

Motivation: Fundamental tool to manage anxiety in the teaching of physics in school students higher

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Abstract

In the present research, a documentary exploration of motivation was carried out as a fundamental tool to reduce anxiety in students during physics classes. For this, a review of the literature was carried out where a variety of studies and investigations are found, which is derived, fundamentally, the fact that the motivation plays an essential and an essential role for the student to work the anxiety provoked by the study of physics. The motivation could change even the psychological and cognitive process of a student in all subjects. Keywords: motivation, anxiety, physics teaching.

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Introduction

Physics is one of the first academic disciplines, if one considers that astronomy is part of this, then we are perhaps in front of one of the most ancient disciplines. In essence, the Physics is, a natural science that studies, among other things, the properties and the behavior of matter, energy, time and space, in addition to the interactions of these concepts. Also, it is very significant and it has great influence, both in the creation of new technologies, as in their relationships with other sciences like Mathematics and Philosophy.

Physics seeks that each of its principles can be demonstrated through experiments and that theory can shape predictions of future experiments based on previous observations. Considering the wide field of study, it covers, it can be said that it is a primordial or basic Science, because among its fields of study are Chemistry, Biology and Electronics. In addition, Physics also explains the phenomena of such areas.

Such discipline is taught in schools as part of the curriculum to students at the upper levels in most cases, in 12th. This class requires for its greater comprehension and understanding a high level of analysis, cognitive abstraction and reasoning on the part of the student. In some cases, this leads to high levels of anxiety and anxiety in young people to this subject.

The aspect that most worry educators is that anxiety can reach such a high level that it causes panic, fear, frustration and in many cases, dropping out of school. Anxiety is a normal feeling or emotional state in certain situations and is a habitual response to different everyday stressful situations. Therefore, some degree of anxiety is even desirable for the normal handling of the day-to-day demands. However, when it exceeds a certain intensity or exceeds the adaptive capacity of the person, for example, during academic activities, it is when the anxiety becomes pathological, provoking a significant discomfort, with unspecific symptoms like physical, psychological and behavioral symptoms, as well. In the majority of the cases, for this reason, when a teacher detects that a student has these symptoms because of how stressful or distressing his class may be, he must create a motivating system to minimize or eliminate these symptoms. Likewise, facilitate the teaching process in students so that they can understand the fascinating world that surrounds physics.

Having this in mind, the following documentary research aims to see motivation as a fundamental tool to calm the anxiety that causes teaching-learning physics process in high school students.

What do we plot?

Physics is one of the subjects assigned to high school students to complete their academic requirements in the Science area. Given the rigor and the level of reasoning involved in this subject, it creates high levels of anxiety in students. De los Ángeles (2011) sets out that learning Physics causes a high level of anxiety in students due to the high level of understanding is required for the student this academic subject and also in some cases, by the lack of previous mathematics knowledge students have.

In the same way, in a study carried out by students of secondary school about Physics learning process, Douglas (2006) ^[1], indicates that the student observes this academic area, needs a high level of abstraction, a level that cannot be reached by the student causing him such a high anxiety that do not let learn this subject. Sometimes these levels of anxiety that cause a particular subject could also affect the other subjects with which the student must be working with. The impact of academic discipline has a big influence on the academic approach to the others one.

In the same thread of thought, Cardenas, Tatiana, and others (2011) ^[20] point out that anxiety caused in a subject has great repercussions in the whole performance that a student performs during his student's trajectory, thus affecting his emotional, physical and cognitive state. Given this concern that the course of Physics causes, in the students of high school, we set ourselves the following study: motivation as a fundamental tool to improve anxiety in the teaching of Physics in high school students

Theory of human motivation of abraham Maslow

Before the study, it will take into account as a basis the "Theory of Human Motivation" Abraham Maslow (1908-1970) ^[2]. It has been a very inspiring figure within the theories of personality. The "Theory of Human Motivation", proposed a hierarchy of needs and factors that motivate people. This

hierarchy identifies five categories of needs and considers a hierarchical ascending order according to their importance to the survival and the capacity of motivation. In this way, as man is satisfying their needs arise others who change or modify the behavior of the same; considering that only when a need is "reasonably" satisfied, it will trigger a new need. One of the countless and interesting aspects that discovered Maslow (1968), at the beginning of his career, while working with monkeys, is that certain needs take precedence over others. He illustrated his theory stating "If you are hungry or thirsty, tend

to quench the thirst rather than eat". The five categories (Fig 1) needs are physiological needs, safety, loving and belonging, esteem and self-actualization; being the physiological needs of a lower level. Maslow also distinguishes these needs (physiological, security, loving and belonging, esteem) "deficit" and "development of the self" (self-actualization). The distinctive difference between the two is that the reference to a lack, the distinctive difference between the two is that the "loss-making" refer to a lack, while the "development of being" refer to the work of the individual.

