Strategy analysis Project Based Learning implementing teachers in training students in the course discipline quality management program technology in Bachelor of Pharmacy, Industrial University of Santander

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Abstract. In the UIS, the teaching-learning process is stimulated so that it has a solution in the context of existing situations and real daily life. Through interaction and reflection activities, spaces for research, analysis and critical thinking are constructed. An integral formation is developed in the student strengthening his professional field through a significant learning. The project-based learning strategy (PBA) implemented was articulated with the competency model of the technology training program in pharmacy regency. The entire execution of the process is described taking the established technical, pedagogical and technological planning as a reference. The results obtained are presented with their respective analyses applying ICTs.

1. Introduction
PBA Methodology has been a method that is already applied in several universities for quite a while, there are different experiences [1-3] that have developed around this issue forming several academic processes where research involves measuring compliance objectives, taking some its characteristics like its principles among others; there are references to research products where the PBA is related to the type of evaluation according to this methodology; others where student results based on final grades by applying this methodology developed folders associated learning environment arguing the benefits of PBA [1]; there are also teaching strategies in which children are taught the subject of social network security from another perspective and another way of applying Project Based Learning [2].

The following article is the product of an experience that is being implemented and had their bases in the framework of the guidelines given for the construction of the course Quality Management given by the program coordination of the technology in affiliated pharmacy Institute Regional and Education Projection Distance IPRED [3] Industrial University of Santander.

In the present era of knowledge work, success depends on how quickly and appropriately employees make decisions in the workplace. Much of the decision-making process is guided by facts and principles, where tacit knowledge that experts have applied while taking decisions. This knowledge is crucial for successful performance of any task. Therefore, as essential to the progress of any society always based education will play an important and fundamental role; to teach, train and educate future professionals Program for teachers is very important to create spaces for reflection so that students can actively promote their participation in all the different aspects of knowledge, know-how and being [4]; in an organized throughout the teaching-learning process, not only in the context that it has to teach but how
to how to teach; providing with this develop in student’s different skills to short- and long-term continue their learning process. It is for this reason that carried out the implementation of a teaching strategy where many more resources, activities and means by which the student internalizes academic process management and assimilation of knowledge are used.

In this experience he has a phase methodology where all the elements that are to be developed are established, who are involved, the time it develops support tools for execution among other factors; Another phase is an evaluation for results of a preliminary analysis of this research and finally to generate some conclusions of the study and research questions that guided this work like a) Is the PBA can generate spaces reflection?; b) With the PBA students can gain meaningful learning?, c) The PBA strategy can be used with other strategies and learning methods?, d) With the PBA teachers provide more elements in the teaching / learning?, e) Could bring PBA students to be active part of a knowledge society [5]? , f) With the PBA facilitate an ongoing process of updating and training of teachers?

2. Methodology

2.1. Research strategy implementation

To present as would be carried out academic activities, it began with the construction of self-learning script being this the chart the course; which contains all technological, educational and technical indications to be met by the course in question; In this construction the search for the technical and information technology was necessary since the three references pedagogy, all this closely related to the competency-based training approach thus determined by the curricular structure of the program [3]. As for the technological requirements for the development of the course it has the Moodle [6] platform.

The implementation of the various activities of this strategy makes students feel more committed and motivate them to be more involved, stimulating responsibility for their learning not only from an academic perspective but from the practical and labor, discovering and strengthening of this so technical skills through the interaction of real situations; It is why Moodle has available resources [7] to perform each of these activities without losing the training intent is intended by the PBA as seen in Figure 1.

![Moodle resources and activities.](image)

Thus this platform through its various resources and spaces help to make an individual work through some deliverables that are known products or tasks according to the script already set, also allows the opening of group spaces from resource Forum which it generated a discussion with a number of elements and situations that encourage the construction of knowledge on a subject where each learner brings his view thus generating the involvement and participation collaboratively; in our case they were incorporated specifically Circles Interaction and Academic and Social Participation - CIPAS - as working groups of students to create opportunities for interaction and discussion of issues related to the
current driving with this social interaction among them encouraging comprehensive training with the search for personal growth as an active part of the group.

Also strengthens teamwork within the group, for the particular space that each CIPA and in which its members (teachers and students) perform the feedbacks his teammates against the different contributions made around the proposed theme, from the roles each; and asynchronously evidenced how the contributions of the monitoring by the teaching building the final project is enriched.

From the technical side, it is carried out the review of the information required and subsequently selecting the same; proceeds to translate the script thematic, learning strategies, organizing students in the course and as would perform different interventions in the areas of building collaborative activities such as individual, and thus achieve the educational intentions of the course.

During Quality Management belonging to the III level Technology Program the UIS [3] which takes place this experience has key elements for the implementation of this strategy, as are the general characteristics of students and they have acquired advanced knowledge about the program, the general jurisdiction of the course involves practical involvement in the issue as it is applied to organizations where future professionals will make active and with the characteristics established from the curriculum program which it is offered in the form given distance.

The themes under which the course Quality Management develops in your large percentage handles information with a high normative component; which requires learning strategies used [8] that promotes the appropriation of knowledge and lead to a practical learning, and this tends to the student finally take decisions in the situations facing a reality, being necessary throughout their training process as well as in the professional field in which it will play well and be consistent with competency-based training [9] that was established from the training program.

