

Designing in Second Life: Identity Construction and Learning in a Virtual Informal Environment

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Abstract: This article investigates the phenomenon of end-user design in Second Life (SL) - a virtual world, particularly in a time when major national organizations and federal agencies express their concerns of a diminishing interest in IT professions and less students interested in careers in science, technology, engineering and math. The authors were interested in the appeal of SL on users for becoming creative designers, how users experience SL as a platform of design and design learning, and how SL users acquired design skills. Results demonstrate that SL is an environment rich of feedback, especially for beginners, and that the boundaries of the environment provide benefits such as the unique interactive elements (objects respond differently to different users) and challenges such as prototyping for the first-world, when SL does not contain all of first-world attributes (such as gravity). The results of this exploratory study (1) call for studies of larger scale to confirm the results, and (2) can already inform formal educational systems and curricula of how to best harness the positive aspects of SL as an informal environment to provide an engaging way for students to explore design.

Index Terms: second life; design identity; learning to design; virtual environment; informal education

I. INTRODUCTION

“Second Life is the biggest programming effort in the history of humanity: 650 million [work]-years invested yearly”[1]. Second Life (SL) is a virtual world that comprises of nearly 1.5 million users from which approximately 150, 000 are core users (numbers vary considerably depending on source). In contrast to the more commonly known massively multiplayer online games, virtual environments like Second Life do not have rules for game-play, a storyline to follow, or set tasks to accomplish for rewards (see for a distinction Gee 2007; [3]. Astonishingly, many end-users devote their time to create virtual worlds within Second Life. This phenomenon of informal design work occurs at the same time when major professional organizations and national panels speak consistently of a need for more information literacy skills [4] and crisis-like shortage

of students interested in engineering and information technology related professions [5].

The phenomenon of end-user created virtual worlds raises interesting questions:

1. What appeal does SL have for its users especially in regards to design and technical skills?
2. How do users in Second Life construct their identity as designers in the context of their design experience?
3. How do users in SL acquire design skills?

Ultimately this research can inform “first-world” educational institutions how to make similar experiences available to new generations of students and how to harness this bottom-up design phenomenon for education and career development in technical areas.

II. LITERATURE REVIEW

Because of the immense complexity of such a new virtual environment and a unique opportunity for research enterprises, SL has not escaped the attention of academia. Many universities in the United States have already constructed their own online presence in SL, and even provide virtual tours of their campus or offer courses in SL.

Existing research focused on the psychological, sociological and economical aspects of SL: Scholars are investigating how SL (and virtual environments in general) can be harnessed to support people with social challenges, e.g. to overcome social anxieties and fears [6] and how SL’s economy and its actors as a microcosm provide insights for the global market at large [7]. Other studies investigate how and why users participate in this digital environment; Reference [8] examines different user types in regards to identity and gender and their expectations and satisfactions in participating in SL and Reference [9] examines the relationship between avatars and their creators, arguing that a strong separation is not possible.

Despite the variety of academic explorations through SL, there is a surprising dearth of studies on the design and creation of these virtual environments, and what compels and motivates designers/end-users to create objects and worlds. Although this road-less-traveled is perhaps explained by the prior constraints of other virtual environments (i.e.: no user-created content) and therefore a lack of prior research opportunities, the advent of SL created a new

chance to explore design theory in such an unprecedented medium.

Following is a review of existing research on design in SL: In his paper entitled "Collaborative Design in Second Life", van Nederveen [10] employs three analytical lenses in an exploration of digital construction in SL: design, engineering, and collaboration. Design projects are often characterized by the co-operation of multiple participants from different disciplines. In the design perspective, his findings (based on students feedback) indicate that, while SL can be perhaps even more time-consuming to new designers (i.e.: because of the high learning curve associated with this specific program) it does offer some unique insights into the construction of any building, particularly the lack of real-world constraints like weather, gravity and alike.

Within the engineering lens, van Nederveen [10] reports the lack of real-world constraints as a disadvantage, since gravity and weather effects (among many other physical factors) play an important part of any real life design and simulations of these effects still remain largely ineffective for educating new designers. Other researchers like References [11] and [12] emphasize the utility that SL has for "real engineering". In particular, SL is successfully utilized for modeling objects and designing prototypes for engineering purposes:

"In Second Life, you can make a static 3-D object move and react as you make changes to it in real time. Scripting allows you to link cause and effect, which you cannot do with 2-D drawings or even CAD" [12, p.76].

