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Artículos científicos

Relación entre el desempeño del docente de matemáticas y el rendimiento académico: caso de estudio de un colegio militarizado

Relationship Between Math Teacher Performance and Academic Performance: Case Study of a Militarized College

Relação entre desempenho do professor de matemática e desempenho acadêmico: estudo de caso de uma escola militarizada

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Resumen

El objetivo de la presente investigación fue señalar la asociación que existe entre el constructo "Desempeño docente de matemáticas" y la variable "Rendimiento académico en matemáticas" con el factor "Aspectos positivos del estudiante", caracterizado por la perseverancia, la resiliencia y el reconocimiento de la disciplina, en el Colegio de Bachilleres Militarizado General Mariano Escobedo del Estado de Nuevo León. El estudio fue transversal, no experimental, descriptivo y correlacional, con una prueba estandarizada aplicada de manera censal a 484 alumnos de cuarto, quinto y sexto semestre de los planteles Apodaca, San Bernabé y San Nicolás. Se corrió una técnica de regresión lineal múltiple entre el constructo y la variable exógenos y el factor latente. Se propuso un modelo teórico que refleja las variables comprendidas en los factores y un modelo empírico que muestra la relación entre estos. Los resultados arrojaron que existe asociación del trabajo que los profesores de matemáticas llevan a cabo en el aula y las calificaciones de los alumnos en esta materia con ciertas características personales de los bachilleres como la perseverancia, la resiliencia y el reconocimiento de la disciplina. En conclusión, se sugiere el uso de ejercicios y tareas en matemáticas que ayuden a memorizar conceptos y procedimientos, así como a aplicar los conocimientos adquiridos en clase a problemas o situaciones, para estimular así los aspectos positivos de los estudiantes.

Palabras clave: disciplina, docente de matemáticas, perseverancia, rendimiento académico, resiliencia.

Abstract

The purpose of this investigation was to point out the association between the construct "Math teaching performance" and the variable "Math academic performance" with the factor "Student positive aspects", characterized by perseverance, resilience and recognition of discipline, in the Colegio de Bachilleres Militarizado General Mariano Escobedo del Estado de Nuevo León. The study was cross-sectional, non-experimental, descriptive and correlational, with a standardized test census applied to 484 fourth, fifth and sixth grade students from Apodaca, San Bernabé and San Nicolás units. A multiple linear regression technique was run with the independents construct and variable and the dependent factor. A theoretical model that reflects the variables included in the factors was proposed. The results showed that there is an association between the work that the math teacher carries out in the

classroom and the levels of certain students' personal characteristics such as perseverance, resilience and discipline recognition. Therefore, an empirical model is exposed. In conclusion, the use of exercises and tasks in math that help students to memorize concepts and procedures as well as apply the knowledge acquired in class to solved problems or situations is suggested to stimulate study positive personal aspects.

Keywords: discipline, math teacher, perseverance, academic achievement, resilience.

Resumo

O objetivo desta pesquisa foi apontar a associação que existe entre o construto "Desempenho no ensino de matemática" e a variável "Desempenho acadêmico em matemática" com o fator "Aspectos positivos do aluno", caracterizado pela perseverança, resiliência e reconhecimento dos disciplina, no Colégio Militar General Mariano Escobedo do Estado de Nuevo León. O estudo foi transversal, não experimental, descritivo e correlacional, com teste padronizado aplicado de forma censitária a 484 alunos do quarto, quinto e sexto semestres das escolas Apodaca, San Bernabé e San Nicolás. Uma técnica de regressão linear múltipla foi executada entre a variável exógena e o construto e o fator latente. Foi proposto um modelo teórico que reflete as variáveis incluídas nos fatores e um modelo empírico que mostra a relação entre eles. Os resultados mostraram que existe uma associação entre o trabalho que os professores de matemática realizam em sala de aula e as notas dos alunos dessa disciplina com determinadas características pessoais dos egressos do ensino médio como perseverança, resiliência e reconhecimento da disciplina. Em conclusão, sugere-se a utilização de exercícios e tarefas de matemática que ajudem a memorizar conceitos e procedimentos, bem como a aplicar os conhecimentos adquiridos nas aulas a problemas ou situações, de forma a estimular os aspectos positivos dos alunos.

Palavras-chave: disciplina, professor de matemática, perseverança, desempenho acadêmico, resiliência.

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Introduction

Although in upper secondary education (EMS) the main mission is for young people to acquire skills to enter a job position or continue their higher education, there is also the objective of developing personal characteristics or aspects necessary to live in a community and face the adult life (Landero, 2012, p. 18). To measure the achievement of this purpose, it is necessary to determine both the knowledge, skills and values as well as the attitudes and singularities necessary for the competitiveness of the person (Martínez, Guevara & Valles, 2016, p. 124). The expected result, beyond accrediting the level, will be the formation of a citizen ready to coexist assertively in their environment using, and in turn enriching, those skills acquired, including certain personal aspects developed during their stay in high school (Carlos, 2016, p. 288; Jaik and Barraza, 2011, p. 222).

Consequently, educational institutions are obliged to plan and implement pedagogical strategies to achieve this end (Peña and Vera, 2014, p. 251; Sesento and Lucio, 2017, p. 34; Silas, 2008, p. 3; Smitter, 2008 , p. 2). The learning of young people and those beneficial individual particularities include understanding information, using knowledge, adapting to the changing environment (Salazar, Peña and Medina, 2018, p. 38) and behaving under established and appropriate norms (Fernández, 2014, p. 2). However, adolescents arrive at high school with deficiencies in both their cognitive and social-emotional skills (Tuirán, 2017, p. 13). However that may be, what is relevant is that they develop these during their preparatory stay, where daily school action stimulates knowledge and affects confidence, motivation (Gómez, 2010, p. 232), effective social participation and positive behaviors of young people (Encinas, Peralta, Cuevas and Anseldo, 2017, p. 2).

With regard to teachers, specifically those of mathematics, their performance is a key element to achieve the purposes outlined in the EMS. They carry out their work by sharing experiences and applying exercises and tasks in order for students to materialize the expected lessons (Tello and Tello, 2013, p. 89) and improve their skills (Rodríguez, 2011, p. 1) and attitudes (Carlos, 2016, p. 288). Current educational models invite an active and versatile teaching of mathematics with determined and committed actors (Salazar et al., 2018, p. 54). In this line, teachers must promote learning, master the subject and understand the different ways in which students capture the content (Martínez, 2018), without forgetting that the latter must direct their own teaching and behaviors. Thus, achieving the goals of the EMS is the responsibility of all the actors involved in the school context.

Finally, among the challenges that EMS has is the low academic performance in mathematics (Rodríguez, 2011, p. 1), as well as deficiencies in human training, mainly in the management of emotions, creation of study habits, leadership and values (Gómez and Vázquez, 2014, p. 3). Tests such as the National Plan for the Evaluation of Learning (Plan) have the purpose of knowing the status of the acquisition of key knowledge in the fields of numerical and linguistic skills (National Institute for the Evaluation of Education [INEE], 2017, p. 2). Undoubtedly, the results in this type of evaluations are given both by internal and external factors, including in the first personal aspects of the students (Gaxiola, González & Contreras, 2011, p. 166). Students who score well have the potential for greater prosperity because they sharpen their knowledge, and these, in turn, amplify those personal behaviors that lead to success.

For the purposes of this study, the performance of the mathematics teacher includes the application of exercises and tasks that help to memorize and apply the concepts, procedures and knowledge acquired. Then, the academic performance in mathematics is the result of the Planea-type standardized diagnostic test applied by the Nuevo León Council for Strategic Planning and which measures the numerical abilities of the students. Finally, the determining elements for the positive aspects of the students include perseverance, resilience and recognition of the discipline, the latter being an important property in militarized educational institutions, where the present work was carried out.

Therefore, the research question is: in what way are the performance of mathematics teachers and the results of the assessments in this subject associated with personal characteristics of the students such as perseverance, resilience and trust in the leader? The objective was to associate the construct and the exogenous variable conceptualized as "Mathematics teacher performance" and "Mathematics academic performance", respectively, with the factor "Positive aspects of the student". The proposed hypothesis was that the higher the mathematics teacher performance and the higher the mathematics academic performance, the greater the development of positive aspects of the student.

