

# Virtual reality in Africa – for Africa

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## **Abstract:**

The paper describes a number of virtual reality projects taking place in Africa. The availability of VR on PCs, it is argued, has made access possible for a large number of users. Applications for education and training and applications that preserve and promote African culture are particularly highlighted.

Keywords: Africa, cultural preservation, third world, virtual reality



**Figure 1. Audience immersion. Curved screen, three projectors, graphic workstations and image blending allow full audience participation in virtual experiences. Very powerful for group discussions, product testing and tourism, etc. Such facilities tend however to be at the higher end of the cost spectrum and cannot easily penetrate rural communities in the developing world. They do not help breach the so-called 'digital-divide':**

Virtual reality (VR) is one of those technologies that always seem to promise slightly more than it can deliver. Commentators so often use the term to illustrate a bright and shiny hi-tech future and its rather more mundane uses have gone unrecognised.

Over and above the more 'traditional' (first world) applications, VR has an important role to play in Africa and other regions of the world. It offers a new way to visually communicate ideas, skills and knowledge, in a way that overcomes literacy barriers so often experienced in education and training.

VR or 'interactive visual simulation' as it is sometimes known, can be defined as *a computer-generated environment in which the user is able to both view and manipulate the contents of that environment.*

It allows for intuitive, real-time interaction, supported by an intelligent, realistic 3D environment.

VR prototypes offer many advantages. One can visualise an entire industrial process, a scientific or engineering principle, test ideas before investment is made in physical construction as well as re-create long gone historic and cultural worlds. VR allows us to view, and alter proposed developments before they take place and to visualise processes in complete safety, often impossible in the real world. Most importantly, VR can clearly illustrate how things work, and also allow the user to manipulate the content by taking advantage of VR's interactive ability. Thus, the user can 'look' and 'see' as well as 'do' in a safe, non-threatening environment.

Until recently, VR was confined to specialised and expensive defence or industrial

simulations. It used high-end graphic computers and was associated with costly peripherals such as data-gloves, stereo glasses and head-mounted displays. However, VR is now readily available on standard PCs, which makes it accessible to a vast number of users.

The 21<sup>st</sup> century sees an expanding awareness of the potential impact of ICT in the promotion of economic growth in Africa. Modern PCs are able to handle intensive 3D graphics, and this ability to provide a platform for visually interactive applications can play a tremendous role for the VR rollout in Africa.

This is especially so in two areas: education and training, and preserving and promoting African culture.

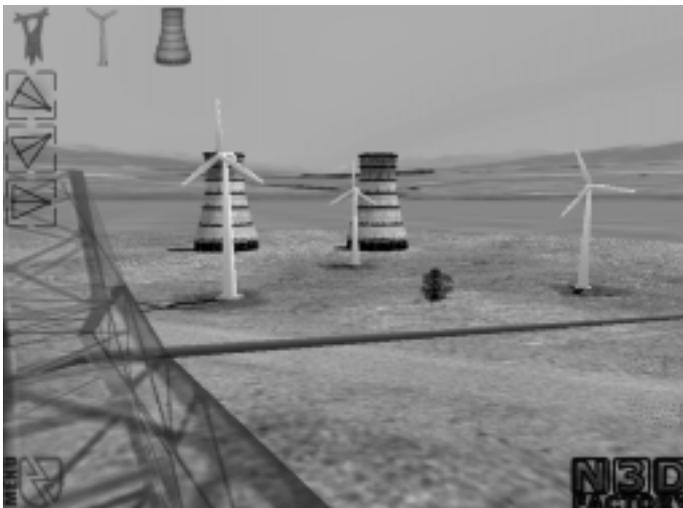
In the African context, VR comes to the fore as a medium to visually facilitate the transfer of context-specific knowledge and thereby overcome traditional verbal and written barriers to communication.

For the first time, we have access to a communication tool that is both context rich and concept rich, as well as visual in experience.

The area of the human cerebral cortex devoted to the processing of visual inputs is more than an order of magnitude greater than that devoted to text and speech input. We



**Figure 3.** Pictures paint a thousand words... 'Reality-Objects' are very powerful in communicating how particular objects work. Users can dismantle the object, make parts move and gain familiarity with operation. Useful in web-based marketing and also for product training.



**Figure 2.** VR Model designed to visualise the visual impact of a proposed wind-farm in the Boland area of South Africa and used as part of a public participation process (PPP). The cooling towers were included to indicate scale but can be hidden (sunk underground) for effect. Free movement allows the user to view the development from any perspective.



**Figure 4.** A PC-based model developed for the Museum of Technology, Delft. It is aimed at young learners to show the basic principles of a 'locomobile'. Five main elements are dragged and put together into the workspace. When the assembly is correct, the Locomobile starts to operate and a dialogue then explains the principles of the steam Locomobile.

dream visually, we read visually. Africa is characterised by lower literary skills and therefore needs new types of educational resources. VR can be tailored to become a fundamental tool in addressing Africa's educational and training needs. With VR, individuals can develop skills using a way that overcomes the need for good literacy skills.

