The emotional intelligence of teachers for the learning of biology in university students

La inteligencia emocional de los docentes para el aprendizaje de la biología en los estudiantes universitarios

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Abstract

Emotional intelligence is the ability of an individual to recognize their own emotions and those of others; this capacity enables them to identify feelings, guide thinking, and adapt their behavior to the environment appropriately. The aim of this research was to analyze the emotional intelligence of teachers in relation to the biology learning of university students at the University of Zulia. The employed methodology was quantitative, descriptive in nature, and with a non-experimental and cross-sectional design. The studied population consisted of 5 teachers and 38 students, who were administered a digital questionnaire containing information about the variables under study. Reliability was determined through Cronbach's Alpha, resulting in a value of 0.964. For data processing, SPSS 27 was used. The results indicate that teachers exhibit deficiencies in the components of emotional intelligence. Additionally, learning styles based on the modulating agent in students show a similar inefficiency, reflecting a weakness in this area. It is concluded that the emotional intelligence of teachers in the context of biology learning is insufficient. Therefore, it is recommended that educators strengthen these skills to enhance teaching and learning in their students.

Keyword: emotional competencies, emotional education, emotional intelligence, emotional teacher, types of learning.

Resumen

La inteligencia emocional es la habilidad del individuo para reconocer sus propias emociones y las de otras personas; esta capacidad le permite identificar sentimientos, orientar el pensamiento y adaptar su conducta al entorno de manera adecuada. El objetivo de esta investigación fue analizar la inteligencia emocional de los docentes en relación con el aprendizaje de biología de los estudiantes universitarios de la Universidad del Zulia. La metodología empleada fue cuantitativa, de tipo descriptiva y con un diseño no experimental y transversal. La población estudiada estuvo constituida por 5 profesores y 38 alumnos, a quienes se les aplicó un cuestionario digital con información sobre las variables en estudio. La confiabilidad se determinó a través del Alfa de Cronbach, resultando en un valor de 0,964. Para el procesamiento de los datos, se utilizó el programa SPSS 27.Los resultados indican que los docentes presentan deficiencias en los componentes de la inteligencia emocional. Además, los estilos de aprendizaje según el agente modulador en los estudiantes muestran una similar ineficiencia, denotando una debilidad en esta área. Se concluye que la inteligencia emocional de los docentes en el contexto del aprendizaje de biología es insuficiente. Por lo tanto, se recomienda que los educadores fortalezcan estas habilidades para potenciar la enseñanza y el aprendizaje en sus educandos.

Palabras clave: competencias emocionales, educación emocional, inteligencia emocional, docente emocional, tipos de aprendizajes.

Introduction

This article focuses on the emotional intelligence of educators, pivotal as they are the agents promoting the comprehensive development of students. It is argued that teachers should equip themselves with skills that allow them to better identify the emotions of their students. Hence arises the importance of nurturing empathy, communication, and self-control, deemed essential for educators since they strengthen interactions with students.

This training not only enables the teacher to renew their personality and pedagogical methodology but also leads them to consider the emotional needs of their students. This, in turn, guides them in choosing strategies and resources and in perceiving individualized learning styles. In this study, the teacher's emotional intelligence is addressed without neglecting that of the students. Given that educators serve as role models, students tend to adopt similar behaviors, benefiting their own growth.

Romero (2022) contends that emotional intelligence is vital for the mental and social balance of individuals, as it allows them to understand their environment and make informed decisions amidst diverse daily circumstances. According to Goleman (2022), emotional intelligence plays a crucial role in education: it boosts motivation, controls impulses, regulates emotions, and promotes student integration. Additionally, it reinforces personal and social skills and values such as self-esteem, autonomy, communication, empathy, and self-control.

On the other hand, Arrabal (2018) breaks down emotional intelligence into several components: *(a) Perception:* involves interpreting, feeling, and experiencing emotions and feelings. *(b) Assimilation:* suggests that emotions and thoughts can be integrated. If one understands how to leverage emotions for the benefit of thought, individuals will make better decisions. *(c) Understanding:* is based on recognizing others' emotions and identifying one's own, which eases connecting with others. *(d) Regulation:* is associated with the ability to manage emotional responses in various situations, whether stressful, positive, or negative.

