

Development of New Syllabus and Materials for Mathematics Teaching in Papua
New Guinea Teacher Training Colleges With the Aim of Addressing
Misconceptions in Geometry

Education for Specialized Subject Matter and Field
International Education Course
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Teacher Training College is a post-secondary institution training aspiring teachers to be absorbed into the teaching force within the Department of Education after three years of study in TTCs. The fundamental purpose for teacher education is to produce teachers who are innovative, competent and reflective about the curriculum, their teaching and adjust the learning environment to meet the needs of different children and classrooms situations (Department of Education, 2000b, p. 47) in PNG.

The OBE was blamed for the drop in education standards across all sectors with regard to important subjects including English, Mathematics and Science standards. There was a nationwide call by parents, students, teachers, Provincial Education Board,

and the stake holders to abolish OBE. Thus, Czuba Report 2013 recommended that OBE is not relevant to PNG context and should be abolished. Thus, the report recommended for SBC curriculum design and its practices be adopted with the aim of improving and raising education standards in PNG. The NEC upheld the recommendation and tasked the NDoE to implement the SBC starting 2014 in PNG.

This research was carried out in an attempt to seek for the applicability of useful methods and materials for conceptual and procedural development of mathematics concepts in TTCs in PNG with the intention to raise standards in mathematics. The findings will serve to inform the curriculum developers, implementers and the recipients about the useful materials

and methods as we implement the new SBC curriculum with its underlying theories and practices in TTCs as well as in all sectors in PNG education system.

A test consisted of six question items on geometric shapes was administered as pretest and posttest respectively to a sample of 100 first year students from two classes, assigned as Experimental Class (EC) and Control Class (CC). The experimental class received interventions on geometry shape property, transformation (Euclidean), and area conservation concepts using (i) Active learning Process in ALT and (ii) an instructional intervention based on a theory of structured "problem-solving" approach as distinguished in Japanese mathematic lesson "pattern" (Shimizu, 2000; Sigler & Hiebert, 1999; Yoshida & Sawano, 2002). The Adult Learning Theory guided the development of learning materials over three interventional lessons, while characteristics of Japanese mathematics lesson "pattern" guided the delivery of each interventional lesson. The experimental group performance was compared to a

control group, which received instruction on the same geometry topics, but with no connections made between learning materials and teaching methods applied during the lessons. Both quantitative and qualitative revealed that those who received the interventional instruction improved more by showing better understanding through their explanations and conceptual reasoning and performed better than those who had received regular instruction. Teaching implications and recommendations are discussed.

Thus, in light of the current implementation of the new SBC Curriculum design and its underlying values and practices, this paper proposes a shift in the traditional instructional approach from 'lecture' method to adopting ALT in planning, preparation and development of overall learning activities delivered using 'SPS' instructional approach through applicable materials and methods so that the intended purpose of the curriculum to raise standards in mathematics must be achieved.