

The Achievements and Challenges of Physics Teachers When Implementing Problem-Based Learning: An Exploratory Study Applied to Rural High Schools

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Abstract : Introduction: The current instructional approach entrenched in memorizing does not assist conceptual understanding in science. Instructional approaches that encourage research, investigation, and experimentation, which depict how scientists work, should be encouraged. One such teaching strategy is problem-based learning (PBL). PBL has many advantages; enhanced self-directed learning and improved problem-solving and critical thinking skills. However, despite many advantages, PBL has challenges. Research confirmed is time-consuming and difficult to formulate ill-structured questions. Professional development interventions are needed for in-service educators to adopt the PBL strategy. The purposively selected educators had to implement PBL in their classrooms after the intervention to develop their practice and then reflect on the implementation. They had to indicate their achievements and challenges. This study differs from previous studies as the rural educators were subjected to implementing PBL in their classrooms and reflected on their experiences, beliefs, and attitudes regarding PBL. Theoretical Framework: The study reinforced Vygotskian sociocultural theory. According to Vygotsky, the development of a child's cognitive is sustained by the interaction between the child and more able peers in his immediate environment. The theory suggests that social interactions in small groups create an opportunity for learners to form concepts and skills on their own better than working individually. PBL emphasized learning in small groups. Research Methodology: An exploratory case study was employed. The reason is that the study was not necessarily for specific conclusive evidence. Non-probability purposive sampling was adopted to choose eight schools from 89 rural public schools. In each school, two educators were approached, teaching physical sciences in grades 10 and 11 (N = 16). The research instruments were questionnaires, interviews, and lesson observation protocol. Two open-ended questionnaires were developed before and after intervention and analyzed thematically. Three themes were identified. The semi-structured interviews and responses were coded and transcribed into three themes. Subsequently, the Reform Teaching Observation Protocol (RTOP) was adopted for lesson observation and was analyzed using five constructs. Results: Evidence from analyzing the questionnaires before and after the intervention shows that participants knew better what was required to develop an ill-structured problem during the implementation. Furthermore, indications from the interviews are that participants had positive views about the PBL strategy. They stated that they only act as facilitators, and learners' problem-solving and critical thinking skills are enhanced. They suggested a change in curriculum to adopt the PBL strategy. However, most participants may not continue to apply the PBL strategy stating that it is time-consuming and difficult to complete the Annual Teaching Plan (ATP). They complained about materials and equipment and learners' readiness to work. Evidence from RTOP shows that after the intervention, participants learn to encourage exploration and use learners' questions and comments to determine the direction and focus of classroom discussions.

Keywords : problem-solving, self-directed, critical thinking, intervention

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