AlphaWorld: The Urban Design of a Digital City

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ABSTRACT This paper describes the urban design of the digital city called AlphaWorld. AlphaWorld is a digital community created in 1995 and accessed daily through the Internet by thousands of users. Unlike other digital communities, AlphaWorld’s users may also settle land and construct objects within the world. The design and content of these constructions are determined autonomously, and the cumulative result of this settlement is an organically evolved digital city. AlphaWorld’s urban form differs substantially from real-world cities in the absence of many of the constraints which govern the design of those cities: permanent population, land cost, zoning and transportation. The paper examines AlphaWorld’s urban design at both the regional and neighbourhood scale. At the regional scale, settlement in AlphaWorld is highly concentrated at its centre but highly deconcentrated elsewhere because of transportation constraints. At the neighbourhood scale, AlphaWorld lacks organizing design features and is very low-density because land has no cost and is settled in an ad hoc fashion. The resulting urban fabric is visually chaotic and difficult to navigate. The freedom of settlement action offered by AlphaWorld allows for individual creativity at the cost of larger-scale urban order. The paper concludes by placing AlphaWorld in the context of real-world urban places. Three urban theories—ideal morphologies, heterotopia and self-organizing systems—show that AlphaWorld is unlike any real-world city but reflects many elements of real-world urban design.

Introduction

Cities have existed for thousands of years, and their form has often been a function both of the time in which they existed and of the civilization that created them. The highly organized design of the Forbidden City of Beijing, for example, reflected the autocratic, hierarchical society of Imperial China. Similarly, the repetitive grids of New York and Chicago communicated the ambitions of the 19th-century industrial societies that platted them. More recently in the 20th century, automobile technology showed a powerful ability to shape urban form. Today, at the dawn of the 21st century, the Internet shows indications of being a window to the city form of the future. The information revolution of the
1990s created, for the first time, an infrastructure for digital human settlements. A digital city would probably signify a paradigm shift in urban design, since it would not occupy physical space, would not be literally inhabited and would only be accessed through computers. What would such a digital city look like?

This paper examines one possibility: the urban design of the well-established digital community called AlphaWorld, founded in 1995. AlphaWorld, unlike most other digital communities, permits its users to design and construct their own structures and objects within a virtual environment. This paper argues that the urban design of AlphaWorld is of particular interest for two reasons. First, AlphaWorld is a pioneering digital community which offers a preview of some of the radical new possibilities of digital cities, and thereby of what future digital communities may look like. Secondly, although AlphaWorld is certainly unique, it has many interesting relationships to real-world urban environments and offers an important perspective on those places.

This paper is guided by three research questions. First, how may the urban design of AlphaWorld be characterized? In other words, what are the components of its cityscape, where are these components located and what are the spatial interrelationships of these components? Secondly, what causes have led to AlphaWorld taking the form that it has? In other words, who created its components and what forces guided their actions? Thirdly, what relationship does AlphaWorld bear to real-world urban settlements? Are there particular settlement forms or real-world urban ideals that it resembles, and why?

The paper answers these research questions in five sections. The first section reviews some of the literature on digital communities and locates AlphaWorld within the context of these digital communities. The second provides an overview of the technical aspects and characteristics of AlphaWorld. The third section examines AlphaWorld’s form at the regional scale and the likely causes for this form. The fourth examines the neighbourhood-scale design of AlphaWorld and characterizes some of the more common typological elements found in the central area of AlphaWorld. The fifth section places AlphaWorld in the context of real-world urban theories which describe ideal urban forms, alternative real-world places and self-organizing environments. The paper closes with some suggestions for incorporating AlphaWorld into future urban design research.

**AlphaWorld and Digital Communities**

AlphaWorld is one of many digital communities that exist on the Internet. Although these communities do not occupy physical space, recent authors have described them as new iterations of the many diverse communities which exist in the real world. According to Beamish (2001, p. 285), “digital technology has given us a new medium with which to experiment and build. No longer are we constrained by the physical; brick and mortar, water mains and roads can be replaced by bits”. Beamish’s (2001) assessment mirrors that of other writers, such as Mitchell (1995) and Graham & Marvin (1997), who argue that the exponential rise of digital communications is likely to both transfer traditional urban functions to the online environment and supplant those functions in the real, or physical, world.1

Many authors also consider digital communities to be equally as valid as those that exist in the real world. Even before the rise of the Internet, scholars
such as Bender (1978) and Anderson (1983) argued that the presence or absence of communities had less to do with physical propinquity than with the desire of the members of those communities to interact with each other. In other words, a community should be considered less as a function of physical space than of common interest. The debate about the validity and extent of virtual communities has also been obscured by the difficulty of defining the meaning and extent of ‘community’ in the real world. This fuzziness of definition has led to continued debate about the rise or decline of the ‘sense of community’ in the real world (Putnam, 1995), as well as uncertainty about the role of the physical environment in determining community. Suburbs, a popular community form in the USA, have consequently come under close scrutiny, with some authors finding that this residential type contributes to community (Gans, 1967; Pope-noe, 1977) while others are convinced that suburbs diminish the sense of community (Alexander, 1972; Duany et al., 2000).

