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Activeworlds: geography and social interaction in virtual reality

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Abstract

This paper examines the interrelation between the geographical and social aspects of virtual worlds. We examine the main geographical features of Activeworlds, a multi-user virtual environment available over the Internet. Activeworlds is not only one of the most popular virtual environments, it is also the only publicly accessible one in which users can build themselves, and thus shape their geographical and social environment. We examine, among other features, transportation, mobility, and property appropriation in this virtual worlds system. Further, we describe some of the influences, both from urban planning and science fiction, on the geography of Activeworlds. We also examine the social relations that arise from these geographical conditions, including the ‘rough and ready’ mentality of this ‘cyberspace frontier’. Finally, we consider the implications of this virtual worlds system for theories of the emerging geographical and social relations in virtual environments. © 2001 Elsevier Science Ltd. All rights reserved.

1. Introduction

This paper examines the interrelation between the geographical and social aspects of virtual worlds. In the first part of the paper, we will give an account of the main geographical features of Activeworlds, a multi-user virtual environment that is accessible via the Internet. In this part, the focus will be on the spatial layout, on transportation and mobility, and on time. We will also examine the influence of some turn-of-the-century ideas about urban planning and of science fiction films on the

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geography on Activeworlds and other virtual worlds. Next, we will examine how space has come to be built up and appropriated in Activeworlds. Here, an analogy will be made with the American frontier and the Turner thesis about American society. The frontier myth that has shaped American society, we will argue, can also be seen at work in the development of Activeworlds, where the ‘tough’ conditions of a new environment have integrated participants from many different backgrounds into a ‘rough and ready’ social order. Finally we will shift to the main features of social interaction in Activeworlds — and especially property rights, social rules and group formation — in order to make a link, in the conclusion, between geography and social relations in Activeworlds. At this point, we shall also put the geography and social relations in Activeworlds into the context of theories of geography and of the geography of ‘cyberspace’. The focus throughout will be on Activeworlds, although some other multi-user virtual worlds will also be mentioned. The main reason for concentrating on Activeworlds is that the users of this system have contributed more extensively than in any other multi-user virtual reality system to building its worlds and shaping its social life.

2. The geography of virtual worlds

Activeworlds is one of a number of Internet-based systems which allows users to interact with each other in virtual environments as avatars (see <http://www.ccon.org> for examples of these systems, and Damer [1] for a description). Activeworlds is the only one of these systems which has allowed users to build in the environment, and thus hundreds of thousands of users have been shaping the emerging physical and human geographies of this set of virtual worlds. Activeworlds consists of hundreds of worlds (more than 500 at the time of writing), including Alphaworld, which is the largest, most highly developed, and most populated of these worlds. This section explores the shape of these geographies and examines how the features of the virtual worlds are influencing the nature of virtual space.

3. Physical dimensions

The physical layout of virtual worlds varies according to system design. The Activeworlds system is based on streaming technologies, allowing new locations to load seamlessly onto the user’s machine. Rendering is based on a viewpoint, set to 60 m by default. This gives the viewer a view of objects up to 60 m away. As the user explores the world, each new object that comes into view is streamed to the client’s computer.

The use of streaming has allowed Activeworlds to develop a large geographical structure. The geography of Activeworlds can be traced back to 28th June 1995 when the first Activeworlds server, AlphaWorld, was opened to the Internet. Its physical geography is relatively simple, it is a flat plain of virtual land 429,038×429,038 km in size, 4.4% larger than California [2]. Navigation is based

on a Cartesian co-ordinate system: the centre of AlphaWorld, and of all worlds in the Activeworlds system, is at 0,0 - also known as Ground Zero. Locations from Ground Zero are represented as a series of cells, the minimum cell size is 10×10 m².

The Cartesian system is used in Activeworlds to represent a location in terms of cells, for example 100n 100w relates to 1000 m north, 1000 metres west. An addition to the system is a Z co-ordinate to represent heights, for example 100n 100w 0.5 represents the same location but 5 m above the ground. Height is an important feature in Activeworlds because it is possible to fly. Otherwise, 'gravity' operates inasmuch as you return to the ground unless supported by an object.

In contrast to Activeworlds, the majority of three-dimensional virtual worlds operate on a 'room' system. Each area is designed as an enclosed room that is fully downloaded from the server to the client's machine for exploration. The user is able to freely explore the three-dimensional space within the confines of the room. If the user wants to move to a new location, for example in Blaxxun (another Internet-based VR system of this type) moving from the 'Hub' to the 'Plex', a new room has to be downloaded. This limits the size and ultimately the complexity of the geography of each location.

4. Constructing geographic features

An important feature in the formation of virtual geography is the ability of individual users to construct their own space. This capability creates a new geographic system, allowing ordinary users to become the architects, planners and landscapers of digital space. However, the ability of the user to construct virtual space varies according to the virtual world system.

Activeworlds has taken a unique approach to the users' ability to construct space. Indeed, the ability to build on virtual land is central to the system. Registered citizens are able to build structures from a library of objects provided on the server. Non-registered citizens, known as 'Tourists' are also able to build in certain areas although with no guarantee of permanence. Users are able to build on any free land, providing it is adjacent to another object. Fig. 1 illustrates the building process from claiming land to inserting a new object, in this case a ready-made building in the Collaborative Virtual Design Studio, part of the Activeworlds system.

