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Scenarios of Virtual World Functionality

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Abstract

Online virtual worlds are essentially social environments, open for users to create rich visual and audio experiences for themselves and others. These environments can be themed to host an extremely wide range of activities but participation remains based within social collaboration with other real people, enhanced by rich digital constructs. This paper will discuss only non-gaming scenarios and will use the virtual social worlds (VSWs) provided by Second Life and Qwaq as examples.

Controlling an avatar (graphical figure that represents your presence within a virtual world) and using it to communicate to other people via their avatars requires only basic gaming skills, but learning to read and quickly adapt to the social etiquette and demands of any new virtual simulation does take practice. The protocols of any given simulation, whether explicit or implicit and a participants adherence to these, are what completes the illusion and helps to make the virtual world environment feel real.

The extent to which social and other educational learning within a virtual world can be translated into valuable real world knowledge and experience, depends upon the extent to which the simulation's illusion affects the users and the depth to which they engage with the established setting. Effective simulations can spin participants into diverse activities and behaviours, leading to previously unimagined situations, challenges and personal discoveries.

If simulated correctly to enforce workplace protocols then serious business scenarios can be set up in virtual worlds for courses, presentations, e-learning and meetings. With or without facilitation, these can help participants focus upon core interests, cut through peripheral issues and by the use of simple record and review techniques, help individuals to develop beyond bad practices or disruptive habits. This can help to create efficient proceedings allowing geographically dispersed individuals to collaborate in a socially rich and highly functional setting from their own desktop. By providing a socially successful virtual workplace and reducing the need to travel to meetings, a company can make significant increases in productivity while at the same time greatly reducing costs and environmental impact. By experiencing such positive learning scenarios in world, the desire to emulate this in real world situations can also help to fuel the crossover of good practice from the virtual learning or practice space. When offered access to a world where you are free to do anything you like and create what ever you desire, you are for the first time truly free to experiment socially, mentally and graphically with no limits, confines and without the consequences of failure. If harnessed in a positive way this can be a tool for discovery and innovation.

Developing new social skills, practicing professional behaviours or learning business workflows can all be undertaken within virtual simulation spaces. However, such unconventional suggestions and approaches create a wide range of challenges. This paper outlines an attempt to instigate the use of virtual worlds within an international oil company.

Project Goals and Plans

An eight week summer student project consisting of three university students (Thea Matland, Thomas Berge and Trond Blomholm Kvamme) led by a project manager Dr Alex Cullum set out to investigate whether virtual spaces could deliver the functionality required to help geographically dispersed workers collaborate more effectively than currently possible with net meetings and videoconferencing. Net meetings and videoconferencing are considered by the authors to lack the social interaction and functionality required to support fast moving technical discussion between geographically dispersed groups and individuals. Net meetings and videoconferencing can be effective tools for presentations and one to one, one to few

discussion but as soon as a larger number of dispersed individuals wish to collaborate while simultaneously sharing complex software these fall short of the demands both technically and socially. Created to facilitate social integration and to host functional tools for simultaneous collaboration, virtual worlds could provide substantial improvements for professional scenarios. For example, virtual worlds:

- Require only a normal PC/Laptop and connection to the internet
- Facilitate meetings of geographically dispersed individuals
- Provide social interaction and the sense of a real physical meeting
- Offer graphical content easily modified to suit and enhance the intended use
- Allow global meetings to be instigated instantly without the need to book facilities
- Additional facilities can be instantly copy/pasted and used immediately at no cost
- Can host fully functional software for collaboration or educational use.

Discussion with potential user groups helped to identify the main areas of focus for this project:

- Instant desktop meetings of all sizes for geographically dispersed individuals with improved functionality and social interaction from that afforded by current solutions. (E-learning, assisted learning, pedagogic teaching, group work and serious games).
- Online community building for recruitment, improved inter-office contact and networking.
- Scenario training for HSE routines (oil platform and installation familiarisation, facilitated practice scenarios for professional skills like presenting, interviews, machine manipulation, first aid, teamwork).
- Cultural and language training (preparation and support for employees embarking upon international postings).
- Media warehousing, display and showcasing of visual and audio media, for example conference posters and picture displays.

Second Life and Qwaq were chosen as the main focus of the project as these two virtual worlds are very different in terms of graphical style, size, security levels and user target groups. At this time they represent end members according to a number of criteria, but in such a rapidly developing arena they should not be taken as representative of all possible virtual social world scenarios. Second Life represents the large, open, metaverse style of virtual social world with millions of active users and a very diverse range of simulation themes. It supports a high degree of realism and detail in its graphical interface, together with a well developed range of communication styles (Intimate messaging, text chat and voice, as well as group messaging, text chat and voice). Active user groups, themed communities and service companies have built up around this metaverse to produce a highly functional system of support and collaboration. Qwaq was chosen to represent the small, closed virtual spaces tailored to provide a serious, professional platform with tight security and supporting standard office software packages in-world to give high levels of functionality.

