Presenting Identity in a Virtual World through Avatar Appearances

Carman Neustaedter and Elena Fedorovskaya

Kodak Research Labs

ABSTRACT

One of the first tasks that people must do when entering a virtual world (VW) is create a virtual representation for themselves. In many VWs, this means creating an avatar that represents some desired appearance, whether a reflection of one's real life self, or a different identity. We investigate the variety of ways in which people create and evolve avatar appearances in the VW of Second Life® (SL) through contextual interviews. Our findings reveal that users balance pressures from the societal norms of SL with the need to create an appearance that matches a desired virtual identity. These identity needs differ based on four types of users—Realistics, Ideals, Fantasies, and Roleplayers—where each presents unique challenges for avatar design. Current research tends to focus on the needs of only one of these user types.

KEYWORDS: Virtual worlds, identity, avatar, appearance.

INDEX TERMS: H5.3. [Group and Organization Interfaces]: Synchronous.

1 INTRODUCTION

Virtual worlds (VWs) are sophisticated 3D environments where millions of people participate. These include VWs as part of massively multiplayer online games (MMOGs) as well as others that focus more on socializing and less on gaming, such as Active World, or Second Life®. Within this second group of VWs, we are interested in understanding how people present their identity: a person's mental model of him/herself [6]. In real life (RL), people present an identity to others through their actions and interactions [6]. People also infer the identity of others based upon visual attributes such as one's appearance [6]. Appearance allows people to recognize others and associate an identity with a person.

In most VWs, one of the first things a user must do is create an avatar that represents his/her online identity in a visual form. The level of sophistication provided by VWs for creating visual representations far exceeds that which is available in other online spaces such as chat channels or forums [10,18]. In the VW, appearance is (most often) highly customizable and unrestricted by the everyday bounds of RL [18]. For example, it is possible to masquerade as one's ideal-looking self, or "try out" attributes of others. This permits unique opportunities for identity presentation.

Existing research illustrates the importance of avatar appearance for status [5], confidence [18], self-disclosure [18], and socializing [21]. We also know that users present different types of identities in the VW. Some transcend their RL identity to become one with a virtual identity [3]. Some users create an identity different than their RL one [3]. Others come to VWs to be a better, more ideal, self [16]. Each of these comes with a need to create a virtual representation that reflects one's identity. Yet what is missing is an understanding of how these different types of virtual identities

1999 Lake Ave, Rochester, NY, {first.lastname}@kodak.com

affect the manner in which users create their avatar's appearance and how users may or may not be limited in this regard. Addressing this allows us to better understand what tools should be made available to users in order to design avatar appearances that match their behavioral needs and intended identity. Without this knowledge, designers may easily be restricting user needs when it comes to presenting virtual identities.

To address this, we conducted interviews in the VW of Second Life (SL) aimed at understanding the ways in which people construct avatar appearances and how this is affected by a virtual identity. Our results illustrate the social pressures that users face to construct an avatar that is refined and sophisticated. We also saw that users try to balance these pressures with user-specific needs to create an appearance that matches their desired virtual identity. Here we found that four identity types exist—Realistics, Ideals, Fantasies, and Roleplayers—where each has different needs for how similar their avatar appears to their RL self and how realistic their avatar looks (e.g., similarity to a photograph or RL person).

Currently, each of these identity types is limited when it comes to avatar creation. As a result, people are either challenged when attempting to construct their appearance or they compromise their identity needs and create less than ideal avatar designs. A further challenge is that research trajectories in both computer graphics (e.g., 1,4,7,9) as well as social science research (e.g., 2,21) suggest that VWs will evolve to be more realistic in the future with an associated pressure for users to create an avatar that appears more like their real self. However, this maps to only one of the four identity types we articulate, thereby suggesting that research take a wider perspective when it comes to avatar design in order to better meet the varying needs of users.

2 RELATED WORK

Identity is defined from a sociological perspective by Goffman as the mental model one has of oneself [6]. Identity formation and presentation is a social act where people present their identity to others through their interactions in everyday life and it is further refined by these interactions [6,18]. People construct an identity in the VW in a manner similar to RL. That is, their identity emerges and evolves through their online interactions with others [16]. Research has identified several classifications of identities that people construct in the VW. Through ethnographic studies of VWs, Turkle [16] found that users could be classified on whether or not aspects of their RL identity are found in their VW identity (e.g., same personality, same appearance, etc). She also identifies two types of users in terms of the goal of their identity formation: *Ego Ideals* attempt to be their ideal selves, and *Role Players* try to be something they are not (e.g., passive, different gender). Taylor [15] points out that many people in VWs have multiple identities.

