Using virtual worlds for online role-play

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Abstract. The paper explores the use of virtual worlds to support online role-play as a collaborative activity. This paper describes some of the challenges involved in building online role-play environments in a virtual world and presents some of the ideas being explored by the project in the role-play applications being developed. Finally we explore how this can be used within the context of immersive education and 3D collaborative environments.

Keywords. Virtual worlds, simulations, role-play, collaboration, learning, serious games

1. Introduction

Role-play is regarded as an established technique for engaging individuals in a problem space through a series of structured tasks, which immerse the participants in some of the challenges of the real-world environment [1]. Role-play has been used for many different purposes such as predicting outcomes, war-gaming, team building, and training. It has been particularly useful as a teaching tool in the classroom, allowing students to act out and experience some of the dynamics of a particular problem or issue, from different stakeholder perspectives. Aspects of role-play have also been used in online environments such as virtual theatre, gaming, and focused discussion forums.

The +Spaces [2] project (Positive Spaces – Policy Simulation in Virtual Spaces) explores how virtual world technologies can be used to allow government bodies to measure public opinion on a large scale and maximize the value from prospective policy measures by leveraging the power of virtual world communities [3]. +Spaces is building a range of virtual intelligent environments, varying from polling and debating applications to more advanced role-playing simulation spaces.

This paper describes some of the challenges involved in building online role-play environments in a virtual world and presents some of the ideas being explored by the project in the role-play applications being developed. We conclude that the use of role-play simulations seem to offer many benefits for public policy debate, in terms of providing a generalizable framework for citizens to engage with real issues arising from future policy decisions. Role-plays have been shown to be a useful tool for engaging learners in the complexities of real-world issues, often generating insights, which would not be possible using more conventional techniques.

2. Simulation in virtual worlds

There are several challenges when it comes to modeling the real world in online simulations. For example how easily can we change a person's regular habits? How can we interpret a habit based on predictions arising from a new government policy?

We also need to be clear about what simulations can do that other techniques cannot do. In an online poll the policy maker should know the exact question to be asked. In an online debate such as a chat forum, the question is usually more open but rooted in a core issue. Whereas, in a simulation, the policy maker may not know the exact question to be asked. In a poll users are asked to give a direct answer, in debates users provide more open answers, and in a simulation users may be unaware that they are being asked anything at all.

There is also the danger of the Hawthorne effect – if we force users to behave in a certain way, they will typically start to adapt their behavior – that means that users who participate in simulations are likely to change their opinions about the topic being studied.

A key issue for +Spaces is the lack of a reusable simulation model. Most existing simulations, such as the BBC Climate Change Simulation [4] combine an underlying simulation model (the rules and conditions which affect climate change) with an environment or user interface, which allows users to explore and interact with the simulation online.

Many simulations are also highly complex game playing environments, which have rich graphics, story narratives and game-playing metaphors.

There is also the issue of how to engage with citizens and policy makers using simulations. People generally want to engage with a simulation because they are interested in the topic (such as climate change), or they are enticed by the game-playing or entertainment provided by the simulation (such as Farmville). It is potentially difficult to use these factors in a simulation that has a government policy-making objective.

2.1. Creating simulation models

Edward Castronova [5] has carried out research into economic modeling using virtual worlds. This research has indicated that virtual worlds that exhibit some form of economic behavior often reflect real world economic propositions. For example:

1) That as the price of a good rises, demand for it falls, and

2) If you insert more money into an economy, the price level rises.

This confirms the notion that a virtual world can provide an authentic environment for studying real-world behaviors. However, a common problem with computer-based simulations is the 'black-box' nature of the model that drives the actual simulation. Often the internal model is hidden from the end-user. This is of benefit in terms of improving the overall usability of the interface, but a major weakness for a policy-making application, where the internal rules of the model will make up the framework for the implementation of any new policy. From a policy-making perspective the transparency of the internal model is critical to understanding the factors that will affect the successful or unsuccessful outcome of any new policy. Also by the nature of their implementation (ie. highly complex models) computer-based simulations are often very specific to a particular problem domain and they do not generalize well to more than

one problem domain. This makes it very difficult for +Spaces to build a general framework for policy simulation without having to re-implement a different simulation for each policy being considered. This makes computer simulations an infeasible option, as it does not easily support the dissemination and use of the outputs from the project by other parties.