Whatever their relationship to real-world communities, digital communities are experiencing a rapid growth in popularity. With approximately 66% of US adults having access to the Internet by early 2002 (Taylor, 2002), computers are playing an increasingly major role in both maintaining community and establishing new communities. Although digital communities may seem trivial or unnecessary to those who do not participate in them, many online activities are in fact related to community. These activities are diverse, ranging from college alumni email lists to online games to Bay auctions. Each of these online activities relates the user to others with similar interests and therefore, if only briefly, creates a digital community, although the relationships established may be even more ephemeral than those of a chat room.

Beamish (2001) believes that the popularity of digital communities stems in part from advantages that they hold over physical ones in spite of their lack of physical propinquity. She categorizes these advantages in three ways. The first is increased sociability: meeting strangers is often easier online. A second is increased creativity: digital communities allow one to express oneself in ways which would be challenging or impossible in the real world. A third advantage is increased flexibility in permitting ‘identity play’, or the ability to represent oneself differently than in the real world, i.e. as older or of a different sex, etc. In some communities a participant’s avatar (the form which one takes to represent oneself online) may range from being a human to being an imaginary creature, or even an inanimate object. The study of identity in the digital world spans many disciplines, from computer science to psychology, sociology and urban planning (Turkle, 1985; Schroeder, 2002).

AlphaWorld is a vibrant and complex digital community which possesses a rich ancillary social structure, with its own civic organizations, additional websites and occasional real-world meetings of its citizens in places such as Las Vegas. There are many AlphaWorld-related websites, including ones that advertise new towns; a historical society dedicated to protecting significant buildings; histories of AlphaWorld; an association of town-building consultants; and a website promoting real-world AlphaWorld reunions. (The addresses for these sites are provided in the Appendix.)

Unlike most digital communities, however, AlphaWorld permits both social and physical expression. In AlphaWorld one may not only be whomever one likes, one may also construct whatever one likes, establishing one’s permanent mark online. This ability to physically annotate the digital environment makes
AlphaWorld distinctly different from most other visual online communities, whose environments are often stylized and inflexible (Beamish, 2001; Taylor, 2002). The consequences of this annotative ability are significant.

An Overview of AlphaWorld

Like many real-world communities, AlphaWorld was begun as a commercial proposition. The city was born just as popular use of the World Wide Web began to balloon in the mid-1990s. AlphaWorld was ‘opened for settlement’ on 28 June 1995 by a company called Worlds, Inc. At the beginning of 1997, AlphaWorld was purchased by a company called Circle of Fire Studios, which renamed itself activeworlds.com in 1999 (Mauz, 2003). As activeworlds.com grew, AlphaWorld became only one of hundreds of ‘three-dimensional worlds’ offered by ActiveWorlds, but it has remained the most popular of these worlds because of its established status.

Internet users access AlphaWorld by downloading, installing and running free software available at activeworlds.com’s website (www.activeworlds.com). Until early 2002, access to AlphaWorld was free (Mauz, 2002). Visitors to the world, or ‘tourists’, could visit at no cost but were unable to construct anything there. Tourists were also limited to using a generic avatar while in the world. However, by paying a US$19.95 yearly fee, one could become a ‘citizen’ of AlphaWorld and acquire the privileges of claiming land and building in AlphaWorld as well as displaying a personalized avatar. In January 2002, seeking a more efficient revenue model, activeworlds.com shifted this fee structure and closed AlphaWorld to tourists, while raising the price of citizenship to US$6.95/month. In spite of this fee increase, the fiscal future of Activeworlds.com remained shaky as of early 2003, reflecting the vulnerability of digital communities such as AlphaWorld to real-world finances.2

In the real world, AlphaWorld occupies relatively little storage space. Its database consumed only 6.07 Gb as of August 2002 (Activeworlds, 2002), meaning that the contents of the entire world were easily small enough to fit on the hard drive of the average new personal computer. In cyberspace, however, AlphaWorld is a very big place. For its first half-year in existence it was only 6 km on each side, but in late 1995 it was expanded to its current size of 655 km on each side (Mauz, 2002). This gave it a 429 025 km² area, slightly larger than the state of California. The number of constructions on AlphaWorld has also increased steadily, from 16.5 million objects in mid-1997 to over 127 million by August 2002. In addition, while AlphaWorld has no permanent population, it may have several hundred avatars visiting at any given time. Despite its growth, AlphaWorld’s vast size meant that it remained thinly settled as of late 2002, with less than 2% of its area occupied by constructions of any kind (Activeworlds, 2002).