For example, workers can learn new skills. Farmers can see, learn and practice the principles of good agricultural practice. Communities can learn how to live with the presence of land mines. Communities could develop a better understanding of the HIV/AIDS virus, its impact

and how to live with people afflicted by the disease, thereby avoiding rejection of the afflicted individual.

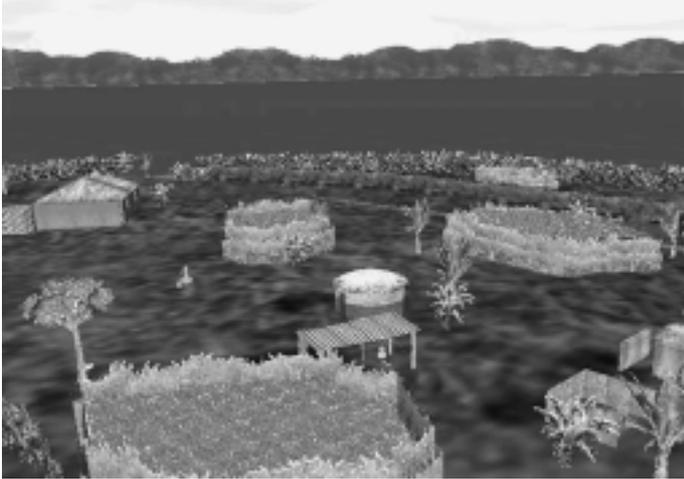
Many marginalised people and communities have the potential for wealth creation within their existing communities, despite the current poverty, illiteracy and lack of development opportunities. They need only to be empowered with knowledge and skills.

It can be argued that the right computers aren't available to the community. However, as ICTs are becoming increasingly available to even rural and disadvantaged communities through telecentres, schools and businesses, the United Nations Educational Scientific and Cultural Organisation (UNESCO), with the Naledi3D Factory, are developing pilot activities on how VR can be applied to develop new and more appropriate learning materials for Africa.

In a recent pilot project, a VR training application was developed to address rural water sanitation for a Multipurpose Community Telecentre in Nakaseke (Uganda). In Nakaseke, 60% of the community are functionally illiterate and therefore traditionally barred from modern facilities such as computers as well as libraries,



**Figure 5.** 'Ndebele Village'. A visual representation of African traditional heritage and culture. A powerful way to capture past traditions as well as the richness of African stories.

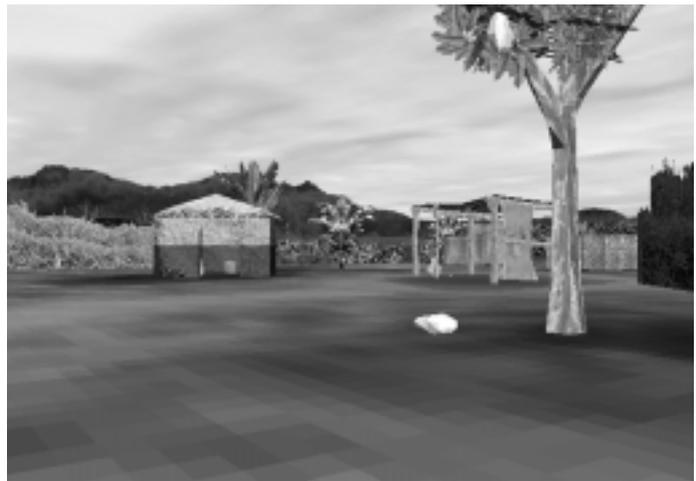


**Figure 6.** *An aerial view of ‘Virtual Nakaseke’ – described elsewhere in the article. A 3D world allows the user to move around and trigger events in ‘self-learning’ mode. Used in an multi-purpose tele-centre in Uganda.*

which primarily offers text-based information and applications. This VR application addresses basic issues that lead to water-borne disease with an emphasis on visual and audio cues to transfer the message within a VR model built using the local communities environment. The material is presented in both English and Luganda.

In this short article, we have looked primarily at the potential and real impact that VR can have on education and training in developing communities. However, much of the forgoing can also be applied to the capturing of African history, its rich heritage and lost cultures. While much is handed down from generation to generation, a lot can be gained by re-creating our history visually, not only for the benefit of today’s generation, but also to take the richness of African heritage onto the world stage.

**Dave Lockwood** has over 5 years experience in the virtual reality field. During that time, he has come to recognise that while the first-world potential of VR cannot be ignored, it is in the developing parts of the world that VR offers most unexplored opportunities. For more information contact Dave Lockwood at the Naledi 3D Factory <[www.naledi3d.com](http://www.naledi3d.com)>.



**Figure 7.** *‘Virtual Nakaseke’. A mango tree trigger — which tells the user (in Luganda) to wash any fruit and your hands before it is eaten etc.*