According to Bariso (2020), emotional intelligence includes: *(a) intrapersonal intelligence*, which relates to the ability to know oneself; it also includes self-esteem, self-control, self-love, self-concept, autonomy, and academic motivation; and *(b) interpersonal intelligence*, which relates to the motivation and ability to understand the emotions and behaviors of other individuals. Additionally, Pincay *et al.* (2018) explain that the complex environment in which teachers have to work clearly requires an increase in emotional intelligence, which enables them to be resilient, adapt to situations, and fully cope with the daily occurring changes.

Furthermore, Waissbluth (2019) states that the global educational aim is the holistic development of students, both cognitively and emotionally. To achieve this, educators must possess robust emotional intelligence and also the ability to plan lessons with themes that incorporate the development of skills, addressing them clearly and cross-curricularly to optimise students' emotional growth.

In this vein, Tacca *et al.* (2020) articulate that in Latin America, teachers should not only focus on imparting subject knowledge and appropriate behavioural patterns but also on emotions and feelings. Educators need to understand student behaviour from an emotional perspective, not just a behavioural one, and learn how to teach emotional intelligence. This approach should not only be implemented in the educational setting but also in familial and social contexts.

In this regard, Segura *et al.* (2018) assert that those lacking developed emotional intelligence impact interpersonal relationships, collaboration, problem-solving abilities, teamwork, and the motivation to achieve life's goals and objectives. Educators with a high degree of emotional intelligence are more empathetic, positive, and relate better with others, demonstrating higher job satisfaction. Given these conditions, Mejía & Londoño (2021) state that emotions conveyed by teachers induce behavioural changes in students that influence learning; therefore, educators become the most crucial emotional guides for students, serving as role models.

In this scenario, a teacher capable of capturing, understanding, and managing emotions will achieve personal balance and social wellbeing. According to Acosta & Blanco (2022), emotional intelligence is linked to several human capacities such as assimilation, perception, evaluation, learning, generation, comprehension, regulation, and expression of emotions. In light of the foregoing, Macazana & Romero (2021) emphasise the need for teacher training to bridge the educational gap in the development of skills, which have been less prioritised for managing thoughts, feelings, emotions, and the acquired skills to understand reality, enhancing both personal and professional growth.

For Bariso (2020), emotional intelligence includes: (a) intrapersonal intelligence, which is related to the ability to know oneself; it also includes self-esteem, self-control, self-love, self-concept, autonomy, and academic motivation; and (b) interpersonal intelligence, which is related to the motivation and ability to understand the emotions and behaviors of other individuals. Similarly, Pincay *et al.* (2018) explain that the complex environment in which teachers have to work clearly requires an increase in emotional intelligence, which allows them to be resilient, adapt to situations, and fully face the changes that occur on a daily basis.

Now, Waissbluth (2019) states that the purpose of education worldwide is the holistic development of students, both cognitively and emotionally. To achieve this, teachers must have good emotional intelligence and also the ability to plan classes with topics that include the development of competencies that address emotions clearly and holistically in the curriculum, as a way to optimize the emotional development of students.

In this context, Tacca *et al.* (2020) express that in Latin America, teachers must focus not only on teaching subject knowledge and correct behavioral patterns, but also on emotions and feelings. The teacher must understand student behavior from an emotional perspective, not just behavioral, and learn how to teach emotional intelligence. This should not only be applied in the educational environment but also in the family and social contexts.

In this sense, Segura *et al.* (2018) state that someone who hasn't developed emotional intelligence affects interpersonal relationships, collaboration, problem-solving skills, teamwork, and motivation to achieve goals in life. Teachers with a high degree of emotional intelligence are more empathetic, positive, and relate better to others, and they show greater job satisfaction. Given these conditions, Mejía & Londoño (2021) affirm that emotions expressed by teachers provoke behavioral changes in students that influence learning; therefore, teachers become the most important emotional guides for students, serving as examples and role models.

In this scenario, a teacher who can perceive, understand, and control emotions will achieve their own balance and social well-being. According to Acosta & Blanco (2022), emotional intelligence is related to various capacities of individuals, such as assimilation, perception, evaluation, learning, generation, understanding, regulation, and expression of emotions. In light of the above, Macazana & Romero (2021) point out that teacher training is needed to close the educational gap in the development of skills that have been less important for managing thoughts, feelings, emotions, and acquired abilities to understand reality and to improve both personally and professionally.

On the other hand, Fuenmayor (2016) notes that in Venezuela, teachers need to change education and teach from emotions to promote different learning styles in students. Therefore, they must keep emotional competencies in mind during their pedagogical practice. In other words, a teacher with emotional skills can create a suitable working environment and better recognize students' emotional states. This leads to an empathetic connection that provides security to the student.