Distances in AlphaWorld are measured by a coordinate system of metric pixel cells. Each cell is 10 m on an edge or 100 m², and the world extends 32 750 cells (or 327.5 km) along the four cardinal directions out from the centre (0,0, also known as Ground Zero, shown in Figure 1), providing a total area of about 4.3 billion square pixels. The coordinates of these pixels provide the only locational attributes of AlphaWorld in what is otherwise a very neutral physical environment. Like a medievalist’s view of the world, AlphaWorld is square and completely flat, although visitors see a surrounding (and inaccessible) ring of
mountains. The ground plane is opaque and has zero-pixel thickness. This ground is permeable, however, and may be penetrated at any point to venture or build ‘underground’. Despite its flatness, AlphaWorld is three-dimensional, extending 2 km up into the ‘air’ and 1 km down underneath the ground plane. Structures are permitted at Z elevations up to plus or minus 350 m (Activeworlds, 2002), a height slightly less than that of the tallest buildings on earth.

Transportation in AlphaWorld occurs primarily through two modes: walking and teleportation. As in the real world, walking in AlphaWorld is a steady but slow means of locomotion. According to Activeworlds (2002), walking a distance of 2000 pixels, or 20 km, takes an avatar over 2 hours. This translates to a digital walking speed of about 8 km (5 miles) per hour, somewhat higher than the 3.7 miles per hour given as the ‘normal walking speed’ of pedestrians by the US Manual on Uniform Traffic Control Devices (2002). Avatars may also fly either above or below the ground surface at a speed equivalent to walking.
Although avatars are tireless, walking across AlphaWorld is a virtual impossibility, since the distance from its centre to its edge would require about 40 hours’ walking time. Therefore, were locomotion in AlphaWorld limited to walking alone, the city’s effective size would be severely constrained, much as the sizes of medieval European cities were limited by walking speeds (Mumford, 1961). However, AlphaWorld also permits teleportation, a uniquely digital mode of transport which affords an instantaneous means of travelling anywhere in the world. Avatars may teleport to anywhere in AlphaWorld simply by typing in the X and Y cell coordinates of a location. As one might imagine, both of these modes of transportation have had a significant role in shaping AlphaWorld’s urban form, and this role will be examined in the next section.

As previously noted, AlphaWorld’s most distinctive difference from other digital communities is that its ‘physical’ environment allows settlement and construction by any citizen who finds a piece of unclaimed land. All unoccupied land is open to settlement, and settlers may occupy land by placing objects or materials (provided via the Activeworlds software) on it. Once a piece of land has been occupied, it remains forever the property of the citizen who claimed it, even if the citizen ceases payment. Property rights on AlphaWorld are strong: apart from the owner, only Activeworlds.com, a few volunteer ‘civic organizations’ and individuals specifically designated by the owner may make alterations to property. This inalienability of digital property provides for secure tenure, but has also led to large numbers of abandoned properties when citizens have stopped building or have withdrawn from the world. Consistent with AlphaWorld’s strong property rights, the content of constructions is unrestricted except for images of ‘pornographic or violent activities’, which are forbidden. While Activeworlds.com does not monitor or inspect the content of constructions, a digital social contract does operate: other citizens may report forbidden features, which may then be removed by the company.

The Regional Form of AlphaWorld

Figures 2 and 3 show the entirety of AlphaWorld (655 by 655 km) in mid-1999 and in mid-2002. These illustrations were produced by an algorithm which scanned and mapped the world at regular intervals. Their somewhat cosmic appearance is an artifact of the programming routine which created them, which shows all occupied cells as white, no matter what the size of the construction within the cell (Activeworlds, 2002). Objects such as paths, which may be quite narrow, therefore assume an exaggerated visibility in these images.

These images show that AlphaWorld is growing rapidly, and they also make it apparent that much of the city’s growth at the regional level is non-random. The two most obvious features of this regional form are the concentrated settlement at the centre of AlphaWorld, or Ground Zero (coordinates 0,0 at the centre of the illustration), and the concentration of settlements along linear paths leading outward at 45° (diagonal) and 90° (cardinal) angles from Ground Zero. These ‘star paths’ give the city a regular, geometrical aspect. The concentration of settlements around Ground Zero is clearly expanding. In 1999 uniform settlement extended out about only 25 km from Ground Zero before fragmenting into star paths, but by 2002 the centre settlements had spread, becoming more diffuse as the centre covered a greater area. The length and intensity of the star paths also expanded substantially from 1999 to 2002. In
1999 they extended about 100 km from the centre before breaking up into separate clusters, but by 2002 star paths extended essentially unbroken for over 300 km from Ground Zero to the edge of AlphaWorld.

Other settlement features are also evident in Figures 2 and 3. The diagonal star paths appear to be more heavily settled than the cardinal paths, and concentrated nodes of settlement are clearly visible both along the star paths and in apparently random locations elsewhere. Finally, from 1999 to 2002 straight and circular paths of enormous length proliferated, slicing across AlphaWorld in both diagonal and cardinal directions.

