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Teachers and Students' Perspectives on Quality Teaching and Learning of Basic Science Concepts in Remote High Schools in Papua New Guinea

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Abstract

Teaching and learning basic science concepts in remote Papua New Guinea (PNG) high schools face persistent challenges including limited resources, weak infrastructure, insufficient teacher support, and restricted practical learning opportunities. Despite national curriculum reforms emphasizing science knowledge, reasoning, and practical skills as essential for student development, implementation in remote schools remains constrained. This mixed methods case study investigated teachers' and students' perspectives on factors affecting quality science education in a remote high school in PNG. Data were collected through student surveys (n=160), semi-structured teacher interviews (n=6), and lesson observations (n=4) during August–September 2025. Quantitative data were analyzed using descriptive statistics, while qualitative data underwent thematic analysis. The three data sources were triangulated to answer research questions about factors affecting quality, their influence on practice, and stakeholder support strategies. Findings reveal that resource deprivation; absent textbooks, laboratories, ICT tools, and science materials shape every dimension of science education quality and represent a systemic rather than incidental constraint. Resource and structural limitations push teachers toward theory-based, teacher-centered instruction with moderate student engagement and limited higher-order thinking opportunities. Despite high student motivation and teacher adaptability, current stakeholder support remains fragmented and insufficient. The study recommends coordinated systemic reform through four pillars: resource provision (textbooks, laboratories, ICT), teacher professional development (networks, training), strengthened home-school partnerships, and sustained government commitment. The findings provide empirical evidence for policymakers, school leaders, and donor organizations supporting rural

science education in PNG and similar low-resource contexts across the Pacific region.

Keywords: Science Education Quality, Remote Schools, Pedagogical Content Knowledge, Science Inquiry, Basic Science Concepts