Bartle [3] describes a series of player types based on how much one identifies with his or her avatar. This identification is referred to as the degree to which someone feels the avatar represents their RL identity. In the classification, users begin as *Players* who control objects associated with them. The avatar and player are two separate identities and the player has little identification with the avatar. This evolves into users becoming *Avatars* where they control an avatar that they feel represents them in the VW. Again, this is a case of two separate identities. Next, users become *Characters*, where the avatar is a representation of one aspect of

Figure 1. A default avatar (left) and refined one (right).

the user's identity. Here users take on the identity of their avatar when in the VW. This identity is an extension of the user's self. The final level, *Personas,* involves users becoming one with their avatar, i.e., users' RL identity overlaps a virtual one. Yee [19] helps explain the categories identified by Bartle and Turkle by showing there are ten factors that affect users' motivations for playing MMOGs. Users play for achievement (e.g., competition), social reasons (e.g., meet others, form relationships), or immersion (e.g., role-play, escape RL).

Research has also shown that avatar appearance plays a significant role for identity presentation and user behavior in VWs. For example, Yee and Bailenson [18] found that people with attractive avatars willingly self-disclose more information to strangers than do those who have unattractive avatars. Taller avatars are found to act more confidently during decision-making tasks [18]. Yee *et al.* [21] found that avatars who are human-like and more realistic tend to create more positive social interactions. People have also been found to treat other avatars more intimately if they resemble themselves [2]. Appearance can also create status issues, such as identifying who is a paid user *vs.* who is not [5].

Currently, VWs let users choose and customize avatars that look similar to cartoons, as opposed to photorealistic humans. For example, Figure 1 shows two avatars from Second Life. Yet this trend is changing. Companies and research institutes are now designing methods for users to create photorealistic avatars and map RL appearance attributes to avatars. For example, Benford *et al.* [4] created MASSIVE®, a virtual reality conferencing system that allows users to employ photorealistic faces that are applied as textures on an avatar's head. Hilton *et al.* [7] are able to construct realistic 3D models of people using multiple orthogonal camera images. Lee *et al.* [9] extended this work to enable 3D model construction from photographs that do not contain special backgrounds or controlled lighting. Ahmed *et al.* [1] use multiple synchronized video streams of humans to create avatar models. While this is just a small sample of the work in this space, these efforts and more will shape the future of avatar design, one that is moving towards a set of more photorealistic virtual environments.

Ultimately, designers control how people can represent themselves and interact in the VW [8,11]. This may be based on what they want users to do in their VW or on who they think users are offline [11]. Defaults are important for they project societal expectations as to how people should present themselves [8]. In most cases, to be anything but the default requires explicit user acts [8]. The realization then is that users can only construct their avatar appearance and corresponding identity based on what the VW allows them to do. This means that designers need to think carefully about the capabilities that they provide for users. Despite the existing research on virtual identities, it is not clear what these capabilities entail when it comes to avatar creation and design.

3   STUDY METHODOLOGY

We build on the existing literature with our own study of avatar appearance and identity in SL. This involved the creation of two avatars, one male and one female, who we used to explore the SL environment and culture. This involved observing and interacting in SL over a period of four months involving several hours per week. These activities provided us with firsthand experiences of how to present our own virtual identity and avatar appearance. We built on this knowledge by conducting semi-structured interviews with 22 participants of SL.

Participants were recruited throughout SL (e.g., in dance clubs, shopping malls, welcome areas, cafes) by asking the people we met if they would be willing to talk with us about our research. We aimed to get a diverse set of participants to form a theoretical sample with varying ages, backgrounds, and amounts of experience in SL. Most people were willing to talk with us as complete strangers. With others, we built a relationship as a prerequisite for learning about their VW experiences. We informed all participants that we were researchers during the course of meeting them. Participants were not remunerated; in fact, most participated merely for personal pleasure and simply to share a conversation with someone.

