RESEARCH RESULTS INFORMATION

Thesis Title: PRACTICING CORE SKILLS OF ENGINEERING STUDENTS

Major: Education

Code: 9140101

Full Name of PhD Student: Nguyen Thanh Thuy

Scientific Instructors: Dr. Vo Phan Thu Huong,

 Associate Professor, PhD. Nguyen Van Tuan

Training Facility: Institute of Technical Education, Ho Chi Minh City University of Technology and Education.

1. Summary of Thesis content

 The thesis includes four chapters, covering an overview of the research problem, the theoretical foundation regarding the training of core skills for engineering students, and the current state of core skills training within the engineering sector, implemented through teaching at various universities in Ho Chi Minh City and organizing core skills training specifically for engineering students.

 Core skills fall within the realm of general skills required for success in the 21st century, necessary for students to possess as they prepare to work and integrate into society upon graduation. For students pursuing engineering careers, which play a crucial role in modern industrial production, it is imperative that they acquire and develop core skills specific to the engineering industry. With the objective of researching and devising methods for training core skills through teaching activities, the thesis conducts a comprehensive analysis to identify domestic and international research trends on core skills and their training. Building upon previously published research results, the thesis establishes a theoretical foundation for the topic and identifies gaps in the research direction addressed in the thesis. This theoretical foundation includes concepts, stages for the development of core skills in engineering students, methods for training these core skills, and procedures for implementing skill training methods in teaching for engineering students. The process is constructed in three phases: Design, Implementation, and Evaluation. The Design phase aims to identify the core skills requiring development (Technical Communication Skills, Creative Problem-Solving Skills, Technical Systems Thinking Skills) based on an analysis of lesson output standards. The Implementation phase integrates selected core skills training methods into the instructor's teaching process, providing students with effective opportunities to practice these core skills. The Assessment phase evaluates learning outcomes and core skill progress using appropriate and objective assessment tools. The thesis also conducts a survey and analysis of the current state of core skills training for engineering students at several universities in Ho Chi Minh City, including the current state of engineering students' core skills, techniques used in core skills training within teaching, and the necessary conditions for training core skills for engineering students. Based on this assessment, the thesis proposes a process for training core skills through teaching, which is subsequently validated through pedagogical experiments.

2. New contributions of the Thesis

 Core skills represent a crucial research issue at the university level. The core skills developed by engineering students must align with the requirements of modern industry. The thesis has established a theoretical foundation for addressing this research problem, clarifying which aspects of the core skills issue have been explored by researchers and identifying gaps in the field for further analysis. This synthesizes forms the theoretical basis for training core skills in engineering students. The theoretical content is structured according to each aspect and tightly interconnected to create a research framework throughout the thesis: the concept of core skills, the role of core skills, the stages of core skill formation, core skills specific to engineering students, and the process of training core skills for engineering students. This training process is customized to suit the subjects and teaching conditions.

 The results obtained from the survey assess the current status of core skills training within technical education at universities in Ho Chi Minh City provide valuable reference materials for researchers interested in this field. Based on this situation, the thesis draws necessary insights to develop a process for training core skills through teaching for students in the engineering sector. This process for training core skills in engineering students is applied within the context of teaching Electrical Engineering Technology. Illustrated lesson plans are designed to foster the development of Technical Communication Skills, Creative Problem-Solving Skills, and Technical Systems Thinking Skills. A pedagogical experiment was conducted at Ho Chi Minh City University of Technical Education from April 1, 2022, to May 1, 2022. The results are objectively processed and demonstrate the effectiveness of the core skills training process within teaching practice.