%), and cellular organization (59.22%). In contrast, the highest proportions of “somewhat unsatisfactory” self-assessments were observed in understanding human reproduction (43.69%), genetic, chromosomal, and genomic alterations (37.86%), and biomolecules (32.04%). These results highlight the need to strengthen teaching strategies for topics in which students express less confidence, prioritizing hands-on activities, visual resources, problem-solving, and learning experiences that promote understanding and consolidate scientific skills.

Table 3*Level of Self-Perception*

N. o	SKILLS ASSESSED	LEVEL OF SELF-PERCEIVED ACHIEVEMENT			TOTAL %
		Satisfactory f (%)	Fairly satisfactory f (%)	Somewhat unsatisfactory f (%)	
A	Identify the levels of biological diversity and their importance to life.	18 (17,48%)	68 (66,02%)	17 (16,50%)	100%
B	Describe biomes and relate their biodiversity to geographic and climatic factors.	21 (20,39%)	61 (59,22%)	21 (20,39%)	100%
C	Compare the characteristics and synthesis of the major biomolecules.	11 (10,68%)	59 (57,28%)	33 (32,04%)	100%
D	Understand the evolution of the Galápagos finches and its relationship to natural selection.	25 (24,27%)	50 (48,54%)	28 (27,19%)	100%
E	Describe the function of DNA and its relationship to genes, chromosomes, and inheritance.	37 (35,92%)	40 (38,83%)	26 (25,24%)	100%
F	Understand genetic, chromosomal, and genomic alterations and distinguish their characteristics.	16 (15,54%)	48 (46,60%)	39 (37,86%)	100%
G	Analyze Ecuador's biodiversity and the evolution of its native and endemic species.	27 (26,21%)	55 (53,40%)	21 (20,39%)	100%
H	Understand human reproduction, from fertilization through childbirth and abortion.	19 (18,45%)	39 (37,86%)	45 (43,69%)	100%
I	Identify and compare the organization of animal and plant cells, as well as their organelles.	20 (19,42%)	61 (59,22%)	22 (21,36%)	100%
J	Recognize diseases associated with lifestyle habits and environmental factors and propose preventive measures.	36 (34,95%)	48 (46,60%)	19 (18,45%)	100%

Note. The percentages reflect the distribution of self-perceived mastery of each skill.

DISCUSSION OF RESULTS

According to Gutiérrez-Delgado et al. (2018), an academic approach to teaching that is playful and interactive encourages reflection on the importance of documenting innovative teaching experiences and leads the researcher to systematize and document the everyday events they observe, discuss, listen to, and act upon—rather than merely noticing them and letting them go unnoticed.

It is necessary to incorporate a wider variety of digital teaching resources, given the broad range available that can complement the materials used in the research and apply to the various dimensions of the learning process. Likewise, teachers need training in the technological and pedagogical use of these tools, since not all digital resources serve the same function or have the same impact on the development of meaningful learning (Delgado-Cobena et al., 2023).

Creative strategies can vary depending on what the teacher can imagine and implement, but success lies in engaging and inspiring students with learning resources that connect to their daily lives or personal interests (Delgado Merchán & Zambrano Llor, 2023).

Technology-driven teaching transformation shows that teachers tend to incorporate changes within a framework of stability. In other words, they adopt technological tools that fit their usual practices, especially the learning activities they do most often. In this regard, teachers make extensive use of technologies that support strategies focused on content and its delivery through various media—such as audio, video, documents, or demonstrations—making these technologies the central pillar of the educational process (Marcelo et al., 2015).

An effective teacher creates a supportive environment that encourages each student's spontaneous participation; this involves body language, tone of voice, a connection to the subject matter, and links to everyday life, all of which foster a strong relationship between theory and practice.

Playful activities enhance visual, tactile, and auditory skills, in addition to fostering spatial-temporal perception and promoting light, coordinated body movements. Similarly, games stimulate language development, spark ingenuity, strengthen observation skills, build determination, and cultivate patience. Therefore, teachers should capitalize on their pedagogical value and use play as an essential resource to help students achieve higher levels of learning by renewing and applying these strategies in educational processes (Caballero-Calderón, 2021).

Learning outcomes depend on designing, implementing, and assessing appropriate tools for each competency. Assessment results should show both the level of learning each student has achieved and the degree to which the competency has developed; furthermore, they should guide the improvement measures that must be incorporated into curriculum designs or the profiles of teaching and administrative-teaching staff. The support and feedback teachers provide to students are essential in guiding them toward competency attainment (Arias Arciniegas et al., 2013).

