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A methodology for embedding research competencies in an undergraduate civil engineering program

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Abstract

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Abstract

Research and its relationship with undergraduate education plays a decisive role in the training of new engineering professionals with a greater affinity for basic and applied research as a fundamental tool in their professional performance and a pillar for lifelong learning (LL). The study aimed to improve the research competencies of civil engineering students from the Universidad de Lima. To achieve this goal, a methodology that allows the acquisition of them gradually, throughout the curriculum, has been developed. Didactic-methodological tools were introduced transversally using a gradual, incremental, and progressive process to promote and develop student research competencies. To follow up on how this process evolved, the acquisition status of research competencies among a group of students was monitored and followed up over four consecutive semesters for two years. The implementation mechanism was based on immersing the students in different types of research exercises depending on their semester by developing exploratory, descriptive, and experimental/predictive research activities. The results indicate that the proposed methodology, Gradual Implementation Research Competencies (GIRC) Program, improved students' acquisition level of research competencies. It was possible to standardize a methodology for the development, improvement and evaluation of students' research competencies, acquired through research exercises. The most representative products generated from the design and implementation of this methodology are: Research competencies proposal, a rubric to assess them, and the Matrix of the Gradual Implementation Research Competencies Program with the proficiency levels expected for each curriculum year. © 2021 TEMPUS Publications.

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