

# Developing a context sensitive VLE for Marginalized Rural Areas - Case study of Dwesa

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**Abstract-** The rapid uptake of Information and Communication Technologies (ICTs) in remote populations of South Africa has increased the potential for ICTs to play a constructive role in the fight against poverty. ICT innovations have been identified as an important component to community development, in supporting various societal activities such as provisioning of E-Learning services to enhance and complement Face to Face (F2F) education. This is because ICTs present a platform for the deployment of a wide spectrum of applications known as Virtual Learning Environments (VLEs) that educators can integrate in the teaching process to improve course management, curriculum design, collaborative learning and also provide fun activities as a way of making the learning process more engaging for students. However, previous VLEs have not helped in improving the levels of education in rural areas. This paper presents an underway development of a VLE that seeks to address the short-falls of current VLEs and their appropriateness for the context of rural communities. The project is undertaken within the Siyakhula Living Lab (SLL), an ICT project by University of Fort Hare and Rhodes University.

Index Terms— E-Learning, VLEs, ICTs, telecenters, F2F Learning, EC

## I. INTRODUCTION

This development targets Marginalized Rural Areas (MRAs) such as Dwesa where projects such as Siyakhula Living Lab (SLL) are being deployed. Specifically, we target rural areas that are afflicted by low high school (Matric) pass rates. According to Department of Education (DoE), the province of Eastern Cape (EC) has had some of the lowest Matric pass rates in the country [1]. This is a cause of concern because EC is the poorest province in the region [1]. The DoE through Umalusi project has identified education as a key to improving the lives of people living in rural areas. It is understood that amongst other reasons, students fail their Matric due to under-use of Information and Communication Technology (ICT) based systems of delivering education [1]. Based on this outcome, a hypothesis has been formulated.

**Hypothesis:** Virtual Learning Environments (VLEs) available to people in rural EC are not context sensitive, thus are rendered ineffective in providing a successful compliment to Face-to-Face (F2F) education. Professionals developing VLEs overlook the nuances of the context in

which these applications are deployed. Cultural and contextual limitations such as user needs, language, and political, financial and social views are often neglected. These hinder the successful use of these VLEs. This project will therefore undertake a detailed investigation of the existing VLEs to determine reasons why these have failed. It will also look at language settings, poverty, distance to school type of devices that are available and these have failed. We believe that these are overlooked when building traditional VLEs. The findings from this evaluation will then be used to inform the structure of an appropriate VLE for MRAs.

## II. LITERATURE REVIEW

The poor performance in the rural E.C schools has been attributed to hindrances that the rural setting of the schools presents to F2F education. These include: limited human and teaching resources, crime, and long distances between schools, poor infrastructure, geography and under-use of electronic, auditory and visual learning methods [1]. On the other hand most of these areas have seen a rollout of ICT equipment being deployed by stakeholders in a move to provide ICT solutions to those areas [1]. Use of mobile devices such as cell phones is also very popular in the province. One would believe that availability of these ICT tools in the region would presents a convenient platform for the successful deployment of E-learning applications but, pass rates in the province have deteriorated over the years and show no sign of improvement [1].

E-learning is the use of VLEs to enhance knowledge and student performance [3]. E-learning technologies offer learners control over content, learning sequence, pace of learning, time, and often media, allowing them to tailor their experiences to meet their personal learning objectives. If implemented properly, VLEs can integrate rural economies into the global economy by promoting better education delivery beyond the scope of the classroom [2].

There are several ways through which learning can be impacted by using these devices. Most VLEs have interfaces for collaborative learning whereby students can engage in group discussions without the need to be in a single physical location [2]. These systems also allow educators to submit course material and thus manage the learning process. The anonymity creates a feeling of a safe environment which empowers students to ask and respond to questions without feeling shy. Furthermore students monitor their own growth and development through observing their own changes in the way they ask questions

while the educator gets feedback on the students learning difficulties [3].

### III. PREVIOUS SUCCESS OF VLEs

Many developing countries including South Africa have begun initiatives to build the necessary ICT infrastructure in rural areas, including establishing ICT access points, also known as telecenters. This has presented itself as a platform for successfully deploying VLEs such as WebCT and Blackboard [3]. Although these applications have been successful globally, they are desktop-only applications and this limits the scope of their use to rural users who have to walk long distances to get to the nearest schools. There is a need to develop VLEs that take into context factors such as language limitations, poverty, geography as well as devices used in MRAs. Mobile Education (MobilEd) is a project that seeks to design a suite of applications and services to support a pedagogy that embraces the cell phone as a key learning tool in South African classrooms [1]. Part of the solution is Thuthong, which is DoE's educational portal. Thuthong is a portal for delivering curriculum, information, and support material to schools.

#### Dr Math

Through MobilEd, CSIR developed an mTutor service aimed at supporting learners with their Maths homework using the MXit platform. Students subscribe to Dr Math by sending a MXit contact request to 079 992 3962 and ask questions on this portal [4]. Messages are routed to the first available online tutors. In 2008 there were more than 3000 active users of this platform. Dr Math won the award for the best ICT for Education tool at United Nations Economic Commission for Africa hosted in Tanzania in 2011[4]. However Dr Math has its own contextual limitations such as lack of multilingual support, limited subjects and lack of Student to Student interaction.

### IV. RESEARCH OBJECTIVES

The primary objective of this project is to carry out an in-depth investigation and analysis on existing VLEs and subsequently develop a system that compliments the F2F education used in MRAs. This will be achieved through the use of the following set of steps:

- i. Information gathered will be analyzed and an in-depth comparison to user needs will be documented.
- ii. A proper model based on the analysis carried out will be then be designed.
- iii. An appropriate context sensitive VLE suitable for the people living in MRAs will be developed and deployed.
- iv. Evaluation on the developed system against changing user needs will then be carried out

### V. RESEARCH METHODOLOGIES

The methodologies that will be used for data collection and analysis will be predominantly qualitative in nature. A qualitative approach provides rich textured knowledge to elaborate on the context of the intended stakeholders. The stakeholders in this context includes educators, parents,

learners and other people who are directly involved in the students' life.

Table 1.1 below summarizes the methods that will be used to achieve the different objectives.

Objective	Methodology to be used
Data collection	Questionnaires + informal quizzes + literature review + internet
Analysis	Data collected will be analyzed and the results obtained will be used to inform the prototype
Model Development	A model will be developed based on the outcome of the analysis
System development	The choice of tools that will be used in the development of this project will be derived from the model that will be constructed after the analysis carried out on the shortcomings of the existing VLEs.
Deployment	Deployment will be done in Dwesa-Cwebe schools and community
Evaluation	Questionnaires + informal quizzes

### VI. CONCLUSION

This project is developed in an ICT4D context where we propose the use of ICTs to enhance and compliment existing education systems. The availability of broadband networks and cell phone networks as well as the availability of ICT devices in these areas present a low cost environment for the deployment of such systems. Critical in the development of this project is to understand why existing VLEs have failed to improve education at these schools. Therefore this project will entail carrying out an in-depth investigation to understand cognitive factors and other issues that may be affecting the use of these applications in MRAs. This will help inform the design and implementation of a context sensitive VLE suitable to improve education in MRAs.

### VII. REFERENCES

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