

**How to Cite:**

Orellana-Solórzano, M. P., & Bermúdez-Cevallos, L. del R. (2022). Education by competencies through project-based learning: Case study educational unit Juan Antonio Vergara Alcívar. *International Journal of Health Sciences*, 6(S6), 3792–3808.  
<https://doi.org/10.53730/ijhs.v6nS6.11506>

# **Education by competencies through project-based learning: Case study educational unit Juan Antonio Vergara Alcívar**

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**Abstract**--In the 21st century, many institutions do not provide competency-based education, since traditionalist education is still applied, without using active methodologies to enhance collaborative work competencies in students. For this reason, the purpose of this work is to analyze the achievement of competency-based education using project-based learning in the Juan Antonio Vergara Alcívar Educational Unit. To carry out the study, bibliographic and field research was used, with a qualitative-quantitative approach. Analytical-synthetic and inductive-deductive methods were used. In addition, a sample of 30 teachers was used, to whom a survey with multiple choice questions was applied. The data obtained refers to the lack of competency-based education through educational methodologies that occurs in secondary education to develop skills in students. The data was analyzed and tabulated and then contrasted with other investigations, allowing the conclusion that, in the Juan Antonio Vergara Alcívar Educational Unit, education by competence is developed by 60-70% using project-based learning, generating in the students a degree of autonomy and problem-solving skills.

**Keywords**--3 skills-based education, traditionalist education, active methodologies, project-based learning.

**Introduction**

Among the challenges of the 21st century is providing a quality education that allows human beings to develop skills and abilities necessary to face the

challenges of the current knowledge society, being able to solve everyday problems using divergent thinking and the use of innovative tools that strengthen their life skills. In this sense, educational institutions and their actors have a great responsibility on their shoulders, to generate an education by competencies, which seeks to give meaning to learning based on conflict resolution, which allows students to feel the reality in the that they must act and develop. Competency education should focus on the acquisition of significant learning (Valiente and Galdeano, 2009).

Despite the importance of generating a competency-based education, a traditionalist education is still observed in certain institutions that does not put the student at the center of learning, focused only on transmitting knowledge, forgetting that in this century of knowledge and information it is necessary to develop countless skills and abilities to deal with problems. For (Montes and Machado, 2014), competency-based education is being brought into educational practice in many countries and at all levels of education from different approaches, with this it is sought that from an early age student are promoting and cultivating skills and abilities. necessary not only to put them into practice in the following levels of study but to work on them in real life looking for the different solutions that may exist to change these phenomena present in the context.

As has been noted so far, a competency-based education is a comprehensive education that forms individuals in all their aspects. There are some ways that can be used to achieve a competency-based education, so that educational actors can make use of so-called active methodologies, which allow a better development of skills and abilities, these methodologies are at the service of teachers to be applied and improve their teaching practice and therefore the teaching-learning process. For (Lazzari, 2014), active methodologies allow keeping the student attentive, focused on the development of their activities, allowing a collaborative construction of learning. Among these active methodologies that teachers have to innovate in their educational work are the following: Problem-Based Learning (PBL), Project-Based Learning (PBL), Cooperative Learning (CL) and Collaborative Learning, all these methodologies They are oriented towards working and learning together, based on interaction and the exchange of experiences, seeking solutions to the multiple problems of the context.

In this study, the active methodology of project-based learning will be analyzed for the development of competency-based education, trying to explain how these competencies are generated by working collaboratively and learning projects where several individuals act to obtain a common good. Project-based learning emerged in the 1970s as a methodology to combat student demotivation (Fernández, 2017). This constitutes an educational methodology that puts the student as the protagonist of his own learning. To carry out this, the student must be guided to actively participate in a research process autonomously to obtain a final product that is useful for society and that is focused on solving context problems (Pinos, 2015).

Consequently, continuing with the analysis of the importance of generating an education by competencies to achieve success in the lives of students, some

approaches those various countries have regarding the need to educate by competencies are presented below. This is the case of the Dominican Republic, where the Ministry of Education proposed in 2016 a new education model for the country, this model called Bases of curricular revision and updating, seeks to provide an education by competencies that generates in students' skills to act autonomously in real and diverse contexts, for this it is indicated that it is necessary to integrate concepts, procedures, attitudes and values. The Dominican educational system tries to eradicate traditionalist education, for this reason it bets on teacher training, so that this staff is trained to know the process of educating by competencies; understanding that this not only refers to a set of cognitive skills or abilities but also to aspects related to motivation, development of emotions, among others (Santana, 2020).

