International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 04, 2020
ISSN: 1475-7192

Academic performance on physics subject of high school students

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Abstract---*An investigation was conducted to assess how academic performance behaved in the subject of physics in students of high school. The bibliographic review was used to know how the levels of performance in the 2016-2017, 2017-2018, 2018-2019 periods; In addition, the qualitative and quantitative method was applied to compare the results obtained in the students of I, II and III level, of the Captain Giovanny Calles Educational Unit, noting that there are no significant differences in the I and II levels, in the III level There is a slight improvement that may be associated with the students have made an effort to achieve qualifications that allow them to graduate, the preparation of preparatory courses for the Be Bachelor test and guarantee their entrance to the university.*

Keywords---*academic performance, baccalaureate, bibliographic, learning quality, physics.*

I INTRODUCTION

The Captain Giovanny Calles Educational Unit has been among the best results in the Ser Bachiller exams for three years (Senescyt, 2018), demonstrating that the efficiency of the education system of the Province is at a level of preparation where students meet the objectives of the evaluations performed. This research work was carried out in order to see the academic performance in the physics subject of high school students in the last three years since it is contributed to the preparation for students to meet their goal of entering university.

Academic performanceis an index that shows how students are able to assimilate the knowledge provided by their teachers in the classroom, these have different factors that influence students being one of them the family and their relationship with the school. The participation of parents in this process is based on the attention they offer their children throughout the period giving emotional support and understanding in the fulfillment of activities (Sanchez, 2012; Suwija *et al.*, 2019). According to the studies carried out, the essential role of the family lies in their active participation in the teaching-learning processes of their children that guide the educational process from an early age.

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DOI: 10.37200/IJPR/V24I4/PR201015
Received: 12 Oct 2019 | Revised: 23 Sep 2019 | Accepted: 15 Jan 2020

The subject of physics, by itself, is considered by students as a difficult subject because it is linked in its process with the subject of mathematics, authors have assessed the learning behavior of mathematics (Garcia &Romero), where they have used ICT tools. In the case of physics, teachers who teach the subject must find methods to make it a normal and easy subject for students to understand and apply similar instruments (Ceballos & Rodriguez, 2019). In the teaching-learning system, the knowledge that students acquire can serve them for their entire lives from school, profession to the social level. Students experience new experiences in all dimensions of the intellect under the direction of the teacher. The subject provides elements that contribute to the components of this process, in terms of Physics and their organization (Salazar, 2016; Sari *et al.,* 2018; Sjaifullah, 2019).

According to Longa(2014), today the physics learning teaching system is invaded by mechanical methodologies, where information is stored, without interacting with pre-existing knowledge. This subject meets many equations and teachers mostly force students to memorize formulas or equations. The author's student-athletes can relate to a large extent the phenomena studied in physics and link it with its main sporting activity. This same can implement the current teacher in the regular teaching of normal schools, educating students with an explanation of the subject based on real phenomena of daily life.

The subject of physics is basic at the levels of secondary education, many natural phenomena have their explanation on the basis of physics in the normal life of a person, in transport, the environment, in the air that sustains life, water, among other examples. Teachers should look for tools that help improve student learning levels.There are variables at the international level that affect academic performance, so many countries take special measures for some subjects, in addition to enhancing their effective development for the understanding of the subject. Variables such as the socio-economic aspect, knowing that many people do not have the necessary resources to reach their maximum performance (Mendoza & Rodríguez, 2019; Suma *et al.,* 2018; Suryasa*et al.,* 2017).

An example of this is the actions carried out by some developed countries that provide financing to support education, in the underdeveloped countries, in many of them the teaching system is not supported so that students move to a higher level. The example could be Asian countries like Japan and Singapore where the family is the guiding base of education (Chipana, 2012; Kasiani& Yusuf, 2019; Salahuddin *et al.,* 2018).In some countries of Latin America, to ensure that students receive the appropriate knowledge of the subject, they are based mainly on examples since the first phenomena were discovered, which have their explanation in physics; but we do not work on strategies to improve teaching levels, so one of the difficulties that exist is the lack of priority of laboratories as a basic and necessary space for students to practice and make visible the phenomena and their behavior in life every day (Giambiagi, 1996).