This article is divided into four parts. First, a theoretical framework is detailed on the teaching strategies and tools used by mathematics teachers, the results obtained in the evaluations of this learning unit and the perseverance, resilience and recognition of the discipline as positive aspects of the students of mathematics. EMS. Second, the context where the study was carried out is described, as well as the research methodology, the instruments, standardized tests and the databases used. Then, the results are detailed and the proposed

theoretical and empirical models are discussed. Finally, it is concluded, future lines of research are revealed and recommendations are proposed for mathematics teachers and EMS directors that contribute to forming positive aspects, or characteristics, in high school graduates.

Theoretical framework

Performance of the mathematics teacher in the EMS

The academic performance of students is a direct function of the teacher's actions in the classroom (Lara, Aguilar, Cerpa and Núñez, 2009, p. 1; Padilla and Villafuerte, 2018, p. 15), which stimulates the development of cognitive skills and socio-emotional in the student (Tuirán, 2017, p. 14). Originating a better understanding of abstract entities, favoring logical reasoning and fostering positive emotions towards numbers and geometric figures in general is one of the main tasks of mathematics teachers (Gómez, 2010, p. 228).

Competitive teachers, including those in mathematics, favor students' self-knowledge, inject into them desires for improvement and expectations for their academic, professional and human growth, guide healthy social practices (Ministry of Public Education [SEP], October 29 2008), have teaching skills, as well as mastery of study plans and programs (Dolores and García, 2016, p. 72), use various teaching materials (SEP, 2015, p. 8) and support students students at all times (Santana, Marchena, Martín and Alemán, 2018, p. 367).

The objectives to be achieved in mathematics are related to the students being able to carry out numerical operations, identify their hierarchies, handle the language of algebra, use linear equations, among others, that allow them to solve challenges and situations in daily life (SEP, 2019, p. 6); also, estimate the behavior of variables, interpret mathematical symbols and experiment the dimensions of space and the physical characteristics of objects (Martínez y Camarena, 2015, p. 194).

Those mathematics teachers who seek quality in their professional work are in continuous preparation, build adequate teaching environments, plan the course and their daily classes, bring classroom knowledge to daily life, seek to meet and satisfy academic needs, and sometimes those of a personal nature, of the students; They are an example of discipline, perseverance and improvement (Martínez et al., 2016, p. 127); they articulate previous content and between subjects, they have vast didactic material and they apply various assessment tools; they invite the participation and construction of knowledge together, grant

rewards and motivate to get up from academic failures (Tello and Tello, 2013, p. 89); they promote interest in mathematics and are able to share their experiences in this field (Artavia, 2005, p. 3; Covarrubias and Piña, 2004, p. 64); They employ strategies so that the teaching of mathematics is accessible to all (Carlos, 2016, p. 305), they adapt to the different behavioral and cognitive characteristics of young people, as well as their socio-cultural environments (Camberos, Lechuga & Salinas, 2014 , p. 11), align the contents with the needs of the students, in addition to promoting coexistence (Working Group "Research on early school leaving", 2013, p. 13); they pose situations that generate conflict of values and stimulate criticism and creativity in order to generate valuable experiences (Jaik and Barraza, 2011, p. 228); They reflect on the problems of mathematics teaching and propose and apply solution measures (Aké, Martínez and López, 2018, p. 129) and are flexible in their dynamics (Rodríguez, 2011, p. 4).

Teachers, particularly mathematics teachers, often represent a positive academic challenge for high school graduates, as they awaken the desire for effort and perseverance. Also, they are a source of inspiration to get up from mathematical failures and continue facing the course (Silas, 2008, p. 14), they invite the construction and application of knowledge without fear of error (Morales, 2017, p. 37), they give great importance to achievements and transmit it in the classroom (Hernández and Ceniceros, 2018, p. 174), they are emotional champions of their students (Venet and Díaz, 2018, p. 5), they incite to increase both the will and the Self-learning and self-regulation, provide ideas and professional and personal experiences that prepare young people for life and their contexts (Peña, Andrade and Aké, 2018, p. 99; Roux and Anzules, 2015, p. 3), are the driving force of motivation and intellectual challenge (Barojas and Ramírez, 2015, p. 71), are dedicated to their students and monitor their progress and if these do not occur, they stop to explain them again (Morales, 2018, p. 80), they foster habits study to be implemented in class, at home and beyond the classroom (Sesento and Luci o, 2017, p. 32), arouse interest in studying (López, García and Díaz, 2018, p. 92), make the complex simple, promote pleasant spaces, support and empathize with students and put their training first (Vidal and Márquez, 2016 , p. 103), invite participation (Cerda, Salazar, Guzmán & Narváez, 2018, p. 265), are accessible both in class and outside of it (Basto, 2017, p. 2), are highly available and are clear in the academic instructions that revolve (Barragán, Aguilar, Cerpa and Núñez, 2009, p. 4), as well as in the advice they share (Covarrubias y Piña, 2004, p. 64).

On the other hand, factors related to teacher-student affect, such as attitudes and emotions, are associated with higher academic performance in mathematics, while lower averages in said learning unit demotivate students (Escobar, 2015, p. . 6; García, 2009, p. 6; Hernández, Rivera and Garza, 2017, p. 7), generate the desire to drop out and lower their expectations in life (Becerra and Reidl, 2015, p. 82; Ricoy and Couto,. 2018, p. 70). Beyond numerical skills, the teacher's work in the classroom favors the practice of tolerance, temper, discernment, stability and mastery of emotions through the practice of mathematics (Rivera, Figueroa & Edel, 2013, p. 31) , high school students tend to agree that their mathematics teachers pressure them to obtain better results (Tapia, Tamez and Tovar, 1994, p. 116) and print greater effort (Barrales, Gómez and Guerrero, 2015, p. 884).

The understanding and correct application of mathematics promotes the productive life of societies, it is a key piece in innovation and technological development, in addition to giving people greater chances of success, since they contribute to forming an edifying, responsible and individual individual. reflective (Martínez et al., 2017, p. 43). The handling of mathematics stimulates teamwork, promotes the habit of being evaluated (Martínez and Camarena, 2015, p. 192), continuous training and contributes to the development of behaviors such as perseverance and resilience (Tuirán and Hernández, 1 de November 2015, p. 8), as well as general culture (Lara et al., 2009, p. 11) and builds habits of academic survival that are transferred to extra-class activities and the work environment.

Thus, for the present research, mathematics teaching performance is defined as the exercise of the teacher who imparts this learning unit and who, through the chair and the application of tasks and exercises, affects the students to apply the knowledge and solve various problems or situations.

Academic performance in mathematics at EMS

Academic performance is the consequence of what has been learned according to the assessment made by the teacher through exams, homework, group work and other activities such as attending classes (Chilca, 2017, p. 18; Saucedo, Herrera, Díaz, Bautista y Salinas, 2014, p. 88); it refers to the certification of the competencies of those students who successfully completed their studies; it is the process of acquiring knowledge, skills, attitudes and values to adapt and interact with the environment (Becerra and Reidl, 2015, p. 81); locates the effectiveness, academic self-regulation of the student and the teacher's work and is expressed through the average or grades (Roux and Anzures, 2015, p. 4); measures what

has been learned and the skills that must be counted upon reaching adulthood (SEP, September 26, 2018, p. 10); includes the quantification of their aspirations and interests (Saucedo et al., 2014, p. 6). With regard to the mathematics learning unit, performance refers to the student's ability to solve real-life problems by applying mathematical knowledge; The student develops skills such as developing numerical problems, applying proportionalities, the use of algebraic language, obtaining products of expressions, calculating the perimeter and areas of figures, among others (SEP, 2019, p. 2). Academic performance is the most used indicator to identify the knowledge of high school graduates, as well as their efforts and capacities in this discipline (Gaxiola et al., 2011, p. 53).

Measuring math knowledge and skills in EMS youth has been a concern for years around the world. Standardized tests reproduce what is understood in school content and check whether students are capable of applying what they have learned in various life circumstances as a committed and reflective individual (Martínez et al., 2017, p. 7). Mathematical evaluations, which are the most disapproving (Vidales, 2009, p. 329), aim to identify mathematical thinking, problem-solving skills, attitudes towards numbers, and acquired values (Flores and Gómez, 2009 , p. 123) and the challenges they have to learn, which do not necessarily have to do with cognitive or pedagogical factors. In the application of evaluations of this subject, the participation of students, teachers, parents and administrative personnel is recommended. (Dolores y García, 2016, p. 34).

