

Interactive3d Learning Objects

A new tool for a new learning paradigm IN Africa



A new learning paradigm

Text-based communication poses a significant stumbling block to clear and unambiguous communication in the classroom.

We know that our brains and our cognitive systems respond effectively to visual perception, visual stimuli and visual mental maps - whereas the text processing part of our brain is much less developed.

A continued reliance on text-based learning material can also further inhibit education and training in Africa – as result of lower literacy levels and language barriers which together can present a major barrier to effective learning.

A revolutionary new approach to education in Africa is needed, one that will unlock Africa's true human potential and help to achieve our Millennium Development Goals.

A solution can be found in **Interactive3d Learning Objects**, developed by the Naledi3d Factory as a marriage between Virtual Reality and Learning Objects.

What are Interactive3d Learning Objects?

Virtual Reality (VR) immerses the user in a 3D environment where he or she interacts with the environment - in the same way as a computer game.

By combining VR with a pedagogical concept that is very efficient in packaging knowledge into small discrete units that are easy to digest and you have a phenomenally powerful tool called the **Interactive3d Learning Object**.

Interactive3d Learning Objects can be rotated, taken apart, re-assembled and inspected – in a way that offers a rich and engaging learning experience – characterised by longer learning retention.

Interactive3d Learning Objects caters very well to our visual strengths - in a way that **literacy and language**, often recognised as barriers to effective learning, are by-passed. The intensely visual nature of VR overcomes literacy barriers by **showing** content as opposed to **telling** it; this gives VR a distinct and powerful advantage over text-based communication.

The value of **Interactive3d Learning Objects** is further enhanced through their re-usability characteristics:

- Language elements can be easily translated
- They can be localised to suit local needs and
- Adapted to local contexts and culture.

In a nutshell, **Interactive3d Learning Objects** created in one language can be circulated across Africa and re-contextualised and translated - locally!

Case Study: Life skills and water (UNESCO):

Five "country teams" created locally relevant learning material on "water" which was shared through the five countries; where the concept of "Learning Objects" was explored; as well as practical ways of working together.

Three **Interactive3d Learning Objects** were built:

- (1) building a VIP latrine;
- (2) hydro-electric power generation and
- (3) how the AFRIDEV water pump works.



Case Study: PC Literacy (OSISA):

Supporting ICDL training and comprises a range of realistic, interactive 3D Learning Objects, embedded in an HTML interface that allow for the exploration of the inner functionality of a typical modern PC and its peripherals. The content is aimed at both youth and adults who wish to learn more about computers.



Meeting the need for local content

There have been many initiatives to build ICT infrastructures across Africa. However, there is often one missing link - local content. The tendency to implement hardware with readily packaged software often conflicts with local value systems and local needs, which can only be addressed by **appropriate and local content**.

The need for locally adaptable learning material has been recognised and the **Interactive3d Learning Object** provides a new approach that is unparalleled, and holds huge potential in education and training. Minimal skills are required to localise **Interactive3d Learning Objects**. A knowledge of image editing, audio-recording, compression software such as WINZIP – and local needs normally suffice.



This means that even advanced technical training such as that outlined in the case studies can be packaged into reusable *Interactive3d Learning Objects* and made freely available to a broader learning community

Case Study 3 - Lathe and Milling Machine training simulation (SA National Skills Fund): includes highly accurate Interactive 3d Learning Objects of a lathe and milling machine as well as relevant measuring tools, etc. As separate entities, these are designed to teach technical students how to use the equipment and also test their understanding of correct usage

Pedagogical templates

- **Interactive image:** the learner clicks on a part of a picture (a human body) and gets more information on a component (heart) - *supports explorative learning*;
- **Visualisation:** which could be an animation, a video clip or in this case, a VR model - *describes procedural information (that is hard to describe textually)*;
- **Phases of a process:** describing the stages of a process in a way that the learner can control and navigate between them – *enhancing understanding*;
- **Interactive simulation:** allows the learner to test and try out two or more variables and see how they influence each other - *supporting Inquiry learning*.
- **Analogy-based presentations:** facilitating learning whereby an abstract concept is presented via a concrete (familiar) phenomenon – *pedagogical bridging*.

Multiple learning objects can also be linked into larger assemblies or even nested.

The ability of *Interactive3d Learning Objects* to define a digital world - where the user can view as well as change the content of the environment holds huge potential. And. ***Their ability to be shared also helps build a spiral of new knowledge creation and sharing that is not only powerful but also flexible.***

Actions count more than words ...

While the *Interactive3d Learning Object* concept has evolved, with the support of UNESCO, WK Kellogg Foundation and others, there has also been action on the ground...

- Surveys in Uganda and South Africa showed that *Interactive3d Learning Objects* are popular amongst teachers and students alike (2003);
- A network of organisations and motivated individuals is evolving, that now includes Senegal (UCAD), Uganda (St Henrys' School, Kitovo), Ethiopia (IICBA and Addis Ababa University), Sudan (Khartoum University), Mozambique (Eduardo Mondlane University), Zimbabwe (World Links), and Kenya (Nairobi University). The main aim of this network is to translate and localise *Interactive3d Learning Objects* into local languages and contexts. This network is expanding rapidly and now boasts our first non-African member - the Solomon Islands in the South Pacific;
- Localisation activities are moving apace with *Interactive 3D Learning Objects* now being translated into Shangaan Shona, Kikuyu, Emba, KambaKikuyu, French and Portuguese;
- The building of a web-based resource to enable the free sharing of *Interactive3d Learning Objects* – which can be off-loaded, localized and of course, put back for others to use;
- Establishing a Contact Point for those requiring information, who wish join the initiative or importantly, who wish to partner in funding the development of new object-based material.

Because objects can be easily localised, for example by college students, educationalists across Africa are starting to realise that this alone has huge benefits for communities - as visual content becomes accessible, in many local languages, and in appropriate contexts;

The future lies in how WE work together...

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