AlphaWorld’s regional form is clearly unlike that of any real-world city. Its stark geometry reflects both the blank, featureless slate of its empty digital landscape and the relatively simple forces guiding its settlement. The first of these forces is the highly centralized system of entry to the world, which places all visitors, unless they specify otherwise, at 0,0. This centralized entry has given Ground Zero great value as the place in AlphaWorld which is easiest to get to and which consequently receives the most avatar traffic. Many settlers have
responded to this ease of access by building as close to Ground Zero as possible. This desire to be at the centre of the action is similar to that guiding the growth of real-world central business districts, though AlphaWorld’s centralizing force seems to be more social than economic in nature, given the world’s lack of an economic component.

The shift in settlement form from the dense central area to linear star paths approximately 25 km away from Ground Zero reflects the influence of a second settlement force—the use of teleportation as a mode of transportation. As Dodge & Vilett (2001) have observed, this unequivocally digital means of transportation has caused both the highly geometric star paths and the settlement clustering seen along those paths. Teleportation requires the keyboard entry of two coordinates \((X,Y)\), and the denser diagonals indicate that many settlers have teleported by entering the same coordinate twice (i.e. 10 000,10 000), or by entering a coordinate and then zero (i.e. 10 000,0), rather than by entering a
random location. This tendency may result from identical numbers being easier to type or easier to remember. No bias is apparent toward a particular direction, however, since Figures 2 and 3 show all four diagonal paths to have approximately the same density. Diagonal star paths do, however, appear to be more heavily settled than cardinal paths, perhaps indicating a preference for entering two identical coordinates rather than entering a coordinate and zero.

Similarly, the clustering of settlements along the star paths can be attributed to a preference for settling at ‘prestigious coordinates’ such as 10 000 and 20 000. The clustering of settlement nodes at these numbers can be seen in Figure 4. Prestigious coordinates are likely to be preferred because round numbers such as 10 000 are easy to remember (Dodge & Vilett, 2001) and also are more likely to be selected by other settlers, increasing the chances for visits or new settlements. The preference for prestigious coordinates, like the desire to settle near Ground Zero, indicates the importance of social forces in guiding AlphaWorld’s urban form. Both at Ground Zero and around prestigious coordinates, settle-
ments which have a greater number of visitors are more desirable and these locations are therefore preferred.

Teleportation’s influence upon the locational value of AlphaWorld’s outer reaches is not unlike the influence of highway exits and interchanges in real-world cities. Garreau (1991) catalogued the multitudes of office complexes, subdivisions and industrial facilities which clustered about these interchanges outside US cities, calling them ‘edge cities’. Unlike those of the real world, AlphaWorld’s edge cities are located in a regular pattern radially scattered about its outer reaches at interludes measured by the world’s coordinate system. Away from these teleportation axes and their prestigious coordinates, the chance of random visitation is much reduced.

The most peculiar regional-scale design feature of AlphaWorld are the vast and highly regular geometrical shapes and paths visible in Figure 3. Since constructing these forms ‘by hand’ would take far too long for even the most dedicated settlers, their existence implies a form of construction other than human agency. Indeed, these forms are not the work of human settlers, but of programmatic agents known as ‘bots’ (short for ‘robots’). Bots have operated in AlphaWorld since at least 1997. They are designed to assist, among other things, in the often monotonous building process. (Bots can also provide social functions such as automatic chatting and information provision.) Many bots are available online as free software (‘shareware’) and their use is not discouraged in AlphaWorld except extremely close to Ground Zero (HamFon, 1998). As can be seen by comparing Figures 2 and 3, the cumulative settlement influence of bots is clearly immense and growing. There seems little doubt that AlphaWorld’s outer reaches will increasingly be settled in large part by bots. Bots are also likely to have constructed the many regular geometric shapes randomly scattered through the outer reaches in Figure 3.

The Neighbourhood Design of AlphaWorld

The distinctiveness of AlphaWorld’s urban form is not limited to its regional scale. At what could be considered its ‘neighbourhood’ scale, the unique urban design of AlphaWorld is even more apparent. Figure 5, mapped by active-worlds.com, shows the area around Ground Zero. Eight years of settlement (as of mid-2004) have turned this area, the equivalent of AlphaWorld’s ‘downtown’, into a rich jumble of features. These include some apparently familiar elements, such as bodies of water, roads and parks, as well as many elements not found in real-world cities.

While Figure 5 shows an apparently dense city centre, an avatar’s view of AlphaWorld shows this area to be low-density and distinctly non-urban in appearance (Figure 6). Structures are generally set far apart and are surrounded by large tracts of open space. Even Ground Zero, designed by Activeworlds, lacks defining buildings and is bounded only by billboards.

How should the urban design elements which comprise this digital cityscape be understood? This paper groups AlphaWorld’s elements into three categories. The first category is comprised of those features which have no apparent equivalents in the real world. The second is comprised of features such as lakes and forests which have visual equivalents in the real world but do not have the same functional role in AlphaWorld. The third are features such as roads and houses which have both visual and functional equivalents in the real
world. Elements in each of these categories, all of which can be found in the central area of AlphaWorld (Figure 5) are discussed in turn below.

