

A PROBLEM-BASED LEARNING APPROACH TO INTRODUCE THE ENZYME INHIBITORS BLIND SCREENING TO UNDERGRADUATE BIOCHEMISTRY STUDENTS

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Abstract

Learning styles based on inquiry, discovery, and problem-based approaches can promote students' problem-solving skills, critical thinking, and self-confidence development. Our Educational Innovation Group TR4BIOCHEM (PIE22-067) is interested in implementing new inquiry-based biochemistry laboratory experiments focused on the last course-chemistry and biochemistry undergraduate students. The high throughput blind screening of enzyme inhibitors, one of the most widely used strategies in pharmacology for the discovery of new drugs, is the subject of a new problem-based learning (PBL) activity developed at the University of Malaga in the last few years. Within the subject "Pharmacological Biochemistry", 4th year-biochemistry undergraduate students must face a situation that resembles the real scenario encountered by a professional working in medicinal chemistry. Working in groups of 4-5 students, and guided by a challenging driving question, students get involved in a meaningful learning process which leads them to propose solutions and carry out the practical identification of acetylcholinesterase inhibitors through enzymatic analysis. The hands-on *in vitro* studies allow students to put into practice in the laboratory much of the knowledge that they have acquired throughout their studies and face, for the first time in some cases, some practical issues such as the reagents selection and protocols optimization. The implementation of this PBL has been very satisfactory in terms of academic performance. As for the students' perception, they appreciate the opportunity to apply concepts in a real-world context, considering that these experiences can better prepare them for their future professional scenarios.

Keywords: *Problem-based learning, drug discovery, blind screening, laboratory experiments, undergraduate.*

ENHANCING DEEP COMPREHENSION IN HIGH SCHOOL STUDENTS THROUGH THE USE OF GRAPHIC ORGANISERS

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Abstract

Reading comprehension is acknowledged by the European Commission as a citizenship right (Recommendation 2006/962/EC) and one of the goals of the 2030 Agenda; however, OECD PISA data show that scores on reading tasks have been steadily declining over the past 15 years, and in 2022 the average reading performance dropped by 10 points, that means half a school year (PISA, 2023). The present project aims to investigate the relationship between the use of cognitive strategies that support students in reading and information processing and deep comprehension of a text, with the aim of guiding the student towards achieving meaningful learning (Ausubel, 1968). Results in a reading comprehension test from a sample of 45 11th-13th graders don't show any difference between a control group with no given material nor instruction and two experimental groups provided with a guided or expert-made map. However, answers from a qualitative self report show a higher cognitive engagement when using a map, and students reported they perceived the use of a conceptual map as beneficial. According to the literature, we hypothesise that graphically visualising concepts may be beneficial when the task is complex, but may harm learning and comprehension when the task is perceived as easy, since it can add cognitive demand, increasing the students' cognitive load.

Keywords: *Reading comprehension, meaningful learning, visualisation, conceptual map, graphic organisers.*

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