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Editorial

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A Replacement Thanks to Teach Maths at University Level as a Part of Everything

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Abstract

The main objective of this article has been to evaluate the effect that the implementation of the Exploria project has had on the Engineering Degree in Industrial Design and Product Development. The Exploria project aims to develop an integrated competence map of the learning process, where the subjects are no longer considered as isolated contents, by elaborating an integrated learning process where the competences and learning outcomes of the subjects are considered as a whole, global and comprehensive learning. The Exploria project connects the competencies of the different Steam subjects that make up the degree, designing a learning process as a logical, sequential and incremental itinerary. Through concepts on which the foundations of design are based shape, volume, colour, space and structure the competencies of the different subjects are defined in incremental learning levels: understanding, applying, experimenting and developing, all taken from Bloom's taxonomy. Mathematics is linked to the rest of learning through active learning methodologies that make learning useful. This new methodology changes the student's affective domain towards mathematics in which positive emotions are transformed into positive attitudes that will improve the learning result and therefore, the students' academic results. To validate it, at the end of the paper, the academic results compared with previous years are shown, as well as an ad hoc survey of the students' assessment of the new teaching methodology.

Keywords: Exploria • Steam • Active methodologies • University level • Affective domain

Introduction

Mathematics is described by the National Council of Teachers of Mathematics (NCTM) as "Maths for Life".This means that mathematics is essential for life as it helps in decision-making, planning, mathematical thinking and problem solving, which are necessary in different professional areas and daily life. They add that mathematics is related to other sciences, not only numerical such as engineering or statistics, but also to arts, drawing, commerce, medicine, and so forth.

The affective domain is defined as a set of feelings, moods and states of mind, understood as something other than pure cognition, and among which three specific elements stand out: attitudes, beliefs and emotions In it is explained that these factors interact in a cyclical way, in the way we perceive mathematics. Beliefs can be understood as a knowledge or feeling of certainty acquired and determined by past situations, which gives meaning to its own world, and which generates typical reactions without being fully aware of it.

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Emotions are affective and automatic responses that arise from a significant event for the individual, and which result from complex learning, social influence and interpretation itself.

Regarding attitude, there is no unified definition in the literature, however, most authors agree in defining attitude as a disposition or predisposition towards mathematics, as for example in

Attitudes are considered as one of the variables that most explains performance in mathematics, It is estimated that attitudes constitute 30% of the explanatory factors of performance, concluding that students who display a more positive attitude towards mathematics will obtain higher mathematical performance.

In an in-depth study is carried out on the rejection and negative attitudes towards mathematics. In this study, the number of participating students was 3187, belonging to all education cycles, primary, secondary, high school and the first year of university. The study was carried out in Spain in 10 different autonomous communities. The first item analysed was the taste for Mathematics at the different educational levels. The results show a high taste for mathematics in the initial levels at 87%; however, the taste for mathematics decreases as students go up in level, with 57% when they reach the first year of university. In, other subjects were also analysed but this decrease in the negative perception of Mathematics was not detected. In the students' self-perception of mathematics skills is also analysed when answering the question, do I consider myself good at mathematics? In this case, the decrease is higher, going from 80% in primary education to 24% at university level. Finally, in the level of the teacher's responsibility is analysed. In this case, the responsibility is about 15% at primary school level, reaching its maximum in the first year of university with about 60%.

The results obtained in were later corroborated in which showed that 67% of the students dislike mathematics and stated that they did not fully understand it. On the contrary, only 38 % showed an interest and liking for this discipline.

Recently, in a study has been carried out on attitudes towards mathematics in university students. In the study, 1293 students (830 women and 453 men) of different degrees, Agri-food Engineering, Biology, Food Science and Technology, Pre-school and Primary Education, IT and Tourism were analysed. As a result, the average percentage in attitude obtained was 54% which shows that, in general, men have a more positive attitude towards mathematics, agreeing with other existing studies in this regard, such as in it was also found that students taking engineering degrees showed a better attitude towards mathematics than the rest, agreeing with other studies such as, These degrees tend to have a greater number of men than women.

STEM (Science, Technology, Engineering and Mathematics) is a curriculum based on the idea of educating students in four specific disciplines: science, technology, engineering and mathematics, in an interdisciplinary and applied approach. Rather than teaching the four disciplines as separate and discrete subjects, STEM integrates them into a cohesive learning paradigm based on real-world applications.

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