*Geometries*

Geometries are among the most highly visible forms in Figure 5. Geometries have little analogy to real-world features and do not seem to serve any particular function. Geometries can be either regular, such as the two large circles and a diamond visible in Figure 5, or irregular, such as the large white expanse dominating the north area of Figure 5. Geometries are visible throughout AlphaWorld, and the scale of some of them, making them visible even in Figure 3, provides little doubt that bots were involved in their construction. It is conceivable, however, that the smaller geometries in Figure 5 were laboriously constructed ‘by hand’.
Graffiti

Irregular large landforms not visible in Figure 5 are clearly seen in Figure 7, which shows a larger area of AlphaWorld. These ‘graffiti’ are perhaps the most peculiar feature of AlphaWorld’s landscape and consist of large words, sometimes up to 1 km long, that cannot be perceived from the ground, such as ‘Platter’ and ‘Oz’ in Figure 7. Hudson-Smith (2002) and Dodge (2001) both observed that graffiti writing is intended to make the taggers’ names visible not in AlphaWorld itself but in maps of AlphaWorld posted on Activeworlds’s website. The high visibility of these maps makes AlphaWorld’s graffiti similar in purpose to that of the smaller-scale graffiti found in the real world. Both are intended to increase the visibility of the tagger’s identity.

Landscapes

Artificial landscapes are popular constructions in AlphaWorld. These are elements that mimic the natural environment of the real world, or reflect an idealized version of that environment. Landscapes visible in Figure 5 include formal gardens, rivers, forests and even artificial topography. In some cases landscapes extend great distances, such as the rivers visible in Figure 7. AlphaWorld’s landscapes reflect settlers’ desires to recreate familiar real-world features in the digital world.

Streets

One of the most highly visible neighbourhood design features of AlphaWorld are its streets. The visual significance of AlphaWorld’s streets far exceeds their
functional import. Since avatars may walk, fly or teleport at will over or through any built object, streets are not really necessary in AlphaWorld at all. Its digital streets thus differ strongly from real-world streets, which are busy, and therefore mandatory, passageways for people, vehicles and infrastructure. Nevertheless, AlphaWorld’s streets do serve two functional purposes analogous to those of real-world arteries. The first is as an agora, or public realm. In high-traffic AlphaWorld areas such as Ground Zero, streets provide space for avatar social interaction (see Figure 8) and pedestrian access to nearby areas. In this respect, Ground Zero’s streets are similar to those of a real-world town centre. A second analogous function of AlphaWorld’s streets is to clearly demarcate boundaries between properties. The north-east section of Figure 5 shows that street grids which were laid out are a framework for settlement. As in the real world, the street grid provides regular and predictable access to properties.

Because of its irregularity, the street network in AlphaWorld lacks the often monotonous consistency of real-world streets. In central AlphaWorld streets rarely form a continuous network. Nor are the street grids oriented similarly;
while most streets are oriented to the cardinal directions, others are skewed at apparently arbitrary angles. Street networks also vary greatly in size: the largest grids visible in Figure 5 have diameters of up to 2 km, but most are far smaller. Streets rarely extend beyond the bounds of a grid, perhaps indicating the ad hoc manner in which they were laid out or their limited utility for transportation. Since streets are not necessary for property access, many of the settlements visible in Figure 5 are not connected to streets at all.
Figure 9. AlphaWorld in mid-1996. One year after opening and approximately 6 months after the original world had been vastly expanded (the 6 km square boundaries of the original settlement can be clearly seen). Image © www.activeworlds.com.

Compounds

The structures built on AlphaWorld give it a third dimension and provide the world with its architectural character. The variety of structures that have been constructed is as great as the building materials provided by the Activeworlds software and the settlers’ ingenuity permit. A detailed typological study of these structures is beyond the scope of this paper, but even a brief survey indicates that a great many structures are personal compounds. These compounds vary in scale according to the design ambitions of their owner and the space available for settlement. Some compounds visible in Figure 5 consist of multiple structures. The largest occupy enough space to become major urban-scale elements (Figures 7, 9 and 10).

In contrast to their real-world analogues, AlphaWorld’s personal compounds are far from private. Instead, they are often intended to be as public as possible, to the extent that many properties advertise their existence through
hyperlinks located throughout the central area of AlphaWorld. These links are represented as signs or billboards which advertise the name and location of a compound. Clicking on the sign immediately transports the interested visitor to the compound itself.

Although all compounds are completely accessible to the digital public of AlphaWorld, fortress imagery is popular, with wide moats or other expanses of space proclaiming the grandeur of the compound and the care which its owner has devoted to its creation. The ostentatiousness of many compounds, and their obvious desire to impress, indicate that much of the perceived value of compounds derives from their social significance rather than from any functional value that they have. Much like the real-world ‘McMansions’ of US suburbia, AlphaWorld’s compounds communicate the human desire to proclaim one’s skill, power and wealth through the appearance of one’s home. And while McMansions may be forced to occupy tight suburban lots, the abundant space
and low-cost construction of AlphaWorld make it fertile ground for extravagant
digital palaces.

