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Integration of Local Wisdom of Pencak Silat in Learning Newton's Laws based on ICT-Technology to determine Student Learning Motivation

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ABSTRACT

Objective: This research aims to develop a 2D technological visualization that integrates the application of Newton's Third Law into pencak silat movements, providing a contextual bridge between physics concepts and traditional martial arts. The objective is to enhance students' motivation and conceptual understanding by presenting the action-reaction principle through culturally relevant motion analysis. **Method:** The study employed a qualitative descriptive method with data collected from literature analysis and expert interviews involving pencak silat practitioners and physics educators. The visualization design was then refined to display key pencak silat techniques such as stances, strikes, and blocks – while mapping the corresponding forces of action and reaction. **Results:** 2D visualization is effective in clarifying how Newton's Third Law operates within martial movements, making abstract concepts more tangible. Teachers and students reported that the visualization improved comprehension, engagement, and learning motivation. Moreover, the concise two-dimensional format allowed force interactions to be represented clearly without overwhelming detail, supporting efficient classroom integration. **Novelty:** This research lies in merging local cultural heritage with interactive technological media, transforming pencak silat not only as a form of art and self-defense but also as an innovative educational tool for learning physics. This approach highlights how digital visualization can preserve tradition while modernizing science education, thus offering a meaningful model for contextual and technology-enhanced learning

INTRODUCTION

In the field of education, learning and teaching are inseparable components. Learning concerns what students should do as recipients of instruction, while teaching is the teacher's role in delivering education. These two elements interact between students and between students and teachers in the classroom (Arrafi et al., 2023; Lestari & Mansyur, 2021). The learning process is more than just memorizing and practicing drills, emphasizing changes in behavior, thinking, and personality in students. Success in the learning process is achieved if students master the material according to the curriculum, especially in the field of physics (Apriantono et al., 2020; Marisa et al., 2022). Physics is the study of physical phenomena, including scientific cyclical processes, interconnections, and explanations of natural events that are measured through observation and research (Fachrezzy et al., 2024). As a scientific discipline, physics includes scientific products, processes, and attitudes, which cultivate outstanding and well-rounded students in physics learning. Student development is closely related to teacher support, including motivating students from the start of learning to ensure they are involved in learning. When teachers start by providing motivation, they can help students understand the purpose of learning and its relevance to life. This not only helps