Contact with Information Technology personnel raised issues of information security, file sharing dangers, malicious attack and firewall degradation. Corporate managers were concerned over potential criticism regarding involvement with such un-regulated media and for encouraging employees and others to misuse company logos and information on the internet.

Detailed discussions with Glenn Fisher (Business Development Manager for Linden Labs/Second Life), and Remy Malan (Vice President of Qwaq Ltd.), led to reassuring answers regarding security issues. Despite these reassurances, an IPS (intruder protection system) was set up around the project PCs in order to monitor and protect against any threats, none were detected.

Design, Construction and Deployment: successes and challenges
The students had very little experience of Virtual World software before the project began, but found that the level of support from networks and communities was unparalleled by anything experienced in the real world. Simple requests to scripting and building groups yielded multiple offers of help, support and suggestions within seconds. Virtual World users have created a wide range of 'how to' instruction videos covering almost all aspects of in-world construction and scripting, these can be found on the many online video archives. Just three weeks into the project we had a virtual copy of an oilrig (thanks to help from Eric Call), virtual helicopters, a wide range of bespoke meeting scenarios, a teleport system, a learning zone with an array of science and maths experiments, media display areas, film theatres and an exact copy of the companies corporate entertainment auditorium. The success of this early design and building phase proved that the user friendly graphics interfaces and support systems found within virtual worlds make them easily accessible to any user.

Early experiences with demonstrations showed that film and image based presentations give the wrong impression of virtual spaces. People experiencing these for the first time as "machinima" (films made in-world) are left with the impression that you

are showing a cartoon or video game. This association to games makes it hard to convince potential users that this has real business value. Only when placed at the controls and forced to interact and communicate with other avatars do people begin to experience the immersive power, social impact and huge collaborative potential of virtual spaces. This is, however, a distinct challenge to the implementation of these media. It is extremely difficult to raise enthusiasm and appreciation for virtual worlds within the professional setting, if each new recruit has to be brought onboard through facilitated personal experience.

To shortcut this stumbling block we attempted to seed interest within a number of groups. The aim was to instigate peer to peer transfer of experience and enthusiasm through personal and professional networks. We offered a number of network leaders the opportunity to hold meetings in virtual spaces. Instruction could be provided for these groups and initial meetings facilitated to help solve any problems. Despite our best efforts most leaders declined this opportunity. Feedback suggested that many felt it inappropriate use of valuable meeting time, did not have the time to learn new software, didn't feel comfortable being part of a test group, or imagined the embarrassment of technical failure in front of their network colleagues. Another major issue was timing; this student summer project took place during July and August 2007, a period during which the majority of employees take a large percentage of their annual leave. Those virtual meetings which we were able to run, were successful. Feedback from department meetings in Qwaq suggested that participants experienced a heightened sense of interest, concentration and productivity than during normal meetings. Others suggested that they were able to multitask, attending to other desktop tasks during parts of the meeting in which they felt less interested. The majority of users suggested that they would like to experiment further with the system in order to gain confidence and test out the more advanced functionality.

For those not wishing to use work time to test out virtual spaces we ran a number of evening events. At these events we demonstrated a number of meeting scenarios, film presentations and conference facilities with groups of avatars (38 people being the largest group to attend at any of the sessions). We ran safety training scenarios on a virtual copy of an oil platform where we gave a basic rig induction before setting a number of fires and smoke generators to simulate an emergency situation. The feeling of real sensory deprivation and panic during these sessions showed the potential value of such virtual scenarios. Those attending attempted to find a safe way to their assigned lifeboat despite areas of dense smoke and fire. Training and practice in a safe but challenging environment is required to properly prepare employees to perform well in life threatening situations and emergencies. Exact virtual copies of real rigs and installations can be easily made so that having spent time in the simulation an employee will recognise the layout instantly upon arrival. Those training to use large machinery or undertake precision critical tasks could also benefit from similar simulation training. All those who attended these sessions were convinced that familiarisation training in virtual copies of specific rigs and installations could represent a major improvement in safety standards. Unlike most E-learning applications VWs draw the user into the scenario producing a very immersive and real experience. Users engaged within an environment supporting a high degree of believability are more likely to learn real skills and retain this new knowledge for real world use.