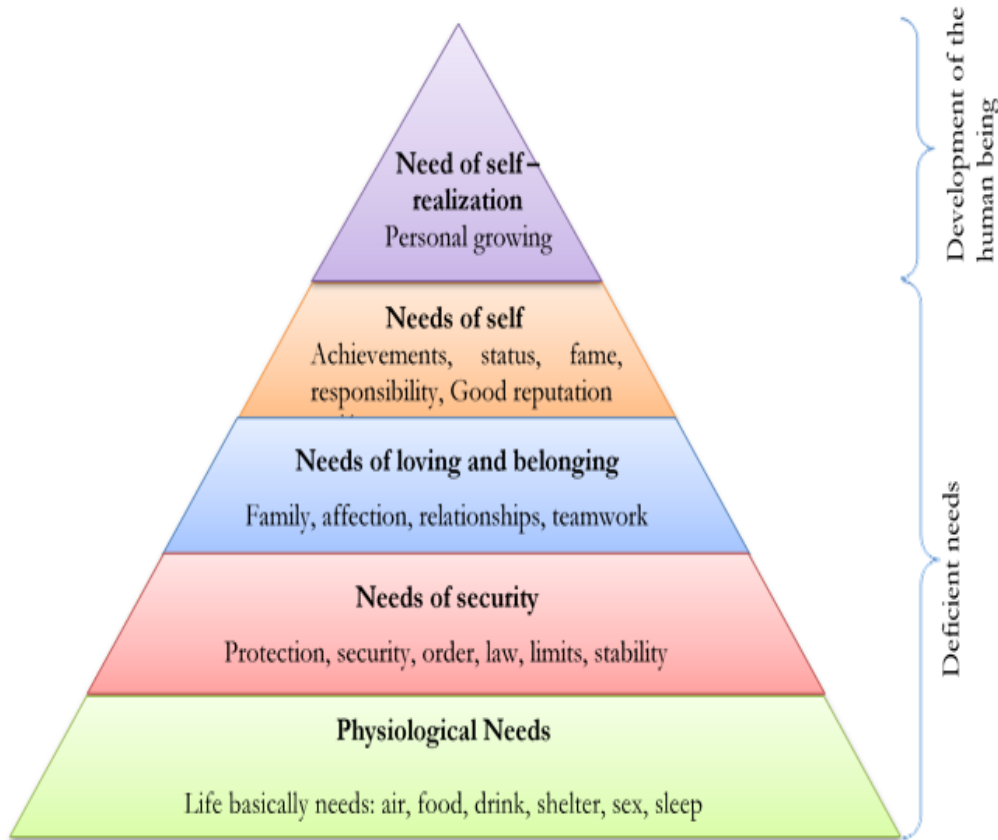


Fig 1: Hierarchy of Needs

Physiological needs are of biological origin and relationship to the survival of man; here are basic needs that include such things as the need to breathe, drink water, sleeping, eating, sex and shelter. When needs are mostly satisfied physiological, emerges the second step of needs calls security needs and that they orient themselves to personal security, order, stability, and protection. Here are things like safety physics, employment, income and resources, family, health, and crime of personal property.

Once the previous needs are moderately satisfied, the following requirements class contains things like love, affection and the membership or affiliation to a certain social group. Here seeks to overcome feelings of loneliness and alienation, these needs of love, affection, and belonging arise continuously in everyday life, when human desires married, have a family, being part of a community, being a member of a church or attend a social club. After that the first three needs are moderately satisfied, arise esteem needs relating to self-esteem, recognition to the person, to the achievement and respect towards others - needs these people tend to feel safe if

same and valuable within a society, if these needs are not met, people feel inferior and worthless.