A user may claim as much land as they wish, and land is claimed by laying ground objects, usually grass. Once an object has been placed, it becomes a user's specific property and cannot be deleted or moved by another user. The claiming of land is a tedious process, as each section has to be cloned and placed adjacent to another object. The nature of claiming land has acted as a natural limitation on the amount of land claimed by single users.

An interesting recent development was that third party software became available, notably RoboBuilder, for automatically claiming land in Activeworlds. Such software has been abused to claim vast areas of land, in reality hijacking large areas of space. As a result of this geographic abuse, the use of automatic builders has been banned within Activeworlds.

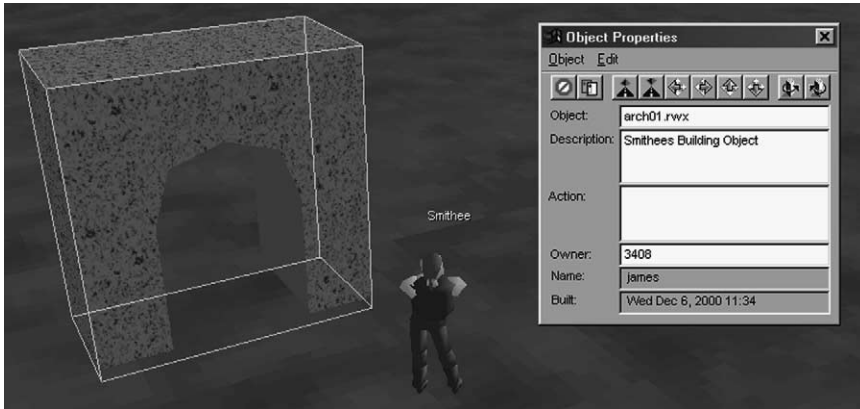


Fig. 1. Building in Activeworlds: land has been claimed and an object — a vaulted entrance gate — has been created and is described in the properties box (normally not shown).

Virtual world systems based on the ‘room’ rendering technique differ from the Activeworlds approach, often requiring the user to run their own server. Such limitations reduce the construction of virtual space to the reaches of the technically competent. Blaxxun has addressed this issue in ColonyCity. ColonyCity allows registered users to claim a plot of virtual land and set up home. Although the users are not able to specifically build, they are given a range of house designs to choose from. The range of house designs available is dependent on a users’ level of virtual credit. Credits can be earned by visiting ColonyCity and taking part in a number of social activities, or by selling your home. The higher your credit rating, the larger the house you are able to buy. Although ColonyCity is a shared virtual world, the user is not able to freely build and therefore unable to shape geographic space. Each construction area is fixed and the designs for houses are limited.

5. Travel and transportation

Methods of travel differ according to the virtual world system. The Activeworlds system is based on a system of teleports, teleporting users to a new location according to a Cartesian co-ordinate system. Teleports are located throughout Activeworlds and act as a convenient means of travel, indeed teleporting is now an integral part of the Activeworlds interface. However, the ability of teleport was not part of the original Activeworlds system, and can be seen as influenced by Neal Stephenson’s science fiction novel ‘Snowcrash’ [3]. In ‘Snowcrash’ the ability to teleport was blocked;

You can’t just materialise anywhere in the Metaverse... this would be confusing and irritating to the people around you. It would break the metaphor. (p. 42)

Pressure from the users resulted in teleportation stations being introduced at select points in and around ground zero, but it caused concern among the developers. The *New World Times*, an AlphaWorld newspaper, reported that “there is still some concern that teleportation will ruin the simulation of reality in AlphaWorld”. Teleportation is now fully implemented and an integral part of travel in Activeworlds. However, in a bid to regain the original vision of transportation, world owners now have the ability to disable a user’s ability to teleport.

Systems such as Blaxxun and Oz Interactive describe each room as a specific location, with transportation to each location via either teleports (the virtual world’s equivalent to hyperlinks) or a clickable image map. An example of this is Superscape’s Virtual World Wide Web (VWWW), utilizing Blaxxun’s virtual world technology. The VWWW is linked using the city metaphor, which is a common metaphor for linking locations in virtual worlds. Each location can be reached by traveling in an interconnected subway system. Such systems give the impression that each location is linked to create a virtual city. In reality, these are merely links to separate three-dimensional scenes, diminishing the concept of geography and physicality.

6. Time

Virtual world systems are global by their very nature, with users logging on regardless of their location in the real world. Multiple users operating within their own time zones can create confusion in virtual worlds, especially when arranging future meetings. To this end a group of users from the Activeworlds community formed Activeworlds Standard Time (AWST) in 1996. AWST, designated as Greenwich Mean Time –2, has recently been renamed Virtual Reality Time (VRT) and has become a standard time for the Activeworlds community. An interesting point to note with regard to the concept of time in virtual worlds, is that time appears to be accelerated. Whereas a city in the real world with all its physical and social forms takes many years to develop, in the virtual world cities can grow, prosper and then decline in a matter of weeks. This concept is especially applicable to the Activeworlds system with users often moving on from world to world, building, socializing and then leaving once the majority of land has been claimed.