On the other hand, there is Chile, whose educational system of higher education based on competences is not only based on "knowing how to do", but also includes a fundamental part that is "knowing how to act"; that is to say, it implies a development that goes beyond what students must learn, focusing the educational process on the improvement of abilities and skills necessary for life and for the environment that the student has to face once he begins his professional life. As an example of what has been stated, the University of Talca, located in the Maule Region, is cited, whose educational model focuses on the integration of various aspects such as the generation of knowledge, training in values and the development of skills for active citizenship. This educational model prepares students to be critical beings, willing to question the practices in their professional lives and to propose new and innovative ideas, which, when worked together, improve the conditions of the environment for all those who are immersed in it (Pizarro, 2014).

As for Guatemala, as a developing country, it has opted to improve its educational policies, taking advantage of the idea of providing an education by competencies, focusing on seeking that students develop the so-called basic skills for life, which are not another thing that the set of learning (knowledge, procedures and attitudes) necessary to achieve personal fulfillment and that children and adolescents can be incorporated into adult life in an efficient and effective way. In this country, a strategy was established in which various actors of society participated, to propose what would be those basic life skills that graduates had to fulfill once they finished their secondary stage. In July 2007, a conference was held, where national and foreign experts analyzed the important role of basic life skills in the formation of Guatemalan citizens. To support this policy, in addition; An investigation was carried out on basic competencies, carried out by Rychen (2007), which provided suggestions for Guatemala to apply competency-based education and achieve positive results for both individuals and society (Maldonado et al., 2011).

By bringing competency-based education to closer contexts, it is evident that Ecuador has tried to take advantage of the global trend of competency-based learning, trying to prepare teachers in pedagogical skills from initial to higher education. However, it is known that work is still being done with a skills-based curriculum with performance criteria, which is not the same when it comes to educating. Well, teaching a skill implies that the student can do something, and

teaching by competence assumes that the student performs said task with experience and knowledge. Therefore, it can be inferred that the educational curriculum deserves some changes, allowing a deeper education based on knowing how to know, knowing how to be, knowing how to do. It must also; encourage teachers to train and prepare day by day to leave banking education behind, in which the teacher only focused on depositing content in the student's mind (EL COMERCIO, 2016).

In more distant contexts, such as in the rural areas of the country, there are still institutions that, despite their limitations, try to provide a comprehensive education, using innovative resources and active methodologies capable of developing in students the necessary skills for life, however; not all teachers join this noble work, there is still a lot of commitment, dedication and dedication to assume a role of teacher of the millennium, who seeks the different possible ways and strategies, to develop in their students all those skills they will need in higher education and also once they face the challenges of society. For this reason, this research is carried out at the Juan Antonio Vergara Alcívar Educational Unit in the Junín canton of the Manabí province.

This study is important because it makes it possible to publicize the need to develop an education by competence, providing students with skills, strategies, and essential knowledge for their lives. In addition, it is a useful work that will show some active methodologies that teachers can use to develop these skills in students and thus prepare them for today's society, improving the teaching-learning process. With the development of this project, teachers and students benefit, considering the necessary strategies to develop an educational process based on competencies, on the other hand, this research serves as a contribution to society for other researchers to take as a reference in future research. on the subject and theories about it can be discussed. For the development of this scientific study, the objective was to analyze the achievement of education by competence using project-based learning in the Juan Antonio Vergara Alcívar Educational Unit.

## **Method**

In this study, a bibliographical investigation was used, which admitted the active search for information, in addition, a field investigation was used, since the scene of the events was visited to work directly with the object of investigation, making use of a qualitative-quantitative approach, with which data were obtained through the techniques and methodologies used with the units of analysis. The analytical-synthetic and inductive-deductive methods were used, which allowed extracting the main ideas for the analysis of the parts and the whole of the object of study. The population and sample for this research was 30 teachers, chosen in a simple random probabilistic manner, a survey with multiple choice questions was applied to these analysis units, as a data collection instrument. Once the results were obtained, they were validated, tabulated, and analyzed to later be contrasted with other investigations to support this work. For this, the statistical method was used. With the use of this methodology, it was possible to reach the conclusions of the case study, demonstrating the degree of education by competencies that is provided in the Juan Antonio Vergara Alcívar Educational

Unit, using active methodologies such as project-based learning (Hernandez et al., 2014).