On the 7th August 2007 a conference style afternoon of films, presentations and discussion was organised, in order to focus attention towards the broad potential of virtual worlds. This event was well attended by a physical audience of over 75 people including a number of key corporate managers. At the start of this meeting, a safety video was screened in which an avatar walked out the safe evacuation routes to the assembly point outside a virtual copy of the venue. The audience gave far more attention to this safety presentation than if we had shown a building plan with exit doors marked on it. Watching this film of actual evacuation routes provided a vivid memory map which is more easily remembered should it be needed.

Within the auditorium, a central screen was used for presentations and film clips from the various events and meetings we had held in both Qwaq and Second Life. Two additional screens either side of this showed live demonstrations of Second Life and Qwaq within which a number of people were using their avatars to attend the meeting virtually. The sound and voice from the virtual worlds was fed live into the auditorium, while microphones and a webcam streamed sound and video from the meeting back into Second Life. This demonstration showed how real audiences and geographically dispersed individuals who where unable to attend physically can be brought together. Eilif Trondsen (Stanford University Research Institute) attended the meeting from California and was supposed to take part in a discussion session but unfortunately, although the voice links worked perfectly before the meeting, a laptop failure caused problems during the demonstration. This led to questions from sceptics about the stability of virtual world communications when you are really depending upon them, which were hard to answer given the circumstances.

Anne-Grethe Jacobsen (IBM, Stavanger, Norway) presented an excellent talk explaining IBM's vision that virtual worlds will impact all our lives in a major way within the next five years. She also unveiled IBM's new protocols for its employees as they use virtual worlds both during and out of work time. It is vital that employers establish a similar policy or guidelines for their staff to ensure a clear set of responsibilities for those using virtual worlds.

The project was documented in a report including films and presentations. This was circulated at the end of the project which received an award for being the most innovative student summer project of 2007.

E-learning

The majority of e-learning applications offer a 2D or 3D interactive experience where information is provided by graphics, sound, film and text. A metric element is normally present, multiple choice questions reducing the complex open format information into simple choices in order to measure performance or determine whether or not the level of knowledge attained is sufficient for the user to pass the course. The use of multiple choice questions repeatedly remind the user that they are not part of a real situation and are simply observers or commentators. This can greatly reduce the level of learning potential, if you are not fully engaged with the scenario then you are less likely to value the information being presented. E-learning remains a powerful tool as applications can be fully automated with no requirement for a teacher during the learning or assessment process.

Virtual worlds allow and encourage complete immersion, full and open communication through voice and text facilitate and demand full engagement in real time by users within the simulation. This style of immersive role-play can be extremely effective for professional "soft skills" and language or cultural training. However, this is not an automated scenario, trained facilitators are required to run these sessions. It is also hard to assess the learning which takes place in such simulations and the absence of clear metrics remain a barrier to implementation at this time.

2D content in 3D worlds

The current trend of placing 2D content into 3D worlds is questioned by the authors. The collaborative use and communication potential of traditional 2D content, software and media can be enhanced by its use in virtual worlds. However, focus should be placed towards the development of new presentation and manipulation techniques that truly utilise the full potential of the 3D content of virtual worlds. We have the 3D tools, but are still thinking and communicating in 2D. During the summer project the students constructed a 3D scale model of our solar system which featured each of the planets and their moons orbiting the sun. To move within this enguaging and realistic 3D model would be a much better teaching and learning experience than looking at a static 2D image. Profesional diagrams and complex models could often be made more effective to an ordience if they were created in a 3D environment. Virtual worlds provide an excellent opportunity to create and share such 3D content.

Virtual World Functionality

Second Life hosts a complex suit of graphical based interfaces and scripting tools. However, the default functionality does not immediately lend itself to the basic business requirements of an active and collaborative office suit (i.e. word processing, spreadsheet, presentation software). These and other tools can however be bought or scripted. Second Life charges a fee for uploading files. Although small, this fee is an obstruction to users wishing to use this platform for professional purposes. Second Life does not easily support the extraction of data files. In world content can only be removed by the use of screen capture tools, again a serious obstacle to business users wishing to extract documents for storage in corporate databases. Second Life could be successfully used for a wide range of teaching, presentation and scenario training or where graphical scenarios and speech are the main focus for example business skills, language learning and cultural education. The potential range of uses of rich graphical worlds are enormous, but most fall outside the boundaries of business use.

A number of the smaller virtual spaces like Qwaq, Protoshere (Pronton Media) and OLIVE (Forterra Systems Inc.) have been developed specifically as business tools. Qwaq supports the open-office suit allowing a wide range of standard software tools to be simply drag and dropped from the PC desktop and into the virtual world. Files can be uploaded into applications from any location (local hard disk, internet or corporate database) and once running in world all the users present can work on this simultaneously applying all the functionality of the original software. Workers are free to take a personal in world copy of the files at anytime or save them back to real world locations or corporate data stores. Qwaq supports the Mozilla internet browser in world, providing access to any additional applications which can be made available over the net. Such advanced in-world functionality facilitates collaboration between dispersed users which can fit within normal real world workflows.