Yet, through the lens of collaborative design, Nederveen notices that SL has been a great success: Since one can see each other's avatars and their actions, chat with them; send messages to them etc., there are good opportunities for collaboration – better than conventional design systems. Reference [13] corroborates these postulates in his research by quoting a teacher of architecture at Montana State University using SL, "It doesn't replace CAD, but it's a supplement for our technology that helps us learn to collaborate" [13].

Other research focuses on cognitive processes essential to design, which can particularly be developed in virtual 3-D environments and transferred to the first world. Reference [14] work on the influence of spatial ability in virtual environments concluded "that, when aiming to transfer spatial knowledge gained from a VE [virtual environment] to a real space, spatial ability may be more important than the visual presentation of the VE" (p.209). However, this training method yielded also the worst performance for individuals with low spatial ability.

Although addressing particular issues on design in SL, the existing literature does not adequately address the questions: what appeal does SL have for its users that education institutions might not provide, especially in regards to design and technical skills, how users in Second Life con-

struct their identity as designers in the context of their design experience and how users in SL acquire design skills?

III. RESEARCH DESIGN - FRAMEWORK

This research was grounded in a phenomenological methodology and qualitative case study inquiry. Reference [15] states "boundedness and behavior patterns are useful concepts for specifying the case" (p. 135). The focus of this study was behavior patterns and associated experiences, especially as related to identity construction and design within the bounded system of SL.

As reference [16] argued, "Narrative imitates life, life imitates narrative," a story is never simply a recital of known facts in chronological order; it is an interpretation of experiences. Because narrative research is focused on the stories told to make sense of lives, it is particularly appropriate for the study of identity issues, lifestyle, and culture [17]. Reference [18] speaks to the connection between narrative research and identity construction.

A. *Second Life*

This section introduces Second Life (SL) in more depths to provide context for this study:

SL is an internet-based platform, which allows the creation of virtual worlds using a 3D modelling scripting language. Linden Lab, the company behind SL, launched the system in 2003.

SL is based on a real-estate metaphor situated in an ocean, in which users can purchase islands. Each one of these islands can be 'developed', which means any 3D artefacts such as buildings, cars, clothing etc. can be constructed with the use of SL scripting language. The scripts written (a) create any object, (b) animate objects with built-in functions such as rotation and (c) program responses of objects to stimulations by contextual factors, for example, when a user comes close the objects provide text, or changes it shape.

The vast, virtual cosmos of SL is completely constructed by the users and not by employees of Linden Labs. As research in this paper highlights, some end-users come with design experience while other users gain their design experience for the most part within SL.

While no one person can possibly visit every island in this world (since it grows everyday), a simple touring to different areas in the game allows the user to garner impressions of the vast creativity and ingenuity that SL designers possess. The residents of SL each control an avatar, which is their virtual representation in this environment. Everyone can customize his/her own avatar with existing and extendable features. From changing physical features, dressing in different outfits, and even turning into animals and mythical creatures, SL offers a myriad of means through which individual users identify with (and even create) an online presence and participate in this new method of reality's social construction.

The creation of an avatar is the first step in the SL user's experience towards participation in the digital space. SL offers its users a wide range of activities to keep them busy and entertained. The world is maintained entirely by its user-base who construct and operate shops, dances, games, lectures on a large array of subjects, live music performances, and, in general, a social atmosphere where people of similar interests can come together to learn. Some of these activities (like shopping, clubbing, and attending classes) are fuelled by the in-game currency, which is called Linden Dollars (L\$). This currency maintains a floating-exchange rate with the US dollar, and so it is no surprise that the world of SL has developed a vast market-economy with millions of dollars passing through its digital borders everyday. Because of this somewhat stable (albeit virtual) market economy, there have been a growing number of designers in SL who have actually become self-employed professionals and make their real-life income from this virtual environment. Others may work in SL as a supplement to their income; for example, architects may first construct a model of their building within SL and show their prospective clients before construction begins in the physical world. Then, of course, there are the SL hobbyists who design in the environment purely for the fun and challenge it provides.

There have been many ways that SL has been used in engineering education contexts as well. For example, Ohio University has been sponsoring the use of software to support interactive video games that help middle school students learn science [19]. Toyota in 2008 also released a virtual edition of its Scion xB prototype for SL residents to test drive online and receive feedback [20].