Students with sufficient academic performance in mathematics have developed study habits (Sesento and Lucio, 2017, p. 32), their own learning strategies, positive attitudes towards knowledge (Padilla and Villafuerte, 2018, p. 18), greater aspirations , his personality (Martínez-Otero, 2009, p. 17), his maturity, responsibility to face personal problems (Dzay and Narváez, 2012, p. 29), his motivation (Sánchez, Téllez, Sánchez and Reyes, 2017, p. . 3), ambitions (Ortega, Macías & Hernández, 2014, p. 35), the ability to face life's challenges, their degree of adaptability (Corzo, 2016, p. 10), their affectivity and perseverance (Ricoy and Couto, 2018, p. 74).

Instruments such as the Program for International Student Assessment (PISA) locate students' competencies to apply what they have learned in this discipline in practical life (Barojas and Ramírez, 2015, p. 72). Also, they place socio-emotional characteristics such as persistence, stress management, empathy and decision making (Hernández and Backhoff, 2017, p. 25). Determines the status of EMS students in the use and interpretation of numbers, algebraic thinking and handling of spaces, shapes, measurements and information. The

obtained marks can be positioned in four levels: in the first, the students have challenges to carry out operations with fractions or variables; in the second, they perform calculations with percentages; in the third, the application of the language of mathematics allows them to do problems with unknowns; and in the fourth, students solve problems of mathematical content seen up to the last grade of high school. In Mexico, 66.2% of students fail to pass level I and 23.3% reach level II (INEE, 2017, p. 6).

Among the challenges that the evaluation of mathematics has are the change of the learning culture, teaching not only for evaluations but to resolve personal and professional conflicts, multiple objectives set in learning that have diverted the focus from main purposes of the preparation for life, the forms of grading that are not aligned with pedagogical principles and the applications of individual exams when in practice there are possibilities of working in a team and using information technologies (Santiago, McGregor, Nusche, Ravelo and Toledo, 2012, p. 133). In addition, the student's assessment must yield data that allow normalizing the real level of knowledge and thus design suitable environments according to levels and ages, motivate creativity, associate the impact that learning has on the intellectual and socio-emotional capacities of boys, eradicate fear of failure, linking learning with community needs and promoting self-learning.

Therefore, the academic performance in mathematics is the result obtained in the numerical abilities of the standardized test type Plan applied by the Nuevo León Council for Strategic Planning and that reflects the mathematical competencies of the students of the Colegio de Bachilleres Militarizado General Mariano Escobedo of the State of Nuevo León (CBMNL).

Positive aspects of EMS students

The mission of the EMS is to transmit knowledge, as well as to perfect the personality of the students (Sesento and Lucio, 2017, p. 34). Current educational models put students at the center so that they themselves are the protagonists in the development of learning and socio-emotional skills (Salazar et al., 2018, p. 69). In addition, they favor the evolution of positive values and attitudes, as well as innovation, permanence and academic elasticity (El Sahili, 2011, p. 36); promote the establishment of personal and professional career plans, assertiveness, leadership (Gómez and Vázquez, 2014, p. 3) and invite schools to be a space to strengthen sensitive security, increase trust (Castro and Morales, 2015, p. 13), awakening

adaptability (Campos, Castaño & Valencia, 2013, p. 44) and mastery and development of emotions (Escobar, 2015, p. 67; Rivera et al., 2013, p. 123).

There is a correlation between mathematical reasoning and the intensity of certain personal qualities such as mood, commitment, satisfaction, resilience, perseverance, discipline (Gómez, 2010, p. 229), responsibility, degree of adjustment to the environment and ability to acquire and use cognitive strategies (Salazar et al., 2018, p. 41). Personal characteristics are behaviors with respect to activities to be developed and social values that affect coexistence (Flores and Gómez, 2009, p. 127); it is the socio-emotional formation that will determine decision-making and the way in which individual challenges will be faced (Hernández and Backhoff, 2017, p. 25). Academic performance affects the aspects of the aforementioned students (Corzo, 2016, p. 100; Landero, 2012, p. 7; Tuirán and Hernández, November 1, 2015), including performance in mathematics (Ricoy and Couto, 2018 , p. 70), so that resilience, perseverance and lack of assertiveness in leadership are affected (Salvà, Oliver y Comas, 2014, p. 73).

First, resilience, in the academic context, is overcoming risks, taking intellectual advantage of them and seeking to turn them into positive aspects (Gaxiola et al., 2011, p. 165); it is emotional recovery from school misadventures that cause anger or stress (Alonso, Beltrán, Méfara & Gaytán, 2016, p. 42); It is the emotional adjustment of the student in the face of disturbing or unfavorable situations and where the illustration is decisive for their good management (Campuzano and Libien, 2019, p. 2); refers to the abilities of the student who is in some type of social vulnerability to face misfortunes (García and Klein, 2014, p. 11; Lagos and Osse, 2010, p. 38). It includes mastery of attitudes (Monroy, Jiménez, Ortega & Chávez, 2013), leaving strengthened with high expectations, which causes a virtuous circle because it reduces disapproval and school dropout (Silas, 2008, p. 4), and ways to react to adversity and unpleasant experiences (Arguedas and Jiménez, 2007, p. 11). Resilience is a key element to obtain academic success (Ruiz, 2013, p. 118; Smulders, 2018, p. 132;) and affects the efficiency of school performance (Hernández and Ceniceros, 2018, p. 174). At the other extreme, academic misadventures include excess homework, strict evaluations, laborious activities, little time available for classes, the degree of difficulty of subjects, and unpleasant academic environments (Barraza and Silerio, 2007, p. 49; Domínguez, Gutiérrez, Llontop, Villalobos and Delva, 2015, p. 36). Therefore, resilience in the academic context, for this article, is conceptualized as the controlled reaction of the student that allows overcoming obstacles that can provoke feelings that affect.

Then, perseverance in the school environment is dedication to academic tasks (Silas, 2008, p. 4); the difference that the student perceives in the benefit invested in academic tasks and the cost of dropping out of school (Landero, 2012, p. 41); practice study habits (Chilca, 2017, p. 72); set goals, work for them (Poy, 2010, p. 161) and achieve them (Lugo, 2013, p. 306); interest, planning, effort, commitment to understanding and mastering the content, feeling that performance is in control and having the motivation to acquire more knowledge (López et al., 2018, p. 92), since it is understood that once learning is achieved, whether it is easy or difficult content, it will lead to a better life (Roux and Anzures, 2015, p. 2) and to optimal performance (Velázquez and González, 2017, p. 123). Therefore, perseverance is considered as the continuous interest in ideas or goals and that is demonstrated by facing the challenges of life and overcoming them.

Finally, the recognition of the discipline can be conceptualized as accepting the instructions of what to do and executing it autonomously while controlling and reflecting on their work (Roux and Anzures, 2015, p. 2). The academic leader is a reference for others: it can be the teacher, a student or even parents. It motivates them to arrive to class on time, to be purposeful, organized, committed, encourages them to be respectful, honest and shared (Mesa, Marcos and Vidales, 2017, p. 59), motivates students to change, makes them more competitive and thus it contributes to achieving the goals set (Álvarez, Torres and Chaparro, 2016, p. 165), sets objectives, tends to influence so that expectations are high and is committed to generating orderly and cooperative climates (Robinsen, Lloyd and Rowe, 2014 , p. 13), guides students towards improving quality through the development of positive aspects of their people and innovation (Sierra, 2016, p. 115), through empathic and assertive relationships they let the members of the team that are important and that by their actions generate value to the school (Reyes, Trejo and Topete, 2017, p. 4) and open the dialogue in class, encourage participation and invite students to reflection (Zapata, 2017, p. 88). Thus, the recognition of discipline is to accept the guidance of some member of the school environment through constant communication.