We interviewed 11 males and 11 females whose ages ranged from 18-54 years with a median of 37. Participants who disclosed their RL locations were from a range of countries in North America and Europe. Not all were native English speakers, but English is the language in which we corresponded. The accuracy of our demographic information is questionable, given that it is easy to fabricate a RL identity within the VW. Despite this, we feel we had a reasonable approximation of our desired theoretical sample. Avatars ranged in age (determined by creation date) from 1 to 31 months old with a median of 9 months. Frequency of visits in SL ranged from daily to weekly; visits varied in time spent from a few minutes to several (e.g., 8-10) hours.

Interviews were conducted within SL. Questions varied but started by collecting general information about the user's experiences in SL (e.g., How long have you been coming to SL?, Why do you return to SL?). We followed these with questions that probed users more specifically about how they constructed and evolved their appearance and identity in the VW (e.g., Have you ever changed your avatar's appearance? What was your goal when you were creating your appearance?). Questions also evolved from participant to participant as we learned more about the topic. We did not have participants show us their RL pictures unless they were already visible in their profile; thus, most of our results that describe similarities between RL and VW appearances are based on descriptions of RL appearances given by participants. The length of interviews varied from 20 minutes to over 1 hour. We logged all chat transcripts and kept field notes of our activities during our cultural immersion and interviews. We then analyzed over 11,000 lines of chat and over 100 pages of field notes using grounded theory and open-coding [14].

The remainder of the paper unfolds as follows. First, we describe the basics of SL and how identity can be presented. Next, we outline how people create and evolve avatar appearances. Finally, we describe four patterns of identities that emerged from our data analysis where each offers unique needs for avatar design. Avatar names in our results refer to pseudonyms and chat orthography is unaltered. We refer to ourselves as "R" for Researcher. Chat lines not germane to the results are replaced with ellipses. Additions to the chat logs are enclosed within brackets.

4   SECOND LIFE

Second Life is a VW launched by Linden Lab in 2003. SL is a free-form VW in that users create and construct the world themselves. Land is for sale and users can construct their own buildings on their purchased land. Users can also create other objects such as furniture or vehicles. The endless creation possibilities have caused SL to contain a wide range of places that
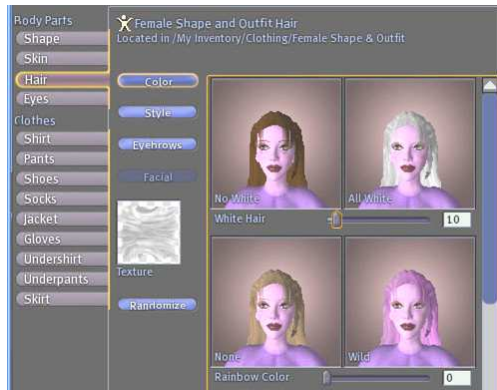
Figure 2. Tools for editing avatar appearance.

people can visit. There are shopping plazas, clubs, coffee houses, colleges, museums, and residences. To support economic activities, SL has its own currency, the Linden Dollar (L$), which can be traded for US Dollars (as of Dec 2008, 1 USD = ~260 L$).

SL has several features that enable users to present facets of an identity. Users must first create a name for themselves and select a default avatar appearance. This appearance can then be modified over time. Each avatar also has a publicly viewable profile where the user can (optionally) input details about him/her. There is also space to include a photo, describe oneself, list a partner, list favorite places, or describe a "1st Life." Identity can also be constructed through interactions with other avatars, objects, and a variety of locations. SL users navigate the world by walking, flying, or even teleporting. Communication is done via a chat window that broadcasts text to nearby people or through private instant messages to individuals. An optional audio link permits voice chat, although use of this is less common. Many people own or rent a residence in SL in which they "live." Some also have paid jobs where they work as hosts, disc jockeys, educators, etc. Income can then be exchanged from Linden to US Dollars.

5 CREATING AND EVOLVING APPEARANCES

First we describe the ways in which avatars are created and evolved as users attempt to fit within SL's social norms.

5.1 The Social Stigma of a Default Avatar

The SL registration requires users to select a default avatar from a set of avatars with varying appearances, genders, and races. All default avatars are humans, although one can later update their avatar to become more animal-like. At the beginning of our studies of SL, only two fairly generic defaults were available—the female version is shown in Figure 1 (left) and a similar male existed. SL currently includes twelve default avatars (Dec 2008). Once a default avatar is selected, users enter SL where they can use the dialog box shown in Figure 2 to modify their appearance using interface sliders.