Therefore, Maslow proposed two needs of esteem: one inferior and one superior. The inferior one includes aspects such as respect for others, need for status, fame, glory, recognition, attention, reputation, and dignity. The superior one determines the need of self-respect, including feelings such as trust, competence, achievement, independence, and freedom (Quintero; J; 2007:1-2) [3]

The needs of self-realization are the highest that are at the top of the hierarchy. It responds to a person's need to be and do what the person "was born to do", that means, it is the fulfillment of personal potential through a specific activity. In this way, a person who is inspired by music must compose music, an artist must paint, and a poet must be inspired by his muse and put it on paper

In addition to the five needs described above, Maslow also identified three categories of needs: esthetic needs, cognitive needs, and self-transcendence. These categories led to a rectification of the hierarchy of needs. Esthetic needs are not

universal, but at least certain groups of people in all cultures seem to be motivated by the need for external beauty and gratifying esthetic experiences. On the other hand, cognitive needs are associated with the desire to know, which most people possess. Among the cognitive needs are the desire to solve mysteries, to be curious and to investigate different activities. The study highlights that this type of need is very important because allow for the individual to adapt to the five needs described above.

Finally, the needs of self-transcendence refer to promoting a more beyond himself and experience a communion outside the limits of himself. This can mean the Service to other persons or groups, pursuing an ideal or a cause, religious faith, the search for science and union with the divine essence. In general, is said that Abraham Maslow's Theory of Human Motivation forms part of the humanist educational paradigm, in which, the maximum achievement of the self-realization of the students in all aspects of the personality is fundamental, trying to provide an education with training and personal growth. Also, according to Maslow's theory, one must have in mind, that for a student to achieve self-realization, it is required that the other Needs to be covered, which is seen as a difficulty for classrooms in which children do not have met physiological, safety or love, belonging and esteem needs. By the way in which the satisfaction of these needs is addressed also becomes a challenge. For educational institutions and the school system in general, considering some important lacks such as example, food, security or sense of defense, and constitution in the family, among others currents difficulties, that are very present in the daily lives of many students, especially those who come from more vulnerable contexts and, therefore, affect their education and the search of their self-realization. (Quintero; J. 2007: 3-5)^[3]

A review of literature on what has been studied until the moment

A series of studies and investigations that have been carried out emphasize the anxiety that Students to face classes that are not to their liking or for which they think they are not ready for. In the same way, studies recommend motivation as a tool that should be considered to help control this anxiety. Jadue G. (2001) carried out a study on the effects of anxiety on student achievements. In the same he found that the Anxiety produces a number of adverse effects on students' academic performance. In the same research, it's established that the student loses his self-control, he cannot be focused on the subjects and these take him in many Times to failure. Similarly, Becerra (2004)^[5] stated that solving problems in Physics, produces a high level of anxiety in the students, so that, they cannot analyze, understand, and solve the set-out problems with applications required on this subject. Golombek (2008)^[6], agrees and also, he goes further when carrying out the research with teachers. The study revealed that they have big difficulties in solving problems and that they were not able to teach in their courses with the required efficiency. For such reason, this situation was cause for anxiety in the students.

In this way, Dima, Gilda, and Gilleri (2012)^[7] taught problem-solving in Mathematics and Physics with the methodological use of constructivism. In this study, groups were created comparative groups, where a group was given the theory and it began to solve problems; while the other group was working

with the constructivism experimental methodology. The study revealed that the students had less anxiety when working with this methodology than solving problems just with theory. Villaseñor - Ponce (2010)^[9], also studied anxiety as a benefit from the students' psychological system. That is when a student feels the responsibility to perform a task or he is learning a subject, such anxiety causes that he takes his responsibility and answer positively to the learning process of that area.

Gil, Blanco, and Guerrero, in 2012, studied the anxiety that is caused by the resolution of verbal problems in students. This anxiety could be minimized with an intrinsic motivation that teacher developed and students who wanted to solve them. Güines and Fiolhais, in 2010, used toys as motivating elements for the teaching Physics to their students. The researchers found that such toys produced high motivation in the teaching-learning process on this subject. They concluded that students minimized the levels of anxiety that they had felt before, understanding better the different topics of the Physics. Bertoglia (2005)^[12] agrees with this statement and established that anxiety depends on the subject that the student is going to learn. For example, if in that subject a high level of reasoning is needed, consequently the anxiety levels grow with the student as well. Similarly, if in advance the student fears him on this subject, this fear will produce more anxiety.

Garcia and Sanchez (2009) consider that the teacher must change the pedagogical processes that used to teach the Physics class, in such a way that it is really motivating for the student to understand it. Likewise, it has been proved that using different method addresses the various ways in which students learn. For this reason, Oliva (2005)^[14] made some future proposals for teaching Physics to students in elementary and secondary grades as well. The investigation points out that the physics teacher must modernize his courses at the same time that he makes the necessary changes to make the class more attractive to students. Arreguin-Ardenson (2011), meanwhile, recommended the use of technologies such as, for example, cell phones for the teaching Science. In this study, cell phones were used to make graphics, measuring, and computing, among other activities. In this way, a change of attitude could be observed and greater positivism on the part of the students towards Science.