Method

Study context

The CBMNL is a state public EMS institution that began operations in February 2017. It combines the academic model for competencies used in civilian schools with military discipline. It has an enrollment of 2,171 students in four campuses (GNL, 2019, p. 195), with 40% of the female gender and 60% of the male gender, who attend class from Monday to Friday from 7:00 a.m. to 6:00 p.m. . In addition to their high school classes, the youth receive three hours a day of physical education and militarized instruction and are trained for work as Physical Education Instructors and Warehouse Accounting Assistants (CBMNL, 2019, p. 14).

On the other hand, the Nuevo León Council for Strategic Planning (CONL) was formed in 2014 as a transexenal body based on the Law of Strategic Planning of the State of Nuevo León. Its purpose is to promote the sustainable development of the entity, as well as the well-being of all the people who live in the state. For this, long-term plans and objectives are established that contribute to the planning and evaluation of public policies. It is made up of members of the three powers of the State, the state delegate for Development Programs in Nuevo León, businessmen from Nuevo León, the rectors of the Tecnológico de Monterrey, the Autonomous University of Nuevo León and the University of Monterrey, as well as development experts human, transparency, sustainable development, economic development, security and justice (CONL, 2020a).

In November 2019, the CONL evaluated the CBMNL budget program by applying a standardized Planea test for 484 fourth, fifth and sixth semester students from the Apodaca, San Bernabé and San Nicolás schools. His goal was to locate math and language and communication skills among students. Additionally, they obtained information on the context and socio-emotional skills through a questionnaire that was answered by the students. (CONL, 2020b, p. 32).

Investigation methodology

The present study is cross-sectional, non-experimental, descriptive and correlational. The Comprehensive Evaluation for the Schools of the Colegio de Bachilleres Militarizado de Nuevo León del CONL (2020b) was used as a database. The data was processed in the SPSS 22 software.

The positive aspects of the student were considered as a latent factor and this was measured based on the responses to the context and socio-emotional questionnaire. Likewise, two factors and one variable were established to form the theoretical model proposed in Table 1, while Figure 1 shows the constructs and the description of the variables that comprise them.

In relation to the construction of the factors, "Mathematics teacher performance" and "Positive aspects of the student", the technique used was through reliability statistics, Cronbach's alpha (□). A statistical result greater than or equal to 0.7 was considered significant (George and Mallery, 2003, p. 188), so the variables measure the same construct and are related (Welch and Comer, 1988, p. 83). To consider that the results were statistically significant, a p-value less than 0.05 was established. Likewise, the extraction criterion of the variables with smaller products was applied.

Tabla 1. Modelo teórico conceptual

Constructo	Variable	Pregunta en la encuesta o calificación
Desempeño docente de matemáticas	DDM1	Los maestros de matemáticas dejan ejercicios y tareas que *ayudan a memorizar* conceptos y procedimientos.
	DDM2	Los maestros de matemáticas dejan ejercicios y tareas que *ayudan a aplicar los conocimientos* adquiridos en clase a problemas o situaciones.
Rendimiento académico en matemáticas	RAM	Resultado en matemáticas de la prueba estandarizada tipo Planea aplicada por el CONL.
Aspectos positivos del estudiante	APE1	Alguna vez me obsesioné con una idea o meta por un tiempo corto, pero más tarde perdí el *interés.*
	APE2	Tengo dificultad para mantener mi *atención en metas* que requieren varios meses para ser terminadas.
	APE3	¿Con qué frecuencia pensé que no podía *afrontar todas las cosas* que tenía que hacer en el último mes?
	APE4	Soy una persona que se *enoja cuando me ponen obstáculos* a lo que pretendo hacer.
	APE5	¿Con qué frecuencia *me afectó algo* que me ocurrió inesperadamente en el último mes?
	APE6	¿Con qué frecuencia *me enojé porque las cosas que me ocurrieron estaban fuera de mi control* en el último mes?
	APE7	Frecuentemente tengo *conflictos con el líder* de mi grupo o de mi trabajo.
	APE8	Tengo *dificultades para comunicarme* con mis padres.

Fuente: Elaboración propia con base en el CONL (2020b)

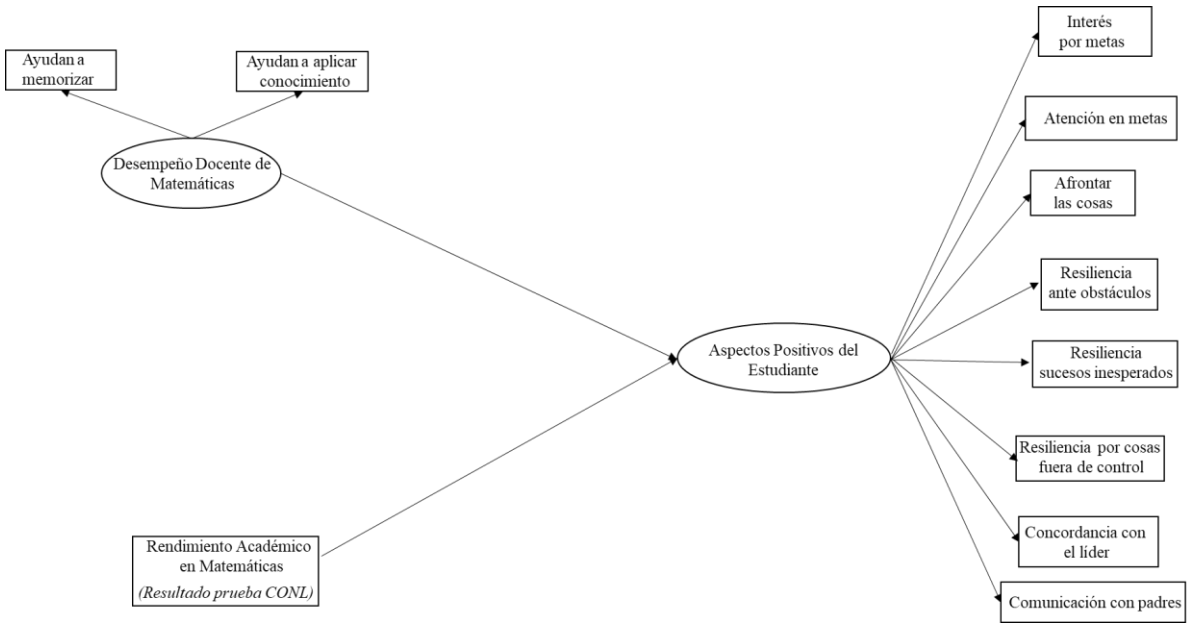
In addition, based on an extensive bibliographic review, a conceptual theoretical model was proposed (figure 1) in which it associates the independent construct and variable and the positive aspects of the student. The independent factor "Mathematics teaching performance" was made up of: a) the student's perception of the degree of application of exercises, by the mathematics teacher, which help to memorize and b) the student's perception of the degree of application of exercises, by the mathematics teacher, who help put into practice the knowledge acquired to problems or situations. A of 0.72 was obtained.

For the dependent factor, “Positive aspects of the student”, the variables included were: a) interest in goals, b) attention to goals, c) facing things, d) resilience to obstacles, e) resilience due to unexpected events, f) resilience due to things out of control, g) agreement with the leader and h) communication with parents. The expressed reliability was good with 0.71.

Finally, regarding the variable “Academic performance in mathematics”, the result of numerical ability in the standardized test applied by the CONL in the CBMNL was taken.

In the conceptual theoretical model, the proposed factors appear within an ellipsis because they are latent, while the variables located inside the rectangles were measured directly (González and Treviño, 2018, p. 115). In the approach of the present study, it is appreciated that both the factor and the variable are directly associated with the positive aspects of the students.

Figura 1. Modelo teórico conceptual



Fuente: Elaboración propia con base en el CONL (2020b)

Results

The application of the standardized evaluation was done in a census manner to 484 students from the CBMNL, 305 for the San Bernabé campus, 130 San Nicolás and 49 in Apodaca; 31.81% for students in the fourth semester, 56.20% in the fifth and 11.99% in the sixth semester (table 2).

Table 3 shows the percentage of students by achievement level in mathematics. 76.3% were at level I, that is, 367 students; 19.1% in level II, which represents 92 young people; 4.2% at level III and 0.4% at level IV. It is observed that 76 out of every 100 students were located at the "insufficient" level of achievement, while the students from the San Nicolás campus showed better results.