The above descriptions barely begin to hint at the richness of AlphaWorld’s
built environment. A closer look reveals an almost infinite variety of structures
constructed, ranging from airports and monorails to memorials to real-world
tragedies (several monuments commemorate the loss of the space shuttle Colum-
bia). Other settlers have constructed purely abstract lines and grids. Construction
in AlphaWorld is clearly used to express personal desires in a wide variety of
ways, and the result is a three-dimensional explosion of digital creativity.

AlphaWorld and the Real World

Although AlphaWorld physically exists in the real world only as electronic data
and as a set of financial and social relationships, its relationship to the real world
is more substantial than this. AlphaWorld’s relationship to the real world exists
on two levels. Of course, AlphaWorld could not exist without the real-world
presence of the computers which generate it, of the company which maintains
and operates those computers and of the people who visit or temporarily inhabit
the world.

On a theoretical level AlphaWorld also possesses many formal and concep-
tual links to real-world cities. These links are manifested in the fact that
AlphaWorld often looks and operates like a real-world city. The visual analogies
to real-world cities are both qualitative and quantitative. As one of its pro-
grammers observed, “[My] first and most obvious impression was just how
much the map [of AlphaWorld] looks like a map of a city in the real world”
(Dodge & Vilett, 2000). Similarly, research which measured the fractal com-
plexity of AlphaWorld found that AlphaWorld’s form is more complex than the
real-world city of Cardiff, Wales (Batty & Longley, 1994; Shiode, 1998). The
visual analogy of AlphaWorld to the real world is further illustrated by compar-
ing Figures 5 and 11. These two maps show central AlphaWorld and downtown
Oklahoma City in the USA at similar scales.

How can we better understand AlphaWorld’s relationship to the real
world? Can this digital environment be placed within known realities or ideals
of urban form, or does it redefine these realities? In other words, what kind of
a city is AlphaWorld? Though urban theory does not provide an exact answer
to this question, viewing AlphaWorld through multiple theoretical lenses, in-
cluding those of urban morphology, philosophy and technology, provides a
useful means of clarifying AlphaWorld’s significance and of framing future
avenues of research into digital cities.

AlphaWorld and Ideal Urban Morphologies

Lynch (1961) proposed that the morphologies of existing cities could be abstrac-
ted into five different ideals. He called these five ideals the dispersed sheet, the
galaxy, the core city, the star and the ring. Lynch (1961) then proposed a sixth
city form called the polycentred net. These six forms are shown in Figure 12.

Lynch’s (1961) polycentred net combined many of the advantages of the five
ideas that he had abstracted. Nodes of activity were centred within a less-dense
web of settlement that achieved maximum transportation flexibility and choices
of living environments. Both areas of density and of open space were connected
Figure 11. At first glance, the central area of Oklahoma City, USA bears some similarities to the central area of AlphaWorld (Figure 5). Both have a concentrated downtown, underutilized neighbourhoods close to downtown and rigid grids. At second glance, however, AlphaWorld has little to no structure, while Oklahoma City’s settlement is defined by a near-universal grid system. Both figures are shown at approximately the same scale.

by corridors which expanded into larger areas in different parts of the city. This lack of a rigid structure provided the majority of citizens with access to both densely settled and open environments in all parts of the city. Lynch (1961) also believed that the polycentred net should be flexible, densifying or dedensifying as needs and conditions shifted. Though he did not go so far as to claim that the polycentred net was an ideal city, he clearly believed it balanced benefits with disadvantages. It is perhaps no coincidence that Lynch’s home city of Boston, with its networks of waterways and green spaces interspersed with concentrated and distinct town centres, provides an indication of what this ideal might look like.

Lynch would probably not find AlphaWorld an ideal city. Its densities are too low, there is little differentiation in its environments and discrete open space and clear city patterns are rare. Perhaps AlphaWorld’s most important failing,
Figure 12. Lynch (1961) proposed five ideal metropolitan patterns derived from existing cities, as well as a sixth which was his ideal synthesis of the five. From left to right, top to bottom: the dispersed sheet, the galaxy, the core, the star, the ring and the polycentred net. Image © MIT Press.

according to Lynch’s (1961) ideals, is its lack of flexibility. Because its properties cannot be redeveloped, AlphaWorld’s urban fabric cannot shift in densities and uses according to the changing desires of its inhabitants. The current users of AlphaWorld are therefore limited to an urban fabric which was established by others and which cannot easily be adapted to current needs.

