ACTIVE METHODOLOGIES APPLIED IN THE CLASSROOM CAN BE HELPFUL TO LEARN THE MANAGEMENT OF A PHARMACY OFFICE

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Abstract

Since the European Higher Education Area (EHEA) was launched along with the Bologna Process in 2010, many changes have been made to improve the design of curricula and teaching programs. In this new scenario, the instructor’s role has significantly changed. Nowadays, instructors must supervise and guide the learning skills and knowledge built by their students.

We present in this work an innovative teaching experience performed in the management, planning, legislation and deontology assignment of the pharmacy degree. We applied in small 3-students teams different kinds of active methodologies such as the guided problem solving, the audience response systems or the Aronson puzzle to work on different learning objectives of the subject related to the management of purchases of medicines and the evaluation of the offers of both drug dispensing laboratories and stores.

The activities developed during the course were evaluated by both group-formative evaluation and by individual-group summative evaluation. At the end of the evaluation period of the activity we collected anonymously the opinion of the students, and results reflected, in general, the acceptance and support of the methodology applied. Additionally, highly satisfactory results were obtained when the activities were evaluated. Therefore, and considering this positive experience, we can conclude that these kinds of methodologies can be really helpful, not only because they helped the student to work in a more autonomous and team way the different competences of the subject, but also because they had a positive impact on the results of the learning achieved.

Keywords: Autonomous learning, degree in Pharmacy, active methodologies, medication management.

1 INTRODUCTION

The launching of the European Convergence process of higher education has opened a new stage for reflection on the perspectives from which to develop university teaching. In this sense, the teaching model should focus, among other things, on the autonomous and directed learning of students, so that student goes from being considered as a passive subject who assimilates knowledge to take a more active role in his own learning process. These demands oblige us to seek a quality education in the information society that does not exclusively include learning of knowledge, but also the learning of other abilities, attitudes and values [1]. In the same way, the activity of the university professional must evolve from the simple act as transmitter of the knowledge to a position in which university professional must stimulate and direct the learning of the student [2]. In this new paradigm, university teachers are forced to design new activities that simulate real-life situations [3] in order to consolidate student learning in a constructivist way, considering as learning the process of relatively permanent change in the behavior of a person generated by experience [4]. In this sense, active methodologies should be basic and essential elements in the current teaching projects of universities, since in addition to fostering the interaction between teachers and students, they improve both the involvement of students [5] and their intellectual development [6,7] in a constructivist environment [8].

The Pharmacy degree is included in the branch of "health sciences", being its main objective the training of experts in all aspects related to medicines, in accordance with the European directives concerning the profession of pharmacist. It is composed of 8 modules, and the subject of Management, Planning, Legislation and Deontology is encompassed within the module M06 (Legislation and Social Pharmacy) along with the subject of Public Health. This subject arose from the course of 2013/2014, as a result of the merger of two independent subjects: on the one hand Management and Legislation, and on the other hand Legislation and Deontology. In this new subject,
students must apply different knowledge necessary to manage the pharmacy office in an efficiently way. To do this, students must work on different concepts, such as those related to marketing, accounting, stock control, purchasing and sales management, to achieve maximum profitability in an establishment of public health interest and private management, always respecting the norms and laws that regulate its operation.

Within the learning objectives of the subject, we can highlight the following ones:

- Calculate the profit margin of the integrators in the drug distribution chain (wholesalers and pharmacies).
- Evaluate distributors of pharmaceutical products based on their main advantages and disadvantages.
- Compare discounts and bonuses of distributors and evaluate the most appropriate offer depending on the stock of each product.
- Evaluate when and how much to buy considering the coefficient of rotation of a product.
- Improve the management of purchases in the pharmacy office.
- Improve the ability of students to work as a team.

Traditionally, in the Pharmacy degree of the Faculty of Pharmacy of Vitoria (UPV / EHU), these learning objectives have been worked using traditional methodologies, such as the lecture class. This type of unidirectional teaching method is still the most used in the university field. In this way, the teaching focuses on the figure of the teaching staff and, in a certain way, ignores the students, who become a "passive" subject of the explanations. Faced with these important limitations, it is expected that their presence will be limited in the next years in Spanish universities, since one of the central elements of the new paradigm of the teaching process promoted by the EHEA is the autonomous learning of students.

2 METHODOLOGY

In order to contextualize the use of active methodologies, we proposed to the student 3 different scenarios, all of them related to the professional activity. We push the students to identify by themselves the learning objectives with the help and supervision of the teachers.

Scenario 1. What path do drugs and sales products at pharmacies follow before they can be dispensed? How can we calculate its price?

