

Study on the Possibility to Restructure the Contents of Mathematics Education and Improve its Pedagogical Practices in Elementary School in Senegal, based on the Competency-Based Approach (CBA).

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In order to improve students' academic performances and train high-skilled citizens, mainly in the domain of sciences and mathematics, Senegal has adopted and generalized the Competency-Based Approach (CBA) in 2013. After nearly a decade of implementation, the results are still dismal, as testified by the different surveys and evaluations. In that context, it is important to conduct a research to highlight with grounded evidence some factors that explain the poor delivery of a curriculum that was initially recognized as well-designed and with laudable intentions. This research examines, on the one hand, the content selection and articulation in the curriculum and textbook, in numeracy and measurement. On the other hand, it reconsiders the teaching practices and how

to upgrade materials such as the manipulatives and the visual aids used to support learning. To the best of our knowledge, this study is the first one to question the alignment of the curriculum in numeracy and measurement to the basic principles of CBA.

Considering Bruner's theories of "Spiral Progression Approach (SPA)" and "Concrete, Pictorial and Abstract (CPA)", and Huntley's model of textbook analysis, the curriculum and a sample of approved textbooks were examined to assess the logical progression in and across the grades. On the other hand, the teaching approaches and materials are compared in order to find out whether they are relevant enough to support effective learning in low grades. So, the overarching aim of this research is not only to identify the best

way to select and rearticulate the contents in and across the grades, but also to make propositions to improve existing teaching methods by using adequate materials.

A mixed method was used in this study.

Qualitative data were first collected through a comparative analysis of curricula and textbooks used in Senegal, Japan and Singapore. Likewise, crucial issues relating to the curriculum implementation were discussed through interviews with some key stakeholders in the prefectural inspections and at the Ministry of Education (MOE). Besides the questionnaires administered to 80 teachers, the researcher conducted five experimental lessons in numeracy and measurement in grade two.

This study showed the dire need to reconsider the volume of contents and their articulation as well.

In numeracy, it revealed the necessity to prioritize an in-depth teaching by limiting the number of contents in the two grades.

Likewise, some additional indications are

needed in the curriculum and the guidelines used to elaborate the textbooks in order to spell out core activities students are expected to experience.

As for pedagogical approaches, it was suggested to improve the current problem-solving approach which is based on a simple discovery and routinization of techniques and algorithms.

In measurement, it advocates reorganization of some contents into direct and indirect comparison the suppression of redundant ones to avoid useless repetition. Ultimately, this research findings can help improve learning outcomes since it highlights crucial elements to reconsider to implement properly the curriculum. It also fosters a cross fertilizing approach that combines top-down and bottom-up strategies during the upcoming curriculum revision.

Key words: curriculum, textbook, spiral progression approach, competency-based approach.