7. Virtual physical geography

AlphaWorld started life as a flat plain of land, devoid of any physical features. Since then, many features have been built by the users of Activeworlds and a physical landscape has developed. The majority of worlds are made up of imaginary geography — they do not represent the real world. However, it is possible to import Digital Elevation Models (DEM) into Activeworlds, enabling real world terrain and physical geography to be modeled within a virtual world. The DEM is scaled and cut into separate objects, 20×20 m² in size. These objects are then reconstructed in the world, like a giant three-dimensional jigsaw puzzle of the real world. At the present time

this is a time consuming process and this has limited the modeling of geographical features in Activeworlds, although an automated system for using DEMs is under development.

8. Community development

There are many areas in Activeworlds that have developed distinctive social relations within a 'community'-like setting. We will briefly describe one example here: Sherwood was developed by the Contact Consortium (an interest group which has developed around multi-user virtual worlds, see <http://www.ccon.org>) as a community project, aimed at developing a community space for the purpose of beauty, function and personal expression [1]. Sherwood is reminiscent of both the utopian and anarchist movements of the late 19th century, where the aim was to build an ideal community, a natural living and working environment. However, whereas the utopians of the 19th century experimented with the development of real world space, the utopians of the present day practice in virtual space. The aim of Sherwood was to create a viable community within this new medium of human interaction and to observe how this community would be built and grow and function. It was to be deliberately planned colonization of cyberspace (Fig. 2).

The foundations to Sherwood were laid in January 1996. Damer [1] relates that a site was selected and carpeted with a large forest, consisting of many species of tree, shrubs and flowers, interspersed with lakes and streams. This was aimed at creating a natural setting in which to situate the new human community. The town was defined by a boundary wall, in effect sealing the community off from the rest of AlphaWorld. Sherwood operated an 'apply and build' policy, users could not just turn up and build. They had to apply to the community leaders for a plot of land, which allowed plots of land to be allocated and the 'town' to be planned. Sherwood is thus like a gated community, entry is via application, and it is isolated from the rest of AlphaWorld. Damer has put forward (in a personal communication) the gated philosophy, and described how opponents of this philosophy complained and opted to build in a more free form in a development dubbed 'New Towne' outside the walls of Sherwood.

A total of 60 people contributed to the development of Sherwood, a community that featured areas for education, contemplation, public and private spaces and a weekly newspaper. It became a social focus in AlphaWorld, and as such, the land around Sherwood attracted a large number of builders, constructing objects ranging from virtual advertising boards to virtual bars, providing entertainment for the occupants of Sherwood. Indeed, Damer [1] compares the construction around Sherwood to the development of low calibre commercial space around Disneyland in the 1950s. It also attracted what Damer [1] calls the 'dark side' of Activeworlds in the form of vandalism and verbal harassment (avatar abuse or 'avabuse') of members of the Sherwood community. Indeed the incident of avabuse became such that a policy of installing call boxes to the AlphaWorld Police Department and Help Patrols was considered [1]. The AlphaWorld Police Department was set up to deal with such



Fig. 2. A bird's-eye view of a part of Sherwood.

crime, having the rights to delete any object in the world. However, proof had to be provided that such acts of vandalism were not creative acts. The police department has since been superseded by 'peacekeepers' (not just in Sherwood, but throughout Activeworlds), citizens that have the power to eject people from worlds if they abuse the Activeworlds terms of use.

While Sherwood developed in many ways along similar social and geographic lines as the real world, it was also a response to the geography of the virtual world. Sherwood was an attempt to depart from the 'build and abandon' philosophy that is prevalent in virtual world construction. Although precise figures are not available, vast amounts of AlphaWorld are in reality virtual ghost towns. Users have claimed a space, built a home, office or other structures, and then abandoned them, either to build elsewhere or to move to another virtual worlds system. The problem of abandoned areas partly relates to the introduction of an annual charge to become a citizen of Activeworlds with world-building rights. The annual fee has also had the result that many areas, built by users while the system was free of charge, became ghost towns overnight. This relates in some respects to the real world phenomenon of urban sprawl [4]. When development comes to the end of its life it is abandoned

and building in harmony with the old does not take place. Central cities are depopulated and abandoned while suburbs keep on growing. This is typical of the Activeworlds environment, an environment of waves of new growth and abandonment. However, unlike the real world, the old areas are not re-inhabited and reoccupied as they remain the property of the initial builder and are thus left abandoned in the virtual space. Despite Sherwood being set up to avoid the build and abandon philosophy, Sherwood is currently an abandoned community. The town was built up over a 2-year period, but nowadays it has become, ironically, a tourist attraction in digital space. The town is still used, but mainly for guided tours or one-off reunion events.