This first situation was worked on individual basis, during 3 hours in the classroom. With the help of the teacher, students should identify the following learning objectives:

- Calculate the profit margin of the members involved in the drug distribution chain (wholesalers and pharmacies).
- Evaluate different offers made by distributors of pharmaceutical products based on their main advantages and disadvantages.
- Improve the management of purchases of the pharmacy office.

For this purpose, a 20-minute brainstorm session was done in the big group at the classroom. In the following 2.5 hours of class, the remote response devices (Turning Point, 5.3) were used as active methodology. In this way, through an individual and inductive process, the student answered a series of guided questions, not evaluable, but related to the driving question. Next, it was promoted a group reflection on the importance of knowing the route that medicines follow since they are manufactured until they are dispensed in the pharmacy office, as well as on the calculation of the price of medicines and sales products in pharmacy to achieve a profit margin that ensures the survival of the company.

The evaluation of this first scenario was formative, meaning that it did not affect the final grade of the subject, but it served to provide immediate feedback to the student’s acquired knowledge.

Scenario 2. How can I get the most profit from my purchases for my pharmacy?

This second scenario was worked in groups, with an estimated 4 hours of work in the classroom and another 4 hours of non-face work. The learning objectives to be identified by the students with this scenario are the following:
• Calculate the profit margin of the different members involved in the drug distribution chain (wholesalers and pharmacies).
• Evaluate offers made by distributors of pharmaceutical products based on their main advantages and disadvantages.
• Compare discounts and bonuses offered by different distributors and evaluate the most appropriate offer depending on the stock of each product.
• Evaluate when and how much to buy considering the coefficient of rotation of a product.
• Improve the management of purchases of the pharmacy office.
• Improve the ability of students to work as a team

For this purpose, we used the active methodology of the Arons puzzle. Briefly, teachers used 10 minutes of class to explain the scenario and to form teams of 3-4 students. Each one of the formed teams were given 3 different types of problems to address issues related to drug pricing, procurement management, and stock management. These 3 types of problems were distributed among the members of the group. A period of 40 minutes was left in the classroom for the individual work of the problems (two exercises for each type of problem), in order to apply the concepts acquired in scenario 1. Additionally, 1 hour of non-contact work was estimated to apply individually the concepts acquired in scenario 1 to face the problems that appear in this second scenario. The following day, a meeting of "experts" was convened in the classroom for each one of the 3 types of problems. At this meeting, the students had to compare the possible ways to solve the exercises, to finally select the approach that they consider is the most appropriate. At this meeting, different roles were adopted:

Speakers: Explains the resolution of the problem as they have resolved it.

Interrogators: Ask for clarification and make critical comments.

Secretaries: Ensure that the discussion is completed in the expected time (50 minutes).

The next day of class, a meeting was held with the original team (50 minutes in the classroom and 1 h non-presential). In this meeting, each one of the team members presented the problems they had worked on previously (initially individually, and then grouped in the "experts" meeting), explaining and justifying to the rest of the team members the way that they think that the problem needs to be resolved, as agreed at the meeting of "experts." Again, different (rotating) roles were adopted for this meeting with the original group:

Speakers: Explains the resolution of the problem as they have resolved it.

Interrogators: Ask for clarification and make critical comments.

Secretaries: Ensure that the discussion is completed in the expected time (50 minutes).

The next day, a representative of one of the teams was randomly chosen to argue with the rest of the class the solution of the problems (50 minutes)

The evaluation of this second scenario was on the one hand by formative group, and on the other, individual-group summative. The group formative assessment (not affecting the final grade of the subject), was based on the sharing with the large group of the class. In this way, the students received immediate feedback on the correct way to solve this type of problems. The summative individual-group assessment was performed as follows. Each student had to answer individually to a series of problems related to the scenario raised and worked in class. This test was done after completing the development of the third scenario and had a value of 1.5 points, on the final grade of the subject (10 points in total). The result obtained depended not only on the individual grade of each student, but also on the work done by the other team members. The formula that was employed to calculate the individual performance was the following one:

Individual performance = \{ \left( \frac{ \text{performance student 1} + \text{performance student 2} + \text{performance student 3} }{3} \right) + \text{individual performance} \} / 2

Scenario 3. Which of the different offers would you choose to obtain the maximum profit in your pharmacy office? What other information would you discuss with the provider?

Again, this third scenario was worked on a group basis, with an estimation of 2 hours of face-to-face work in the classroom and another 2 hours of non-face-to-face work outside the classroom. The learning objectives that the students should identify in this third scenario are the following ones:
• Calculate the profit margin of the members involved in the distribution chain of medicines (wholesalers and pharmacies).
• Evaluate the offers made by the pharmaceutical distributors based on their main advantages and disadvantages.
• Compare discounts and bonuses offered by distributors and evaluate the most appropriate offer depending on the stock of each product.
• Value when and how much to buy depending on the coefficient of rotation of the product.
• Improve the management of purchases of the pharmacy office.
• Improve the ability to work as a team.