In this sense, Romero *et al.* (2022) indicate that there is a need to include new areas of work related to emotional intelligence, such as perception, assimilation, understanding, emotional regulation, communication, and interpersonal relationships, among others. Likewise, it is necessary to train teachers to understand the role of emotions in the school environment, as this will enable the development of more effective teaching activities.

Therefore, it is necessary to incorporate this teaching model to have a positive effect on the daily work results of the teacher. Since it impacts learning, mental health, effectiveness of social relationships, and job performance, it fosters a positive classroom environment to reduce the inherent stress of the profession and improves communication and relationships among students, colleagues, and the educational community. Teachers with developed emotional intelligence project a understanding personality in their daily work, which goes beyond observing students' behavior. It involves delving into feelings, understanding what behaviors mean, comprehending them, and creating an atmosphere of dialogue, understanding, and active listening.

According to Heredia & Sánchez (2020), a teacher must possess an education that enables them to create a positive learning environment that promotes students' acquisition of knowledge. This way, the educational environment becomes a more positive reflection of society. Moreover, they should encourage an appropriate school atmosphere, which is linked to physical and psychological development that fosters optimal learning, reduces disruptive behaviors, and

nurtures the formation of good groups and empathy.

On the other hand, Bulás *et al.* (2020) state that when these basic emotional competencies are developed, it becomes easier to build others such as autonomy, commitment, and critical thinking. When a teacher is skilled in emotional teaching, students enjoy school more, build their self-esteem easily, become more creative, and recognize the humanity in each student. All of this reduces discipline problems and creates a less hostile school environment.

Recently, teachers have become aware of the impact that students' emotions have. However, very few educational institutions have aligned their content and academic goals with emotional intelligence. In this regard, Ávila (2019) suggests that there is shared responsibility for the socio-emotional development of students in the educational process. This begins with the harmony that should exist within the family, as it is the emotional model that forms the student's initial environment for socialization and emotional education. The second is the academic environment, where, with the support of laws, strategies, and resources, teachers must promote emotional intelligence in the classroom.

On another note, Coll (2017) explains that people's learning consists of the reception, assimilation, and accommodation of knowledge. Similarly, Kolb (2014) notes that learning is observed when individuals acquire or modify skills, knowledge, and behaviors due to lived experiences. Therefore, learning is the process of constructing experience and adapting it to new situations. Learning is part of personal development and is most effective when the individual is motivated, willing to learn, and puts in effort. For this, they have to pay attention, use their memory, and employ logical reasoning.

In this context, Ojeda (2022) points out that for effective learning to occur, the following conditions are necessary: methods, procedures, strategies, resources, motivation, will, and appropriate time management. Therefore, teachers must possess emotional intelligence and manage students' emotions effectively, as various consequences can arise, such as social issues like bad moods, isolation, withdrawal, dissatisfaction, and dependence.

The study was conducted at the University of Zulia, involving students and teachers from the biology education program. The aim was to analyze the emotional intelligence of teachers for the biology learning of university students at the University of Zulia. As previous studies indicate, it is necessary for teachers to have developed components of emotional intelligence (self-motivation, self-regulation, motivation, empathy, and social skills) to effectively conduct their classes and enable students to achieve lasting, useful, applicable, and transferable learning outcomes.

According to Escolano (2018), the development of emotional intelligence is in the hands of everyone and depends on the conditions individuals experience throughout their lives. Childhood is a crucial stage where these capacities are developed. Learning them is essential as they allow understanding how to interact with the people around us. Humans need to develop emotionally

and intellectually throughout their lives to progress both cognitively and personally.

Components of Emotional Intelligence

Goleman states that the components of emotional intelligence include: (*a) Emotional self-awareness*, which refers to individuals' ability to identify, recognize, and understand their own emotions. *(b) Emotional self-regulation*, the capacity to control and manage emotions and reactions. *(c) Motivation*, the ability to self-motivate and motivate others, setting and working toward goals. *(d) Empathy,* the capacity to understand and comprehend others' emotions. e) Social skills, enabling effective interaction and communication with others, fostering healthy interpersonal relationships and collaboration within teams.

Student Learning

Learning involves the assimilation of knowledge and behavioral change; it's a shared task between teachers and students. To achieve this, Acosta & Barrios (2023) emphasize the need for teachers to fulfill their role as agents of capacity development through innovative strategies. They should recognize the students' role in learning and choose methodologies that enable students to acquire knowledge.

