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CurriculumNet: Creating Freely Available Curriculum Materials to Meet Uganda's Growing Student Population

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Abstract: To meet the needs of its rapidly growing student population, the government of Uganda has adopted Information and Communication Technologies (ICTs) as a central part of its strategy for curriculum development and dissemination. The goals of the CurriculumNet Project are to develop, test, and integrate ICT-based instructional materials and teaching into existing Ugandan curricula. This case study presents key practices and learnings from the CurriculumNet project's collaborative curriculum development process, as well as the opportunities and challenges faced by the project overall. Through analysis of the project's internal documentation, as well as interviews with the CurriculumNet project leader, the study first documents how the project developed and disseminated curriculum resources, before turning to the project's funding and infrastructure related challenges.

I. Introduction

In 1997 Uganda's president instituted free Universal Primary Education (UPE). As a result, primary and secondary attendance rates rose dramatically as students from within Uganda as well as from neighboring East and Central African countries entered the country's free educational system. The National Curriculum Development Center (NCDC), an office under the Ugandan government's Ministry of Education and Sports, proposed using Information and Communication Technologies (ICTs) to assist in addressing the curriculum needs of the growing student population in both rural and urban schools in Uganda.

The NCDC is responsible for developing and evaluating curriculum for pre-primary, primary, secondary and post-secondary levels of education in Uganda. In 2002, NCDC sought and received funding from the Canadian International Development and Research Centre (IDRC) for its CurriculumNet project. The goal of CurriculumNet has been to develop, test, and integrate ICT-based instructional materials and teaching into existing Ugandan curriculum. In addition, the project has sought to explore the viability of using ICTs in education by evaluating their potential for a positive impact on teaching and learning, and to test the economic, technical and operational feasibility of the delivery process. The project was undertaken as a participatory effort, wherein curriculum experts and teachers were trained and supported in the collaborative development of ICT-based curriculum, and in delivering the curriculum electronically in their local classrooms.

The purpose of this report is to present key practices and learnings of the CurriculumNet project in terms of its collaborative curriculum development process, as well as the opportunities and challenges faced by the project overall. Although CurriculumNet has successfully developed ICT-based curriculum for primary and secondary schools in Uganda, it faces challenges in sustaining the project going forward—specifically in terms of securing new sources of funding, and also with regards to meeting the technology and other infrastructure requirements needed to support teachers as they continue to develop and use the content in their local classrooms. Through analysis of the project's internal documentation, as well as interviews with the CurriculumNet project leader, the report first documents how the project developed and disseminated content to meet those needs, before turning to its funding and infrastructure related challenges.

II. Approach

The report is part of a larger initiative[1] led by the Institute for the Study of Knowledge Management in Education (www.iskme.org), which involves case studies of six open educational resources (OER) projects to increase understanding of issues that are common across them—such as engagement of online communities, collaborative authorship, volunteer recruitment, and licensing decisions—and to create synergies and knowledge sharing possibilities for field-building and leadership development. The aim has been to conduct participatory case study research[2] by way of working with OER projects collaboratively to assess their key challenges, and to help them conduct research to address those challenges and move their projects forward.

Partly because CurriculumNet had already documented its processes and practices, and also due to the difficulty of both phone and internet-based communications, a full, participatory case study was not conducted for CurriculumNet. Thus, this report is based on interviews with the CurriculumNet project leader as well as analysis of the project's own, internal documentation on its activities, challenges, and lessons learned. More specifically, ISKME first conducted an Internet-based interview (via Skype) with the CurriculumNet project manager. Due to a combination of poor connection and language difficulties, ISKME conducted a second, telephone-based interview with the project leader, followed by two email-based interviews. ISKME concomitantly conducted an analysis of CurrriculumNet's own research report, which highlighted the project's goals, objectives, successes and current needs. The sections below are a combination of the learnings gleaned through CurriculumNet's own documentation, as well as ISKME's analysis of that documentation and interviews with CurriculumNet's project leader.

II. CurriculumNet Materials: Stages of Development

At the start of the project, CurriculumNet conducted a needs assessment study at the primary and secondary levels to identify subject areas that would most benefit from the development of new ICT-based materials. Through surveys and discussions with teachers, curriculum experts, and researchers, as well as school site visits, the needs assessment lead to the identification of four content areas for potential development: social studies and math at the primary level and geography and math at the secondary level. Importantly, the needs assessment also sought to assess the level of computer connectivity in Ugandan schools, and to determine the types of equipment that were needed to support the project. From this, the NDRC Resource Centre was established—with five computers, software and an internet connection—to serve as a resource hub and a production facility for the creation of curriculum materials.

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[1] The case study initiative has been supported by the Shuttleworth Foundation, the International Development Research Centre, the William and Flora Hewlett Foundation, and Curriki.

[2] The participatory case study methodology used is a model for research that helps organizations build the capacity to assess their practices and develop insights that can be fed back into those practices in light of project goals. This entails developing research and data collection tools collaboratively with the case study organization, which can be used to reinforce, test and modify internal knowledge. In such an approach, the external researcher's role becomes that of a critical friend and facilitator as opposed to a decision maker or expert purveyor of knowledge. As such, value and weight are placed more upon the insights and experiences of importance to the organizational members, as it is from their perspective that knowledge can be cultivated to inform practices and continuous improvement.

In developing the curriculum, subject panels were established, encompassing a total of 18 curriculum experts who would create the curriculum. Each of the participants was trained in instructional design and in ICTs and assigned to one of the four subject areas. The content creation process itself was both iterative and collaborative: After drafts of the content were written by the subject panel authors, they were revised by editing teams and further developed by multimedia experts before being tested by curriculum specialists and improved.

