



How Do STEM Teachers' TPACK Self-Efficacy and Expectancy-Value Shape Their Intention to Use Virtual Labs?

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ABSTRACT

Virtual laboratories (V-Labs) provide an innovative solution for STEM and vocational education, offering safe and flexible environments for experimentation, but many teachers remain hesitant to adopt them. To explore the motivational factors underlying this hesitation, the study employed a model based on Expectancy-Value Theory with Technological Pedagogical Content Knowledge (TPACK) self-efficacy. Using PLS-SEM analysis and qualitative interpretation of responses from a survey of 180 Vietnamese STEM teachers, the study revealed that perceived value and expectancy for success significantly predicted behavioral intention, while perceived cost had no significant effect. Teachers' TPACK self-efficacy strongly influenced both expectancy and value beliefs, indicating confidence as a key driver of adoption. Qualitative findings reinforced this result, showing that teachers' choices were primarily value-driven; hence, professional development should focus on providing authentic experiences that build teachers' technological–pedagogical competence and reinforce the perceived instructional benefits of V-Labs.

Keywords: Virtual Laboratories, Expectancy–Value, TPACK Self-Efficacy, STEM Teachers