## Discussion

### Education by competencies

Educating in competencies is a challenge for educational institutions, which is why schools, colleges and universities must develop content, attitudes, skills and values and the appropriate environments to provide individuals with skills, abilities and competencies that they will allow facing challenges and solving problems (Trujillo, 2014). On the other hand, Cejas et al. (2019), assume that competency-based training is known as a teaching-learning process focused on individuals developing abilities, knowledge, and skills using attitudes that will allow them to improve their performance and carry out tasks effectively and efficiently. tasks entrusted, generating satisfactory results in the personal and professional field. Education by competencies integrates the development of four knowledge or four fundamental pillars, which, when applied in an appropriate and timely manner, will guarantee people the development of suitable capacities to function in any area of their lives. Figure 1 below outlines these pillars proposed by Delors et al. in 1996, for the education of the 21st century.

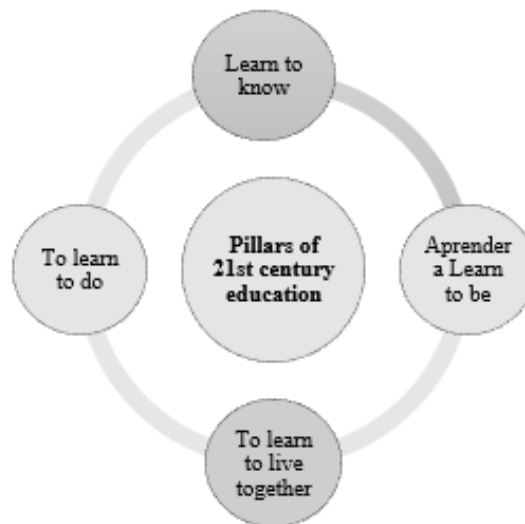


Figure 1. Fundamental pillars of competency-based education  
Source: (Diaz et al., 2020)

As can be seen in figure number 1, education in the 21st century requires four necessary skills to be developed in people to ensure their success in the different areas of life. Learning to know refers to the acquisition of elements to initiate knowledge, which will allow the development of capacities to understand the surrounding environment. For its part, learning to be represents everything that allows the person to develop their autonomy and values to act critically, contributing to the integral development of each person.

Learning to live together is undoubtedly that part that fosters a culture of peace, respect for others and allows human beings to live in harmony with all forms of life on the planet. Finally, learning to do, focuses on developing in individuals those capacities to apply the knowledge acquired, they are developed skills that allow communication, teamwork, facing and resolving conflicts.

### **From traditional education to 21st century education**

To understand the need to implement an education by competence, one must start from the analysis of traditional education, which represents many limitations in the development of students' abilities, however; in some places it is still used, without considering the urgent need to change the system and generate new and innovative ways of teaching. Traditional education refers to a banking education model, the same one that according to Freire (2010), refers to the student seen as a bank in which knowledge is deposited so that it can be memorized and accumulated, leaving the student with a passive role in which its function is only to receive knowledge, limiting the development of creativity and invention. That is why Freire fights to move from an oppressive pedagogy to a liberating pedagogy, making it clear that education is not only the transmission of knowledge, but also a continuous construction of the world in common, based on the practice that allows building knowledge day by day. in the classroom.

With this background about traditionalist education, it gives way to the understanding of the need and leave behind this practice that limits the integral formation of the new generations, for this reason the implementation of an education based on the challenges and challenges of the century should be contemplated. XXI, where not only knowledge but also procedures and attitudes are integrated that allow students to create new valuable products for society, allowing them to have an active role in their education, where they have autonomy to learn at their own pace, considering their educational needs. An education is needed where the teacher is the guide and counselor of innovative and significant learning that allows students to solve problems. Figure 2 shows some characteristics of the traditional school and the new school, making a clear comparison and differentiation that allows keeping in mind what must be left behind and what must be put into practice to improve educational processes.