The amount of time that a user spends as a default avatar will vary. Most will update their appearance at some point. Yet while people remain similar in appearance to a default avatar, an interesting social stigma arises. People in SL recognize what a default avatar looks like and make certain assumptions about these avatars, first that the person is new to SL. This implies that conversation with these individuals will tend to be about SL itself and not other conversational topics. They also assume that the avatar has less online prowess and it may be difficult to interact with the person. For example, they may not know how to: use a private chat channel, dance, travel, etc. This equates to a "teaching" conversation where experienced SL users explain to newcomers how to do things in SL.

For example, *Yaleen R* has been in SL for nine months and told us that it is fairly easy to identify who is a "newbie" in SL based on their appearance. She tries to associate with non-newbies:

```
(YR stands for "Yaleen R" and R stands for "Researcher")
YR: looks are important, as in RL
YR: shallow, but true ...
YR: me, I am not even interested in newbies anymore
YR: sounds stupid...but that is how it works
R: interesting
R: how come?
YR: being with a newbie means that you are 'teaching' all
the time
YR: ppl who are here longer, have seen everything and
done everything
YR: so it comes more to conversation
```

Some SL users, however, enjoy teaching others and prefer to play a mentor role. For them, finding newbies is important and location coupled with the default avatar appearance helps them achieve this role. *Faith G* purposely goes to one of the locations where SL users are placed when they first join. She can then use the appearances of avatars there to discern who may need help.

Associating a default avatar with being a newbie in SL does not always work, however. Looks can be deceiving. One of our interviewees told us that she has some avatar friends who have created new avatars after a period of time. This lets them experience SL in a new way. Because of this, there could be a short time where a default avatar may in fact be someone who has already been coming to SL for a long time. However, these avatars are usually updated much faster and refined in appearance to look different than the default. Thus, a recent creation date and an avatar with a sophisticated look suggests the person is actually a veteran SL user who has recreated him/herself.

Together this illustrates the social pressures that are placed on newcomers to SL. There is a culturally-engrained need to construct an appearance that matches SL societal norms of being different than the default and more refined.

5.2 Changing Appearances

It should be clear already that the appearance of avatars in SL is very important to users. Further evidence for this is found in the fact that many people spend a lot of time constructing and evolving their appearance. All interviewees had refined their avatar from the defaults available. *Maggie L* comments:

```
ML: it is a matter of learning what you can do in SL
ML: you learn to change your shape
ML: your skin....
ML: your hair...
ML: then you learn where the best shops are
```

People also told us that when they look back at pictures of their original avatar, they are surprised at its primitiveness and described it as "awful," "boring," or "unrealistic."

As suggested by Maggie, refining one's look is done by purchasing appearance items such as hair, clothes, body shapes, or body postures, in stores throughout SL. Some stores even offer free items. Figure 1 (right) shows an avatar who is refined with purchased items. Appearance items have either been made by companies that market them in the VW or by other SL users. Figure 3 shows a typical store in SL where images of items are displayed on wall signs. SL also has stores that appear similar to RL stores with racks of clothes, but these are less common. Right clicking on appearance items on store walls provides users with options to purchase the items. Appearance items can then be "applied" to one's avatar through interface controls where the items will attach themselves to the avatar's body based on the item's scripted location. People also do not just purchase a single set of apparel. Many have selected multiple sets of items to adapt their appearance, including multiple outfits, hairstyles, etc.

Figure 3. A dress store in Second Life®.

Once people have a repertoire of appearance items and customizable looks, they will change their appearances, sometimes on a regular basis. Updating appearances is a naturally evolving process and is similar to the way people change facets of their appearance in RL (e.g., clothes, haircuts, makeup, etc). Even items like skin and body shape, are used in a manner similar to clothing in RL.

```
R: do you change your appearance often in SL?
FG: yes. part of fun in SL is shopping for new bodys,
hair, clothes, weapons, magic, shoes, etc
R: how often do you buy new thigns and change appearnce?
FG: at least one per week. usual severals times
```

In SL, people often customize and change their appearance depending on their activity and with whom they interact. Extreme examples of updating appearance frequently come from those SL users who participate in role-plays (RPs). Here users dress like a particular character and partake in a fairly elaborate enactment of a scenario.