In terms of facilitating use and engagement around the curriculum materials, 150 teachers were trained on the use and basics of computers and the Internet, on the curriculum design process (to facilitate further development of the curriculum), and on how to deliver lessons using technology in their classrooms. Some of these trainings were conducted on site, so that the teachers' unique and diverse needs could be addressed, and so that their facilities and teaching environment could factor into tailored training programs. Also trained were curriculum specialists, education administrators and head teachers of schools as a way to provide institutional support, awareness, and engagement around the effort. Finally, the project offered awareness-building programs for schools that lacked ITC skills and understanding, but which expressed enthusiasm for learning how to incorporate technology into their infrastructure and teaching and learning.

Once complete, the materials were offered both online, through the NCDC website (www.ndcd.go.ug), and offline (CD-ROM). Schools were informed about the materials through circulars distributed by the Resource Center. The project subsequently established evaluation mechanism—including teacher surveys, school site visits, and workshops and meetings with researchers and curriculum experts—to monitor and evaluate the delivery and use of the materials in classrooms. The CurriculumNet project leader indicated that through this evaluation process, the materials have been continuously updated and improved.

III. Opportunities and Challenges Going Forward

According to CurriculumNet's project leader, its instructional materials have been implemented in 13,000 primary schools and in 5,000 secondary schools in both urban and semi-urban areas where electricity is available. The successful implementation of the curriculum development process has led to additional requests for the design of biology, chemistry, physics, and math curriculum at higher levels. In light of these requests and its original aim to support the growing student population in Uganda, CurriculumNet has proposed three new goals for continuing its work: 1) to continue the development and production of ICT-based learning materials, primarily in science at the secondary level; 2) to restructure and establish a fully functioning multimedia production center; and 3) to develop and deploy an interactive educational portal for Ugandan schools, where teachers and learners can access the materials and collaboratively develop and modify them to meet local teaching and learning needs. In addition, CurriculumNet aims to continue to distribute ICT-based materials (both online and offline) throughout urban and rural schools in Uganda.

The analysis of CurriculumNet's internal documentation and interviews with its project leader revealed that a central challenge to sustaining CurriculumNet's activities and reaching its newly defined goals stems from lack of adequate funding. NCDC originally received three years of funding from IDRC to develop and implement CurriculumNet, which supported the project from September 2002 to August 2005. The project then received an 18-month extension from IDRC, taking its support into 2006. According to CurriculumNet's project leader, funding challenges have hampered CurriculumNet in moving forward with its curriculum development work.

Although Microsoft East Africa has provided additional support, it accounts for only about one-sixth of what the project needs to reach its new goals. To address this issue in part, the CurriculumNet project leader indicated an interest in receiving support not only in terms of funding, but in terms of building the project team's capacity to identify potential funders and write successful grant proposals. Additionally, the project has sought and successfully secured the integration of CurriculumNet into the NCDC's five-year strategic plan, indicating its role and importance in meeting curriculum needs for Ugandan schools, which can in turn help to facilitate future financial support.

Furthermore, the analysis revealed that Uganda's technology and energy infrastructure has been an additional challenge for the project, specifically in light of its aim to disseminate and support the use of ICT-based materials in rural schools throughout the country. The NCDC has provided used computers to some schools; however, lack of necessary hardware in some cases required NCDC to actively encourage schools to use community-based telecentres.[3] In areas with limited electricity, Uganda's Ministry of Energy has also encouraged schools and their districts to seek alternative energy sources, such as solar energy. In moving forward into additional schools with limited access to electricity and technology, the project recognizes the need to continue to explore and leverage existing resources, and to find alternative ways to disseminate the materials, such as offering printed versions, or hard copies.

IV. Discussion and Conclusion

The case of CurriculumNet reveals how a project set out to meet the curriculum needs of its country's growing student population, and successfully achieved that goal by securing the funding, volunteers, and technology to do so. CurriculumNet describes its greatest accomplishment as the successful development and production of interactive, engaging learning materials for the primary and secondary levels in social studies, math, and geography. It also recognizes its accomplishments in training over 150 teachers to use computers, developing digital content through participatory processes, and testing and using the content in classrooms.

The case of CurriculumNet also reveals useful lessons for other curriculum development projects, particularly those in developing countries. First, the case reveals the importance of looking beyond the purview of a project's internal resources in meeting its overall goals.

CurriculumNet has sought to provide not ICT-based resources, but also access to and engagement around them in a country with substantial gaps in computer and electricity availability, particularly in rural areas. By leveraging hardware donations for schools and promoting telecentres as well as solar and alternative energy solutions, CurriculumNet helped to ensure the project's long-term viability.

Furthermore, the case reveals the importance of continuously assessing and reassessing users' needs in light of the content being developed and maintained. Through CurriculumNet's initial needs assessment to determine content gaps, its involvement of teachers and curriculum experts in the development and testing of the materials, and its ongoing evaluation of the use of the materials in

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[3]A telecentre is a community centre that offers shared access to information and communication technologies (ICTs), including the internet, for the purpose of community development and poverty reduction.

the classroom, the project has sought to ensure that the materials are relevant and meet local needs of the teachers and students who use them.

Finally, the case of CurriculumNet reveals the importance of addressing long-term financial sustainability early on in a project's lifecycle. As initial funding came to a close for CurriculumNet, and it formulated new goals for curriculum development moving forward, the project faced the central challenge of acquiring additional funding. Although the project successfully secured its role in the long-term strategic plan of its parent organization, the NCDC, it is now confronted with the challenge of exploring new sources of funding and building internal capacity to potentially develop alternative funding models going forward.