Arhuiri (2021) emphasizes that students must be aware of and committed to their own learning. Adequate guidance can lead them to reflect on their learning. Therefore, achieving academic excellence requires the commitment of both teachers and students. This involves proper planning, execution, control, and monitoring of the learning process, as well as clear evaluation criteria that students are aware of.

Learning Styles

There are various learning styles, each describing how students acquire knowledge differently. For the purposes of this study, the learning style according to the modulating agent proposed by Kolb (2014) was selected. Kolb suggests that learning style is influenced by genetics, life experiences, and social situations. Information can be received and absorbed in concrete, creative, abstract, or adaptive ways. These styles are classified as: *(a) Convergent learning:* This occurs when a person perceives information concretely and is capable of finding practical solutions. They can synthesize knowledge graphically and easily create diagrams, plans, maps, others.

(b) Divergent learning: These individuals offer multiple solutions to various situations due to their creativity. They tend to generate innovative ideas and are often artists, designers, creators, and inventors. *(c) Assimilative learning:* People with this style excel in abstract knowledge and are more inclined towards research, programming, and engineering. *(d) Accommodative learning:* This style is characterized by adaptability to different situations, a strong desire to interact socially, and leadership qualities. Individuals with this style are good speakers and presenters.

Methodology

During the course of the research, it is necessary to determine which paradigm is suitable to be used as guidance during the study's development. This is why Hernández & Mendoza (2018) point out that without a clear understanding of the models that guide the researcher's approach in the study, scientific research cannot be conducted. In this context, the method used was positivist, as described by Arias (2016), which deals with the existence of a specific way to comprehend the investigated fact or phenomenon, thus proposing the use of this technique as authenticity of knowledge.

Furthermore, the type of research conducted in the study was descriptive. According to Palella & Martins (2017), it aims to understand certain phenomena through systemic criteria that allow observation of behavior. Similarly, this type of study does not involve testing hypotheses, but rather describes the subject in terms of predefined judgments. They also indicate that it is a mechanism aimed at obtaining information about the situation of the phenomenon under study.

On the other hand, the study was non-experimental. According to Hernández and Mendoza (2018), its purpose is to investigate the values of events. This means that the study's objective is to analyze the state of a variable, individual, or entity in order to provide a description. Similarly, it was cross-sectional, as a specific scenario was chosen for data collection: the Faculty of Humanities and Education at the University of Zulia.

According to Sabino (2014), the population is a group of subjects that constitute all individuals in a study. Due to its small size, a population census was conducted where all individuals participated in the research. It consisted of 5 teachers and 38 students, the latter from the following semesters: 18 from the sixth, 13 from the seventh, and 7 from the eighth. They were selected because of their advanced academic training and their ability to provide a more objective judgment.

For data collection, the technique used was a survey, as described by Suárez *et al.* (2022). It involves a set of questions applied to the individuals who participated in the research, in this case, teachers and biology students from the University of Zulia. Based on this, the tool for data collection was a questionnaire, defined by Arias (2016) as a document consisting of well-formulated, organized, and related questions related to indicators, dimensions, and variables.

To gather information, the instrument employed was a questionnaire, which was approved by six experts in education and methodology before its use. Its reliability was 0.964. It was transcribed into a digital questionnaire version using "Google Forms," where questions were organized for each indicator that composed the study's variables. The digital link was sent via email and WhatsApp to the respondents. Once the information was collected, it was analyzed using Excel. The data were subsequently classified and grouped for interpretation and discussion with the selected theories.

The instrument contained 4 variations due to the type of questions in the questionnaire. In other

words, the criteria for choosing the scale correspond to each subject's direction. The response options were (4) Always; (3) Almost always; (2) Almost never; (1) Never. In this study, only 4 alternatives were considered. This, according to Hernández *et al.* (2014), is done with the purpose of "committing the subject or forcing them to pronounce themselves favorably or unfavorably" (p. 244).

Similarly, a scale, as indicated by Hernández & Mendoza (2018), was developed to display a set of categories allowing the evaluation of variables, dimensions, and indicators, with the aim of facilitating the interpretation of the data that can be found. Furthermore, the process of analyzing the information enables the quantitative evaluation of the survey's outcome through the classification and tabulation of data for the subsequent formulation and interpretation of the process.