Figure 2 shows a comparison of the results for mathematics that were obtained in the Planea test applied in 2017 in the subsystems with state and federal support in Nuevo León. It can be seen that 76.1% of the students from federal subsystems and 79% of students from state subsystems were located in level I; in level II the percentage was 16.1% and 16.7%, respectively. For levels III and IV the federal subsystems registered 5.8% and 2%, while the state subsystems registered 3.5% and 0.9%. Although it is high, the proportion of CBMNL students that is at the "insufficient" level of achievement in mathematics, 76.3%, in just three years of existence, is similar to that registered in Planea 2017 at federal and state campuses.

Tabla 2. Distribución de alumnos del CBMNL por plantel y semestre

	Alumnos			
Plantel	Total	Cuarto	Quinto	Sexto
San Bernabé	305	102	145	58
San Nicolás	130	33	97	0
Apodaca	49	19	30	0
Total	484	154	272	58

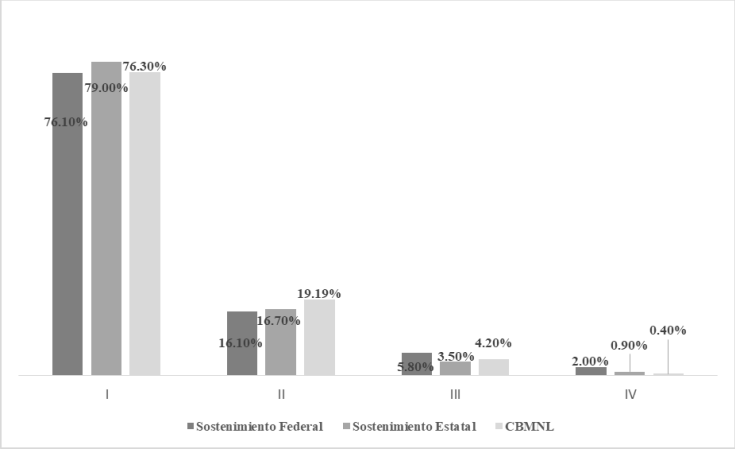
Fuente: Elaboración propia con base en el CONL (2020b)

Tabla 3. Porcentaje de alumnos por nivel de logro en matemáticas

Plantel	I	II	III	IV
San Bernabé	81.50 %	15.20 %	3.30 %	0 %
San Nicolás	64.60 %	28.50 %	6.20 %	0.80 %
Apodaca	75.50 %	18.40 %	4.10 %	2 %
Total	76.30 %	19.10 %	4.20 %	0.40 %

Fuente: Elaboración propia con base en el CONL (2020b)

Figura 2. Comparativo de resultados



Fuente: Elaboración propia con base en INEE (2017) y CONL (2020b)

Tabla 4. Porcentaje de alumnos por desempeño docente de matemáticas (ejercicios que ayudan a memorizar) y aspectos positivos del estudiante

Los maestros de matemáticas dejan ejercicios que ayudan a memorizar conceptos y procedimientos					
Alguna vez me obsesioné con una idea o meta por un tiempo corto, pero más tarde perdí el interés					
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nunca	0.84 %	0.63 %	1.47 %	1.26 %	0.21 %
Algunas veces	3.79 %	*11.16 %*	8.21 %	1.68 %	2.53 %
Frecuentemente	9.68 %	*13.89 %*	*11.79 %*	2.95 %	2.11 %
Siempre	7.37 %	8.21 %	5.89 %	2.95 %	2.74 %
No contestó	0.21 %	0.21 %	0.21 %	0.00 %	0.00 %

Fuente: Elaboración propia con base en el CONL (2020b)

Tabla 5. Porcentaje de alumnos por desempeño docente de matemáticas (ejercicios que ayudan a memorizar) y aspectos positivos del estudiante

Tengo dificultad para mantener mi atención en metas que requieren varios meses para ser terminadas					
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nunca	1.68 %	1.26 %	0.84 %	0.42 %	0.00 %
Algunas veces	7.97 %	*10.90 %*	5.03 %	2.52 %	0.84 %
Frecuentemente	*11.74 %*	*15.93 %*	8.60 %	3.56 %	0.84 %
Siempre	*12.37 %*	8.18 %	4.40 %	1.68 %	0.63 %
No contestó	0.21 %	0.21 %	0.21 %	0.00 %	0.00 %
Soy una persona que se enoja cuando me ponen obstáculos a lo que pretendo hacer					
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente

Nunca	0.84 %	1.68 %	1.05 %	0.42 %	0.21 %
Algunas veces	7.98 %	9.87 %	4.62 %	2.52 %	2.31 %
Frecuentemente	*11.34 %*	*17.23 %*	6.51 %	2.31 %	3.15 %
Siempre	8.19 %	*10.08 %*	4.41 %	2.52 %	2.10 %
No contestó	0.63 %	0.00 %	0.00 %	0.00 %	0.00 %
Frecuentemente tengo conflictos con el líder de mi grupo de trabajo					
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nunca	3.56 %	0.00 %	0.63 %	0.21 %	0.00 %
Algunas veces	*17.82 %*	6.08 %	1.68 %	1.47 %	0.21 %
Frecuentemente	*25.16 %*	9.64 %	3.35 %	1.68 %	0.63 %
Siempre	*17.61 %*	5.66 %	0.84 %	2.10 %	1.05 %
No contestó	0.42 %	0.21 %	0.00 %	0.00 %	0.00 %
Tengo dificultades para comunicarme con mis padres					
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nunca	2.10 %	1.05 %	0.63 %	0.21 %	0.42 %
Algunas veces	*13.21 %*	6.92 %	3.77 %	1.68 %	1.68 %
Frecuentemente	*17.82 %*	*12.79 %*	7.13 %	2.52 %	0.42 %
Siempre	*14.68 %*	5.24 %	3.56 %	2.31 %	1.47 %
No contestó	0.21 %	0.00 %	0.00 %	0.21 %	0.00 %

Fuente: Elaboración propia con base en el CONL (2020b)

Tabla 6. Porcentaje de alumnos por desempeño docente de matemáticas (ejercicios que ayudan a memorizar) y aspectos positivos del estudiante.

¿Con qué frecuencia me afectó algo que me ocurrió inesperadamente en el último mes?					
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nunca	0.42 %	2.51 %	1.05 %	0.21 %	0.21 %
Algunas veces	4.81 %	*12.97 %*	5.86 %	3.56 %	0.00 %
Frecuentemente	9.21 %	*21.76 %*	7.11 %	2.51 %	0.00 %
Siempre	7.74 %	13.18 %	3.97 %	1.88 %	0.42 %
No contestó	0.42 %	0.00 %	0.21 %	0.00 %	0.00 %
¿Con qué frecuencia pensé que no podría afrontar todas las cosas que tenía que hacer en el último mes?					
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nunca	1.47 %	1.26 %	1.05 %	0.21 %	0.21 %
Algunas veces	5.25 %	*12.39 %*	7.98 %	1.05 %	0.42 %
Frecuentemente	8.40 %	*18.70 %*	*10.29 %*	3.36 %	0.00 %
Siempre	7.35 %	*12.39 %*	5.46 %	1.47 %	0.63 %
No contestó	0.42 %	0.21 %	0.00 %	0.00 %	0.00 %
¿Con qué frecuencia me enojé porque las cosas que me ocurrieron estaban fuera de mi control en el último mes?					
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nunca	1.05 %	2.09 %	0.63 %	0.42 %	0.21 %
Algunas veces	6.90 %	9.21 %	7.11 %	3.97 %	0.00 %
Frecuentemente	*11.92 %*	*14.85 %*	9.21 %	4.60 %	0.00 %
Siempre	8.37 %	*10.25 %*	4.60 %	3.35 %	0.63 %
No contestó	0.42 %	0.21 %	0.00 %	0.00 %	0.00 %

Fuente: Elaboración propia con base en el CONL (2020b)

Tabla 7. Porcentaje de alumnos por desempeño docente de matemáticas (ejercicios que ayudan a aplicar conocimientos) y aspectos positivos del estudiante