9. Real, virtual, and science fiction

AlphaWorld is essentially a rural world with areas of dense urban clusters. A satellite picture of Ground Zero would show that this place has grown up like a real world Central Business District. Growth away from the centre is on distinct axes, focused on the eight compass quadrants. Growth along distinct paths is a result of a number of factors, ranging from aspects of agglomeration, natural clustering and building restrictions. Circle of Fire, the owners of Activeworlds, observed in a newsletter that:

You can see the ‘Starfish’ shape of the building as people crowd their buildings along a north–south axis and ‘equator’ of AlphaWorld, and as they build along the co-ordinates with matching numbers (i.e. 220n, 200w, 450s, 450e etc.). Some do this so that their co-ordinates are easy to remember, and others simply by building onto what others have built.

By building out on a number of distinct paths, AlphaWorld has taken the shape of planned space, and from above it resembles a city. Yet, the only centrally planned section of AlphaWorld is Ground Zero. The structure and ideal of AlphaWorld, from the radial structure to the village green style development, can be seen as reminiscent of cities built out of the Garden Cities movement, Letchworth in the United Kingdom.

Yet this resemblance is not planned. It has developed, and is perhaps a reflection of the desire to move towards a more village-like city. Further examples of the influences of urban planning and utopian social ideals [5,6] include the anarchist movement, a movement which flourished during the last decades of the 19th century and the first year of the 20th, and with it visions of an alternative organization of society, ideas of urban form such as Ebenezer Howard’s concept of the Garden City in 1902, Le Corbusier’s authoritarian centralist views, and the current re-development of brown field sites.

While AlphaWorld reflects utopian and anarchist ideals, the space of other worlds within Activeworlds and other virtual worlds systems are influenced by science



Fig. 3. Fredersen tower from the film *Metropolis*.

fiction. Pictured in Figs. 3–5 are illustrations of urban towers from the film *Metropolis* and *Bladerunner* and from *Metatropolis*, which is a world within the Activeworlds system. There is a clear continuity, both in terms of how *Metatropolis* is influenced by the geography and architecture of *Bladerunner*, and by how *Bladerunner* was, in turn, influenced by *Metropolis*. Such influences can be found in many virtual world

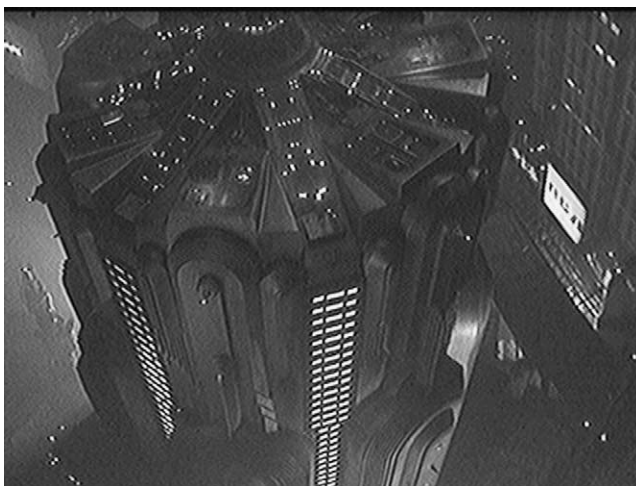


Fig. 4. Police tower from the film *Bladerunner*.

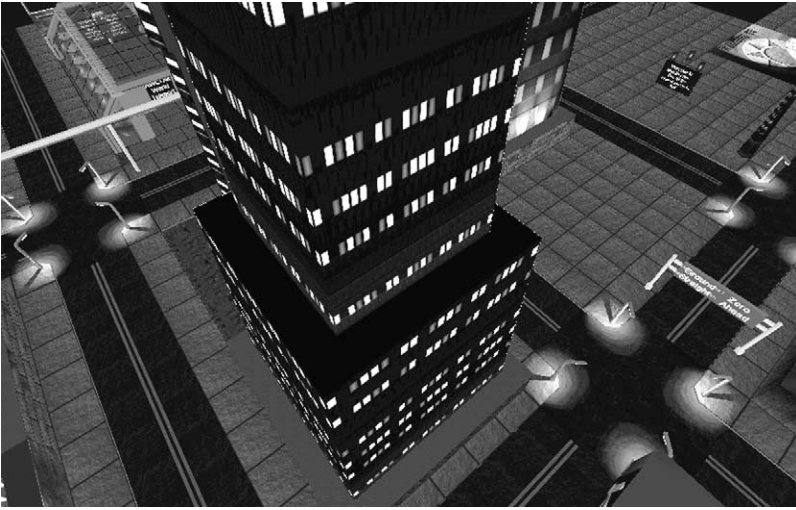


Fig. 5. Tower building in Metropolis world in Activeworlds.

systems, although they are most prominent in Activeworlds. More recent examples include the world within Activeworlds called *Godzilla*, which is based on — and an advertisement for — the recent remake of the eponymous film.

