African Virtual University
Université Virtuelle Africaine
Universidade Virtual Africana

AVU POLICY BRIEF

AN OFFICIAL PUBLICATION OF THE AFRICAN VIRTUAL UNIVERSITY
Research & Practice in Open, Distance & eLearning
Policy Brief Number 2016-36

No Math Textbooks? Try Online Open Math Resources (OOMR) and Create a Community of Practice (CoP)

Issue at-hand

With very few exceptions, African countries are confronted with an acute shortage of textbooks in all subjects and at all levels of the education system. There are even countries where no textbooks exist in one or many subject areas. This state of affairs has further compounded an already dire situation regarding education quality as unqualified and poorly trained teachers are more often than not in charge of African classrooms. The importance of textbooks is underscored by the Global Partnership for Education (GPE) in its *Policy Paper 23* entitled *Every Child should Have a Textbook* (published in January 2016) as they are seen as "*especially relevant to improving learning outcomes in low income countries with large class sizes, a high proportion of unqualified teachers and a shortage of instructional time*."

The "picture" of the shortage and absence of textbooks in Africa in both primary and secondary schools is dissapointing. At primary level in Cameroon, for example, the GPE reports that in 2012 "*there was only 1 reading textbook for 12 students and only 1 mathematics textbook for 14 students in grade 2. Mathematics textbooks are often scarcer. In Togo, in grade 2, there were 3 students for every reading textbook, compared with 8 students for every mathematics textbook*."

At the secondary level, an analysis of 19 Sub-Saharan African countries carried out by the World Bank in 2008 revealed the following situation: (i) *only Botswana had adequate textbook provision, close to a 1:1 ratio for all subjects and all secondary grades* and (ii) *in the other 18 countries, including Lesotho, Mozambique and Zambia, secondary textbooks, particularly in non-core subjects, were in very short supply*.

In the poorest African countries such as the Sahelian countries (Burkina Faso, Mali, Mauritania, Niger and Senegal) the situation is even worse. In Mali, for instance, there are no math textbooks for upper secondary students in a context of a major curriculum and pedagogical reform that introduces competency-based teaching and learning. This is the situation that a group of dedicated and creative math teachers and trainers of teachers have been trying to address by setting up an online platform of open math resources (booklets and exercise books) and creating a community of practice (CoP) to enhance teacher professional development.

Policy Recommendation: Setting up an online platform of open math resources and creating a Community of Practice.

In a paper presented at the 2016 AVU International Conference entitled "*the Renaissance of a Community of Practice: from Malimath to Malimath.Net*" (translated from French), Castanet, Dissa, Sangare and Sokona described how, in response to the inexistence of an official math textbook for upper secondary school, they took it upon themselves to establish an online platform of open math resources (malimath.net) and created a CoP to enhance teacher professional development and instructional material design.

Malimath.net was launched in 2013 and built on the foundations of a previous conventional CoP which was created in 1985 but ended abruptly in 1994 when funding from the main sponsor, the French Embassy in Mali, dried out. The initiative also emerged out of necessity to renew mathematics teaching resources as the government of Mali was implementing a new reform of its education system. At the upper secondary education level, the reform called for a new curriculum, new tracks (hard sciences, social studies, arts, etc.) and the adoption of a new teaching and learning pedagogy (competency-based approach).

In terms of results, and after three years of implementation, www.malimath.net is fully operational. Both interfaces (public and managers) work without a bug. The project has an exercise library consisting of over six thousand four hundred (6,400) math exercises. It covers the two (2) levels of basic education in Mali: (i) the lower secondary level (the 7th, 8th and 9th grades) (ii) the upper secondary level (high school) which consist of the 10th and 11th grades. The booklet of each grade can be downloaded from the initiative website. In addition to books, one can find additional exercise resources with corrections based on the official math curriculum.

Secondly, there is the increasing size of the membership of the CoP created around malimath.net. The size of the community has quadrupled since the inception of the initiative.

There are currently more than forty active members. Fifteen (15) high schools and six (6) lower secondary schools participate directly in the project. These institutions have "adopted" the booklets as their reference textbooks. They also serve as testing grounds for the resources created by the core team. There are also contact details of dozens of teachers from different regions of Mali who can demonstrate the use of the booklets in their teaching of mathematics.

Unfortunately, the current Website does not have the capacity to record the number of hits (downloads) on the resources but there is a strong assumption that this should be counted in the thousands.

One important outcome worth mentioning is the professional development opportunities for members of the CoP. Indeed, the approach adopted by the core team allows members of the COP to share ideas and tasks in the production of math resources for the platform and at the same time provides a venue for exchanging notes on lessons learned/feedback during production and use of the resources. Therefore, it allows for the refinement of the resources produced and uploaded onto the platform. The CoP also creates a growing interest in the use of ODeL pedagogy. As a result, training sessions or rather co-trainings are held regularly by members whereby each of them, including classroom teachers, can acquire professional capacities in the following areas:
– Mastery of the use of the online platform, especially the private interface, to download or upload resources;
– Production of pictures with *Metapost* (vector drawing application);
– Use of *GeoGebra* (application for computing and mathematics education);
– Applied Competency-based Approach (CPA) in Mathematics as required by the official curriculum.

Recommendations

Malimath.net is a good example of how online open educational resources (OERs) and ICTs could bring about a major paradigm shift in how to improve education quality efficiently and effectively in Africa. Therefore,

- Governments could save a substantial amount of money by investing in the capacity of schools and other learning institutions to tap into the myriads of free open educational resources while at the same time opening up opportunities for the creation of Communities of Practice among teachers for professional development.

- Schools and learning institutions should have the prerequisite infrastructure for accessing OERs: reliable source of electricity, computers and printers, paper, internet access, trained technicians for the maintenance of the IT equipment, etc.

Malimath.net is blazing the trail for other Francophone countries who depend heavily on foreign editors and publishers to procure textbooks for their schools at a very high cost. For example, the design of a platform for Togo is underway (www.togomath.net) and the long-term goal is to have a common database/clearinghouse that would operate with a group of countries.

References

Castanet, Thomas; Dissa, Sinaly; Sangare, Mamadou and Sokona, Sidi. 2016. *Renaissance d'une Communaute de Pratique: De Malimath a Malimath.Net. A contribution the 2016 AVU International Conference*

GPE.2016. *Every Child should Have a Textbook. Policy Paper 23.*

World Bank. 2008. Textbooks and School Library Provision in Secondary Education in sub-Saharan Africa. Washington, DC, World Bank. (Africa Human Development Series Working Paper, 126.)

For more information, please visit AVU's Website: http://www.avu.org/avuweb/en/

African Virtual University| Université Virtuelle Africaine
Cape Office Park, Ring Road, Kilimani
P. O Box 25405 – 00603, Nairobi, Kenya.
Tel: +254 20 2528333; +254 20 3861458/59

Working Across Africa
Beyond Technological, Language and Cultural Barriers
www.avu.org; http://oer.avu.org

Published in the framework of the AVU Multinational Project Part II,
funded by the African Development Bank

Kindly refer queries to
Research & Development Unit at submissions@avu.org