In the same way, Pérez, Castro, Fernández and Cano (2009)^[9] were able to reduce the anxiety of students through the implemented motivation in their class. In that same line of thought, Pagano (2012)^[18] also points to motivate as the great element of decreasing anxiety that be able to cause studying a subject at the secondary level. Due to the importance of motivation in the teaching-learning process, Núñez (2009)^[17], Anayan-Duran and Anayan-Huertas in (2010)^[16], created a series of strategies to achieve that students are highly motivated when they take a subject, sport or activity that they are interested in. Among the strategies, they listed are: that the student is aware of what motivation is and its importance. In the same way that the student takes into account the Importance and the usefulness of studying a particular subject. Finally, that he often realizes that now he knows things he did not know before, as well as making him conscious about his progress in this area.

What can we conclude and deduce from the different studies and researches?

Given the literature review regarding the subject of study, it was found that anxiety is a very frequent factor in students. Subjects that appeal to reason and analysis, among which is Physics, can produce in the student a certain level of anxiety. As a result, of this, the level anxiety greatly affects students' academic achievement, not only in the Physics course, but it may affect other academic subjects. In the same way, anxiety affects in a meaningful way, the psychological behavior process of a student in his daily life. The studies also reveal that motivation reduces anxiety that it's produced by the students and that this motivation comes with an intrinsic and extrinsic way, as they are understanding the content of the subject.

The studies also make it clear that students understand the importance of Physics in the academic life of apprentices, but they see it as a complicated as subject tedious as well, so that it requires a high level of reasoning and analysis. These levels of reasoning and analysis are the ones that cause them great anxiety. Using the constructivist learning model, and elements such as toys and other materials, students minimize anxiety levels and feel more motivated to understand a certain topic. Motivation, in the psychological aspect, also helps as a factor that changes the attitudes and behavior of students in their daily lives.

Having clear the ideas obtained by the compiler and the reviewing of the literature and in contrast with students' lives in their classrooms, we are able to establish that motivation, in a small or large scale, plays an essential and transcendental element to get reduced to some degree the anxiety which it is caused when the student enrolls in courses such as Mathematics and Physics. As far as the student is able to decrease levels of anxiety he can improve cognitive levels and thus understanding the Physics class contents. The teacher has an essential role in provoking that students' motivation in order that their anxiety in Physic class decreases. The teacher as the motivator of the intellect and the analysis must transform its pedagogical processes while integrating resources and new methodologies that helps the student to understand the Physics subject. In this way, the levels of anxiety in, the student will be minimized.

The motivation can transform the entire process in which the student learns all its disciplines. This is reinforced by the theory of Maslow, where the child who does not feel motivated to learn something does not show grand opening so want to do it. It is then when comes into play, the importance of the teacher as a motivator, which with a word or a stimulus can change and transform the lives of students. Once the teacher has put all its efforts and dedication in lower levels of anxiety, once the teacher made all the effort and dedication in lowering the levels of anxiety that they produce the discipline of Physics, they will teach their subject in the best situation. The student will have understood in his being is that the anxiety produced by fear, panic at the unknown or lack of understanding in the discipline can work better with the acquisition of the confidence and good wishes of the teacher's teaching.

It is undoubtedly expected that teachers who teach the discipline of physics will have identified and understood that with the motivation that they infuse in their students toward the be reciprocated with the desire and trust generated by a good

relationship in the teaching - learning process. An important aspect that the teacher who gives the course of physics could take into account when preparing your class is to have, as far as possible, an activity related to the topic to discuss that fosters in the student the interest and the spirit to learn something new. This new activity that appeals to the motivation, must have an aspect close to the real life, to the daily life, to put into perspective that physics is contained in everything that surrounds it and is not an isolated knowledge at an abstract level, difficult to understand and assimilate.

Once the concepts are assimilated by the students, it is important to try to carry out simple laboratory practices, with materials that in many cases they can get, and design by themselves, assemble, so they can experience and so there is a better understanding. In this way, we will be helping students to control or minimize the anxiety that produces new issues. It is not an easy process, and you do not have a single recipe, to manage those states of anxiety and frustration experienced by the student in the class of Physics, each has different ways of dealing with them. We as teachers must prepare, exercise, invent, create, test new techniques and skills that allow us to reach students and create in them greater confidence so that they can face and continue advancing in the class.

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