Affective bond and attitude towards mathematics in university students of the Peruvian Amazon

Vínculo afectivo y la actitud hacia las matemáticas en estudiantes universitarios de la Amazonía peruana

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Abstract

The research was aimed at establishing the relationship between affective bond and attitude towards mathematics in university students in the Peruvian Amazon. The approach was quantitative, the design was non-experimental and the type of design was correlational. The population consisted of 590 students and the sample by 233 students, an amount that was determined by probabilistic sampling. To collect the information, two Likert-type questionnaires were used, instruments with adequate levels of reliability and validity. The results indicate that, using the Spearman correlation test, there is a relationship strength of 0.716 between the affective bond and attitude towards mathematics variables with an effect size of 0.846 and a statistical power of 1. Likewise, the relationship strength between the dimension pedagogical bond and attitude towards mathematics was 0.718 with an effect size of 0.847 and a statistical power of 1. Finally, the strength of relationship between the dimension bond between classmates and attitude towards mathematics was 0.764 with a statistical power of 1. effect size of 0.874 and a statistical power of 1. Finally, it was concluded that the affective bond is directly and significantly related to the attitude towards mathematics.

Key Words: Learning, relationship, educational practice, bond and attitude.

Resumen

La investigación se orientó a establecer la relación entre vínculo afectivo y la actitud hacia las matemáticas en estudiantes universitarios de la Amazonía peruana. El enfoque fue cuantitativo, el diseño no experimental y el tipo de diseño, correlacional. La población estuvo conformada por 590 estudiantes y la muestra por 233 estudiantes, cantidad que fue determinada mediante un muestreo probabilístico. Para la recolección de la información se utilizaron dos cuestionarios de tipo Likert, instrumentos con adecuados niveles de confiabilidad y validez. Los resultados señalan que, mediante la prueba de correlación de Spearman, existe una fuerza de relación de 0,716 entre las variables vínculo afectivo y actitud hacia las matemáticas con un tamaño del efecto de 0,846 y una potencia estadística de 1. Asimismo, la fuerza de relación entre la dimensión vínculo pedagógico y actitud hacia las matemáticas fue de 0,718 con un tamaño del efecto de 0,847 y una potencia estadística de 1. Por último, la fuerza de relación entre la dimensión vínculo entre compañeros y actitud hacia las matemáticas fue de 0,764 con un tamaño del efecto de 0,874 y una potencia estadística de 1. Finalmente, se concluyó que el vínculo afectivo se relaciona de manera directa y significativa con la actitud hacia las matemáticas.

Palabras clave: Aprendizaje, relación, práctica educativa, vínculo y actitud.

Introduction

The educational practice implies a necessarily interpersonal activity, in which each one of the actors that participate has a very particular perspective of the other based on their behavior, and the way in which they conceive each of the situations that they live in on a daily basis in the educational context[1]. Being the educational interaction influenced by the very nature of the groups that are formed or the individual characteristics of the students and the teacher, a fundamental aspect that is part of the process[2]. It integrates logical and rational elements with emotional and motivational ones, bringing with it a combination of logical associations, desires, and emotional connotations[3].

Human beings are sensitive to the affective conditions in which they develop, therefore, lack of affect could limit the field of student learning[4]. Affectivity would become an incentive, fulfilling an encouraging function and strength to express what they know, necessary for the student to put their knowledge into practice, without altering their affective or emotional state.

At the university, links are formed with educational actors and with the institution itself throughout the student's stay that affect the construction of a vision of himself, of others and of the world[5]. The link plays an essential role in the construction of the identity of the person and in their development, being the model that configures the relationships and the filter through which a student receives all the basic information necessary for their cognitive development and from this the social[6]. Likewise, it is expressed as the production of meaning and form, enabling the acquisition of new learning[7].

The origin of the link between teacher and student results from the mutual and direct observation of their characteristics and behavior, from the previous information they have received, the selection and categorization of their characteristics, as well as from the negotiations that must be present and guide their relationships interpersonal[1]. In addition, it is a powerful driver of learning because students find meaning in those activities that recognize them as subjects and allow them to express their cultural capital in them[8]. This shows that learning is defined by the quality of the relationship between teachers and students, as long as it is aimed at promoting their comprehensive training, without neglecting it, since it could directly affect the effectiveness of what is intended to be done and achieved[9]. For adolescents, the educational institution is a fundamental social environment, when students have a good relationship with their teachers, both their academic performance and their sense of belonging to the center benefit[10].

