

## **ANALYZING DRUG COMPOSITIONS IN A PROBLEM-BASED LEARNING EXPERIMENT TO STIMULATE UNDERGRADUATE STUDENTS' AUTONOMY**

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### **Abstract**

The oversimplification of higher education experimental practices may provoke a lack of confidence among graduates, who do not feel fully prepared to face the situations that they will find when entering the labour market. Our Educational Innovation Group TR4BIOCHEM (PIE22-067) is interested in the implementation of new Problem-Based Learning-laboratory experiences to bring students closer to real situations that they may encounter in their potential job opportunities in an immediate future. Herein, we present a didactic experience carried out with fourth year-biochemistry undergraduate students, within the subject "Advanced Instrumental Techniques" at the University of Malaga. Students, working in groups of five people, adopted the role of analytical chemistry companies, which had to find a solution for a driving question, set in a letter from a pharmaceutical company, interested in the quantitative analysis of a newly developed drug. In this letter, the problem (the quantitative composition of the drug) was issued and the main required specifications for the analysis (sensitivity, accuracy, price, etc.) established. Groups had to search bibliography in order to select the most suitable analytical technique for the analysis, design and optimization of the experimental protocol, including cost estimation and safety considerations. Following the practical implementation in the laboratory, results were presented in a session that simulated a work meeting where the group members assumed a different role in the company organigram. Students, who perceived having gained skills in designing laboratory experiments, felt strongly involved in this project, considering that this experience could be useful for their future careers.

**Keywords:** *Problem-based learning, biochemistry, analytical chemistry, autonomous work, undergraduate.*

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## **PEDAGOGICAL POWER OF STORY-TELLING IN HIGH EDUCATION TO DEVELOP CRITICAL THINKING**

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### **Abstract**

Storytelling is the art of telling stories. It helps to facilitate better communication and connection between humans. In high education this methodological technique helps to keep learners engaged, activate their emotions and make learning more memorable. Besides, stories are easy to remember and facts are to be remembered much better if they are part of the story. Provided that our goal in every communication is to impact the target audience, i.e., change their beliefs, attitudes and behavior, well-structured stories are the most effective vehicle for making impact. From this perspective, using stories as a pedagogical tool in high education provides great opportunities to develop students' critical thinking and reasoning skills which enables them to have better study outcomes. A good story has a transformational effect which helps students to respond positively to teaching. For example, a well-selected and structured case study presented in a narrative format helps students to feel themselves as part of the story and experience characters. Therefore, when students are taught to include the details in their stories that generate additional interest from the audience and provide significant context, they study better and communicate more effectively. Additionally, story-telling works for all types of learners – visual, auditory and kinesthetic. The article will display outcomes of research conducted in high education context in Georgia. More specifically, in teaching areas of business communication, leadership, organizational behavior, academic writing, English language and research methods. The methodological tool of story-telling was employed with the view to facilitate student learning and acquisition, especially, during pandemic times when anxiety and psychological strain were high. Tasks and activities were designed in a way which allowed learners to narrate stories and by doing so get involved in learning. Outcomes demonstrate that students found this method effective for their learning since it helped them to better and accurately remember. In business communication classes it

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