CRITICAL THINKING DEVELOPMENT IN PHYSICS COURSES BY PROBLEM-BASED LEARNING IN VIRTUAL COLLABORATION ENVIRONMENTS

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SKILLS AND DISPOSITIONS OF CRITICAL THINKING

As a result of confinement, drawbacks with learning appear; memorization and repetition appear ineffective to reach the expected educational outcomes in physics courses that require problem solving abilities. It is urgent to adapt the courses of study to implement strategies that allow the development of 21st century skills that foster the learning process (Slisko, 2017). The online resources learned during confinement are harnessed to benefit the teaching and learning processes (Alsaleh, 2020). This research we are presenting, comprises the design of a strategy to develop critical thinking skills throughout the physics courses in engineering careers, trough collaborative work, problem-based learning (PBL) and virtual classroom interactions. To know any student's development level and propose improvements to the learning strategy, an evaluation instrument is adapted, seeking to increase the learning effectiveness before the course has finished (Rodríguez et al., 2016, Plummer et al., 2022).

METHODS AND INSTRUMENTS

In various research stages a mixture of quantitative, qualitative, and inductive-deductive methods was used. An open-ended questions instrument was adapted to show the initial and final critical thinking skills from the students. This didactic instrument focuses on developing critical thinking through the usage of collaborative work to solve problems in virtual classrooms. These spaces were used simultaneously to observe the performance and participation of each student in every exercise, this information was collected using checklists and a semi structured interview to recognize the developed cognitive skills, lastly an individual summative evaluation was applied to assess their effectiveness at problem solving (Ossa et al., 2017).

PREVIOUS RESULTS

The students exhibited a greater analytic development, willingness to argue and sustain hypotheses, also an inquisitive level to comprehend the nature of the problem at hand, an array of students also demonstrated cognitive skills that allowed them to find the right solutions based on analysis and inference with various proceedings.

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