Other experts also back up this analysis. Prof. Richard Duke, author of 'Policy Games for strategic management: pathways to the unknown' [6] is a pioneer of computer based urban simulation games and is President of the International Simulation and Gaming Association. His work has moved away from using simulations precisely because of their black-box nature, to a more general approach based on role-playing simulation exercises that allow different players to engage with each other. Professor Duke believes that this provides a far less deterministic approach, which is more generalizable, and introduces an unpredictable element of human choice into the process (which is a good thing).

2.2. Role-play as a form of simulation

An alternative simulation scenario therefore is to provide a virtual world in which the participants themselves can act out a particular government policy issue through an online role-play activity. This would be a mediated task, facilitated by an online moderator, whereby the users are assigned roles (such as central government policy maker, civil servant, local government agent, citizen) and then asked to act out a particular simulation scenario (such as the implementation of a new waste removal service by private contractors). The role-play could take place in a virtual world that visually recreated the location of the intended policy such as a town hall, or local street.

This type of virtual world simulation is often referred to as a 'serious game'. A serious game is defined as (from Wikipedia):

> *Serious games are designed for the purpose of solving a problem. Although serious games can be entertaining, their main purpose is to train, investigate, or advertise. Sometimes a game will deliberately sacrifice fun and entertainment in order to make a serious point. Whereas video game genres are classified by gameplay, serious games are not a game genre but a category of games with different purposes. This category includes educational games and advergames, political games, or evangelical games. The category of serious games for training is also known as "game-learning".*

Serious games are often used where it would be too dangerous or too costly to attempt the activity in a real-world setting. Examples include safety training on oilrigs and war-gaming exercises. In both of these examples, the keys factors are:

- A realistic virtual world environment (reflecting the real world)
- Multi-player scenarios and collaboration, often with users role-playing different characters (such as paramedic, doctor, patient)
- A rich underlying model reflecting the real-world behaviors available (such as fire fighting capabilities on an oil rig)

The creation of a serious game simulation will often have the same issues as identified for other complex simulations (as discussed above). However, there are some open source tools, which could be used to create a serious game policy making simulation. For example PIVOTE [7] is authoring system for learning in virtual worlds.

Created by Daden originally for the JISC funded PREVIEW project, PIVOTE is now an open-source project and available for free download and use by anyone.

PIVOTE supports:

- Creation of learning exercises on the web using a simple forms based interface
- Creation of objects in a virtual world such as Second Life, which users can use to interact with the exercise
- Playing the exercise in Second Life, OpenSim, or on the web or even an iPhone.
- Porting exercises between virtual worlds
- Sharing PIVOTE compatible objects between exercises and institutions
- Rapidly editing exercises to create variations, or custom versions for different skill levels
- Exporting student performance data for us in an online learning environment

Using PIVOTE it would be possible to create a forms-based interface to allow policy makers to input the content for a simulation scenario. This could then be translated to a web-service, which can be interfaced to a range of front-ends, including Second Life, Open Wonderland, and the web (such as a Facebook page). PIVOTE also supports in-world chatbots, which can be used to structure the simulation dialogue with the human participants.

The role-play simulation could then be followed up by an online poll and debate using the other +Spaces applications, to elicit further information about the implications of the new policy initiative.

3. +Spaces role-play simulations

The +Spaces project is building on these ideas to create both 2-dimensional (web-based) and 3-dimensional (virtual world) environments to support synchronous role-playing simulation events. We have already created a 3D polling environment and a virtual debating chamber, which have been evaluated in a series of field trials (to be published). The 3D role-playing tools and applications will represent the final and most challenging aspect of the project.