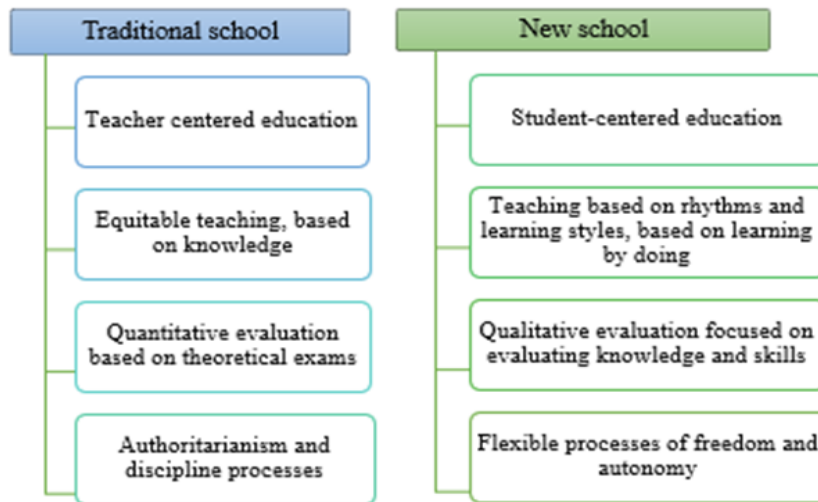


Figure 2. Differences between the traditional school and the new school  
Source: (Garrido, 2015)

To summarize the information presented in visual representation 2, it can be inferred that traditional education is a closed education, where the student plays a passive role, dedicating himself only to receiving knowledge to store it and then replicate it in a theoretical exam. In this type of education, the development of creativity, criticality, reflection and the generation of new abilities, skills and competencies are limited. On the contrary, the new education of the 21st century seeks for the student to be the protagonist of his education, making him learn through practice, allowing him to compare, infer, analyze, make value judgments, and draw conclusions, working together with other colleagues, and demonstrating their abilities through the development of products or projects that contribute to society, changing or improving problems that afflict it.

### Active

methodologies Active methodologies are an interactive process that allows communication and harmonic relationship between students-teachers; students-students; student-teaching material and student-environment, this leads to the enrichment of altogether, who work for a common good developing skills and abilities necessary for life (López et al., 2020). Likewise, for Labrador (2008), active methodologies are methods, techniques and strategies that are available to teachers to be used and thus convert the teaching-learning process into participatory activities for students, which allow them to acquire learning significant and innovative, developing the skills and competencies necessary to deal intelligently and in a timely manner with the problems and challenges present in the environment. Figure 3 presents a brainstorm of active methodologies, detailing some ideas about them.

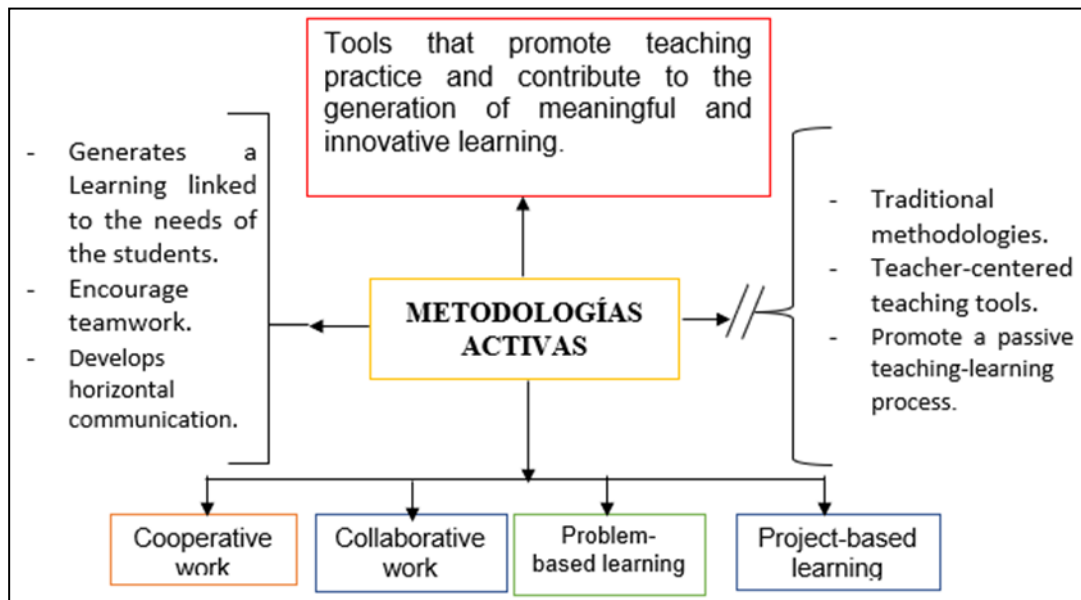


Figure 3. Mentefact about active methodologies  
Source: (López et al., 2020).

