The Development of Critical Thinking of Grade 9 Students Learning With Constructivist Web Based Learning Environment Integrated With Artificial Intelligence in Computing Science

Research Background

Critical Thinking Crisis

PISA 2022: Thai students below OECD average. Only 2.09% of students met critical thinking standards - an urgent educational crisis.

Digital Age Challenge

Students face massive information daily in digital age. Critical thinking essential for evaluating data credibility and making informed decisions.

Research Objectives

To compare pretest and posttest scores of critical thinking of the students who learning with a constructivist web-based learning environment integrated with artificial intelligence.

Methodology

Participants

42 Grade 9 students from Kanlayanawat School, enrolled in the Computing science subject.

Research Design

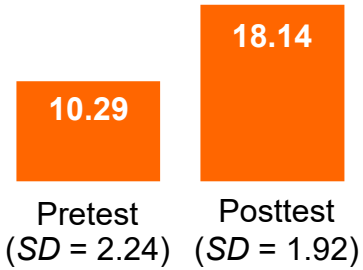
One group pretest-posttest experimental design with cluster random sampling.

Data Analysis

- Descriptive statistics (Mean, *SD*) and dependent samples t-test for quantitative data.
- Protocol analysis for qualitative interviews.

Results

Critical Thinking Scores Comparison



Statistically Significant Improvement ($p < .05$)

$t = 17.25$, $df = 41$, $p < .001$

Interview Results

After learning, students were able to demonstrate all three components of Ennis's critical thinking framework: basic clarification, bases for a decision, and inference – more effectively than before learning with the learning environment.

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