Table 1. *Criteria for interpreting responses.*

Variables	Values	Options	Quntitative value	Categories
Emotional intelligence of teachers and biology learning of studentsInteligencia emocional de los docentes y aprendizaje de la biología de los estudiantes.	Positive	Always	4	Efficient
		Almost always	3	Not very efficient
	Negative	Almost never	2	Inefficient
		Never	1	Very inefficient

Source: Self-made (2023).

Results

In the following tables presented below, the results of the variables and dimensions are expressed in frequencies, percentages, and the interpretation of the scale.

Table 2. *Components of emotional intelligence.*

Indicadores	Opcions	Always		Almost always		Almost never		Never		Total		Categories	
	Subjetcs	Stu.	Teac.	Stu.	Teac.	Stu.	Teac.	Stu	Teac.	Stu.	Teac.	Stu..	Teac.
Self-awareness	Fa	3	3	19	1	13	1	3	0	38	5	Not very efficient	Efficient
	%	7,9	60,0	50,0	20,0	34,2	20,0	7,9	0	100	100		
Self-regulation	Fa	4	1	18	3	14	1	2	0	38	5		Not very efficient
	%	10,5	20,0	47,4	60,0	36,9	20,0	5,2	0	100	100		
Motivation	Fa	11	1	14	2	10	1	3	1	38	5		
	%	28,9	20,0	36,9	40,0	26,3	20,0	7,9	20,0	100	100		
Empathy	Fa	10	2	17	1	8	1	3	1	38	5		Efficient
	%	26,3	40,0	44,7	20,0	21,1	20,0	7,9	20,0	100	100		
Social skills	Fa	9	2	21	1	7	1	1	1	38	5		
	%	23,7	40,0	55,3	20,0	28,4	20,0	2,6	20,0	100	100		

Source: Self-made (2023).

In Table 2, the results of the "components of emotional intelligence" dimension are shown. Regarding the "self-awareness" indicator, 50% of biology education students expressed that teachers almost always know how to identify, recognize, and understand their own emotions and those of others; placing these results in the category of low efficiency. On the other hand, biology teachers, at 60%, claim that they always know how to interpret their emotions and those of other individuals; placing themselves in the efficient category.

For the "self-regulation" indicator, 47.4% of students expressed that teachers are almost always capable of controlling and regulating emotions and reactions; placing these results in the category of low efficiency. In the case of teachers, 60% stated that they almost always regulate emotions and reactions due to various situations they face in their academic practice and daily life; placing themselves in the category of low efficiency.

In the "motivation" indicator, students, at 36.9%, state that teachers almost always, despite the circumstances they live in, are motivated, guide students, set goals, and work to achieve them; placing these results in the category of low efficiency. On the other hand, teachers, at 40%, expressed that they almost always have motivation and set goals for their personal and professional lives; placing these results in the category of low efficiency.

In the "empathy" indicator, students, at 44.7%, point out that teachers almost always have the ability to understand the emotions of others; placing these results in the category of low efficiency. Whereas teachers, at 40%, express that they always have the ability to identify and understand people's emotions; placing these results in the efficient category.

Regarding "social skills," students express that 44.7% of teachers almost always relate and communicate effectively with others, establish healthy interpersonal relationships, and work in teams; placing these results in the category of low efficiency. However, teachers, at 40%, affirm that they always establish communication with their colleagues and students; placing these results in the efficient option.

Table 3. *Learning styles according to the modulating agent.*

Indicators	Options	Always		Almost always		Almost never		Never		Total		Categories	
	Subjetcs	Stu.	Teac.	Stu.	Teac.	Stu.	Teac.	Stu.	Teac.	Stu.	Teac.	Stu.	Teac.
Convergent learning	Fa	5	1	20	2	10	1	3	1	38	5	Not very efficient	Not very efficient
	%	13,2	20,0	52,6	40,0	26,3	20,0	7,9	20,0	100	100		
Divergent learning	Fa	14	1	19	3	3	1	2	0	38	5	Not very efficient	Not very efficient
	%	36,9	20,0	50,0	60,0	7,9	20,0	5,2	0	100	100		
Assimilative learning	Fa	15	1	13	2	7	1	3	1	38	5	Efficient	Not very efficient
	%	39,5	39,5	20,0	34,2	40,0	20,0	7,9	20,0	100	100		
Accommodative learning	Fa	9	9	1	18	2	1	2	1	38	5	Not very efficient	Not very efficient
	%	23,7	20,0	47,4	40,0	23,7	20,0	5,2	20,0	100	100		

Source: Self-made (2023).