Some SL users are concerned about the social impression of their avatar's appearance. For example, *Gwen I* purposely records what clothes she wears when she meets different people because she does not want to be seen wearing the same thing repeatedly.

Appearances also evolve based on the technological capabilities in SL. As the SL environment offers more sophisticated ways to appear, many people adopt them and update their appearance. Because SL is user-customizable, the pace of this is somewhat determined by the extent to which users can realize their creativity. However, it is still restricted by the gaming environment: SL users can only create within the bounds of what is available. Over the lifetime of SL, appearance items have slowly grown to look more realistic to RL attributes. Of our interview participants, *Cassandra T* had been in SL the longest (31 months) and her appearance reflects the technological improvements in SL:

```
CT: yep as the years past the designs, Skins hair,
clothes got better . . .
CT: I keep changing things as they are design better so
from the newbie look to this is still in progress
```

Given the possibilities in SL, it is not surprising that we came across a wide variety of avatar appearances. Most resembled beautiful/handsome human beings. In fact, most people in SL could be considered to look similar to models in RL. This has created a cultural expectation that if you do not look this way, then you should update your appearance.

We also met other users who purposely went against the cultural norm in SL. We met two avatars in a coffee shop who were dressed as raccoon-like humans with furry bodies and tails protruding from their trousers. They told us their appearance was what they felt best represented themselves. We also interviewed one user who looked like a spaceship; he told us that he had over 5000 different outfits (potentially exaggerated, but still an extensively large collection) that he used to modify his appearance. These outfits included other spaceship motifs along with various sorcery and medieval outfits. The goal of his appearance was twofold: he outfitted himself for the roleplays he participated in, yet he was also trying to purposely deviate from the social norms in SL as a form of social rebellion.

Figure 4. A virtual makeover from before (left) to after (right).

5.3 The Virtual Makeover

While many update their appearance on their own, others may not realize the potential to update their appearance or may simply require some prodding from others. This prodding often takes the form of a "virtual makeover" where an experienced avatar will help a newbie update their appearance. In essence, the experienced users are illustrating the social norms of SL to newcomers.

We illustrate this by example. Our male avatar spent his first three weeks in SL with minimal appearance updates. This included only using the standard SL tools for appearance editing (Figure 2). During the fourth week, our avatar met a woman named *Helena D* when he entered a dance club. The dress code of the club was suits/tuxes for men and our avatar was not dressed to match this. At the time, Helena acted as the greeter at the club where she would say "Welcome" to each person as they entered. She saw that we did not match the dress code and sent us a tux to wear (Figure 4, left); at this point, our avatar wears the tux, but is still without a refined look.

We interviewed Helena over the next several hours and she convinced us that we should refine our avatar's appearance to look more sophisticated. We then spent time with Helena visiting various shopping malls in SL. Helena would use her list of landmarks (similar to web bookmarks) and teleport to a location, see if it provided what we needed, and then "invite" us to the same location. While there, we looked for items to update our appearance and Helena purchased those items for us (with the currency exchange, cost was minimal, ~10 USD). First, we updated the avatar's clothing—with Helena's advice—by buying jeans, suits, shoes, and shirts that "looked good." Then we looked for body and face shapes, but here Helena would not offer any advice. She told us that body shape helped identify a person and it needed to be self-selected. As we headed to the walls full of various body shapes, she told us:

```
HD: its all yours
HD: find your self
HD: WHO IS [RESEARCHER]??
```

After finding what we thought was a reasonable body, Helena took us to a store that sold hair. We tried on several styles as demos and Helena helped us select a suitable one. The last item we found was a set of body postures that included a more natural walk than was available with the default avatar. Our virtual makeover had concluded and we felt more sophisticated and confident in the VW. Figure 4, right, shows our avatar after his transformation.

Our virtual makeover was certainly not one of a kind. We interviewed other avatars who told us similar stories. For example, *Lady L* had been in SL for several months and had a similar makeover experience. For her, the virtual makeover did not involve someone taking her shopping. Instead, another SL user helped her edit her appearance through the SL interface:

```
LL: [We] Met at a jazz club...he is experienced in sl and
became a good friend
LL: he runs a club in sl
LL: and so has experience with his team of makeovers
LL: he gave me dimensions for eyes and features
R: so took you shopping?
LL: No did it through appearance editing
```

Maggie L underwent a virtual makeover several months into her time in SL and *after* she had already refined her avatar. Her friends felt that she had the same appearance for too long and were tired of her "jeans and biker boot" combination, so they took her shopping for a new shape, skin, eyes, hair, and clothes.