The Metaverse of Neal Stephenson's 1992 novel 'Snowcrash' [3], mentioned earlier, has also strongly influenced both the development and the geography of virtual space. Stephenson's Metaverse consists of inhabited virtual worlds where the geographies and physicalities of the real world are modeled in networked digital space with users represented as avatars:

He is not seeing real people, of course. This is all part of the moving illustration drawn by his computer according to the specifications coming down the fiberoptic cable. The people are pieces of software called avatars. They are the audio visual bodies that people use to communicate with each other in the Metaverse. (p. 32)

Perhaps an even more well-known source are William Gibson's science fiction novels dealing with virtual worlds. Both Gibson's 'Nonspace' and Stephenson's 'Metaverse' are products of science fiction, and the resulting development of a cyberpunk culture has also had strong influences on the development of the human and physical geographies of virtual worlds. In addition to *Metropolis* and *Bladerunner*, one could point to the influence of more recent films like *Lawnmower Man*, *Lawnmower Man II (Beyond Cyberspace)*, *Johnny Mnemonic*, *Hackers* and *The Matrix*. The influence of these and other works of science fiction and film is most evident in the representation of urban form in virtual worlds. Urban virtual worlds are often a blend of real and simulated spaces: put differently, reality is often mimicked or

simulated, and this applies both to the physical forms of the world and to the ideals that have shaped these forms.

10. Activeworlds as a frontier

As we have seen, the ability to claim land and build has played a central role in the development of Activeworlds, and it sets the Activeworlds system apart from other such systems. It can be argued that the land-claim metaphor plays a crucial role in understanding the history of Activeworlds, and its success compared to many other virtual worlds and virtual environments systems. The idea of taking a piece of land in the wilderness and building one's own home on it is one that has roots deep in American culture (where the Activeworlds system developers are based). The experiences of text-based shared environments, MUDs and MOOs, which have been available for many years, also indicates the importance of building and ownership. The ease with which users can add their own room to the textual environment has often been identified as crucial to their success.

The early buildings found in Activeworlds were like log cabins, owing more to the television series 'Little House on the Prairie' than to the imagined 'cyberspace' of William Gibson. (Fig. 6 shows an old log cabin building in Activeworlds.)

But this did not prevent Activeworlds from becoming one of the most successful shared spaces. This section will look at the design of early virtual worlds and suggest that the image of the American Frontier has helped in its success with its target audience. The early Activeworlds pioneers faced great hardships with unstable and slow system software. They were rewarded for their efforts with the promise of a new world that would be theirs and a recognition of their status as the vanguard.



Fig. 6. Log cabin building in Activeworlds.

11. The frontier theme in virtual worlds

No interpretation of American history (and much of the work in virtual worlds is American) has attracted such attention as the ‘Frontier hypothesis’ put forward by Frederick Jackson Turner [7]. Turner’s paper was originally presented in 1893 and entitled ‘The significance of the frontier in American history’ before the Chicago meeting of the American Historical Association. Put briefly, Turner argued that what made Americans different from Europeans was the struggle to settle the new continent, leaving their homes to settle successive frontiers. In doing so, they discarded many of the customs and institutions they had brought with them, either from the Eastern seaboard, or even further from their European roots, as these institutions were no longer appropriate to the new conditions.

The changes in culture were, he argued, due to various forces, most importantly that people were few and land was plentiful, but conditions in these new lands were very difficult; and that people from different backgrounds met and mingled, bringing together different customs. The validity or otherwise of this thesis is not at issue here. Indeed, many historians have questioned its details as well as the thesis as a whole. What is beyond question is the role that this thesis has had on the public imagination.

12. The Internet as a frontier

The idea of the frontier has been used to understand the Internet in general. Epperson [8] uses the idea of the ‘Frontier hypothesis’ to explain data about the use of Internet services. In this model, the role of the ‘natives’ is played by system administrators who began the Internet. The ‘early settlers’ are the researchers and academics who used it as originally intended, to support military and scientific research. And the nomadic ‘trappers’, using the resources in a transitory manner, are played by the young hackers and bulletin board operators.

They have recently been joined, however, by “the new crowd of business and commercial users play[ing] the role of ‘settlers’, who have newly arrived from the east, have little respect for the frontier, its lore, its etiquette or its limitations. They have come to expect the Internet to service them as if it were a private business venture for their benefit. They have arrived with the advertising flyers still buzzing in their ears ‘Free resources, open frontier, plenty for all, new horizons, perfect communications, digital reliability’. What they have discovered, to their disappointment, is a lawless and strange place filled with bandits of various kinds and very little elbow room, except for the technically adept” [8].

What graphical virtual worlds — as a visual extension of the Internet — do, is to make this frontier image even more manifest. And Activeworlds does so more than others because of the way building patterns have developed.

However, although the general rationale for this image comes from the idea of ‘cyberspace’ itself as a frontier of the possible, there are also more specific reasons why the ‘frontier image’ applies to Internet-based shared virtual worlds at this time:

first, because of its novelty and technical instability; and second, because of the real-time global communications that are possible. These two features have a close parallel with features drawn from the 'Frontier hypothesis'.

13. Hardship

One of the characteristics of the frontier above was that people were few and land was plentiful, but conditions were very difficult. The free and open aspect of the western frontier is evident in AlphaWorld. The designers, as indicated above, have instituted a form of 'land claiming', in imitation of the system used in the US, where land was such a central feature that its allocation, division and ownership occupied more legislative time in the Congress's first century than any other issue.

You can move across the landscape of the world until you find an untouched green area, and claim it for yourself by building a dwelling on it. As mentioned earlier, this is achieved by copying components from buildings already there, moving them to your area, and putting them down. This simplicity in building allowed many thousands of people to immigrate into the world, unlike with other shared world technologies, where the construction of a 'home' takes special skills and software.