Los maestros de matemáticas dejan ejercicios y tareas que ayudan a aplicar conocimientos adquiridos en clase a problemas o situaciones					
Alguna vez me obsesioné con una idea o meta por un tiempo corto, pero más tarde perdí el interés					
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nunca	1.05 %	0.84 %	1.05 %	0.63 %	0.21 %
Algunas veces	3.37 %	8.84 %	7.58 %	1.89 %	1.26 %
Frecuentemente	8.42 %	*16.42 %*	*12.21 %*	4.21 %	3.37 %
Siempre	9.05 %	8.00 %	6.11 %	2.11 %	2.74 %
No contestó	0.00 %	0.21 %	0.42 %	0.00 %	0.00 %
Tengo dificultad para mantener mi atención en metas que requieren varios meses para ser terminadas					
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nunca	1.68 %	1.26 %	0.63 %	0.21 %	0.00 %
Algunas veces	5.67 %	9.45 %	4.41 %	2.94 %	0.63 %
Frecuentemente	*14.29 %*	*16.39 %*	8.61 %	4.41 %	0.84 %
Siempre	*12.39 %*	8.82 %	5.25 %	0.63 %	0.84 %
No contestó	0.00 %	0.42 %	0.21 %	0.00 %	0.00 %
Soy una persona que se enoja cuando me ponen obstáculos a lo que pretendo hacer					
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nunca	1.27 %	0.84 %	1.05 %	0.21 %	0.21 %
Algunas veces	5.27 %	10.13 %	2.53 %	3.38 %	1.90 %
Frecuentemente	*13.08 %*	*16.24 %*	9.28 %	2.53 %	3.59 %
Siempre	9.07 %	*11.39 %*	3.59 %	1.69 %	2.11 %
No contestó	0.42 %	0.21 %	0.00 %	0.00 %	0.00 %

Fuente: Elaboración propia con base en el CONL (2020b)

Tabla 8. Porcentaje de alumnos por desempeño docente de matemáticas (ejercicios que ayudan a aplicar conocimientos) y aspectos positivos del estudiante

Frecuentemente tengo conflictos con el líder de mi grupo de trabajo					
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nunca	2.74 %	0.42 %	0.21 %	0.21 %	0.21 %
Algunas veces	*13.68 %*	5.05 %	2.53 %	1.47 %	0.21 %
Frecuentemente	*30.32 %*	9.47 %	2.53 %	1.68 %	0.63 %
Siempre	*17.47 %*	6.32 %	1.26 %	2.11 %	0.84 %
No contestó	0.42 %	0.21 %	0.00 %	0.00 %	0.00 %
Tengo dificultades para comunicarme con mis padres					
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nunca	1.47 %	1.05 %	0.84 %	0.21 %	0.21 %
Algunas veces	*10.50 %*	6.09 %	3.15 %	2.10 %	1.26 %
Frecuentemente	*21.85 %*	*11.34 %*	7.56 %	2.31 %	1.47 %
Siempre	*13.87 %*	7.14 %	3.57 %	2.31 %	1.05 %
No contestó	0.42 %	0.21 %	0.00 %	0.00 %	0.00 %
¿Con qué frecuencia me afectó algo que me ocurrió inesperadamente en el último mes?					
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nunca	0.63 %	1.89 %	0.84 %	0.21 %	0.21 %
Algunas veces	4.41 %	*10.92 %*	5.04 %	2.73 %	0.00 %
Frecuentemente	9.66 %	*24.58 %*	7.77 %	2.52 %	0.00 %
Siempre	7.35 %	*12.82 %*	4.62 %	2.73 %	0.42 %
No contestó	0.42 %	0.21 %	0.00 %	0.00 %	0.00 %
¿Con qué frecuencia pensé que no podría afrontar todas las cosas que tenía que hacer en el último mes?					
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente

Nunca	1.27 %	1.69 %	0.42 %	0.21 %	0.21 %
Algunas veces	4.43 %	*10.13 %*	7.17 %	1.48 %	0.00 %
Frecuentemente	9.07 %	*21.10 %*	*11.81 %*	2.11 %	0.42 %
Siempre	7.81 %	11.60 %	5.49 %	2.32 %	0.63 %
No contestó	0.42 %	0.21 %	0.00 %	0.00 %	0.00 %

Fuente: Elaboración propia con base en el CONL (2020b)

Tabla 9. Porcentaje de alumnos por desempeño docente de matemáticas (ejercicios que ayudan a aplicar conocimientos) y aspectos positivos del estudiante

¿Con qué frecuencia me enojé porque las cosas que me ocurrieron estaban fuera de mi control en el último mes?					
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nunca	0.84 %	1.26 %	0.84 %	0.84 %	0.00 %
Algunas veces	5.46 %	8.19 %	6.30 %	3.15 %	0.00 %
Frecuentemente	*12.61 %*	*17.02 %*	*10.29 %*	4.41 %	0.21 %
Siempre	9.45 %	9.87 %	4.20 %	3.78 %	0.63 %
No contestó	0.42 %	0.21 %	0.00 %	0.00 %	0.00 %

Fuente: Elaboración propia con base en el CONL (2020b)

Tabla 10. Porcentaje de alumnos por rendimiento académico en matemáticas y aspectos positivos del estudiante

	Alguna vez me obsesioné con una idea o meta por un tiempo corto, pero más tarde perdí el interés				
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nivel I	*18.26 %*	*23.57 %*	*21.02 %*	6.58 %	6.37 %
Nivel II	3.18 %	8.49 %	4.88 %	1.91 %	1.06 %
Nivel III	0.64 %	1.91 %	1.27 %	0.21 %	0.21 %
Nivel IV	0.00 %	0.42 %	0.00 %	0.00 %	0.00 %
	Tengo dificultad para mantener mi atención en metas que requieren varios meses para ser terminadas				
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nivel I	*25.47 %*	*26.72 %*	*14.61 %*	7.31 %	2.09 %
Nivel II	3.13 %	8.35 %	4.80 %	1.88 %	1.04 %
Nivel III	0.63 %	1.88 %	1.25 %	0.21 %	0.21 %
Nivel IV	0.00 %	0.42 %	0.00 %	0.00 %	0.00 %

Fuente: Elaboración propia con base en el CONL (2020b)

Tabla 11. Porcentaje de alumnos por rendimiento académico en matemáticas y aspectos positivos del estudiante

	Soy una persona que se enoja cuando me ponen obstáculos a lo que pretendo hacer				
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nivel I	*23.11 %*	*29.37 %*	*13.39 %*	7.34 %	5.40 %
Nivel II	4.54 %	7.99 %	2.38 %	0.43 %	1.30 %
Nivel III	1.08 %	1.30 %	1.08 %	0.00 %	0.86 %
Nivel IV	0.22 %	0.22 %	0.00 %	0.00 %	0.00 %
	Frecuentemente tengo conflictos con el líder de mi grupo de trabajo				
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nivel I	*50.83 %*	*14.38 %*	5.00 %	4.17 %	1.46 %
Nivel II	10.83 %	6.25 %	1.04 %	1.04 %	0.42 %
Nivel III	2.08 %	0.83 %	0.42 %	0.63 %	0.21 %
Nivel IV	0.00 %	0.42 %	0.00 %	0.00 %	0.00 %
	Tengo dificultades para comunicarme con mis padres				
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nivel I	*37.29 %*	*18.54 %*	*11.46 %*	6.04 %	2.92 %
Nivel II	9.17 %	5.83 %	2.50 %	0.83 %	0.83 %
Nivel III	1.67 %	1.04 %	1.04 %	0.21 %	0.21 %
Nivel IV	0.00 %	0.21 %	0.21 %	0.00 %	0.00 %
	¿Con qué frecuencia me afectó algo que me ocurrió inesperadamente en el último mes?				
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nivel I	*17.08 %*	*38.13 %*	*13.75 %*	7.08 %	0.21 %
Nivel II	4.79 %	10.00 %	3.13 %	1.04 %	0.21 %
Nivel III	0.42 %	2.08 %	1.46 %	0.00 %	0.21 %
Nivel IV	0.21 %	0.21 %	0.00 %	0.00 %	0.00 %