Likewise, it is considered that the basis for autonomy and openness to learning is due to the bonding characterized by affection, respect and realistic expectations about the abilities of the students, whatever the history of their relationships, this represents an opportunity to provide the experience of being cared for and teaching others to care[11]. More than a unidirectional relationship through which the teacher forms unfinished people, it would be a bidirectional correspondence, in which both subjects would be reciprocally transformed, the student being the subject who can not only learn, but also teach his teachers[12]. To achieve this, students must adopt a certain position regarding their history, their recognition in an institution, their culture, the meaning and meaning of their reality in relation to the past and future projects, desires, projections of others deposited in them, of family and social mandates[13].

According to Manzo[5], the bond between colleagues is characterized by being affiliative, feelings of identity, belonging, support, accompaniment, gratitude and fraternity are shared, therefore it is strong and lasting; although it is temporary, it facilitates the transition and stay during university studies. In this sense, the link facilitates the way to be part of the community in which university life is organized, such as leisure time; constituting a collective process in which peer ties play a leading role[14]. However, circumstances such as love relationships, rivalries, conflicts, qualifications, among others, could favor or hinder relationships between peers, causing the opinion or gaze of peers to generate different interpretations and anxieties and even the possibility of being included or excluded[15].

It is inferred that both the pedagogical bond that the students establish with the teacher and in the same way between peers will be decisive in order to acquire learning and strengthen the relationships that will be decisive in leading a favorable university life. This factor could be associated with the attitude towards learning mathematics in university students, because the nature of the basic or specialization courses would require, at certain times, their use; therefore, their disuse or the need not to learn them could not be justified. The learning of mathematics represents a complex process in which different actors with common interests intervene, in a cultural and social framework, being the attitude of the learner and the collaborative aspect, the one that favors or limits the process[16]. The use of mathematics in everyday life is constant and is present in different actions and operations that we carry out on a daily basis. It seems that its use is unnecessary; however, discarding its application could affect the development of various activities, the fact of solving certain arithmetic or calculation problems would allow users to respond to the demands of the academic or work field[17]. Therefore, acquiring certain basic mathematical skills and understanding certain concepts are essential for effective functioning in today's society[18].

The acquisition of mathematical abilities would be determined by the attitude that students show during the learning process. Then, attitude would represent the intention that includes the beliefs, convictions and feelings that cause a reaction to a stimulus or to learning in the areas of knowledge, if negative, the students would show rejection of work, participation in activities and even giving attention[19]. In addition, it can be a way of being, of acting, which would imply the internal and the external, but it is the human being in his conscience who qualifies, with time and learning, what is good or bad about that learning[20]. This way, it would understand a social orientation in terms of a favorable or unfavorable response that is manifested through cognitive, affective and behavioral content communicable verbally and non-verbally[21].

Bazán and Aparicio[22] explain that to solve a problem you have to want to find the solution, feel that it is within the possibilities, believe that you can reach it, these strengths related to the essential concepts would allow you to acquire certain basic mathematical skills necessary to address a problem. Achieving autonomy in learning mathematics would be determined by affective aspects and from a central position would influence persistence and willingness to solve problems, resulting in satisfaction and enthusiasm for wanting to function well[23].

Then, the recognition of the importance of attitudes in the teaching and learning process, as in the case of mathematics, would allow to achieve a favorable climate within the classroom, as well as the acceptance of the differences found in it[20]. Yáñez r Villardón[24] consider three components to be able to evaluate attitudes towards mathematics in students: The student's mathematical self-concept, the perceived usefulness of mathematics and interest in mathematics (Table 2).

Table 1. Dimensions of the variable attitude towards mathematics.

Dimensions	Description
student Mathematical Self-Concept	A student who scores high on this dimension believes that he or she has the ability to understand and solve tasks related to mathematics.
perceived usefulness of mathematics	A student who scores high on this dimension considers mathematics to be very useful for their current and future goals.
interest in mathematics	A student who scores high on this dimension has a high interest in learning and doing mathematics.

Source: Yáñez y Villardón[24].

It is worth mentioning that the feeling of anxiety at adequate levels allows the person to face tasks efficiently, however, if mathematics is perceived as threatening, anxiety levels can block and even avoid facing situations associated with them[25].

Finally, the objective of the research was to establish the relationship between affective bond and attitude towards mathematics in university students in the Peruvian Amazon.

Materials and methods

A correlational investigation was carried out, a modality in which it is attempted to determine the existence of concomitant variations between two or more variables, without prior manipulation of them. Likewise, the collection of information was carried out in a single period determined in time, a condition of the cross-sectional study[26].

As for the population, it was composed of 590 students, likewise, through a simple random sampling, a sample of 233 students was obtained. Regarding the environment, the study was carried out considering the students of the professional career of Education of its three specialties: Mathematics and Computing, Initial and Special and Primary and Informatics of the Universidad Nacional Amazónica de Madre de Dios, located in the Madre de Dios region, Peru.