However, the plenty that exists in terms of the availability of a great deal of space, both in the physical and the virtual worlds, comes at a cost: conditions are harsh. For, as Turner remarked, "American development has exhibited not merely advance along a single line, but a return to primitive conditions on a continually advancing frontier line". In other words, the frontier is challenging. And it is a challenge that one must accept, or perish. Although obviously the virtual is nowhere near as hazardous as the physical world, the new virtual worlds offer their own trials and tribulations. The Internet is itself unstable at times, and new software takes time to sort the bugs out. Logging into the world can sometime fail, the communication between users breaks down, and the Internet can be so slow that you sit in frustration as the scenes wait to be downloaded.

Activeworlds citizens have even made a myth based on the problems that arise with very new technologies. When in the early days, a few years ago, the server system at the World Inc. (the owners of the system) end crashed, as computers are prone to do at the edge of what is technically possible, all the construction work that had been undertaken by users disappeared. This problem was grudgingly accepted by its users, who read in their local paper, the *New World Times* (a web site run by some of its inhabitants) that their world had been hit by a natural disaster: an asteroid had struck the virtual world destroying everything!

14. Frontiers of the social

A second crucial feature that Turner identified on the frontier was that people from different backgrounds met and mingled, bringing together different customs and creating a new 'Americanized' character.

Activeworlds, indeed all the Internet worlds, provide an example of this. At certain times of the day one finds Finns, Swedes, Spaniards and various other nationalities in Activeworlds. Various social forms of what constitutes acceptable behaviour collide in one space. Each user beyond the casual visitor will feel that they are citizens, that their ways should be accepted. To an outsider, this can look absurd, as various degrees of sexual innuendo and verbal abuse appear.

Of course, in the physical world, you cannot just mute people, as is possible in shared spaces (a feature that was added to the system). However, the conditions of these new spaces allow for the creation of new social forms, contingent on certain strengths and weaknesses. Who can be certain that all the characters are being ‘truthful’ in their descriptions of themselves, their gender, age, and so on? The communities are trying to create new forms of social formation, adopting what works from their physical worlds, and abandoning those that do not match the new conditions.

One of the most significant paintings from this part of American history is Thomas Coles’ ‘The Oxbow’, which, Wolfgang Born [9] claims, expresses “the influence of the frontier on the aesthetic attitude of America”. The argument here is that it is just this kind of imagery that the designers of AlphaWorld, wittingly or otherwise, have drawn upon in its creation. ‘The Oxbow’ is divided into two halves, two aspects of a continuous, singular landscape. To the left lies the wilderness. A great storm has passed through, a destructive act of god as powerful as the asteroid that caused so much ruin in AlphaWorld in those early days. The right half of the painting, representing civilization, is a pastoral landscape. There are even tiny shapes of people about their work. They are not great heroes, but ‘agents of a transformed landscape’ [9]. AlphaWorld users are being sold the image that they, too, are among these pioneers, agents in the transformation of a virtual landscape, of the future development of Cyberspace itself. This is their pay-off for tolerating the hardships, both technical and communicative. They can be part of the dream, and write themselves into the myth of the frontier.

15. Social interaction in Activeworlds

Against the backdrop of this account of the geography of Activeworlds and some of the ideals and myths that have shaped it, we can now take a closer look at some of the social relations in this multi-user virtual environment. The best way to do this is briefly to describe some of the main features of Activeworlds that are relevant to social interaction (some of them have already been mentioned in passing):

Citizenship: those who enter Activeworlds are either ‘tourists’ or fee-paying ‘citizens’ (citizenship costs US\$19.95 per year). Tourists have access to all public spaces just as citizens do, but they do not have the same range of choice of avatars and they can only build in certain areas and their buildings can be destroyed.

Property rights: there are two kinds of spaces or property in Activeworlds — there are spaces where building is allowed by anyone on any unoccupied space

(in AlphaWorld), and spaces where building is restricted to the owners of a particular world who have paid a fee for ‘ownership’. Activeworlds.com.Inc. maintains the right to remove buildings in the ‘public’ areas, but the buildings in ‘private’ areas cannot be removed (although what this means in practice is unclear: what, for example, would happen if Activeworlds.com.Inc. experienced technical difficulties, or was forced to shut down entirely?).

The use of space within worlds: avatars tend to cluster in small groups. This is partly because if there are more than a few avatars present, it becomes difficult to participate in the conversation as there is only limited space in the text window for contributions. It is unusual for more than, say, 20 avatars to be present within sight of each other, except in the case of the infrequent special events like parties or conferences.

Distribution of users between worlds: it is clear from both informal observation and from data capture about populations that certain worlds are more popular than others. AlphaWorld itself is by far the most popular world, followed by ‘Gate’ and a dozen or so others, such as ‘America’, ‘Patagonia’, ‘Russia’ and ‘Metatropolis’. These worlds are almost always occupied. There also seems to be a second tier of worlds which attracts much smaller numbers (typically two or three) and more infrequent use (examples include ‘Germany’, ‘Colony’, ‘Yellow’, ‘French’). A third and final tier of worlds is almost always empty or contains only one infrequent user. There has been considerable movement within and between these categories of popularity, but the main point here is that the division into these three groups of popularity has remained constant.

