

Chapter 63

A Practical Application of TrimCloud: Using TrimCloud as an Educational Technology in Developing Countries

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ABSTRACT

The current educational technologies in developing countries are not always successfully implemented and utilized due to infrastructure limitations, such as limited resources, limited training in educational technologies, and the unrealized potential usefulness of these technologies. Using an effective and relevant educational technology will efficiently maximize the use of the limited resources available to schools in developing countries in order to provide a larger outreach and increase access to up-to-date information and useful electronic resources. Thus, the authors propose TrimCloud as an alternative educational technology to help rebuild the education system and encourage innovation and development in developing countries. TrimCloud is an open-source virtual desktop infrastructure (VDI) that is offered as a software-as-a-service (SaaS) and a desktop-as-a-service (DaaS). In this paper, the authors examine possible solutions to issues plaguing the educational environment in developing countries by using TrimCloud at the primary, secondary, university/higher education, and administration levels. They propose the use of refurbished legacy systems as the alternative hardware source for using TrimCloud as an educational technology, which will also aid to alleviate the “e-waste dump” problem. Lastly, the authors explore further network enhancements to TrimCloud that will provide a reliable and robust option for developing countries.

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1. INTRODUCTION

The field of educational technology provides an alternate medium for sharing and/or communicating knowledge, ideas, and skills with the ability to reach a wider audience. This field uses a variety of technological tools and services to disseminate knowledge in learning and teaching environments. Many efforts to implement educational technologies in developing countries have not been as effective as originally hoped (Gulati, 2008; New Internationalist, 2013). The current educational technologies in many developed countries may not always be viewed as practical for use in developing countries due to infrastructure limitations, limited resources, limited training in educational technologies, and the unrealized usefulness of these technologies (Gulati, 2008; Marshall & Ruohonen, 1998). As a result, this has widened the gap between developed and developing countries (Lu, 2001).

Developing countries have some of the richest cultures and the oldest educational foundations/institutions in the world (Gulati, 2008; Saheb, 2005). However, due to social and economic inequalities, and/or political instability, many developing countries could greatly benefit from a more sustainable education system (Gulati, 2008; Lewin & Stuart, 1991). Consequently, many organizations worldwide have raised awareness of the social, economic, and political issues and have offered relief in the form of donations, volunteering, and establishing education programs (Morley & Coady, 2003; Osin, 1998). Many of the established programs have used television, radio, and computers to improve the education systems in developing countries (Gulati, 2008). Subsequently, the current widespread use of technology in both developed and developing countries points to technological innovation as the optimal solution for the improvement of education systems. When appropriately engineered for the proper audience, educational technology can improve and advance the education systems in developing countries (Marshall & Ruohonen, 1998). However, there have been many obstacles hindering the development of a sustainable educational technology infrastructure. Thus, an alternative educational technology is proposed: TrimCloud - one that is more suitable and more applicable to those who need help in developing countries; one that may improve conditions in the education system where all else has seemed to fail.

TrimCloud is an open-source virtual desktop infrastructure (VDI) that has been adapted into an educational technology tool that provides a channel for more outreach, more up-to-date information, a more relevant curriculum, and increased access to useful resources. It will efficiently maximize the use of the limited resources available to schools and at the same time alleviate the “e-waste dumping” problem in developing countries. The “e-waste dumping” problem is a preventable epidemic of millions of tons of electronic waste caused by developed nations unnecessarily and excessively donating either outdated or unusable hardware to developing and underdeveloped countries (Puckett, Westervelt, Gutierrez, & Takamiya, 2005). Most developing countries suffer from hundreds of thousands of electronic waste products that leads to poor sanitary living conditions and contaminated land, air, and water systems (Puckett et al., 2005). By utilizing outdated hardware to provide educational technology services, TrimCloud can help reduce the “e-waste dumping” problem.

In addition, TrimCloud will deliver more up-to-date information that can build the foundation for restructuring outdated curriculums which are common in developing countries. Thus, this paper will explore the education system issues in developing countries at the primary, secondary, university, and other higher education levels and present possible and plausible solutions with the application of TrimCloud as an educational technology. Additionally, proposed network enhancements of TrimCloud will be addressed to ensure that TrimCloud can effectively supply its services to developing countries.

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