When analyzing figure 3, it is inferred that active methodologies are innovative tools that support the teaching task and that leave traditional teaching behind, promoting significant learning, based on teamwork, these methodologies are worked considering the rhythms in which each student learns, allowing their needs to be met, since they learn from each other and develop abilities and skills together. The active methodologies that are presented in the image are: Cooperative work (TC), where each student works on an assigned task to consolidate the execution of a project. For its part, it is collaborative work (TC), it seeks equal and joint participation of individuals, where everyone works for the same purpose, sharing successes and defeats. Problem Based Learning (PBL); the students make use of their abilities; they work based on the resolution of complex phenomena of life. Finally, project-based learning (PBL) refers to shared work, where all individuals participate together to acquire a final product. All these methodologies allow an active role of the student in the learning process that helps them develop skills necessary for life.

### **Project-Based Learning (PBL) for the development of competencies in secondary education**

PBL is an innovative methodology of teamwork, which encourages research in students, based on questions and hypotheses. When developing a project, students explore, inquire, analyze, compare, discover, and organize information, make critical and reflective judgments, reaching conclusions that allow them to understand possible problems in the environment, this helps them enrich and transform their capabilities, being able to communicate results and formulate proposals to solve these problems (García et al., 2017). By implementing PBL in an appropriate and timely manner in the classroom, students will be helped to learn by doing, based on the knowledge, attitudes, and coexistence skills that

they develop by working together to achieve the same goal. Here is the relationship between competency-based education and the use of active methodologies such as PBL, this contributes to the development of abilities, skills, and competencies necessary for the creation of new products that are focused on solving problems present in daily life and which students must face efficiently and effectively to achieve success in all aspects of their personal and professional lives.

Therefore, the PBL, like the other active methodologies, must be the protagonist of the teaching-learning processes that are developed in educational institutions. Students in basic, middle, and higher general education must be prepared with life skills and the potential to develop projects that help their communities and society in general. Current education cannot focus on traditional methodologies, on the contrary; this must generate divergent thinking in students, based on the application of multiple innovative strategies that allow students to be the generation of change. Active methodologies supported by Information and Communication Technologies (ICT) are part of the new teaching models that allow students to be protagonists of their own training. Thus, PBL encourages this active role of students, which is why it is an ideal tool to strengthen teaching practice and therefore the teaching-learning process. Figure 4 shows the steps that must be followed to apply this methodology, giving guidelines for its implementation in educational institutions, trying to find a better approach in educational processes.

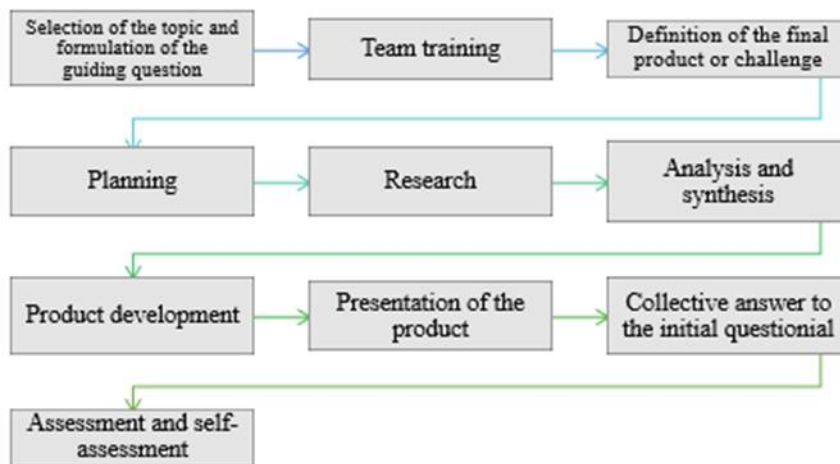


Figure 4. Steps to apply Project-Based Learning (PBL)  
Source: (ulaplaneta, 2015)

Figure 4 presents a scheme to follow to properly apply PBL in the classroom and thus obtain positive results. The following describes what each of these steps presented refers to.