	¿Con qué frecuencia pensé que no podría afrontar todas las cosas que tenía que hacer en el último mes?				
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nivel I	*17.57 %*	*33.68 %*	*19.25 %*	5.02 %	0.63 %
Nivel II	4.60 %	8.79 %	4.81 %	0.84 %	0.21 %
Nivel III	0.42 %	2.09 %	0.84 %	0.42 %	0.42 %
Nivel IV	0.00 %	0.42 %	0.00 %	0.00 %	0.00 %

Fuente: Elaboración propia con base en el CONL (2020b)

Tabla 12. Porcentaje de alumnos por rendimiento académico en matemáticas y aspectos positivos del estudiante

	¿Con qué frecuencia me enojé porque las cosas que me ocurrieron estaban fuera de mi control en el último mes?				
	No me describe	Me describe poco	Me describe	Me describe mucho	Me describe totalmente
Nivel I	*22.71 %*	*26.46 %*	*16.67 %*	9.79 %	0.63 %
Nivel II	4.58 %	8.33 %	4.38 %	1.67 %	0.21 %
Nivel III	0.83 %	1.88 %	0.42 %	1.04 %	0.00 %
Nivel IV	0.21 %	0.00 %	0.21 %	0.00 %	0.00 %

Fuente: Elaboración propia con base en el CONL (2020b)

Tables 4 to 9 show the distributions of what students think about mathematics teaching performance, particularly those related to exercises that help to memorize concepts and procedures and those that help to apply acquired knowledge to problems or situations and the various positive aspects of the student. Tables 10 to 12 show the distribution of students by academic performance in mathematics and the positive aspects.

Next, the descriptive statistics were obtained. For the present study and in order to make comparisons with other variables that measure on a scale of four, the scale used was adapted, multiplying it by four and subtracting two (Muñiz et al., 2011, p. 47). Likewise, the scale applied to the variables that comprise the student's positive aspects factor was inverted to make associations with the independent factor and variable. As can be seen in table 13, the mean of the dependent construct is 3.63, that is, the students consider that their personal

characteristics, all referring to the levels of resilience, perseverance and recognition of the discipline, are between “describes me ”And“ describes me a lot ”. Academic performance in mathematics was in "basic", although the mode was "insufficient". The mathematics teacher performance registered a mean of 2.74, equivalent to between “sometimes” and “frequently”.

Table 14 shows the correlations between variables. It highlights the significant correlation at the 0.01 level that exists between the positive aspects of the student and the teaching performance of mathematics with 0.636.

Tabla 13. Estadísticos descriptivos.

Constructo / Variable	Media	Desviación Estándar	N
Aspectos positivos del estudiante	3.6397	1.1057	484
Rendimiento académico en matemáticas	2.1389	0.69612	484
Desempeño docente de matemáticas	2.7466	1.03841	484

Fuente: Elaboración propia con base en el CONL (2020b)

Tabla 14. Correlaciones

Constructo	Características personales del estudiante	Rendimiento académico en matemáticas	Desempeño docente de matemáticas
Aspectos positivos del estudiante	1	-0.014	0.636
Rendimiento académico en matemáticas	-0.014	1	0.008
Desempeño docente de matemáticas	0.636	0.008	1

Los resultados fueron estadísticamente significativos a un nivel de confianza de $p < 0.05$

Fuente: Elaboración propia con base en el CONL (2020b)

Consequently, to check the associations between the variables exposed in the theoretical model, a statistical technique of multiple linear regression was applied, represented by equation 1.

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + e \qquad \text{Ecuación 1}$$

As x_1 = Academic performance; x_2 = Mathematics teaching performance; y = Positive aspects of the student.

Consequently, in table 15 it can be seen that the model has a significant explanatory level of 40.3% of the variance (R2 of 0.403), which, with a value of β = 0.000; p = 0.001, represents the degree to which the model explains the behavior of the dependent variable with respect to the independent variables, or the relationship between x and y, which is 40.3%.

Tabla 15. Estadísticas de regresión para la ecuación 1

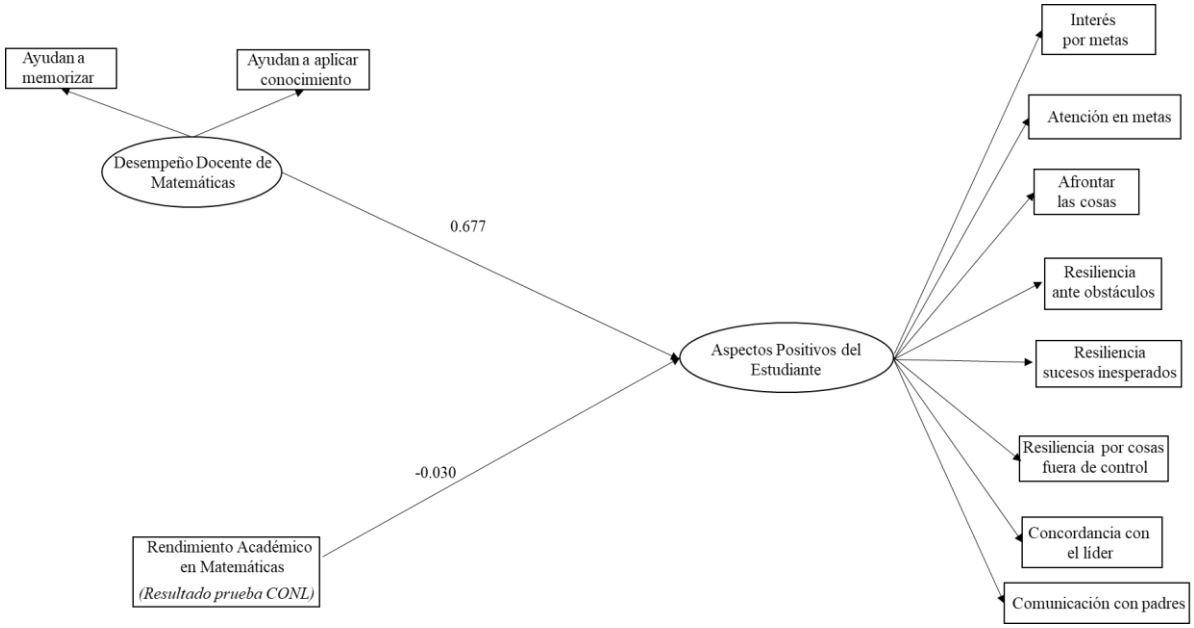
Estadísticas de la regresión	
Coeficiente de correlación múltiple	0.405
Coeficiente de determinación R^2	0.403
Error típico	0.85461
Durbin-Watson	2.078

Fuente: Elaboración propia con base en el CONL (2020b)

With the value thrown, it is determined that the model that reflects the relationship between "Mathematics teacher performance" and "Mathematics academic performance" with "Positive aspects of the student" is reliable. Therefore, it is understood that mathematics teachers who leave exercises and tasks to memorize concepts and procedures, as well as to apply acquired knowledge to problems or situations, and the results that young people obtain in mathematics will influence their interest in the goals set. , attention to these, facing things, frustration in the face of obstacles, resilience, anger about things out of control, conflicts with the leader and communication difficulties with the parents of CBMNL students.

Figure 2 reflects the associations that exist directly between the independent factor and variable with the dependent construct. In a negative way, "Academic performance in mathematics" has a weight of -0.030, which, in a practical way, does not influence, but there is a tendency for positive results to affect the positive aspects of CBMNL students. On the contrary, the higher the mathematics teacher performance, the greater the positive aspects of the CBMNL student. Therefore, equation 2 is established.

Figura 2. Modelo empírico conceptual



Fuente: Elaboración propia con base en el CONL (2020b)

$$y = 1.843 - 0.030x_1 + 0.677x_2 \qquad \text{Ecuación 2}$$

Discussion

Sensato and Lucio (2017) affirm that EMS develops competencies that include aspects of both knowledge and personality that lead to perfection for students; Tuirán (2017) establishes that high school is responsible for forging many elements that make up social-emotional skills.