According to the Ministry of Education, there are three types of baccalaureate: in sciences where the subjects of the "common trunk" and electives are studied, the technician has a complementary training based on labor competencies and the subjects of the common trunk, the international that offers programs International Baccalaureate, so they modify and intensify their curricular network (Delgado, 2015; Suantari*et al.,* 2018; Suarsana*et al.,* 2018). The average numbers of students per classroom are around approximately 20 to 29

DOI: 10.37200/IJPR/V24I4/PR201015
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students who are served by a teacher, which allows him to carry out his pedagogical activities inappropriate ways, as he does not have a large number of these. This indicator can influence the learning results in the tests being a bachelor (Sachez*et al.*, 2016).

An interesting reflection is that the physics subject is taught as part of the Natural Sciences (Ministry of Education of Ecuador, 2019), not as a basic subject influencing student knowledge (Education, 2018), but not in the tests that these perform to enter the university.

In spite of the previous reflection, the objective of this research is to know how this level behaves in the level of knowledge that students acquire in the three levels of high school.

II MATERIALS AND METHODS

To carry out this research, a documentary search was carried out to know how academic performance behavior is treated in high school students in different contexts, in order to compare the results obtained in the collection of field information. A quantitative and qualitative analysis was carried out in the last three consecutive periods, in addition, the deductive inductive method was applied, to evaluate the results obtained in the physics subject in a school.

III ANALYSIS AND DISCUSSION OF THE RESULTS

In academics, skills and effort are not synonyms; the effort does not guarantee to reach better results, the skill is developed in each student with the support of the teacher in many cases, this is valued in the student as he travels through different levels, new goals and objectives are proposed. These elements provide the student with better cognitive ability (Navarro, 2003; Alcivar&Ormaza, 2018; Arevalo *et al.*, 2017), this author suggests that this content allows the student to make a mental elaboration of the causal implications of managing self-perceptions of skill and effort, which in many cases do not they present the same weight for the student; according to the model, perceiving as skilled (capable) is the central element.

The physics course, provides different knowledge of logical reasoning, which students learn in the three years of high school, this contributes to the skills and dexterity, improving their levels of academic performance (Cobeña& Rodriguez, 2019).

In this research, statistical studies were carried out at three levels of high school to learn how academic performance behaves in the subject of physics. To do these analyzes, the average assessments were selected in classrooms of different levels, but only two first-level parallels, two second and one-third level were investigated.

Evaluation in the I level of Baccalaureate

In the first level of baccalaureate, it was obtained, that in average reached by the students at the end of the course was in the order of 7.37, as it is observed in the graph of figure 1, in the three Years investigated The trend line can be observed, being able to notice how the averages of the evaluations are decreasing.

DOI: 10.37200/IJPR/V24I4/PR201015
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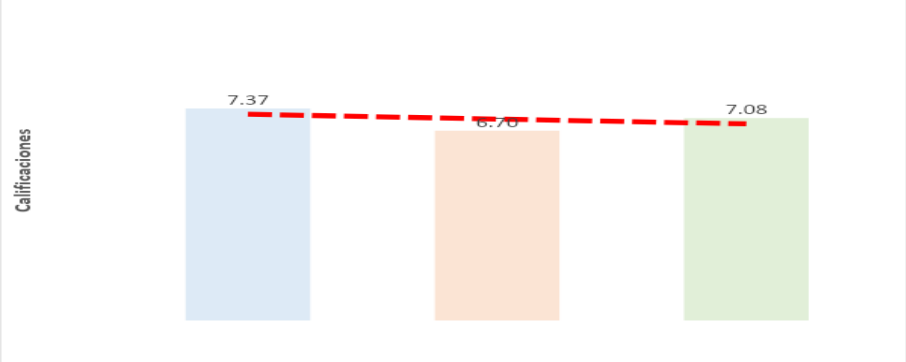

Figure 1: Average evaluations in the first year of baccalaureate

Evaluation in the II baccalaureate level

This same analysis was carried out with the baccalaureate level II showing the results in Figure 2. The behavior at this level was similar to that assessed in the I level, The trend lines have the same behavior.

