Exploring Teachers' Significant Experiences Utilizing Physics Material Resources Towards a Skills Development Program

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Abstract

This study explored the significant experiences of science teachers in utilizing physics material resources, specifically ripple tanks, electric circuit packs, force tables, and acceleration kits towards the development of a structured skills development program at Thai-Singapore International School, Samut Prakan, Thailand. Guided by Experiential Learning Theory, Resource-Based Theory, and Social Learning Theory, the research employed a qualitative design using semi-structured interviews, validated questionnaires, and thematic analysis supported by NVivo. Twelve purposively selected teachers contributed rich narratives describing how physics resources enhanced conceptual understanding, supported hands-on inquiry, and increased student engagement by making abstract scientific concepts more tangible. Findings revealed that while electric circuit packs were frequently and confidently used, equipment such as ripple tanks and acceleration kits were underutilized due to limited training, safety concerns, and technical challenges. Teachers emphasized that meaningful laboratory experiences promoted deeper learning but were often constrained by insufficient equipment, time limitations, and lack of confidence in handling advanced apparatus. Themes that emerged included hands-on conceptual learning, challenges in resource utilization, evolving instructional practices, and professional skill development in areas such as classroom management, technical proficiency, and communication. Based on these insights, the study proposed a comprehensive skills development program that integrates technical training, pedagogical workshops, simulations, peer mentoring, and blended learning approaches. This program aims to enhance teacher competence, increase effective resource utilization, and elevate the overall quality of physics instruction. The findings highlight the importance of sustained professional development to ensure that laboratory resources meaningfully contribute to student learning and teacher growth.

Keywords: experiences, physics material resources, skills, development program, Cambridge practical, educators, IGCSE