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STRATEGIES FOR DEVELOPING INNOVATIVE AND CREATIVE THINKING IN TECHNOLOGICAL EDUCATION

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ABSTRACT

This thesis explores strategies for fostering innovative and creative thinking among students within the context of technological education. The study emphasizes the importance of integrating theoretical knowledge with practical application to enhance students' problem-solving, critical thinking, and innovation skills. The research examines pedagogical approaches, including project-based learning (PBL), interactive and collaborative teaching methods, and creative workshops, which contribute to the development of both cognitive and metacognitive competencies. The findings aim to provide evidence-based recommendations for educators to cultivate students' innovative capacities effectively.

KEYWORDS: Technological education, innovative thinking, creative thinking, project-based learning, pedagogical strategies, student competencies.

INTRODUCTION

Technological education in the 21st century demands more than the mere acquisition of theoretical knowledge; it requires the cultivation of students' innovative and creative capacities. Developing these competencies is essential for preparing students to address complex, real-world problems and to engage in continuous innovation in professional and academic contexts. Innovative thinking involves generating novel solutions, applying knowledge in new ways, and demonstrating flexibility in problem-solving, while creative thinking emphasizes imagination, originality, and the ability to combine ideas in unique ways. The aim of this thesis is to investigate effective strategies for fostering innovative and creative thinking in technological education. The objectives include:

1. Analyzing the theoretical foundations of innovative and creative thinking.
2. Identifying pedagogical approaches that enhance these competencies.
3. Developing practical recommendations for integrating these strategies into the educational process.

2. Theoretical Background

2.1 Innovative and Creative Thinking

Innovative thinking refers to the ability to conceptualize and implement novel ideas, solutions, or processes, whereas creative thinking emphasizes the generation of original and imaginative ideas. Both competencies are closely linked with higher-order cognitive processes such as critical thinking, reflection, and problem-solving (Anderson et al., 2001; Runco & Acar, 2012). Developing these skills in students promotes autonomy, adaptability, and the capacity to navigate complex technological environments.

2.2 Pedagogical Approaches in Technological Education

Project-Based Learning (PBL) has emerged as a highly effective method for promoting innovative and creative thinking. PBL encourages students to tackle authentic problems, collaborate in teams, and engage in reflective practice (Thomas, 2000). Interactive and collaborative teaching strategies, such as group discussions, simulations, and role-playing, further stimulate creative cognition and enhance students' engagement and motivation

2.3 The Role of Creative Workshops Creative workshops and laboratory-based exercises provide hands-on experience, allowing students to test hypotheses, design prototypes, and implement innovative solutions. These activities bridge theoretical knowledge with practical application, reinforcing both cognitive and metacognitive skills necessary for innovative problem-solving.

3. Methodology

This study employed a mixed-methods approach, combining qualitative and quantitative research techniques to investigate effective strategies for developing innovative and creative thinking

Research Methods:Literature Review: Analysis of scholarly publications on innovation, creativity, and technological education. Experimental Method: Implementation of PBL and creative workshops with undergraduate students in technological disciplines. Observation and Assessment: Monitoring student engagement, problem-solving processes, and project outcomes. Surveys and Interviews: Gathering students' perceptions and self-reported development of creative and innovative skills.

4. Practical Implementation

Students participated in a series of project-based assignments and creative workshops, including: Collaborative design projects addressing real-world technological challenges. Brainstorming sessions to generate innovative solutions. Prototype development and testing activities. Results indicated significant improvements in students' ability to generate original ideas, develop innovative solutions, and apply knowledge in practical contexts. The integration of PBL and interactive workshops enhanced critical thinking, team collaboration, and reflective practices.

5. Conclusion and Recommendations

The study concludes that fostering innovative and creative thinking in technological education requires a combination of pedagogical strategies, including project-based learning, interactive teaching methods, and hands-on creative workshops. Educators are encouraged to:

1. Integrate authentic, problem-based projects into the curriculum.
2. Employ collaborative and interactive methods to stimulate creative engagement.
3. Provide opportunities for students to experiment, prototype, and reflect on their solutions.

These strategies contribute to the development of students' cognitive, metacognitive, and practical competencies, preparing them for professional and academic challenges in technological field

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