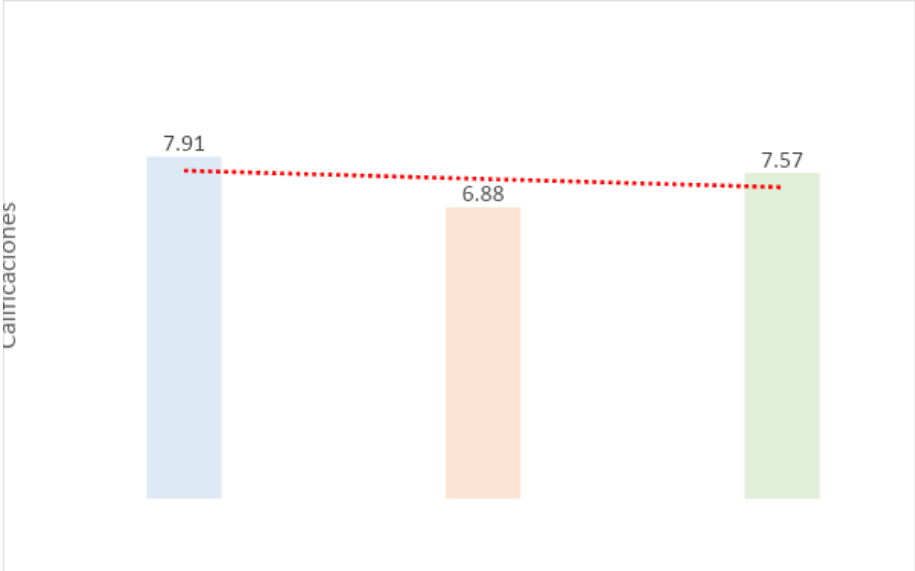

Figure 2: Average evaluations in the first year of high school

Evaluation in the III level of Baccalaureate

If the behavior is assessed per year, the trend line is maintained, that is, it decreases in the second year and increases in the third year.When performing this assessment at level III, which can be seen in Figure 3, how the trend line continues to be maintained.

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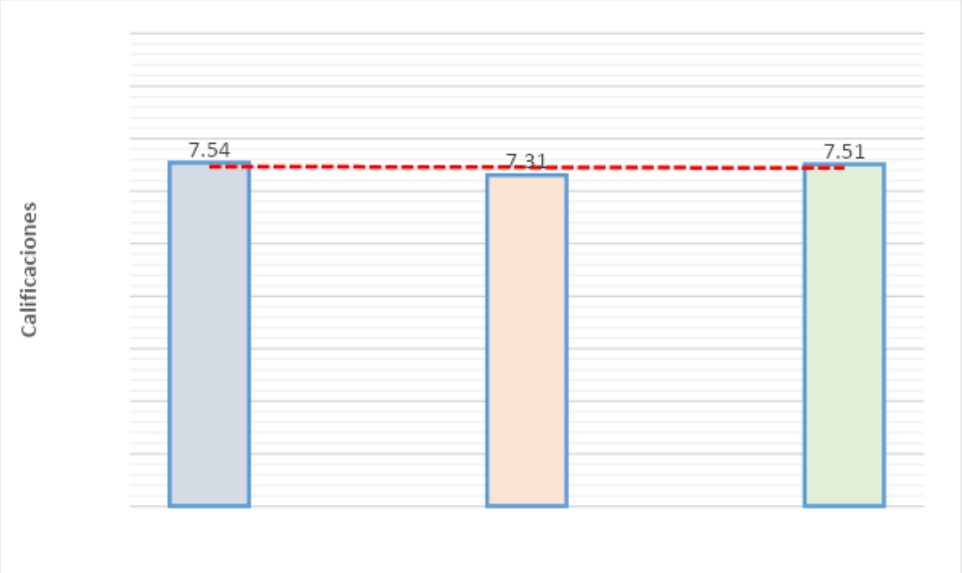

Figure 3: Average assessments in the first year of high school

The R square value is a relatively good fit of the line with respect to the data. A polynomial trend line is a curved line that is used when data fluctuates. The behavior of R^2, at all levels of education are equal to 1, not showing significant differences in the behavior of its trend.

Comprehensive analysis

These results are shown in the graph of Figure 4, and the behavior of the averages obtained per year in each of the levels can be noted.