Lynch’s (1961) ideal morphologies were constructed according to principles of city growth which existed in the real world rather than in cyberspace. Nevertheless, although Lynch (1961) probably never imagined a digital city such as AlphaWorld, its urban design would not be unfamiliar to him, for in it he would recognize several of the same principles of urban growth and change which guided his ideal morphologies: centralization, rapid transportation, corridors of growth and the presence of discrete city units. AlphaWorld, however, shows new applications of these principles. It is more highly centralized, due to its central access point at Ground Zero, than most real-world cities. At the same time, because of the existence of teleportation, it is also more highly decentralized. A similar paradox is the fact that AlphaWorld’s regional form is highly structured, while its neighbourhood form is highly unstructured. Although it is a far from perfect place, AlphaWorld is an exciting indication of the possibility of cyberspace and technology to expand existing concepts of urban morphology.

AlphaWorld as Heterotopia

AlphaWorld’s uncontrolled aspect was designed into its nature from its very beginning. Ron Britvich, a programmer who created the first version of AlphaWorld in 1994, felt that his digital city should be a place where:
People can set up their own communities and have it be however they want it to be. They can decide who enters that community, who can build there, who can destroy things in that community, what type of government they should have...people could traverse from community to community and decide where they want to live. (McClellan, 1995)

Many of Britvich’s early sentiments were realized in the mature AlphaWorld. For example, the variety of civic organizations cited earlier are, exactly as Britvich desired, citizen-generated institutions which have evolved to provide guidance in an otherwise unregulated regulated society. Only in a few extreme cases, such as the ban on pornography, has it been felt necessary to institute controls where Britvich desired freedom.

Anarchy advocates the dissolution of structured social and political institutions, and in many ways AlphaWorld is an anarchic city. There are no government or other institutions to regulate the content, placement or relationship of buildings and other space. Citizens may build anywhere, occupy as much land as they like and build whatever they like, subject to very few restrictions. Socially, AlphaWorld is similarly lightly governed, although limited institutions have evolved to maintain a non-threatening social atmosphere. AlphaWorld’s society is also non-hierarchical—there is no mayor (unless activeworlds.com can be considered a remote administrator). The other civic organizations that have evolved are organized on an entirely voluntary basis.

Real-world urban settlements exist within a broad spectrum of governmental control, and AlphaWorld, existing as it does within a loosely defined regulatory environment of its own making, lies close to the unregulated extreme of this spectrum. AlphaWorld’s contrast with the real world may increase as the real world becomes ever more tightly controlled for security or social conformity purposes. While real-world places such as suburban gated communities are intended to provide a stable and unthreatening social and physical landscape, it is little surprise that many people find such environments restrictive. Perhaps as a response to these restrictions, human beings seem to have an emotional need to spend some time in environments where the rules of society are altered or reversed. The scarcity of such environments in the real world was problematized by Sennett (1971), who criticized the inability of US suburbs to provide environments which exposed citizens to disorder and difference. Foucault (1986) called such environments ‘heterotopias’: places where rules were challenged and where the normal order of things was reversed. For Foucault (1986), environments such as asylums, vacation villages and prisons had heterotopic qualities. Others have observed a similar relaxation of societal strictures in festival environments (Schuster, 2001), in abandoned or waste spaces (Lynch, 1990) and in postindustrial urban waterfronts (Campo, 2002). At a larger scale, entire cities such as New Orleans, Las Vegas or Rio de Janeiro possess heterotopic qualities, especially at certain times of the year. Visitors from around the world descend upon these places to engage in activities that are forbidden or frowned upon elsewhere or at other times. Perhaps the most compelling heterotopia is the Burning Man festival (www.burningman.com), which takes the form of a temporary city each summer in an otherwise empty Nevada desert. Features of US society prevalent elsewhere, such as the cash economy, permanent dwellings and even clothing, are abandoned in Burning Man for 1 week of idiosyncratic
creativity, celebrations of freedom and the ritualistic immolation of a large wooden statue—the ‘burning man’.

Digital communities and heterotopic qualities are closely related. Burning Man has a heavy Internet presence, and many of its participants come from the information technology industry. Turkle (1995) referred to the heterotopic quality of the digital world as a ‘second self’—the ability to establish a personal identity unconstrained by everyday life. Though digital worlds lack the tactility of the Mardi Gras and Burning Man festivals, they are far more accessible and permanent than these festival heterotopias. AlphaWorld permits a full range of heterotopic experiences, from socializing to building construction, town building and society building. It is not surprising that people who live in environments such as suburbs, which allow for few or no heterotopic experiences, enjoy participating in AlphaWorld, a place where rules are relaxed and almost anything goes.

**AlphaWorld as a Self-organizing System**

Like real-world cities, AlphaWorld can be viewed as a self-organizing system. Kelly (1994) described how natural and ‘artificial’ phenomena such as swarms of bees, flocks of birds, online chat rooms and digital simulations shared common principles. They are all systems which are comprised of individuals who, acting independently and making relatively simple individual decisions, are able to form higher-order group decisions and products. Kelly (1994) called this resulting higher order the ‘hive mind’. He believed that the information revolution was leading to a future where the ‘hive mind’ would play a greater role in decision making and where biological and mechanical systems would merge to create entities which were both alive and artificial.