5.4 Summary

Up to this point, we have shown that avatar appearances are affected by the social environment of SL. People are introduced to societal norms when they enter SL and are reminded of this on a continual basis when they see the appearances of others, see the variety of shops available for purchasing items, and interact with others who may compliment them on their looks or suggest that they update their appearance to better fit-in or create a new look. Those who do not update their appearance carry a social stigma and can even be more strongly influenced by others to change their appearance. Yet we also found this need to fit-in is balanced with one's need to project a specific identity. We discuss this next.

6 PATTERNS OF AVATAR APPEARANCE AND IDENTITY

Within social norms of SL, we also found that there were additional reasons people had for choosing to look the way they did. The specifics of appearance are dictated by the identity people aim to present in the VW.

During our interviews, we found that some users were creating a virtual identity that reflected their RL identity; this resonates with Bartle's Characters/Personas [3]. We also saw that some users were constructing identities different than their RL self; these resonated with Turkle's Ideals [16] and Bartle's Roleplayers [3]. We further analyzed these identities in terms of other traits that we found in our interviews: the number of identities a user had, the relative continuity of their identity over time, and whether or not they tried to create an avatar that appeared similar to their RL self. These differentiated our interviewees and showed that our users fell into one of four identity types. Three types were similar to Turkle's and Bartle's categories—*Realistics, Ideals,* and *Roleplayers*—and the fourth was a subset of Bartle's Roleplayers category—*Fantasies*. We analyzed these identity types further and found that each had specific needs when it came to avatar creation; this is something Turkle and Bartle's work does not indicate.

Our experiences in SL also intrigued us about the changing nature of appearances in terms of the graphics that were being used and made available. People updated their appearance from somewhat primitive graphical representations (e.g., hair rendered as part of a body shape) to more sophisticated and realistic looks (e.g., hair textured and attached to the body). The natural evolution of this is to be even more realistic and reflect the way people actually look in RL. This caused us to probe users during our interviews about their desires for realism in their avatar's look. Here we found varying needs within the four identity types again.

Table 1 summarizes the four user types within the typology where ✓ means the group matches a characteristic, ✗ means they do not match, and ~ means they somewhat match the characteristic. Rows 3 and 4 appear similar yet there is an important distinction. Row 3, "Resembles RL Self," describes a need to look the same in the VW as one does in RL. Row 4 "Desires Realism," describes a need to look more like a real person graphically, but not necessarily like one's real self. Thus, a user could want to look more like a real person but not necessarily look like he/she does in RL.

Table 1. Patterns of appearance and identity.

	Realistics	Ideals	Fantasies	Roleplayers
# of Identities	1	1	2	n
Identity Continuity	✓	✓	✓	✗
Resembles RL Self	✓	~	✗	✗
Desires Realism	✓	~	✗	✓

For privacy reasons, we do not show images of the avatars from our study that we felt matched the different patterns. However, if one were to look at the avatars from our study, it would be difficult to tell that they were from different groups, as there is little or no visual difference among them. In fact, they would look very similar to the avatars shown in Figures 1 and 4. This is because one would need to understand the similarity/difference between an avatar's appearance and the user's corresponding RL appearance, as well as understand the reasons behind the virtual appearance. How one chooses to define a VW identity can also certainly evolve based on the experiences a person has in SL (e.g., who they meet, what they do), much like identities evolve in RL [6]. For example, a person classified as an *Ideal* could become more of a *Realistic* over time. We discuss this more in Section 7.

6.1 Realistics: It's Just You

Realistics are those people who want their VW and RL identities to be one and the same (Table 1, Column 1, Row 1). To them, life in the VW is just an extension of their RL. Thus, they desire an overlap between the two worlds where their activities in the VW are part of their RL activities. Realistics also aim to maintain continuity with this identity, meaning that their identity tends to stay with them over time (Row 2). Realistics construct their avatar appearance to match these identity needs. They attempt to create an avatar that looks as similar to their RL appearance as possible (Row 3).