- **Selection of the topic and approach of the guiding question:** The student should be motivated to choose a topic linked to their reality and

which motivates them to learn. They should be asked questions that invite them to think about what they should investigate and what strategies they could use to solve the topic or problem in question.

- **Team formation:** It is recommended to form heterogeneous teams of 3 or 4 participants where there is a diversity of profiles, and some can learn from others.
- **Definition of the final product or challenge:** You can establish the development of a final product focused on the skills you want to develop, this product can be a brochure, a presentation, scientific research, a model, among others.
- **Planning:** At this stage, students should be asked to present a plan detailing the activities to be carried out, how they will be done and the schedule to prepare them, as well as; the role of each team member.
- **Research:** Students should be given autonomy to inquire and investigate, analyze, and contrast the information necessary to carry out the work, this should be done without neglecting the role of guide and counselor of the teacher.
- **Analysis and synthesis:** In this step, the students analyze and contrast the researched information together, share and debate their ideas, develop hypotheses, and seek together the best answer to the initial question.
- **Elaboration of the product:** In this phase, the students put their creativity into practice, applying what they have learned and translating it into the final product.
- **Presentation of the product:** The students present what they have learned and show how they have found the answer to the initial question.
- **Collective answer to the initial question:** Once all the presentations of the teams have been concluded, a general debate is held, the teacher must invite all the students to reflect on the lived experience and thus they will be able to find together a collective response to the initial question.
- **Evaluation and self-assessment:** To conclude with the PBL, students must be evaluated using a rubric, which the teacher has previously provided, in addition, self-assessment must be applied since this will allow them to recognize their strengths and weaknesses, allowing them to work to improve them

The survey applied to the teaching staff of the Juan Antonio Vergara Alcívar Educational Unit was made up of multiple-choice questions, where the respondent had to select only one alternative; In relation to the study sample, it was composed of male and female people, whose ages range between 30-60 years of age. Based on the results obtained are presented below and are shown in Figure 5.

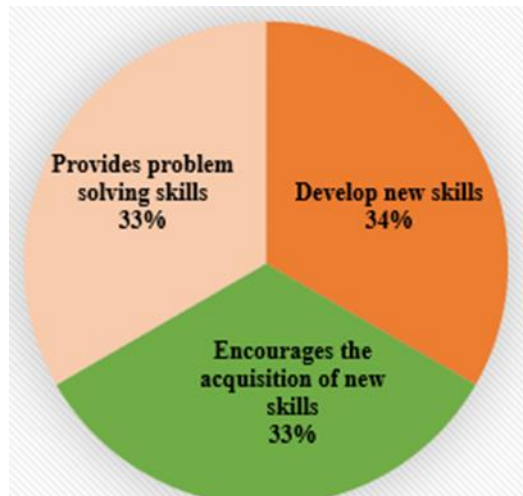


Figure 5. Importance of competency-based education in secondary education

34% of teachers said that competency-based education is necessary to develop new skills in students, while 33% said that this is important because it encourages the acquisition of new skills and another 33% said that this type of education is important because it provides skills for problem solving. As can be seen, education by competencies has multiple benefits as it is developed in a timely manner since it allows the acquisition of abilities, skills, and aptitudes to solve problems. Teachers were consulted on efficient strategies to develop competency-based education, the results are shown in Figure 6.

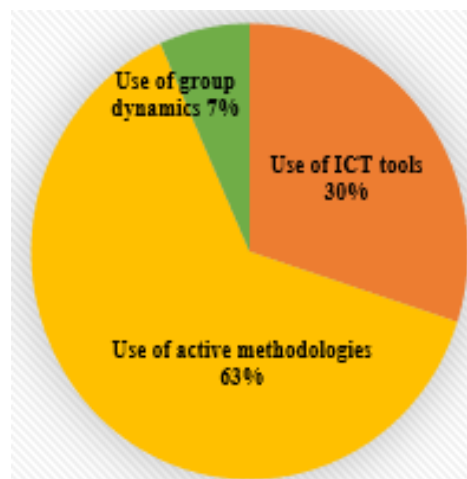


Figure 6. Efficient strategies to develop competency-based education

According to the data collected, 63% of teachers said that active methodologies are efficient strategies to develop competency-based education, while 30% stated that the use of ICT is the efficient strategy for educational development and 7% mentioned that these strategies develop group dynamics. As can be seen, there are several tools to work on competency-based education, however, active methodologies have a preponderant role in improving the educational process.