Fundamental learning is now emerging as a teaching strategy that responds to the challenges of pedagogical innovation. Within this framework, many teachers have incorporated various tools into their pedagogical strategies to guide students in constructing knowledge. This approach not only offers an innovative model but also serves as an effective resource that enhances learning, allowing students to identify their existing knowledge, expand it progressively, and apply it in their daily lives (Baque-Reyes & Portilla-Faican, 2021).

Loor Alcívar and Alarcón Barcia (2021) note that creative methodological strategies are planned processes aimed at achieving meaningful learning and that, to reach this goal, they must be applied in a flexible, dynamic, and adaptable manner to the students. The notion that each student learns differently allows teachers to assess the most effective ways to facilitate learning; this is why it is important to analyze the methodological strategies that teachers apply in the teaching-learning process.

Sánchez Velastegui and Guamán Coronel (2024) state that in the educational sphere, there is a push to broaden the approaches and proposals for methodological strategies, developing the pedagogical process through the use of information and communication technologies

(ICT), since one of the goals of education is to create a student-centered lesson plan and transform information into knowledge.

Biology is a science dedicated to studying the diversity of life and its evolution—a particularly relevant topic, given that Ecuador is globally recognized for its extraordinary biodiversity. Therefore, educators must implement strategies that strengthen their teaching practice in educational institutions. In this context, four factors influence the application of the flipped classroom method as a strategy for teaching biology: the teacher, the subject (biology), the teaching method (flipped classroom), and the student (Veliz-Bravo & Rangel-Donoso, 2022).

The biology course is particularly well-suited for gamification because, like the processes found in nature, gamification is built on organized structures and systems. Furthermore, narrative and contextual coherence is a key element of this strategy's success because, as experts in the field point out, it helps increase student motivation (Zambrano et al., 2022).

Every person must be fully capable of thinking independently and critically, forming their own judgments, and deciding what to do when faced with each dilemma, guided by sound values oriented toward progress (Tumbaco-Gabino et al., 2020).

High school students' self-perception of biology skills encompasses academic self-concept, self-efficacy, confidence, metacognitive skills, and 21st-century competencies. The literature, covering both high school and early college contexts, shows consensus that self-concept and self-efficacy predict performance in biology, although the accuracy of self-perception varies by subject area and student (Mbamalu et al., 2026).

Teaching the concept of DNA has become challenging for science teachers, as it is an abstract concept that requires visual representation to help students understand its structure, function, and importance in all living organisms.

Implementing learning environments and intervention strategies in high schools will improve student performance by building the knowledge needed to support quality education. Current educational standards emphasize these practices, which—from a professional standpoint—are vital. With the involvement of teachers, curricula, educational models, and other

stakeholders in this process, a radical change will emerge in how education is implemented at all levels (Elías Segura, 2021; Rodiah et al., 2020).

It is essential to incorporate a variety of text types into school activities—both in subject matter and structure—and to promote reading complete works rather than excerpts, dedicating time to explaining their characteristics and functions.

It is also necessary to provide feedback on the individual and group progress made throughout the course through reading and writing assignments. For written work, students should be encouraged to develop and communicate their own ideas—even when their initial texts are limited or incomplete—and discouraged from copying content. To this end, teachers must participate more actively in preparing and presenting these activities, ensuring they are clear and accessible to students (González de la Torre and Jiménez Mora, 2023).

CONCLUSIONS

Regarding teaching strategies and high school students' self-perception of their biology skills, the study concludes that there is a descriptive relationship between the two variables. The results show a predominance of strategies such as teacher-led lectures, question-and-answer sessions, and group work, while active, experimental, and technology-based methodologies are used less frequently.

At the same time, students' self-perception of their skills is primarily concentrated at a moderately satisfactory level, with greater difficulties in skills related to human reproduction, genetics, and biomolecules.

Although teachers acknowledge and report using strategies such as projects, problem-solving, collaboration, design thinking, and emerging technologies, students do not perceive these being used as frequently.

In a consultation conducted, teachers expressed their vision of what education should be like today: student-centered, fostering students' talents, and emphasizing the development of

learning experiences, teamwork, critical thinking, the use of varied tools to generate interest and engagement, and a continuous connection between theory and practice that gives meaning to what is learned.

This entire conceptual and factual framework contrasts with the views expressed by the students surveyed in this study, which allows us to reflect on teaching practices from the perspective of the methodological instructional management they employ in the classroom—a management approach that must align with contemporary educational trends based on innovation, creativity, and the ongoing participation of the learner.

In this regard, the findings suggest that greater diversification and systematic application of active, participatory, experimental, and creative strategies could foster skill development and a more satisfying sense of achievement.

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