3rd Global Conference on Innovations in Education
June 20-22, 2025
Singapore, Singapore

PAES + Cr-STEM (Curriculum-Rooted STEM) Methodology: An Innovative Student-Centered Approach to Secondary Education

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ABSTRACT

Effective teaching in mainstream education requires methodologies that respond to students' characteristics, rather than relying solely on the teacher's didactic intentions. Based on this core educational principle, the present study analyzed generational, social, and psycho-pedagogical components—specifically learning styles—of 289 students (aged 15–16) from *Colegio San Agustín* in Cochabamba during the 2024 academic year. The aim was to design an innovative teaching and learning methodology. Research methods included secondary data analysis to identify the generational cohort, sociometry to examine interpersonal relationships, and the VARK test (simplified to VAK) to determine learning styles. Methodological design was guided by the ADDIE model.

Diagnostic results indicated that the entire student population belonged to Generation Z, exhibited social structures favorable to group work, and showed a clear kinesthetic learning preference. Based on this characterization and institutional goals (scientific rigor, sociability, values-based education, and practical applicability), the PAES + Cr-STEM methodology was developed. This approach integrates the PAES model (Problematize, Analyze, Experiment, Synthesize) for day-to-day curricular development and Cr-STEM for the application and consolidation of curricular content through STEM-based projects. The methodology was implemented with satisfactory outcomes, including improved academic performance and a positive shift in student engagement. Student profiling proves essential for designing effective educational strategies, and the PAES + Cr-STEM methodology offers a validated and transferable pedagogical contribution.

Keywords: Student profile, Learning Styles, Sociometry, PAES + Cr-STEM Methodology, Educational Innovation