Current Status and Future Plans

A wide range of possible uses for virtual worlds have been identified and evaluated during this project. Those considered by the authors to have most potential for the oil industry are listed below:

- Instant, collaborative and functional meetings with small or large numbers of dispersed individuals.
- Teaching, demonstration and learning (pedagogic, assisted and supported).
- Scenario training, familiarisation and practice (HSE, business skills and physical operation skills).
- Language and cultural training (support, tuition and advice before during and after international travel and placement).
- Network and community building (recruitment, improved global communication/contact and pier to pier support).

At this time a number of initiatives are under discussion within StatoilHydro. Some groups within the company have realised the potential to use Qwaq to help with communication and collaboration between teams located throughout the world. Discussion is underway to get Qwaq installed within the corporate firewall and make it available to a number of groups as a trial of the platform. Virtual worlds are being seriously discussed by visualisation teams planning the future solutions for geological software integration and collaboration. The use of online communities in a range of buisiness settings is currently in review, virtual worlds may play a central role within this area.

One concrete way to secure a true test of Virtual world scenarios would be to set up a number of pilot groups which have an identified high level of travel and aim to cut this by an agreed percentage over a period of time. At the same time a small number of international offices could be included in a pilot project with the aim to increase inter-office communiciaion through the use of virtual world scenarios. The creation of a virtual world work group would be necessary to co-ordinate such projects and monitor, study and report the levels of success.

Conclusions

Second Life provides the impression of highly developed functionality, but in reality much of this scripted interaction is designed to suit game and scenario building sitations. Fully functional versions of standard business tools are not available for use in Second Life at this time. Serious obstructions exist and the input/output of data and information is too complex. Scripted solutions and fixes are available but lead to an over complicated workflow unsuitable for the heavy demands of professional collaborative use.

Qwaq and other small virtual spaces developed specifically as business tools do offer full collaborative functionality and support standard office software in-world. The use of familiar tools in world makes such solutions robust and capable of meeting the serious demands of business users.

For many professionals the concept of using the virtual world scenario as a serious tool is just one step beyond their comfort zone. This remains a serious barrier, restricting the development of this media towards its full potential. Net meetings and video conferences work well enough that many users do not see the need to learn yet another piece of software (ie. virtual worlds) in order to gain what they see as only peripheral benefits.

It is relatively straightforward to demonstrate the potential of virtual worlds for communication and collaboration, but it is within this area that there is the most competition from existing solutions. It may therefore be more effective to develop their use towards unique functionality which cannot be provided by any existing means. Such uses appear to be the ultimate goal of virtual world pioneers, but such unprecedented applications and innovative scenarios are the most difficult to demonstrate and sell to sceptics. Virtual worlds might, therefore, have to establish themselves as platforms for communication and collaboration despite the current competition, before the most beneficial uses can be explored within a professional setting.

A corporate level decision is required if virtual worlds are to be used within an organisation. A central group is then required to help drive integration and development out into all the potential areas where benefits could be achieved. If a central decision for implementation is not made then a slower and more organic pattern of growth can be achieved as groups of users become aware of the benefits of virtual worlds through small pilot projects.

Whether or not virtual worlds receive full corporate backing within an organisation, a set of user protocols for these and similar media should be put in place to help develop and maintain professional behaviour within online communities and other social software.

In order to satisfy strict and necessary professional security standards, any virtual world will have to be centralised behind a corporate firewall. To the closed and professionally focussed platforms such as Qwaq this is preferable, but for Second Life and other open worlds this can pose problems at this time.

Despite attempts to produce a more accountable and ethical community, Second Life still has a serious problem with undesirable in-world content. It remains almost impossible to screen against this mature material or protect professional users from exposure to it as can be done with the traditional internet. Despite its many positive features, Second Life appears to be plaugued by this issue. This problem creates negative attention in the media and is giving virtual worlds a bad press. Most virtual worlds have developed solutions to this issue and are free from such undesirable in-world content.

Virtual worlds are in an adolescent stage of development. They do display serious signs of potential as a professional tool, but like many teenagers, they are still in need of some development before they find their place in the professional world. In this way it is easy to push the responsibility for further development back upon this emerging technology and those who drive it. However, as with our relationship with the next human generation, much of the required development lies within us. It is our attitudes, preconceptions and resistance to change that are limiting the potential of this new media at this time.

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