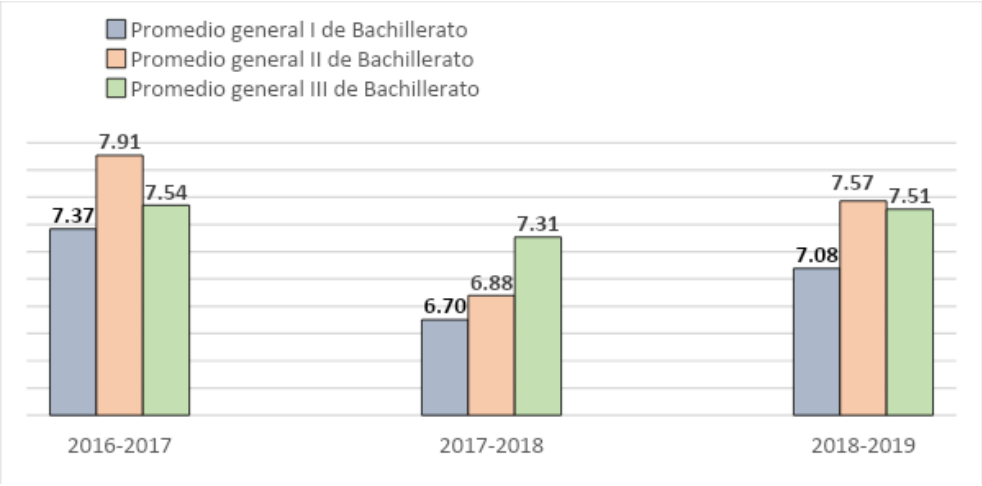

Figure 4: General averages per year of the three Baccalaureate levels

The behavior of the averages obtained by each baccalaureate level when comparing them, it is noted that in the year 2016-2017, in the third year of high school the average was decreased, in 2017 -2018 was increasing, although the average does not exceed 7.31 points, lower than in other courses. In the year 2018-2019, it is noted

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that the behavior was similar to the year 2016-2017, although the averages increased in level II and III. The year of best average 2016-2017 had a basic physics laboratory facilitating a better understanding of the subject, as well as the best support and participation of parents in the educational process.

It could be assessed, from studies conducted by other authors, learning approaches to measure academic performance, according to Lamas(2015), there are two approaches, the deep and the superficial. The deep one is based on the student's interest in learning (intrinsic motivation), here the student has an interest in the subject and achieves good results. In the case of the superficial approach (extrinsic motivation), the student aims to comply with the evaluation, his strategy is based on machine learning, using routine memorization without taking into account the principles, guidelines or guides, that is, his level of commitment is null. It could be said that at level III the behavior is intrinsic, when a small improvement in the evaluations is observed, being a terminal year (Garcia & Rodriguez, 2019).

Other researchers have studied the different factors that influence the school performance of high school students, as it is a concern, which not only occurs in Ecuador. For example, in Mexico, research has been carried out to measure self-efficiency, self-determination and self-regulation in high school levels, obtaining results related to the values of students acquired at home, where the family has played a leading role (Frías, 2014). In this sense, it is worth mentioning that during the educational process the support received at home has been reflected, the parallels where parents have made a permanent accompaniment to their children, the performance has been more satisfactory. Infrastructure, (heated classrooms) and applied technology (ICT) has facilitated the learning of physics in the institution (Mero *et al.*, 2019).

In Ecuador, achievements have been obtained from strategies outlined by the Ministry of Education, to improve the level of achievement of schoolchildren in the years 2017-2018. The country obtained results above the regional average, in student performance evaluations contrasting with previous studies where the results placed the country in the last seats at the regional level (National Institute of Educational Evaluation, 2018); it would be worthwhile to be able to make an assessment of the behavior in other subjects, but in the case of the physics that is investigated in the school, it is noted that in that period the behavior was not high.

The results obtained showed that there are gaps, especially the socio-economic level and ethnicity can influence. Likewise, the well-being and exercise of young people are serious problems, which, although they cross the educational system, its dimension refers to a society in general. In this sense, the pending challenges and the advances achieved in education depend on the orientations of public policy (Vázquez *et al.*, 2019), which govern the education system. In the current regulatory framework, this mainly refers to the guarantee of access to education in full exercise of the rights of Good Living (National Institute of Educational Evaluation, 2018).

IV CONCLUSIONS

In the educational process, several factors are combined, initially, students must have ethical and moral support and training at home, there must be minimal physical conditions in the infrastructure (Laboratory) that guarantee the development of the experimental part of some physical phenomena For their best understanding,

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the teacher must innovate and motivate more with their teaching methodology. The results obtained in the academic performance in the baccalaureate levels have a similar tendency, only in the III level, a slight difference is observed in the years 2018-2019, being able to be valued as significant since it is the level that allows you to climb to a higher university level which is the goal set by most students.

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