

Alignment of intended curriculum to teaching and learning instructions and assessment: A comparative study of Papua New Guinea (PNG) and Japan Science curriculum at Primary/Elementary Education level

Name: Dadavana Modagai Colette

Principal Supervisor: Professor Ozawa Hiroaki

Major: International Comparative Education

Course: International Education Cooperation

Introduction

As the world continues to progress into 21st century and beyond, more and more emphasizes is exerted on education systems focused on alignment of learning components as a way to strengthen school and students' performance. Alignment is viewed as the key element to effective development and implementation of educational programs including standards based systems. According to scholars, curriculum is the backbone of a nation and main engine of an education system in which curriculum elements are created and configured through curriculum development process. Curriculum alignment is a curriculum development process that provides the criteria and a check and balance instrument that guarantees the compatibility of an education system whereby the curriculum is set and systematically aligned to teaching and learning activities and assessment. Hence, the primary purpose of this comparative study is to analyze the degree of alignment between science curriculum intent, teaching and learning activities and assessment at primary level for PNG and Japan to identify factors that influence the effectiveness of curriculum development processes and quality of curriculum materials designed with the view that issues identified can be addressed to improve the way PNG Science programs are designed.

Study background

The research study is set on the following major issues; firstly that the overall academic performance for PNG students in particular Science is worsening than improving. Secondly, that curriculum material produced are of low quality with irrelevant context and content. Thirdly, for the introduction of a Standards Based Education system in PNG.

Research Study Design

The research study was guided by a mix quantitative and qualitative research paradigm utilizing an "inside out" approach based on International Comparative Education perspective in which Japan curriculum is used as a model to benchmark against. The main question that guided the study is: *To what degree of alignment is between the national science curriculum intent, teaching and learning activities and assessment items at Primary Education level?*

Data collection and analysis was facilitated through document analysis, focus group discussion with the utilization of Webb (1999) proposed alignment instrument modified to the context and purpose of the study. The subjects of the study were mainly curriculum designers, coordinators and teachers.

Findings and Discussion

According to the findings, PNG degree of alignment between the national Science national curriculum intent, teaching and learning activities and assessment items is as follows;

Firstly, the findings revealed that there is relatively a high degree of inconsistency for the main categories of concept or content incorporated in the key learning organizers at all levels of hierarchy of knowledge and the most crucial issue was the fact that Science Education for PNG neither has an overall National goal nor specific grade overall goals in the current curriculum while Japan indicated a perfect connection at all level of hierarchy for learning organizers.

Secondly, in relation to the Depth of Knowledge (DOK) for the curriculum intent, findings indicated that the depth of knowledge for grade 6 learning outcomes is lower than grade 7 & 8 learning outcomes. Moreover, the depth of knowledge for teaching and learning activities lack proper articulation of sequential progress of the DOK embedded in the activities across grades. Finally the DOK Grade 8 Science examination items in 2011, 2012, 2013 and 2014 were mostly of low cognitive levels, with some examination items found to be out of the context for the set learning outcome while Japan DOK is well outlined and cognitive levels of activities articulated clearly across grades progressively according to learners' growth.

In relation to the Balance of Representation (BOR), findings indicated that there is a poor balance of representation of teaching and learning activities for set learning outcomes and science curriculum was not represented well in the Grade 8 examination since almost same learning outcomes and same cognitive levels were examined between 2011 and 2014.

Conclusion and Recommendation

The compatibility of PNG Science curriculum is in question due to the high level of misalignment

between learning components including national examination items set and examined. In addition, having science education without an overarching goal is like building a house without posts. The curriculum is the backbone of a nation and curriculum development process is the architecture that creates and configures the elements of a curriculum. Curriculum alignment is the criteria and a check and balance instrument that guarantees the compatibility of an education system.

Therefore in order to have a coherent, rigor and strong foundation Science at all levels for PNG, it is vital that the following issues are addressed:

Firstly, review the structure and number of curriculum materials designed and ensure to define an overarching vision or goal for Science Education with grade specific general aims in the main curriculum policy document. The aims should provide opportunities for all students to learn Science and to achieve the essential knowledge, competencies and attributes reflecting the society needs and global trends.

Secondly utilize Categorical Togetherness, Depth of Knowledge and Balance of Representation or equity as vital curriculum alignment criterion for curriculum development for PNG.

Moreover, the design national curriculum standards monitoring assessment specification or framework for Science in which the main conceptual knowledge or understanding, key scientific and process skills and attributes are scoped to guide the measurement of the intended and taught curriculum.

Finally, the challenge of curriculum designers applying normative style to curriculum development due to limited expertise and content knowledge and the negative impact to overall curriculum intentions should be addressed for the improvement and sustainability of quality education in PNG.