Roles and group differentiation: the more narrowly conceived ‘social’ aspects of Activeworlds have been described in more detail elsewhere [10,11]. In the context of geography, it is worth highlighting that it is possible to identify avatars that adopt different social roles (‘friendly helper’, ‘aggressive bully’, ‘deviant’, ‘prankster’ and the like). The only ‘roles’ that are defined by the system itself are the roles of ‘gatekeeper’ and ‘peacekeeper’ (mentioned earlier), roles for which one can volunteer and which entails helping novice users and enforcing certain rules of conduct. Apart from this, a distinction can be made between ‘insider’ and ‘outsider’ groups, or ‘regulars’ and ‘newbies’. Other distinctions could be added, for example between active participants (builders, participants in newsgroups, and the like) and more passive users. Or again, certain worlds tend to attract different types of users, such as religious worlds, worlds for education, worlds with a permanent ‘party’ atmosphere, or worlds with an atmosphere of ‘deviance’.

Formal and informal rules and norms of social interaction: at the Activeworlds ‘Gate’ world in particular, ‘gatekeepers’ have begun to enforce a policy of threatening to expel users who use aggressive language or threaten other users (this policy harks back to the emergence of ‘wizards’ in text-based MUDs). And as we have seen, attempts have been made to establish mechanisms for dealing with vandalism and other forms of anti-social behavior. In addition to this formal rule, many informal codes of behavior have emerged in the interaction between users. Conversations, for example, often make use of graphic accents and other conventions from e-mail and MUDs. Conversational exchanges also tend to be in short

sentences and not sustained over longer periods, although exchanges in smaller groups of two or three and among groups of ‘regulars’ are often longer [12].

Navigation and avatar appearance: apart from the transportation systems discussed above, the way that participants make use of space is that they tend to stand fairly immobile in groups, and otherwise ‘walk’ to explore — although flying is also a fairly common mode of navigation. Users choose from several dozen avatar types, most with a human appearance (but ‘bird’, for example, is also among the choices), with certain avatars more popular than others. Avatars only very rarely use the special features that allow their avatars to be ‘happy’, ‘angry’, ‘wave’, ‘jump’, ‘fight’, and ‘dance’.

At this stage, we can turn from these basic features of Activeworlds to more complex social dynamics. The first is that the population of Activeworlds has become more self-organized over time. We have already mentioned a few examples of this, but there are also newsgroups, parties, and votes for the best-designed world. Another interesting example is the Activeworlds Historical Society, which has a homepage and a museum, and includes images of ‘historic’ moments in the development of Activeworlds as well as maps that chart the growth of the worlds in Activeworlds. In other words, some basic social institutions are emerging. (Here it should be noted that there is a difference between social rules or institutions that are built into the design of the system by the system’s designers or operators, such as the ‘gatekeeper’ role in Activeworlds or the money economy in the Worldsaway system — and the institutions arising from the populations in the virtual environments themselves, like the museum and others just mentioned.)

It is also possible to identify some changes in the attitude of the population towards the system. Initially, for example, the policy of ‘gatekeepers’ in ‘cracking down’ on deviance provoked widespread dissatisfaction, especially among ‘regulars’, and led them to urge other users to boycott the use of Activeworlds. Or again, the introduction of fees for ‘citizenship’ in 1997 led many users to be disgruntled. We have already seen that this policy caused some built-up areas to be abandoned or turned into ‘ghost towns’. Interestingly, the disgruntlement in the discussions among users died down fairly quickly, although it is of course impossible to tell whether those who were disaffected simply no longer used the world — leaving the field to contented fee-payers.

The switch to fee-paying citizenship is also an interesting chapter in the development of Activeworlds because it might have been expected that many users would simply remain non-fee paying ‘tourists’ — especially since relatively few citizens seem to be making use of the ‘permanent building’ privilege which is the main advantage of citizenship. However, it seems that the majority of users who venture beyond short visits to Activeworlds have become citizens.

Another development has been the increasing commercialization of Activeworlds. One aspect of this, citizenship fees, has already been discussed, but there are a number of others: the increasing use of advertising hoardings, themed worlds related to products (‘Godzilla’, mentioned earlier, related to the blockbuster film), the offer of a CD-ROM for faster and higher resolution graphics, and the ‘sale’ or ‘leasing’ of

whole worlds. Since 1999, there has also been a shopping mall world ('@Mart') where users can buy and sell products in a virtual space. And finally, the recent (again, in 1999) flotation of the developer, previously Circle of Fire and now known as Activeworlds.com, Inc., on the stock exchange can be seen as a further step in commercialization.