Thus, based on the information contained in figure 2, it can be seen that the mathematics teacher performance composed of the application of exercises and tasks that help both to memorize concepts and procedures and to apply the knowledge acquired to problems or situations influences in a way positive in the positive aspects of the student: interest in goals, attention to goals, facing things, resilience to obstacles, resilience to unexpected events, resilience to things out of control, agreement with the leader and communication with parents. The foregoing has been described by Gómez (2010), who stated that when teachers apply exercises so that there is a greater understanding of mathematics, students develop certain components of their personality such as perseverance and the management of frustrations, fears and anger. Similarly, Tuirán and Hernández (November 1,

2015) concluded that teachers who use effective teaching tools favor social-emotional skills such as perseverance and resilience in students. Silas (2008) adds that the quality of mathematics teaching, in addition to motivating tenacity and promoting resilience, benefits the relationship between leader and disciple as it arouses admiration for teachers. For their part, Campuzano and Libien (2019) considered that math instructors are key to injecting enthusiasm among students and thus facing and overcoming problems. And Fernández (2014) adds that the teacher's performance affects the acceptance of rules and regulations by the group.

On the other hand, Cerda et al., (2018) published that the work of mathematics teachers in the classroom can stimulate participation, dedication, assimilation of errors and the new attempt to solve problems in which the student has made a mistake. . Islas and Carranza (2011) and Jaik and Barraza (2011) stated that mathematics work and exercises influence interest in this science. Montes and Machado (2011) and Hernández et al. (2017) ensure that the didactic strategies and the resources used benefit, in addition to the cognitive aspects, affective bonds, social relationships and communication; While mathematics teachers who apply activities to manage knowledge and skills favor aspects such as self-control, exceeding expectations and harmonious integration between teachers and students (SEP, October 29, 2018, p. 4). Rivera et al. (2014) stated that through performance and example EMS teachers model personal aspects of students such as resilience, perseverance, mastery of emotions and understanding of the role of their tutors. Beresaluce, Peiró and Ramos (2014) considered that teachers teach young people to set goals, work to achieve them and allow themselves to be guided by their teachers or parents. Covarrubias and Piña (2004) identified that teachers awaken in their students an interest in achieving academic objectives and agreeing with the discipline of their superiors. Zapata (2017) contributed that the moment the math teacher gives feedback, he sends a signal to the students of referential leadership, which makes it easier to earn respect. In turn, Venet and Díaz (2018) wrote that mathematics teachers become leaders when they use appropriate tools for teaching and maintain affective relationships with their students. Dizay and Narváez (2012) published that the academic orientation of the teacher promotes certain socio-emotional aspects of the students, such as striving to meet the goals set and resilience. Ricoy and Couto (2018) emphasize that through the stimulating work of mathematics teachers, students are motivated to show more interest in meeting goals, pay attention to them, and manage their emotions in the face of obstacles and unexpected events that occur. inside the classroom and probably outside it. Finally,

Becerra and Reidl (2015) add a better interaction with their family environment, including communication between them.

However, academic performance in mathematics practically does not influence the positive aspects of the student, which coincides with Gómez (2010), who concluded that although teaching performance affects certain characteristics of students, the results in their grades only does in motivation. Likewise, Dolores and García (2016) stated that the sole objective of the evaluations is to benefit the knowledge and skills of the high school graduates. While Martínez and Camarena (2015) and SEP (2019) suggest that academic performance will develop specific skills circumscribed to numerical operations, application of knowledge in practical life and the use of mathematical language, among others. Gaxiola et al. (2011), Mondragón, Cardoso and Bobadilla (2017) and Silas (2008) stated that resilience and perseverance can predict the academic performance of high school students, but not vice versa, as Robinsen et al. (2014) and Sierra (2016), who identified that the leadership of teachers or parents influences the qualifications of young people, but not enough evidence was found to indicate an association in the opposite direction to what is stated in figure 2 Alonso et al. (2016) added that if school results help to face obstacles, unexpected events or things out of control among students, this contribution would be minimal, while Aké et al. (2018) refer to the fact that academic performance is only associated with conceptual and technical competences. Mirete, Soro and Maquillón (2015) identified that disinterest affected academic performance, but not necessarily the second affected the first. And Lara, González, González and Martínez (2014) added the fear of facing various aspects of life as an element that affects school performance but also found no evidence that the second affected the first.

It should be noted that some investigations were reviewed that obtained results different from those obtained here: Salazar et al. (2018) found that academic performance is associated with improvement in personal characteristics, for example, the degree of acceptance and adaptation to the environment and their levels of self-control. Tuirán (2017) reported that negative academic performance largely affects the decrease in resilience, discouragement, loss of interest in goals or in facing life, as well as in the credibility of teachers as academic leaders. Finally, Corzo (2016) and Landero (2012) considered that negative academic performance, in addition to generating fear to face things, contributed to students being less resilient.

Conclusions

The present study achieves the stated objective. The results show that the factor "Mathematics teacher performance" and the variable "Academic performance in mathematics" are associated with the factor "Positive aspects of the student".

When mathematics teachers use exercises and tasks that help memorize concepts and procedures, as well as apply the knowledge acquired in class to problems or situations, positive aspects of students related to perseverance, such as interest and attention for goals and coping things, resilience to obstacles, unexpected events and things out of control and recognition of discipline, agreeing with leaders or having good communication with parents, for example, are increased.

Regarding grades in mathematics, although there is a correlation with "Positive aspects of the students", the impact of the independent variable on the dependent construct is practically nil, with a very slight negative trend.

Some limitations of the study were not having had prior access to the context questionnaire to refine the items related to the variables analyzed here. Within the interpretation of the results, one of the challenges was to understand the relationship between two constructs such as "Mathematics teaching performance" and "Positive aspects of students" when both combine, according to the theory analyzed, a vast amount of variables that here it was impossible to cover. An extra difficulty, which will undoubtedly open up future lines of research, is to associate the role played by teachers in other learning units such as Spanish, natural sciences, social sciences or even physical education with the positive aspects of the students.

Finally, some recommendations to favor the performance of mathematics teachers, specifically in relation to the exercises and tasks that they use in their classes, and that will help to benefit the positive aspects of the students are: of course, that the tasks in the classroom take the student to numerical competence; use information technologies to apply activities in a virtual, dynamic, attractive, playful and innovative way that include graphics, models, simulations, demonstrations and real practices, among others; apply activities that have potentially been experienced by students in their real life and that arouse their interest; develop dynamics whose objective is the understanding of mathematics, beyond the qualification, so that the result obtained, if it is negative, discourages the demotivation of the students; promote assertive teacher-student interaction during the class, this awakens both

affection and respect towards the teacher; encourage mathematics assessments to generate information for both academic and class management decision-making and the establishment of tasks and exercises that lead to the fulfillment of pedagogical and comprehensive training objectives for life; apply schoolwork that can be developed between teachers and students and between students and their families; distribute the weighting of the grade both in assignments and exams and in participation, attendance, group collaboration, interpretation of results, among others; share experiences or readings about the importance of mathematical knowledge; injecting a spirit of challenge into the students every time they pose problems or activities in this learning unit; promote the accessibility of teachers, as well as availability even outside class hours; establish daily teaching plans that include the application of exercises and tasks such as problem labs, practical cases and problem solving sequences; undertake creative didactic strategies that include real contexts, interaction, free participation and achievable objectives; make the student community aware that mistakes can lead to good things when you learn from them and that high school is the right place to make mistakes in math labs without great consequences for life; constantly ask questions in class; use general culture and global and future visions as tools to connect with the teaching and liking for mathematics; set course goals from the beginning and be an example of behavior through rectitude, punctuality, kindness, diligence, among others; train teachers in relation to their subject so that they are considered by students as the best, and start with simple mathematical tasks and exercises to later increase the degree of complexity of concepts, procedures and application of knowledge.

Future lines of research

Through the literature review carried out in this article, various factors were identified that could be associated with positive aspects of the student, which, for reasons of time and resources, it was impossible to address in this proposal.

Thus, it will be interesting to study the degree to which the performance of Spanish and English teachers, particularly, affects the dependent construct proposed here. Likewise, what is the degree to which factors such as teacher facilitators, school coexistence and supervising parents determine the positive aspects of the student, specifically in militarized high schools. On the other hand, for future studies it is intended to determine the level at

which the positive aspects of the student could be related to two topics of deep interest to educational scientists: failure and retention at the upper secondary level.

Finally, projects will be proposed where the constructs analyzed here are studied, but in contexts other than militarized subsystems, such as autonomous, state or federal ones, particularly in the state of Nuevo León.

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