Throughout the second scenario, the students worked on issues related to the price of medicines and the correct management of stock and purchases in a pharmacy office. In any case, each one of the 3 "type" of problems that they worked on, were simplified situations. However, in a situation closer to the real one, all these concepts cannot be taken into account in an isolated way. This is why in this third scenario, a more complex problem is proposed that will be solved progressively and guided by the Guided Problem Solving (GPS) methodology.

The first 15 minutes were used to explain the scenario in class. Then, 10 minutes were left in the classroom to propose different brainstorming attempts to solve the problem. After that, another, 10 minutes were given for the qualitative analysis of the problem and for the identification of the variables involved in the large group. Previously at the emission of the hypothesis, a qualitative analysis of the problem must be done. That day, 1 hour of non-face-to-face work on the teams formed was estimated to find an answer to the following question: which will be the gross profit that will get the pharmacy office when each one of the different purchase options is chosen?. The next day, in the classroom (50 minutes), an analysis of the results was done, as well as a reflection in the big group.

The evaluation, as in the case of the second scenario was on the one hand by formative group, and on the other, individual-group summative. Students initially had identify the variables that appear in the scenario (cost price, price invoicing, rotation coefficient, average stock, discount, bonus). The following 25 minutes were used to analyze the emission of hypotheses and attempts to resolve the problem in the large group. Once the variables were identified and understood, students analyzed the limit cases and the relationships that could exist between the variables identified for immediate resolution. For the individual-group summative evaluation, students had to resolve a series of issues related to the scenario. This exercise was performed in the classroom after finishing stage 3 (1h non-present for its preparation). The test, as mentioned previously in scenario 2, had a value of 1.5 points, on the final grade of the subject (10 points), and the result obtained depended not only on the individual grade of each student, but also on the work done for the rest of the partners. The same formulation that has been previously described was applied to calculate the individual performance.

Individual performance = \( \frac{\left( \text{performance student 1} + \text{performance student 2} + \text{performance student 3} \right)}{3} + \text{individual performance} \) / 2

### 3 RESULTS

The following table collected some data of the student enrolled in the 2016/17 course in the Management, Legislation, Planning and Deontology assignment, in the Degree and Pharmacy of the Faculty of Pharmacy of Vitoria (UPV / EHU).

<table>
<thead>
<tr>
<th>Table 1. Characteristics of the students enrolled in the assignment.</th>
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<td><strong>Number of students enrolled</strong></td>
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<td><strong>Number of repeated students that choose the continuous evaluation</strong></td>
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<td><strong>Number of students that took part in the continuous evaluation activities</strong></td>
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<tr>
<td><strong>Number of ERASMUS students</strong></td>
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<tr>
<td><strong>Number of groups</strong></td>
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<tr>
<td><strong>Number of students that do not have to do continuous evaluation</strong></td>
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</table>
More than 82% of the students enrolled in the course received the continuous evaluation system. However, no repeater chose this system of evaluation and all of them (10) decided to avail themselves on a final evaluation system, without participating in this activity. 11 groups were formed by 3 students (groups 1, 4 5, 6, 7, 9, 10, 12, 13, 14 and 15) and 4 groups by 4 students (2, 3, 8 and 11)).

The data of the evaluation of the proposed problems on the activities carried out are shown in Fig. 1.

![Figure 1. Results of the activities in the different groups.](image)

Only 6.6% of the groups (1 of 15) did not get half of the 15 points (7.5) that were given to this test, although group 11 stayed very close. (7.28). 40% of the 15 groups (groups 3, 4, 4, 9, 10, 13, 15) scored more than 80% of the maximum possible score (12 points out of 15). The rest of the groups scored between 7.5 and 12 points, although 3 of them (groups 1, 2 and 8) were very close to 12 points.

From the standard deviations observed on the different groups, we can conclude that they are not very high. The highest values were obtained in group’s number 7 and 8 with a value of 2.02 in both of them. Low standard deviation values could reflect difference in the expectations among the members of the groups.

4 CONCLUSIONS

Over all, and considering the positive results obtained, we are highly satisfied with this kind of methodologies applied in the classroom, not only because of the good results obtained that are reflected in figure1, but also because we have the firm conviction that with this type of methodologies we can get a greater involvement of students in their own learning [5,9], developing a different way of thinking, where the team work has its own relevance, as usually happens in the professional life. All these arguments, and the increase in the assistance to the classroom, encourage us to continue implementing this type of active methodologies in other subjects of the teaching program of the Pharmacy degree.

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