For example, *Mike M* is a Realistic that we met. He is a 35-year-old father in RL who is separated from his RL wife and son. In RL, Mike can be found in the US, but he is in SL every day as his avatar. Mike owns a dance club, apartments, and a shopping mall in SL and people pay him rent for leasing space. He also makes virtual items such as motorcycles, which he sells in SL. Mike converts the money he makes in SL into USD and this comprises his entire RL income. To Mike, his SL activities are just an extension of his RL. Mike's appearance also reflects this attitude. In his profile is a RL image of himself, whose face looks remarkably similar to his avatar's face. Both have the same haircut, eye color, and face shape (within reasonable limits given the constraints of SL).

Appearance construction is a challenge for Realistics, given the tools available in SL. For example, interviewees told us that avatar eyes tend to not look real and textured hair can be purchased but sits on top of the head rather than being attached to it. It is even more difficult to replicate aspects from one's RL appearance. For example, interviewees told us that replicating the shape of a person's RL facial features like eyes, a chin, or a nose is very difficult in SL. It is not surprising then that Realistics want the appearance tools available in SL to progress in a direction that permits them to make their avatar even more realistic (Table 1, Column 1, Row 4) and more similar to their RL self. Realistics also face an interesting social challenge: not everyone shares their belief that the VW should overlap with RL. This becomes evident when we describe the other three appearance groupings.

6.2 Ideals: A Better You

Ideals are those people who want their VW and RL identities to be one and the same (Table 1, Column 2, Row 1) and continuous

over time (Row 2), although they do not want to present all aspects of their RL self in the VW. Their personality is the same in the VW as it is in RL, yet Ideals feel their RL appearance is less than ideal and aim to overcome perceived inadequacies. This means their appearance will differ somewhat between the two worlds; it will reflect what they look like in RL, but in an idealized fashion (Row 3). For example, they may have a better hairstyle, be taller, thinner, or look younger in the VW. Ideals are similar to Realistics, yet we did not find the same level of overlap between RL and the VW for Ideals as we did for the Realistics. That is, Ideals did not see the VW as an extension of their RL like Realistics. The VW allowed them to present their RL self with an idealized appearance in a separate, disconnected place from RL. Most of the Ideals that we met did not want to look more realistic graphically (Row 4). This is so they can experience the VW as themselves while still ensuring they remember it is a VW and not a representation of reality.

Taylor D is a 21-year-old nursing student in RL and has been in SL for 13 months. We categorized Taylor as an Ideal, which her comments reflect:

```
TD: I enjoy making my avatar look a little more like a
real person than the flashy boots and short skirts
avatars that a lot of women have. . . .
TD: I mean, you can create whatever shape you want.
People often make what is visually appealing . . .
R: were you trying to make yourself look like the real
you? . . .
TD: For the most part, yeah. I mean, what girl wouldn't
change the size of her breasts or hips, you know? But
yes, my avatar has pretty much the same style as me.
TD: my hair in SL is always shorter though :P
R: so would you say then it is the ideal you then?
TD: visually, sure. But aside from the body, everything
is the same. The personailty is the same as I am in RL,
as is the taste in clothes, etc. . . .
TD: there's a certain quality to SL that's just a notch
down from realistic, and I like that.
TD: That's why I went with the skin I have instead of
some of the more realistic skins
```

Further discussions with Taylor illustrated that, unlike Realistics, she separates her RL from her virtual one, despite presenting the same identity (aside from a modified look) in both environments.

Ideals face similar challenges for avatar appearance construction as do Realistics: It can be difficult to replicate one's RL face, hair, body, etc. The Ideals face an additional challenge, however. They do not necessarily want their appearance to look the same as RL, but they want it to be enhanced. Thus, Ideals require tools that will permit them to create an avatar based on their current appearance and then idealize it. While most Ideals did not want avatar graphics to appear more realistic, there is a chance that over time Ideals would change their perspective on this, especially if such tools were readily available to them. We met one Ideal who differed from the others and, in fact, desired this type of realism.