Table 3 displays the results of the "learning styles" dimension according to the modulating agent. For the "convergent learning" indicator, biology education students, at 56.2%, express that they almost always perceive information in a concrete manner and are capable of finding practical solutions to their problems; placing these results in the category of low efficiency. On the other hand, biology teachers, at 40%, indicate that almost always students receive accurate information and seek solutions to the situations they encounter; placing these results in the category of low efficiency.

Regarding the "divergent learning" indicator, 50% of the students indicate that they almost always offer multiple solutions to problems, show creativity, and generate innovative ideas; placing these results in the category of low efficiency. Teachers, at 60%, agree with the students that they almost always seek to solve difficulties, are creative, and innovative; placing these results in the option of low efficiency.

In the case of the "assimilative learning" indicator, 39.5% of students mention that they always have the capacity for abstract knowledge and excel in research; placing these results in the efficient category. Whereas teachers, at 40%, indicate that students almost always develop this type of learning; placing the results in the option of low efficiency.

In relation to the "accommodative learning" indicator, 47.4% of biology education students indicate that they are almost always capable of quickly adapting to different situations, leading, and socially interacting; placing these results in the option of low efficiency. Biology teachers, at 40%, indicate that almost always students have the ability to communicate easily with their peers; placing these results in the option of low efficiency.

Discussion of results

To establish a theoretical framework that provides an explanation for the study's phenomenon, it is relevant to begin with Goleman's conception of emotional intelligence. He defines it as the ability to perceive, understand, and regulate one's own emotions, as well as to understand and successfully relate to others. This capacity aids in making well-informed decisions, managing stress and interpersonal interactions successfully, and achieving personal and professional life goals.

Now, in studying certain indicators of emotional intelligence, which include self-awareness, self-regulation, motivation, empathy, and social skills (these being the components of emotional intelligence), Tacca *et al.* (2020) point out that teachers must have developed these components, which should manifest through the skills they demonstrate in interacting with students and selecting pedagogical mechanisms. This achievement is attainable through assertive decisions regarding strategies and resources implementation.

In this line of thought, concerning the self-awareness indicator, the results indicate a lack of efficiency. This suggests a weakness among teachers, as expressed by Barragán & Trejos (2022),

considering it an essential professional competence that educators should possess. This self-awareness allows them to understand themselves, be conscious of their motivations, needs, thoughts, and feelings, and how these affect behavior and connections with others and the environment.

Regarding the indicator of self-regulation among teachers, the results differ from Gaeta's (2014) description, who refers to this ability as the capacity to manage and control one's own behavior, and to plan and monitor one's learning and professional development. This implies that teachers should be capable of identifying their strengths and weaknesses, setting realistic goals to improve their performance, seeking feedback and support, and adjusting their practices accordingly.

As for teachers' motivation, the indicator showed a weakness. This contradicts Durange's (2022) assertion, as teacher motivation is significant, affecting performance and the quality of education they provide. When a teacher is motivated, committed, and holds a positive attitude towards instruction, students' interest and commitment increase. Moreover, motivation can help teachers be more creative and innovative in their teaching methods and stay updated in their field of study.

According to the results, the empathy indicator exhibited weakness. This contrasts with Pincay *et al.* (2018) statement that empathy is fundamental for educational success and student learning. It implies that teachers should put themselves in students' shoes to understand their feelings, thoughts, and motivations. An empathetic relationship between the teacher and the student promotes meaningful learning and reduces disciplinary problems. Hence, the teacher's empathy is essential for helping students integrate with peers and understand their needs.

Concerning the indicator of social skills, weaknesses were identified, as it was rated as inefficient. This contradicts Huambachano & Huaire's (2018) perspective, emphasizing the importance for teachers to connect with students with kindness, respect, empathy, humility, and trust. Moreover, teachers should possess effective communication skills, utilizing various resources such as oral, written, and body language. These skills are mainly acquired through learning, observation, imitation, experimentation, and information.

In this context, Extremera *et al.* (2020) point out that teachers' social and emotional skills are fundamental for achieving effective teaching objectives. Therefore, emotional inclusion in classrooms should be promoted, recognizing that teachers are perceived as the main role models for students' attitudes, behaviors, feelings, and emotions. Consequently, they should establish a healthy and intimate connection with students, understand their emotional state, teach them self-understanding, and facilitate conciliatory and calm conflict resolution.