The consequences of not developing competency-based education were consulted; the results are shown in Figure 7.

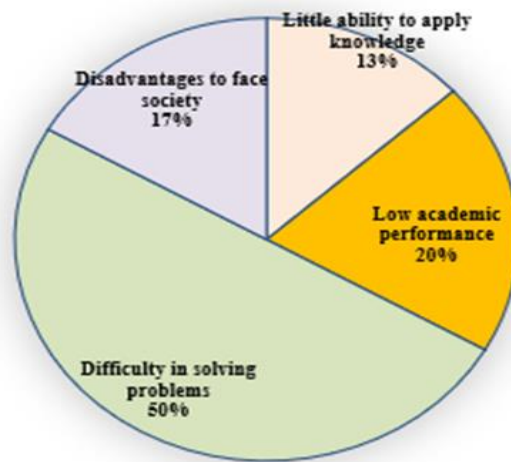


Figure 7. Consequences of not developing competency-based education

50% of those surveyed said that the difficulty in solving problems is one of the consequences of not developing competency-based education, while 20% indicated that poor performance is the consequence more noticeable; 17% said that they are the inconveniences to face society and 13% mentioned that it is the little capacity to apply knowledge. What makes it clear that if an education by competencies is needed, the students are affected in their abilities to function both in their personal lives and in society. The importance of active methodologies within the teaching-learning process was investigated, the results are shown in figure 8.

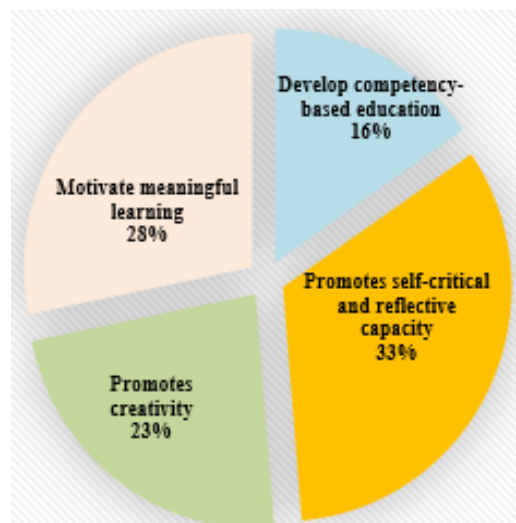


Figure 8. Importance of active methodologies within the teaching-learning process

33% of teachers said that active methodologies are important because they favor self-critical and reflective capacity in students, while the 28% said that they are important because they motivate significant learning, 23% mentioned that this importance lies in the fact that it promotes creativity and 16% said that they are important because it develops education by competencies. With this, the idea is that active methodologies develop some aspects necessary to strengthen the skills, abilities, and competencies in students. The benefits of implementing PBL in the classroom are also investigated, the results are shown in Figure 9.

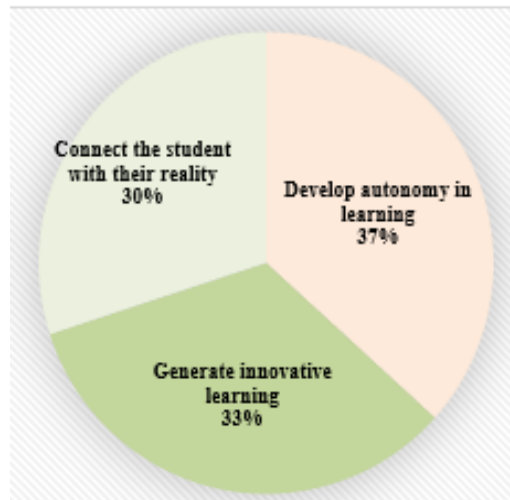


Figure 9. Benefits of implementing PBL in the classroom

It was also investigated on the active methodologies most frequently used for the development of competency-based education, obtaining as a result that 44% of respondents said that project-based learning is the most used active methodology for the development of competency-based education, while 30% said it is cooperative learning; 13% indicated that this methodology is problem-based learning and another 13% expressed that it is collaborative learning. From this it is clear that PBL can be combined with other active methodologies to achieve the development of competencies in students; In addition, the percentage in which education by competencies is developed was valued, obtaining that 57% of teachers mentioned that in the Juan Antonio Vergara Alcivar Educational Unit education by competencies is developed in 60%-70%, through the use of PBL, while 30% indicated that it develops in 40%-50% and 13% stated that it develops in 80%-100%. From this, it is analyzed that new strategies should be applied to raise the percentage of teachers who bet on competency-based education and the use of methodologies that encourage students to develop basic skills.

