

CLOSING THE GAP: EXPLORING THE GENDERED IMPACT OF PROJECT-BASED AI LEARNING ON STUDENTS' SELF- EFFICACY, CAREER INTEREST AND CONTENT KNOWLEDGE

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Abstract. This nonexperimental survey-based quantitative study measures the effectiveness of a project-based AI learning program in affecting students' self-efficacy, career interest, and AI content knowledge, as well as addressing potentially gendered differences in the outcomes. The program significantly improved students' confidence level and AI literacy. Gender differentiation was not statistically significant. Nevertheless, an inclusive and interactive AI educational program can inspire young learners, particularly marginalized students, to pursue relevant careers in the field.

Keywords: Gender equity, Self-efficacy, Career interest, AI PBL program, Social cognitive theory

Addressing AI education and gender equity, this study measured the impact of a project-based learning (PBL) program on middle school students' self-efficacy, career interest, and AI knowledge, with a focus on potential gender differences. The Social Cognitive Career Theory provided the theoretical basis for the study. The theory emphasizes the reciprocal feedback loop across students' demographics, task completion, learning environment, efficacy level, and career choice.

The study surveyed 56 male and 48 female middle school students who participated in the AI PBL program. The dependent variables were self-efficacy, career interest, and AI knowledge, while gender and time were the independent variables. 3 paired t-tests found that the program significantly increased students' overall self-efficacy, career interest, and AI knowledge assessment. This finding supports the merits of PBL where hands-on interactive projects stimulate students' confidence, curiosity, and career outlook. Contrary to the traditional classroom, PBL demonstrates its advantage in deepening students' understanding of AI content knowledge through a more hands-on and interactive approach.

To explore gender differences, a repeated measure ANOVA was run on the three dependent variables. Statistics showed that gender did not significantly differentiate the changes in the dependent variables. This could be attributed to the strong female figures as the instructors of the program, whose presence may have already uplifted girls and thus rendered the gender disparities less salient. Nevertheless, the impact of teachers' gender still requires additional inquiries. Furthermore, based on the descriptive

statistics, girls' average scores for self-efficacy and career interest were still lower than those of their male counterparts. Interestingly, girls performed better in assessment tests. These results deserve further investigations. To recapitulate, the findings corroborate the overall merits of PBL programs for students' AI learning outcomes, at the same time opening up new potential for probing into the gendered impacts.