Designers and architects in SL are starting to create their own types of "live art" that respond to certain conditions, something not possible in the real world. Reference [12] details, for example, how an engineer has used SL to design an entire plumbing system and to effectively use it with scripts to simulate real life conditions that model the real world and detect potential problems.

Second, one of the most important tools in Second Life is the ability to communicate with multi-modal means. Through text and microphone chats, and the possibility to chat privately or publically, the program allows people to design, communicate and collaborate simultaneously. Since the world in SL is highly populated (comparative to other online communities), timely feedback and critiques on one's own work from a diverse body of people is possible.

B. Data collection

Six participants were selected (see Table I. for the demographics of the research participants)

Table 1: Demographics of Research Participants

| Participant # | Age/Sex | Education | Exp. | Career | Misc. |
|---------------|------------------------|-------------------------|-------------------|-------------------------------|----------------------------|
| 1 | 18-22 M | Undergrad | None prev. | School | Interested in design |
| 2 | 30 F | B.S. Economics | Nothing extensive | Self-employed through SL | SL Designer |
| 3 | 65 F | Not Given | None prev. | Retired Insurance Agent | Freelance Designer |
| 4 | F | Business degree | Nothing extensive | Teacher of Microsoft products | Store Owner |
| 5 | Mid or late 20's (?) M | BS in Architecture | School | School | Prev. Computer programmer. |
| 6 | 32 M | Masters in Architecture | School | Architect in SL/RL | Famous SL Designer |

for inclusion in this study based on the following criteria: they all had extensive experience in SL (determined by the age of their account and hours they spent in SL). Although the goal was to have a wide representation from different users and different age groups, the researchers were particularly concerned about establishing a relationship between researcher and participants that is equal and caring, so feelings of trust and "connectedness" [21] were able to emerge. Our goal was to retell the stories of users, how they constructed their design identity and learned to design in SL, while also telling our story as researchers of SL.

Data from a variety of sources can be gathered in narrative research, including interview transcripts, field notes, journals, observations, letter/email writing, and pictures as in [21]. In this particular research, design artefacts, field notes, and unstructured interviews in the form of conversations and mutual-storytelling were the primary source of data.

C. Analysis

After the data collection, two distinctly different qualitative analysis frameworks were utilized to let different results speak to each other:

- (1) The primary data analysis followed the holistic/content approach as outlined by reference [17], which means it was key, that the content of the stories was understood in the context of the whole story and as a phenomenological unit.
- (2) A secondary data analysis employed a modified analytic induction process, a qualitative research methodology that uses a systematic set of procedures to develop an inductively derived grounded theory [22]. The authors modified analytic induction with the following procedure: Instead of quantifying the individual findings – which was not possible due to small sample size -, the authors utilized the strongest themes for the selection of themes to be presented. In this analysis, a constant comparison framework [23] was utilized to identify themes and categories within the stories told by users of SL. By utilizing a multi-case design, several experiences were compared and contrasted.



Figure 1. Examples of Replica

IV. FINDINGS AND DISCUSSION

The interviews with the designers offered an introspective view in this virtual world of designers. From the several different themes we will focus particularly on those who have educational and personal-growth implications.

Theme 1: Development of Virtual (Design) Identity

Through design and their appearances, users of SL are allowed to customize and create almost anything. Research participants identified strongly with their avatars, and the evolution of their avatars mirrors the development of them as users which confirms earlier research by [9]. Although grounded in their first-life reality, some avatars use metaphors to express who they thought they were, such as certain skin tones without fear of becoming social pariahs. Evolution was a central theme touched on in all the interviews. The changes made often times were the result of the user advancing their taste in design and refining what they found appealing. So describes one participant

“[...] but my character has evolved over time into more of a playful or communicative device - and [I] wanted to also have a place as a virtual architect, capable of building purely virtual projects as well“ (code 300).

As an extension to existing findings, the user’s identity seemed to be additionally constructed through the design work and by the production of artefacts, so described by a more advanced designer in the following quote:

“... I have already transcended a large part of my real-life practice into exclusively virtual projects for organizations in Second Life, and I think that is just the beginning. It is a little like occupying my mind.... since it is a place where I can build and realize anything I can think of, its like taking part of my mind and my thoughts, and building it in a shared space others can also experience and explore” (code 252).