And the total content of the course learning different strategies are applied; Departing from the moment of conceptualization and later appropriation and socialization of learning, it is how the student takes to from conceptualization of specific knowledge of the topic addressed both individually and in groups, in search of collaborative learning [10] in each of the stages in which the course is developed; group making available the expertise acquired since the beginning of the course, and develop skills such as designating roles, group decision making, work organization, to conclude in delivering product developed collaboratively.

Specifically, for the development of the main course work learning strategy called project-based learning [11] is used; and where harmoniously integrate this strategy achieving a significant learning. The results of this experience are very valuable and positive from the aspects such as the application of knowledge to real situations [12] to which they correspond to respond since the construction of the project, submitting written and finally lift the same, results measured by the application of evaluation rubrics to quantify the scores obtained in the two activities described above and which lead to develop the skills [13] that are required in the work context.

For the teacher also represents an enriching experience that contributes greatly to transfer all the knowledge and experience in the workplace to academic spaces training; allowing dynamic knowledge and get the maximum student academic achievement and achieve competency training intentionality proposal from the Program; as well as opening up new application scenarios of different learning techniques or strategies in other courses or signatures of the curriculum of the training program.

2.2. Strategy implementation
The Quality Management course is designed to give a general reference to the basic concepts regarding Management Systems and Regulations has established for a regency professional pharmacy in a general context. In this framework, students will learn that it is a management system, as implemented, monitoring is given and controlled, how it is the regulation and how it affects any process and relate to their professional profile.

The activities developed to comply with the process are shown below and in Figure 2:
• A review by teachers in the general context of good practice in pharmaceutical distribution facilities and process monitoring and control, licensing and accreditation issues in the course will be given.
• A problem that involves a real situation to generate the respective project is formally established goals that lead to student cognitive development while the respective grading rubric are established.
• The requested activities are designed, the working groups are established and guidelines for resolution are forthcoming.
• Spaces in which students must define what terms, concepts, identify "keywords" tracks and delimit the problem for this project can use the tools you have the platform as are forums and internal messaging are established.
• Students conduct brainstorming to go organizing the causes that may cause the actual problem to set in the project.
• They should then identify the needs facing the problem of the project, establishing the relationship of the objective of the activity with the themes and objectives of the course.
• Search and analysis of information through various resources that serve as support to the development of the project and thereby creating the best strategies.
• The teacher will give a brief presentation and explanation of the project giving suggestions, summary, key points and some questions that give solution routed to the project after seeing the progress of students would be generated.
• Interaction between students with significant contributions in the forum platform space where some questions you do not know on the subject arise is done.
• Feedback is performed by the teacher to each of the groups in the generated tracking to promptly clarify doubts.
• During interaction forum is generated the respective document in accordance with the guidelines established in compliance with the respective heading.
• For the solution of some item of projects complementary strategies to help strengthen the subject as in the case of audits where real context space is generated audit are used.
• Document delivery is done by a space designed exclusively for sending tasks, this shipment is made by a representative from each group.
• Feedback from the teacher is facing the product delivered.
• A session for the socialization of each product group is established and a group discussion is to clarify concepts.

![Strategy implementation](image)

**Figure 2.** Strategy implementation.

### 3. Results and discussion

With the implementation of this learning strategy in the Quality Management course, it has been possible to identify that from the first period of 2017 to the first period of 2018 the evolution of students regarding their academic performance [14], reflected in their grades, where the behavior is evidence
from inception to the current period of investigation; allowing to identify a gradual increase in the last measurement period with 91% of students with notes in a range between 4.0/5.0 and 4.2/5.0.

The analysis also performed identifies the relationship between the qualification obtained by active participation in the Thematic Forum through contributions shared this space, as well as the marks obtained in the final work (includes written documents and supporting thereof) as shown in Figure 3, showing the dynamics and the correlation occurs between the scores obtained for the two activities.

![Figure 3. Tracking relationship participation in the forum against the final work.](image)

Finally, is presented in Figure 4 the behavior of the final grade for the selected academic periods where significant growth [15] for the range 2018 endnotes evidenced, which allows us to recognize how the strategy of project-based learning provides most favorable scenarios for the overall development of students [16].

![Figure 4. Final results ratio versus academic periods.](image)

4. Conclusions
With the implementation of this experience in the institution and specifically mentioned within the course provides a great training process and interdisciplinary learning as it is useful and according to the requirements found in the workplace; carrying a feedback between academics and the real world; It is coherent with the provisions of competency-based training program and professional profile.
The behavior of the grades obtained to measure the effectiveness of the implementation of the PBA and the use of appropriate evaluation techniques, enabling the development of cognitive, behavioral skills and performance to implement a project that leads to solve a need in the actual environment.

Similarly identifies the close relationship between student achievement forum for project construction, as the qualification obtained final product comprising written work and sustaining it.

The application-based projects make the group of teachers who directs the course become actors more active in the process of teaching and learning by encouraging all students to face new experiences with new tools for learning looking strategy always a search and an optimal solution to all problems proposed. This strategy becomes a challenge for teachers; it is necessary that each knows the approaches or learning strategies, which like this can be implemented in the respective courses motivating and encouraging students to make decisions that are inherent to their professional training.

Open spaces where there is construction of collective thinking, critical analysis strengthens and generates positive changes in decision-making through joint work has in common generates products which has been active.

This experience opens the possibility to replicate in other courses of the training program, using the same way other strategies or learning techniques according to the main theme, seeking to strengthen skills for the professional future from the bimodal training offered by the Program.

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