

# Context Based Approach to Applying Virtual Reality

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## INTRODUCTION

It was Ivan Sutherland, nearly 30 years ago, who introduced the modern concept of VR in his thesis work (Sutherland, 1963). It has been 14 years since Jaron Lanier (1996) coined the term *virtual reality* to collectively present such ideas as formulated since Sutherland. Since then, VR has been offered as a one-stop solution for tackling issues as diverse as ranging from manufacturing and design to tourism. In fact, the liberal usage of the word *virtual*, often drawn from the term *VR*, is best summed up by Professor J. Vince when he says, “today we have virtual universities, virtual offices, virtual pets, virtual graveyards, virtual exhibitions, virtual wind tunnels, virtual actors, virtual studios, virtual museums, virtual doctors—and all because of VR” (Vince, 1998, p. 1). Unfortunately, even such worldwide media attention has been unable to help VR penetrate and broad-base itself across all market segments as had been predicted.

This article builds upon the above-mentioned issues while specifically focusing on:

- a. Finding and understanding the reasons for an overall lack of enthusiasm for VR usage in the Cost Sensitive Organizations (CSO).
- b. To develop and present a VR application methodology specifically for CSOs based on the findings of point “a”.

## BACKGROUND: A HISTORICAL OVERVIEW OF VR

One of the earliest examples of a VR-like representation can be traced back to the works of Mond.

Mond and Mackay, during 1914 to 1916 (Mitchell, 1999), created a photographic archive of the interior of the Tomb of Menna. A rail-based camera rig was set up by Mond along the inside walls of the tomb. He shot 3,300 black and white photographs using 10.5cm by 8cm photographic plates. Photographs were placed so their edges would overlap. They were then touched up using a paint brush and rephotographed, thereby creating seamless panoramic shots. The panoramas were pasted onto cardboard walls, put up based on the floor plan of the tomb. As people walked along the cardboard walls, it created an impression as if they were walking inside the real Tomb of Menna.

Modern day VR can be said to start from the time of Ivan Sutherland who is aptly called the father of VR. It is he who, in his 1968 work, “The Ultimate Display”, referred to computer rendered space as virtual worlds with the chief characteristic of the space being realism. Later in the year, he used a head mounted display for viewing his virtual worlds. In his paper “A Head-Mounted Three-Dimensional Display,” he wrote, “Our objective in this project has been to surround the user with displayed three-dimensional information” (Sutherland, 1968).

Although numerous projects (mainly in America) were experimenting with VR, it was in 1989 that the term *virtual reality* was coined by Jaron Lanier. “VPL performed the first experiment in what I decided to call VR in the mid to late 1980’s. VR combines the idea of virtual worlds with networking, placing multiple participants in a virtual space using head mounted displays” (Lanier, 1996).

It should be noted that realism in terms of virtual worlds and the hardware used to view virtual scenarios, that is, head-mounted displays, were considered important since the early days of VR—an image that persists today. Perhaps this was because,

in its early days, aerospace sector, in general, and flight simulators, in particular, were one of the main areas of application where VR was experimented with.

## **VR AND ITS PERCEPTIONS**

VR is predominantly considered a technology that falls in the realm of flight simulators, offshore oil rig simulation, construction industry, and so forth. Often, organizations (be they private corporations or government sectors like the Ministry of Defence) applying VR tend to have large budgets at their disposal. This popular view of VR regards the technology as a means of providing an alternative reality where the level of realism blurs the distinction between what is real and what is provided by the technology. Image of VR created in the films, sometimes termed *Hollywood Factor*, too, presents virtual worlds in the same light of high realism, as can be seen in films like *The Lawn Mower Man* and *The Matrix*.

Perception that high-end hardware, software, and a high level of reality are a prerequisite to VR is also confirmed in two surveys. The UKVR awareness survey (Bevan & Leston, 1999) looked at the UK business potential for VR in the small and medium enterprise (SME) sector confirming this expectation of VR among the business community. A further survey of 25 professionals in companies developing/applying VR applications or with a potential to do so, conducted by the authors, also echoed findings similar to that of the UKVR awareness survey. It was found that SME's view of VR was often driven by the Hollywood ideal coupled with a perception of high costs. Another point that emerged was the fact that only few SMEs could find any correlation between VR and the real value it could add within their business process. UKVR awareness survey also had such responses as can be seen by the following statement, "VR has been well received and is clearly working, but it's difficult to pin down the value of a process improvement", according to a department head of an automotive industry.

The survey conducted by the authors also found an alternative perception of VR to exist that came

from the games industry and the Internet, one which is usually considered to be gimmicky. Once again, business professionals failed to see any real value in this relatively less complicated use of VR other than entertainment. As a consequence, this level of VR is generally dismissed as not being of use for any serious application.

These perceptions seriously hinder the exploitation of the real potential of an intermediate level of VR, where serious business applications can be serviced by relatively inexpensive VR hardware/software that offer a suitable and not necessarily the highest level of realism. Perhaps VR needs to be redefined to bring about a change in its stereotypical image and perceptions.

## **VR REDEFINED**

As has been highlighted in previous sections and upon examining numerous definitions from Sutherland's time to late the 1990s, the key point that emerges is the increasing stress on the importance of realism within VR scenarios. This in turn means investing into high end technology to be able to attain such realistic environments even without knowing what returns that investment would give. As Professor Roy Kalawsky says, "VR is perhaps an unfortunate term... Press and media speculations about VR provided the platform for its world-wide exposure. However, these speculations were in the danger of 'over claiming' what could be delivered with existing technologies" (Kalawsky, 1993, p. 3).

VR, according to the authors of this article, is simply defined as a real-time interactive communication and visualization tool that uses computer-generated models to build any given scenario. Such models are drawn and viewed across all three axis—x, y, and z—thereby creating an illusion of a three dimensional visual representation of the given scenario (in a two dimensional space).

The above definition makes VR independent of any specific hardware, software, and levels of realism while focusing on the actual application nature of VR. Equipment used and the level of realism required become a function of the given project's context of application and budget.

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