Chapter 6
Collaborative Development and Utilization of iLabs in East Africa

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ABSTRACT

Since 2005, Makerere University and the University of Dar es Salaaam have taken definitive steps toward the development and utilization of iLabs. This chapter presents the iLabs experiences of the two East African universities. The experiences presented here are characterized by: institutionalization of developer teams, development of ELVIS-based iLabs, staff & student exchanges, and utilization of iLabs to support curricula. The two universities have also undertaken to setup iLabs communities at peer universities and other higher institutions of learning in East Africa.

INTRODUCTION

iLabs are remote laboratories initially developed at MIT. It is an educational technology that allows experimental setups to be accessed remotely through the Internet. Through the iLabs platform, students and educators are able to perform experiments conveniently. A single experiment setup can be shared by a scalable number of users - thereby alleviating the logistics challenges associated with administration of conventional laboratories in terms of experiment hardware, space, time, and technical personnel.

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The iLab Project was started at MIT in 1998 by Prof. Jesus Del Alamo, who developed the Microelectronics WebLab for use in courses involving semiconductor devices, which did not have a laboratory component at the time. The laboratory enabled students to experiment using a single shared Agilent 4155B semiconductor parameter analyzer (Harward, et.al, 2008). Thereafter, remote labs were developed for other engineering fields at MIT. In 2002, a standardized, scalable architecture, the iLab Shared Architecture (ISA) was developed for creating online labs. The success of iLabs at MIT and the birth of the ISA prompted the formation of the iLab Africa partnership in 2005 to promote the use of iLabs in Sub-Saharan Africa.

BACKGROUND TO THE ILAB-AFRICA PROJECT

The scalability and economic viability of iLabs is of special interest, especially in African Universities where conventional laboratories are inhibited by inadequacies in equipment and skilled manpower for their administration. It is against this background that MIT sought to establish links for utilization of iLabs in Africa. As such, a partnership toward exploration of the potential of iLabs in Sub-Saharan Africa was established between MIT and three African universities to form the iLab-Africa Project in 2005. The three Universities are Obafemi Awolowo University (OAU) in Ile-Ife, Nigeria, University of Dar es Salaam (UDSM), Tanzania and Makerere University (MAK), Kampala, Uganda. The Project was established with support from the Carnegie Corporation of New York. It was envisaged that such a partnership would support the proliferation of iLabs into curricula so as to enrich science and engineering education. A feasibility study conducted between 2003 and 2004 to determine whether iLabs could be useful in Sub-Saharan Africa found that electrical engineering was one of the main areas that lacked laboratory facilities, and which could easily utilize existing iLabs experiments from MIT like the microelectronics device characterization experiment.

At the inception of the iLab-Africa Project, the partnering universities, with support from MIT, setup infrastructure enabling them to access iLabs hosted at MIT. The distinct curricula requirements, with time, necessitated empowerment of the partners to develop their iLabs using low cost technologies. These iLabs could also be accessed via the high speed local area networks, to overcome the need for fast-speed internet connections, which can be costly.

INSTITUTIONALISATION OF DEVELOPER TEAMS

Makerere University

When iLabs were introduced in 2005, the iLabs Project at Makerere University (iLabs@MAK) had one developer; Mr. Albert Lumu. In 2007, iLabs@MAK, under the leadership of Professor Sandy Stevens Tickodri-Togboa, embarked on a more structured approach to team building. An institutional iLabs@MAK project team structure was put in place. The structure had provisions for the Principal Investigator, the project administrator, the research co-ordinator, graduate developers and undergraduate developers. The student developers work under the guidance and supervision of the staff members. The iLabs@MAK Project is hosted by the Faculty of Technology. Figure 1 shows the iLABS@MAK structure as of November 2010.

The student developers are chosen holistically on merit from the BSc Computer Engineering, BSc Electrical Engineering and BSc Telecommunications Engineering Programs. This ensures continuity of the team when the majority of the final year developers leave on completion of their undergraduate studies. One of the core values of iLabs@MAK is the provision of equal opportuni-

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