On the other hand, Macazana *et al.* (2021) express the necessity for teachers to develop the components of emotional intelligence, as they influence students' behaviors. Therefore, teachers need to recognize emotions that favor concentration, motivation, and all elements contributing

to the assimilation of academic information and enhancing students' mental processes.

According to Hernández & Guárate (2017), as mediators between the subjects they teach and how students acquire that knowledge, teachers should serve as role models. Students spend a significant amount of time in class, making it essential to channel feelings and emotions through a mentor's image. However *et al.* (2017) indicate that for students to develop emotional feelings and skills associated with emotional intelligence, they require a teacher to be their emotional guide.

Similarly, Acosta & Villalba (2022) suggest that as teachers, it's essential not to forget that a significant part of fostering feelings and values occurs with the assistance of parents. Thus, activities with parents should be conducted, enabling them to be models for their children at home. School meetings with parents and children should also be held to discuss and provide a set of recommendations applicable at home.

Regarding the results obtained from the learning style dimension based on the modulating agent, such as convergent, divergent, assimilative, and accommodative learning, these were perceived as inefficient. This indicates weakness, contradicting Kolb's (2014) assertions that learning is constructed from lived experiences and social situations. When combined, students focus on finding efficient solutions to specific problems, particularly situations involving logic and creativity, such as answering multiple-choice questions or solving problems recognizing they have a possible solution.

For the indicator of convergent learning, the results suggest inefficiency. This contradicts the viewpoints of Acevedo *et al.* (2016), who note that this occurs when a person perceives information concretely and can find practical solutions. It centers on acquiring cross-cutting competencies and encourages student participation in their own learning. It seeks to integrate different disciplines and approaches to solve complex problems, fostering critical thinking, problem-solving, and collaboration. Therefore, students need to engage in this type of learning to acquire necessary skills for their academic formation.

Concerning the indicator of divergent learning, the survey respondents indicated weakness. Silva (2018) states that this approach focuses on developing critical, creative, and flexible thinking skills, fostering inquiry, ingenuity, and generating multiple solutions instead of seeking a correct answer. This educational approach is designed to empower students and prepare them for real-world challenges.

For the indicator of assimilative learning, the results show weakness, differing from Rodríguez's (2020) description. According to him, this style involves integrating new information into pre-existing mental schemes that allow individuals to build knowledge and understanding of the surrounding world. In this sense, Blanco & Acosta (2023) note that it is an active process in which individuals attempt to relate, argue, and comprehend new information, also allowing them to engage in research.

Finally, concerning the accommodative learning indicator, the results differ from the viewpoint of Tripodoro & De Simone (2015), as this style is characterized by active experimentation and practical tasks. Therefore, individuals tend to learn best when engaged in real-world situations, facing challenges, and directly solving problems. It's an adaptive style characterized by the ability to quickly adapt to new situations and make rapid decisions based on practical experience. Essential for learning biology and highly effective in fast-paced situations requiring swift reactions.

According to Kolb, learning is fundamental as it enables individuals to adapt, improve, and make effective decisions based on past experiences. It also allows them to face new challenges, optimize behavior, and achieve the best outcomes in various environments and situations. The importance of learning style lies in helping individuals understand how they learn best, so they can adapt their style or way of acquiring knowledge. Furthermore, Kolb's model has been used in education to enhance teaching and learning, and to assist individuals in being more productive and effective team members.

Conclusions

Once the results have been analyzed, it can be indicated that, according to what the students expressed, it was evident that almost never do the professors in the Education in Biology program at the University of Zulia exhibit the components of emotional intelligence, placing these findings in the category of low efficiency. In the case of the teachers, they point out that they efficiently demonstrate the indicators of self-awareness, empathy, and social skills, but self-regulation and motivation are not very efficient. These results indicate a weakness in the teachers in this dimension; perhaps this is due to the social, economic, and political factors that teachers currently experience.

Regarding the case of learning according to the modulating agent, the results presented by the Education in Biology students indicate that they almost never acquire knowledge. They attribute this to the possibility that teachers may not properly employ the components of emotional intelligence and methodologies so that students can apply learning strategies appropriately, placing these results in the category of low efficiency. On their part, the teachers express that students rarely apply learning styles in their classes, placing these results in the category of low efficiency as well. They also show concern, as this has an impact on their professional development.

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