From the tabulation and analysis of the data obtained, it is evident that the teachers of the Juan Antonio Vergara Alcivar Educational Unit, for the most part, agree that competency-based education can be developed using active methodologies such as Project-Based Learning, which allows students to improve their abilities to solve problems. This is in line with what Antonio Valiente and Carlos Galdeano explain, in research carried out in 2009 on competency-based education, where they assure that this type of education gives meaning to

learning, making them meaningful for students, bringing them closer to their reality, allowing them to generate skills to face the challenges of current problems.

Other results obtained in the application of this research, allowed to show that the importance of developing education by competencies lies in the fact that new skills and attitudes are encouraged in high school students, this allows them to manage basic skills when entering the university that will allow them to achieve success in their personal life, academic and professional. This is consistent with what is stated by Cejas et al., (2019), in their research called: "Training by competences, a challenge of higher education", where training by competence is attributed to the development of knowledge to be, know how to know and know how to do, from an early age, since these constitute necessary skills to achieve success and productivity in higher education, taking it in the aftermath of the workplace, allowing individuals to perform effectively and appropriately.

Regarding the use of active methodologies, the results showed that some of the teachers do use them, being aware that they develop education by competences, improving in the students the autonomy and self-critical capacity, motivating creativity generating a significant learning. The data obtained showed that Project-Based Learning is the methodology most used by teachers, because they consider that it allows students to develop new skills to solve problems. With a similar idea, Rodriguez et al. (2010), in their research on "Evaluation of the project-based learning strategy", ensure that with this methodology students can improve critical thinking. Studies have reflected that student learn better when they put knowledge into practice, it has been proven that the knowledge acquired after 24 hours in a student is 5%, for master classes, 50% for discussion in groups, 75% for practical experiences and 90% to teach other students. These are precisely what active methodologies such as PBL allow (Sousa, 1995).

Finally, as researched, it is evident that most respondents implement competency education in the Juan Antonio Vergara Alcívar Educational Unit through Project-Based Learning with an interval of 60% to 70% which leaves a margin of failure to be applied in 100%, this may be due to a lack of knowledge about the benefits of this type of methodology to develop new skills in students. This is a common problem, in some institutions, teachers with little training on issues of innovation in education. This is also demonstrated in a study carried out by Cano et al. (2019), on "Active methodologies: a need in the Kingdom of England Educational Unit", where the results show that 64.2% of the teachers surveyed do not know about active methodologies, since they have not been trained on this subject even though 35.61% master them in depth and 7.14% know certain characteristics of these methodologies. Therefore, this lack of knowledge of active methodologies slows down the development of competency-based education and the improvement of the teaching-learning process, since in some cases they continue to work with traditional education methods that limit the achievement of innovative learning, creative experiences, and efficient skills to solve the problems of the reality that surrounds individuals.

## Conclusion

From the literature researched and analyzed with the data collected through the survey and the confrontation of said information with the theories, statements and disclosures made by other researchers, it is concluded that:

- Project-based learning as an active methodology allows students to develop the necessary skills to solve problems, manage conflicts and make decisions. Therefore, most teachers surveyed apply this methodology in conjunction with collaborative work, obtaining the benefit of promoting significant learning in the students.
- Competency-based education is developed from the use of active methodologies such as project-based learning since this generates in students' new skills of autonomy and reflection.
- In the Juan Antonio Vergara Alcívar Educational Unit there are teachers who frequently apply methodologies and strategies to develop competency-based education, with project-based learning being the active methodology most used by teachers to develop autonomy in learning and connect the student with their environment.
- In the Juan Antonio Vergara Alcívar Educational Unit, education is developed by competence in 60%-70%, helping students to improve their abilities and skills for problem solving. However, it is necessary to work on training to improve this index and for more teachers to join the development of comprehensive education through active methodologies such as PBL.

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