Although Kelly’s (1994) musings were consciously idealistic, AlphaWorld can be seen as an early manifestation of a self-organizing digital system in the form of a city. Unlike simulation environments such as SimCity, events in AlphaWorld do not unfold according to predetermined algorithms. Instead, AlphaWorld is a relatively loose decision environment where autonomous users numbering in the thousands make individual decisions. The self-interested decisions of these settlers, however, must comply with the settlement decisions made by similarly self-interested individuals in the past. The sum total of these decisions is the evolving urban environment which has been documented in this paper.

In the real world, construction decisions are guided by forces that are far more numerous and complex than in AlphaWorld. In this sense AlphaWorld can be thought of as a simplified simulation of the highly complex self-organizing systems of real-world cities. It is not a simulation which attempts to mimic real-world cities, but a simplified simulation with a reduced set of decision variables.

Simulation has already been applied as a tool to other self-organizing systems. Resnick (1994) developed a computer language known as StarLogo, which allows users to create their own algorithms to guide the movements of objects known as ‘turtles’. Turtles interact both with each other and with ‘patches’, which represent changing environmental variables. By altering the decision environment of turtles and patches, users can simulate self-organizing systems such as traffic jams and beehives.
Although a simple computer language such as StarLogo would probably be unable to simulate the complexity of a real-world city with any degree of accuracy, it is worth considering whether AlphaWorld might be reliably simulated. Such a simulation would demonstrate the relationship of AlphaWorld to other self-organizing environments. A simulation of AlphaWorld would also indicate the relative influence of the different settlement decisions being made in AlphaWorld. Once a reliable simulation algorithm was established, shifting the algorithm variables would indicate how ‘regulating’ AlphaWorld might influence its form. These reliable simulation algorithms might eventually be extended to examine real-world cities as well.

Conclusions and Future Directions

AlphaWorld was not founded by city designers, and its lack of urban design control is clearly manifested in the digital city which has evolved since 1995. The programmers who created the framework for AlphaWorld emphasized *laissez-faire* urban design rather than tight regulatory control, and the result is a digital city which maximizes the potential for land acquisition and construction creativity which fails to encourage high-quality public spaces. AlphaWorld is not alone: many real-world settlement forms, such as the speculative grid and the US suburb, also privilege individual properties over spaces intended for the larger society.

As we have seen, AlphaWorld has a highly structured metropolitan form but an unstructured local form. The desirability and accessibility of Ground Zero have concentrated many activities at or near the centre of the world, while the symmetrical logic of teleportation has produced a settlement pattern extending evenly out from this centre. All of these patterns, unfortunately, are imperceptible at a local level, where individual settlements have located in the absence of any larger-scale planning decisions. This produces a disorienting feel for the avatar on the ground, where the lack of a uniform street grid or other ordering elements prevents easy visual orientation.

AlphaWorld is not likely to be redesigned. Much as in the real world, its digital landowners have strong attachments to their property, and any redevelopment would probably be very unpopular. Similarly, AlphaWorld’s lack of a land economy inhibits the transfer and redevelopment of properties. The consequence is a low-density, visually disorienting place lacking a perceptible urban order except at the metropolitan scale.

What lessons does AlphaWorld offer urban designers?

First, the interest and participation that this digital city has attracted indicates that many more communities of this nature are likely to evolve as digital and communication technology improves. As they do, the potential role for urban design in the digital realm is likely to grow. Given the shapelessness which has resulted from AlphaWorld’s relative lack of design, urban designers should resist trivializing digital communities and seek a positive role in influencing the design of these communities in the future.

Secondly, AlphaWorld offers valuable lessons that can be applied to the design of real-world cities. Perhaps AlphaWorld’s most valuable lesson is the degree to which its citizens can shape their own environment. In an age when technocratic standards seem increasingly determined to regulate the real-world built environment more and more heavily, AlphaWorld reminds us that the
absence of such regulations can empower individuals and provide variety and colour to the urban landscape. Its heterotopic and self-organizing qualities are notable.

Much current urban design debate seems focused on formal and stylistic issues. Relatively few participants in the debates over the form of the future city acknowledge the importance of providing individuals with the power to endow neighbourhoods and cities with self-organizing systems. Yet even a cursory review of the literature, from Sitte (1889) to Jacobs (1961), reminds us that many of our most important urban thinkers supported the extension of such individual power and the reduction of the homogenizing power of regulations. AlphaWorld reminds us that the importance of integrating the individual city dweller’s potential for creativity with the need for order is likely to continue as one of the great challenges of urban design.

Notes
1. The term ‘real world’ will be used in this paper as a convenient shorthand to indicate the physical world in which we all live. Of course, the use of this term does not imply that digital environments are any less real than physical environments.
2. AlphaWorld’s ownership entered a period of flux in mid-2002 due to the continued unprofitability and subsequent delisting from the stock market of activeworlds.com (Mauz, 2002). As of May 2003, activeworlds.com and AlphaWorld remained in operation.

References

**Appendix**

AlphaWorld mapper: http://mapper.activeworlds.com/aw/.
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