To collect information on the affective bond variable, an instrument composed of 24 items was used, with an assessment scale composed of: never (0), sometimes (1), almost always (2), and always (3). Its psychometric properties were determined through the process of validity and reliability. In this sense, it was established through the expert judgment technique that the inventory had an adequate level of content validity (Aiken's V= 0.842). On the other hand, the reliability was found through a pilot test carried out on 20 students and through it was determined that the inventory had an adequate level of reliability (α= 0.810). As for the second variable, attitude towards mathematics, the SATMAS[27] scale composed of 19 items was used. Its metric properties were also determined through the content-based validity and reliability process, and it was found that the scale had an adequate level of content validity (Aiken's V= 0.876) and reliability (α= 0.860).

To verify the general and specific objectives of the research, Spearman's correlation was applied between the two variables to establish the intensity of the relationship. Similarly, as measures of association between ordinal variables, the Gamma test was used to identify symmetry and Somers' D for directionality[28]. Likewise, the statistical power was identified to determine the degree of probability of rejecting the null hypothesis when it is really false and as a complement the effect size was obtained to verify the degree to which the null hypothesis is false[29].

Results and discussion

When establishing the intensity of the correlation between the affective bond and attitude towards mathematics variables in university students from the Peruvian Amazon, a relationship strength of 0.716 was obtained; likewise, it was found that the statistical significance (bilateral) was 0.001; the effect size (ρ) was 0.846 and the statistical power (1 – β) was 1.

The results show that the affective bond is related to the attitude towards mathematics, according to the perception of the students. In other words, the more consolidated the affective relationships are (they are conducive to reassessing the links, correspondences, concordances and dependencies between equals) the greater the attitude that students predispose to learning mathematics. With the data obtained, the null hypothesis is rejected and the alternative hypothesis is accepted: the affective bond is significantly related to the attitude towards mathematics in university students.

Then, the intensity was described the intensity of the correlation between the pedagogical link dimension and attitude towards mathematics in university students in the Peruvian Amazon. In this sense, a relationship strength of 0.718 was obtained; statistical significance (bilateral) was found to be 0.001; the effect size (ρ) was 0.847 with a statistical power (1 – β) of 1.

Through statistical analysis it was possible to verify that the link that teachers consolidate during the development of their subjects is related to the attitude that students manifest towards learning mathematics. Therefore, the greater the strengthening of the teacher's affective bond, the greater the attitude that students have towards learning mathematics. Likewise, it is demonstrated that the teaching function is highly significant and indispensable (in any of the areas of the curriculum) for learning, as well as the consolidation of the emotional structure of the students, being fundamental the stability and competences that the teachers have. The result, unlike other investigations, considers that the student body does not show interest in learning mathematics; while the teaching staff values them as a pleasant and fundamental discipline in the formation of every person. The foregoing creates a challenge for the teacher, who must innovate in their classroom work to positively influence the affective domain of their students[30]. Likewise, from the experiences lived by the teachers, affectivity emerges in the teaching of mathematics, which leads to good personal relationships, provides hope, color and meaning to the learning, acts and life of the student[31]. Therefore, the results obtained provide sufficient evidence to associate the affective domain (attitudes, beliefs and emotions) with the pedagogical practices of both teachers in initial training and in service[32].

Also, we analyzed the intensity of the correlation between the peer bond dimension and attitude towards mathematics in university students in the Peruvian Amazon. Thus, a strength ratio of 0.764 was obtained; statistical significance (bilateral) was found to be 0.001; the effect size (ρ) was 0.874 with a statistical power (1 – β) of 1.

The dimension of the affective bond that has the highest correlation, according to the statistical analysis carried out, corresponds to the bond between partners, which is significant in the consolidation of the attitude (corresponds to the predisposition that people have to behave or act) towards learning. of mathematics. Therefore, the greater the healthy relationships between students, the greater their predisposition (attitude) towards learning mathematics. The results relate to Marin[33], who determined the existence of two groups of students: those who receive a good affective control of their environment and another group that does not. Likewise, in each group two categories are observed according to how permeable they are. In addition, in those students with good affective domain, a favorable scenario is distinguished to generate an attitudinal change.

Conclusion

Using Spearman's correlation test, it was found that there is a strength of relationship of 0.716 between the variables affective bond and attitude towards mathematics with an effect size of 0.846 and a statistical power of 1. Likewise, the strength of relationship between the dimension pedagogical bond and attitude towards mathematics was 0.718 with an effect size of 0.847 and a statistical power of 1. Finally, the strength of the relationship between the pedagogical bond dimension and attitude towards mathematics was 0.764 with an effect size of 0.874 and a statistical power of 1.

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