The project has been exploring the use of role-play templates to help policy makers devise an appropriate role-play simulation to support a given policy issue. The following are examples of role-play templates that have so far been developed:

- Galactic wormhole: participants imagine themselves to be five years in the future and reflect on positive and negative outcomes of a particular strategy
- Depolarizer: structured game based on the philosophy that many issues that we treat as problems to be solved are actually polarities to be managed

The 3D environment will be implemented on Open Wonderland [8]. So far the project has developed the following new modules that extend the functionality of the Open Wonderland platform:

- Office-converter - enables drag-and-drop of office documents into Wonderland
- Twitter-viewer - module to search and display twitter micro blogging posts animated in world

- VNC control webapp, Webcam control webapp and Poster control webapp - modules to edit the VNC, webcam and poster cells respectively

A role-playing session on Open Wonderland will be initiated by a +Spaces scheduler, based on the time stated by the policy maker upon creation of a role-playing experiment.

The Open Wonderland role-playing chamber will clearly display the current phase of the role-playing simulation session as well as the current topic. It will also display the participant's own role to other participants.

Users will also have an opportunity to prepare reasoned arguments or vignettes based on an assigned character role or perspective. When quiet thinking time is over and users are ready to contribute their input, Open Wonderland will provide colour-coded post-its, on which participants will write their input, and which can be placed onto a 2D board.

A separate 2D asynchronous role-playing simulation will be implemented in Twitter. Participants will be invited to take part via their tweets – be that for open discussion or for contributing their structured input.

A role-playing session on Twitter will be initiated by the +Spaces platform upon the creation of a role-playing simulation experiment by a policy maker. Participants will be able to follow the session and participate through their regular Twitter use (Twitter page or a browser add-on), or through the +Spaces Twitter role-playing application page, where they will be able to follow the structure of the session, and where their responses will be automatically wrapped with the relevant and required hashtags.

The +Spaces Twitter Role-Playing Application will also summarize the session, and it will clearly display the current phase of the role-playing session; display an aggregation of the participants' responses; and display the user's own role in the session, and clarify the type of required response.

We are currently in the process of building the following Open Wonderland modules to support the +Spaces role-play application:

- Templates, users and roles
- Role-Play Banner
- Poll results and final results
- Clustered Post-its
- Poll carpet with 9 segments
- Heads Up Display (HUD)
- Role assigner
- Clock countdown timer

4. Implications for immersive education

The tools being developed by the +Spaces project to support online collaborative role-play can also be used in classroom based learning activities. Simulations have long been used to support constructivist-learning tasks, particularly based around participatory models of learning [9]. However, the 'black-box' nature of these simulation models is recognized as a limitation in their use for teaching and learning. Students can often get frustrated by the hidden nature of the underlying simulation models. There is also evidence that it can result in '*superficial understanding'*, or '*factually wrong conclusions*' about the topic [10]. Contributory, 'glass-box' based approaches to discovery learning are therefore encouraged. The +Spaces role-play tools also take this approach. By facilitating online role-plays, we envisage that students can go beyond the superficial understanding of complex topics, to become more engaged

with and ultimately achieve a better understanding of the subject matter. This is combined with the use of 3D virtual environments, in which we hope to provide highly engaging immersive collaborative spaces for teaching and learning to take place.

5. Conclusion

The innovation for +Spaces is in the application of role-playing as a simulation tool for policy makers. Many of the challenges for the project are shared with immersive education:

- How to support online participants across different platforms
- How to define a role-play and then select users and schedule (and setup) the event
- Managing the structured role-play
- Capturing the results from the role-play
- Analyzing the results to support assessment (eg. for policy making)

The benefits of using a role-play simulation for the +Spaces project are that it supports the need for interoperability across platforms (Facebook, Twitter, Blogger, Wonderland), across +Spaces applications (polls, debates, simulation), and with other core +Spaces services (a recommender/reputation system for selecting participants and a data analysis service).

It will also provide rich data sets for the analysis systems in terms of the role-play dialog and events, and it should provide a more generalizable policy simulation framework.

The project is currently building several role-playing applications, which will then be evaluated in a series of online trials. We envisage that the +Spaces role-play tools can also be used to support classroom-based discovery learning activities, and is highly relevant to the field of immersive education. We hope to further report on the outcomes from these trials (and the implications for collaborative role-play using virtual worlds), in future presentations.

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