Theme 2: Entrepreneurs vs. Artists

Users in our research population were separable into two central groups. There were people who were interested in the design in Second Life, and those who came to Second Life in the hope of making money through their design. The people who were interested in the design saw themselves as artists and the other group saw themselves as entrepreneurs. The entrepreneurship-oriented population focused on replicas of real objects and maximizing the detail in their design, often utilizing the most advanced modeling tools provided by SL (see Figure 1).

Users who considered themselves artists were interested in pushing the bounds of human imagination through things possible in Second Life, but not in real life. The users would take advantage of freedoms not given in the real world (which will be addressed more in-depth in a later theme).

Second Life has an immensely steep learning curve, especially in regards to scripting and building. This initial learning curve dismays many first-time users and can often times serve as a weeding-out tool that only leave the most determined to learn and refine their work. To be successful one has to be highly motivated. Our research found that motivation is fueled and can be explained by the two previously described user categories: artists and entrepreneurs. Either users wanted to make money through the in-game economy by building and selling objects, or users were curious enough to pursue many painstaking hours working on refinements to their design.

Theme 3: Collaboration or Cooperation?

Given the existing literature on SL and collaboration mainly [13] and [10] we expected to find evidence and examples of a high level of collaborative design in SL. While designers communicate, share ideas, and critique each other’s work, they seemed to work independently from one another on the actual design and production. Designers rarely worked together on the same project at the same time, in short, designers exhibited a classical division of labor and roles (design by one, critique by others, for example). This is described in the literature as cooperation [24] in contrast to collaboration.

Nevertheless, the social community and the ease of access to other designers/artists provided designers with a “collaborative” atmosphere otherwise not experienced, as participants described:

“On one side, you have the community to rely on to learn, and people can show you exactly how to do things [...]” (code 105/106) and “through the in-world building tools options to ‘share’ modify and copy privileges with others” (code 282/283).

The experience is often described with a metaphor of collective mind, for which the following quote stands as an example:

“if my mind is the only one tackling a project, the result will necessarily be limited only to what my single brain can think of.... but when we open the process to many minds, we can achieve an end-result far greater than the sum of the individual parts” (code 285/287).

Theme 4: SL as Informal Learning Space to Improve Skills, Gain Expertise and Express Creativity

Many skilled designers (for whom SL was not the first introduction in design and architecture) described that their skills were improved by the affordances of different view points within SL. The ability to fly, for example, led to interesting locations of structures and transportation mobiles and design artefacts used scripts to animate objects depending on attributes of an avatar around them.

Similarly, newcomers felt supported by inhabitants of SL to gain design skills by the willingness to share scripts, tips etc. and ‘lending a hand’:

“When I got into Second Life, it was within three days that I had found a mentor who was interested in spending the time to teach me the ropes. To begin with, it was very much basics to do with how to use the interface. But it included a whole crash course on creating some simple objects and putting them together” (code 16).

Research participants had ambivalent opinions about the facilitation of the acquisition of design skills in the context of SL: On one side, people expressed that SL allows for unique perspectives to develop, that SL facilitated to take design to new creative levels and that SL brought back and protected - like a firewall - the fun of design, which often got lost in the context of either schooling environments or first-life work environments.

On the other hand, participants acknowledged “SL’s potential for creation is not limitless and it requires a great deal of prior knowledge to make exactly what you want here.” (code 45), yet SL was seen as an ideal first step into design. This apparent contradiction (prior knowledge is necessary and ideal for first steps to learn design) can be explained with the participants overall agreement that the process to learn design is long-lasting and hard, with SL adding more joy containing less barriers.

In addition to limitations due to prior knowledge or advanced learning needs, participants mentioned technical limitations (data cannot be easily exported; interface between SL and existing graphics and CAD software are not well defined), which might hinder designers to further their design or even enter SL for design a design purpose.

V. CONCLUSION

This study shed light on the design experience of several participants and user/designers in the virtual environment Second Life. The exploratory research revealed that collaborative activities in SL are reduced to forms of coopera-

tion, that SL design is as hard to learn as other forms of design, yet the environment provides a social space and therefore additional motivations for design work. There are numerous implications of this paper for teaching engineering, especially design, particularly, that a social and informal context is as equally important as formal support in order to develop design skills. Further research is necessary, especially (a) more exploratory research comparing specifically the design experience in schooling environments with SL and (b) large scale research in order to investigate how well the developed themes of this research hold true and can be generalized over the larger population of SL users.

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