There are some parallels between how Activeworlds is divided up into 'citizens' and 'tourists' and divisions of 'class' or 'status' in the real world. Similarly striking is how Activeworlds is carved up into worlds, especially worlds with the names of real countries ('France', 'Russia', 'Japan' etc.), just as the real world is divided up into nation-states. At the same time, these parallels should not be taken too far: for example, there has been no money economy in Activeworlds — as there is, for example, in the Worldsaway multi-user virtual worlds system (the successor to Habitat). And there are as yet no 'passports' or 'customs' barriers between worlds (apart from the citizenship fee and building restrictions that have been mentioned) or differences between national cultures (again, apart from the different atmospheres in different worlds, and the fact that speakers of the same language will sometimes prefer to socialize in the same world). However, the main divide between citizens and tourists in Activeworlds is perhaps that 'citizens' sometimes treat 'tourists' with mild disdain because of their 'inexperience', although it is difficult to gauge how widespread this sentiment is. In any case, this is not a divide between material resources and cultural capital — like the divisions of class and status in the real world — but rather one between insiders and outsiders.

How do these characteristics of social interaction relate to what has been said about the geography and architecture of Activeworlds? To begin with, the appearance of the landscape can be linked to the social 'atmosphere'. For example, a world like 'Patagonia', with its beaches and thatched huts, has fostered a 'relaxed' or 'party-like' ambience, unlike the 'seedy' and futuristic 'nightlife-in-the-big-city' appearance of 'Metatropolis', which has often been a place for deviant or aggressive behavior. There are also different 'national' atmospheres in the worlds associated with particular languages or states, and in this case the landscape and its reflection of certain features of the national culture may reinforce the users' sense of being 'at home' in their world.

The connection between social behavior and the built environment is less obvious. Aside from the public squares, there are two main types of houses or dwellings, depending on whether they are 'public' (sometimes provided by the system developers) or 'private' (built by participants). The public buildings and spaces, such as museums and parks, are often designed with 'civic' or recreational functions in view. However, in practice, the main use of public squares and public buildings is to provide central places for socializing and for displaying public information. The main function of 'privately' built houses, on the other hand, is to give builders a sense of having their own place and for 'showing off' to visitors. Hence the most common form of socializing that takes place in relation to private buildings is that builders will invite others to their 'homes' to show them its unique features and engage in more private conversations than in the 'public' spaces. In this respect Activeworlds is similar to the text-based MUD LambdaMOO, for which Schiano

and White [13] found that regular users spent most of their time in the private spaces that they had ‘built’.

16. Conclusion: virtual geography and social interaction

Virtual world systems like Activeworlds allow system developers and builders a lot of freedom in creating spaces and places to socialize. However, as we have seen, the virtual worlds in Activeworlds have also reincorporated many features of the geographies and forms of social interaction from the real world. There is thus a balance between the utopian visions on which parts of the Activeworlds geography have been modeled and the ‘real world’ patterns of building and socializing that have emerged. The utopian and science fiction elements in Activeworlds remain a strong influence, but there are also increasingly commercial pressures in this virtual worlds system which have shaped the appropriation and use of land. The myth of an open frontier, of a vast expanse of land with unlimited opportunities, has thus been important for the patterns of land development, but it is also coming under increasing pressure.

There is also a great deal of variety in the types of virtual worlds that have been created in Activeworlds, and these worlds have different ‘atmospheres’. This diversity has allowed different groups of users to find their own favorite places and ways to socialize. What is perhaps more important is how the social relations in Activeworlds as a whole have been shaped by geography: despite the division into many worlds and types of spaces within worlds, users still congregate in certain worlds and concentrate in central areas for general socializing, especially among newcomers. The use of far-flung or private places is reserved for one-to-one conversations or ‘special purpose’ activities.

This differentiation of virtual spaces has implications for the dispersion of users: how, for example, are these similar to and different from the space–time patterns of human mobility [14] in the ‘real’ world? And if they are different and more ‘open’, do they create possibilities that may avoid some of the current problems of mobility in ‘real’ world geographical settings (see, for example [15]). As we have shown, many of the features of real world social and geographical relations have become transferred (albeit in modified form) into virtual geographies, while some forms of transportation and settlement are more malleable and subject to faster transformations.

From the perspective of geography and social science, virtual worlds also seem to offer much scope for speculative theorizing (see, for example [16]; and [17, chapter 6] for an analysis of this phenomenon). However, the patterns we have described can equally be seen as a process of acculturation which is not so different from theories of geography that were formulated in the early days of the discipline, even in the form of evincing an historical evolution along the lines proposed by historical geography. So, for example, one could see the development of Activeworlds in terms of the historical geography of Friedrich Ratzel (as summarized here by Osterhammel [18]): “With ‘increasing culture’, peoples become more settled...they dig themselves

literally into the ground” — as we have shown in Activeworlds through their appropriation and building — “and at the same time increase their mobility by means of the technological progress of modern transport” (p. 65), or in this case, developing the nature of their ‘mobility’ in virtual spaces.

Still, despite ‘acculturation’, the balance between settled social and geographical relations in this new setting remains very open, and so do the norms of social behavior in Activeworlds. Users from different backgrounds are constantly being thrown together in an open and relatively ‘lawless’ space, and although they will no doubt keep socializing in a cosmopolitan and unstructured way, there will also continue to be a further differentiation of the geographies of virtual environments and with it an acclimatization of users’ modes of social interaction to these environments.

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