6.3 Fantasies: A Fantasy You

Fantasies are those people who want to have two separate identities, one in the VW and one in RL (Table 1, Column 3, Row 1). That is, they want to masquerade in the VW as someone different than their RL self and they feel as though RL and the VW are two separate places. This separation makes them similar to Ideals and much different than Realistics. The desire for a fantasy VW identity is reflected in their avatar's appearance, which appears much different than their RL self (Row 3). Fantasies do not typically alter their appearance or identity over time beyond minor wardrobe updates. It is important for them to maintain a continuous VW identity (Row 2) much like a Realistic or Ideal, but, again, the identity is different than their RL one. This continuity allows them to establish and maintain long term relationships. In order to remember their VW identity is a fantasy

and that virtual life is separate from RL, they aspire to keep the VW fantasy-like by keeping avatar representations non-realistic (Row 4). That is, they want avatars to appear similar to the way they do currently in SL (e.g., cartoon/game-like) to act as visual reminders of the fantasy nature of their existence.

For example, *Lady L* is a 39-year-old teacher and recently separated in her RL marriage. We categorized her in the Fantasies group because she told us that she purposely looks different in SL than in RL and she tries hard to keep her two identities (VW and RL) separate. This is not an easy task and Lady told us it can be difficult to separate the two identities mentally. Lady comments on maintaining fantasy-like avs (avatars):

```
LL: the sl avs keep it distanced from RL
LL: safer
LL: more like a game
LL: easier to tell your head you are in a game
```

Fantasies face challenges that are unique from those of Realistics and Ideals. For them, the tools in SL could almost be said to be "good enough." That is, Fantasies can create an imaginative character that remains distanced from RL because of its non-realistic graphical traits. They do not necessarily want avatar representations to appear more real as this could jeopardize their ability to separate the VW from RL.

6.4 Roleplayers: Many Fantasy "Yous"

Roleplayers are those people who come to the VW to experience it as someone else or in situations they cannot normally experience. The difference between this group and Fantasies is that Roleplayers constantly fulfill new fantasies and do not maintain identity continuity over time (Table 1, Column 4, Row 2). They change identity for each new experience and situation; thus, they have many identities (Row 1) as opposed to the two identities of Fantasies. Some Roleplayers appear to have one dominant identity with one or more secondary identities however. The Roleplayer group was also the only one that we found where someone told us they had alts (alternate avatars). This is not surprising given the nature of the group. Those who had alts used each avatar to fulfill different identity needs. Those who had only one avatar would alter that avatar visually when they wanted to realize yet a new fantasy. Roleplayers do not construct their avatars to look like their RL self (Row 3), which would be contrary to their needs. We also found that Roleplayers want their roleplays to be as realistic as possible and told us they would prefer more realistic avatar representations (Row 4).

For example, *Kala F* is 39 years old and a jewelry store manager in RL. She has been in SL for 9 months and is categorized as a Roleplayer. Kala changes her appearance frequently to match her ever-changing fantasy identities:

```
R: what prompts you to change outfits?
KF: because im a lot of people
R: what do you mean?
KF: i havea lot of personalitys
R: oh interesting
R: what makes you change personalities then?
KF: i love to wear beautiful gowns and jewells then i
love to wear latex and black boots and wild hair then i
love to be a vampire then i love to ride my camel naked
with tattoes on me
R: wow, exciting
KF: i cant be that in RL so im that in here . . .
KF: i love sl its my ultimate fantasy . . .
KF: im very detached from my RL in here what goes on in
here stays in here
```

For Kala, appearance needs matching a fantasy are somewhat generic (e.g., latex and black boots). Yet other Roleplayers we interviewed had highly specific needs. For example, they may try to carefully match their appearance to characters from a specific television show. In this respect, Roleplayers face challenges of trying to make their appearance match the situation they desire to

experience. This may involve looking like a particular person from RL (e.g., a movie star) or a more generic character (e.g., a flight crew member on a spaceship). Either way, it can be difficult to construct an avatar to accurately look like someone else. Roleplayers also have difficulties maintaining many different identities. If Roleplayers maintain only one avatar but change it for each fantasy, it can be difficult to manage the volumes of appearance items that one uses.

6.5 The Effects of a Social Environment

Each of the aforementioned identity types resides within the same SL environment where users may not know of each others' identity desires. Our interviewees revealed several examples of this which involved socially awkward exchanges and situations. For example, we interviewed one Roleplayer named *Gwen I* who used multiple avatars to present her varying identities in SL. She told us that it can be easy to forget which avatar knows what information and has experienced which activities. One time she ran into a person in SL that she had met previously as her other avatar and began talking with the person using knowledge that only her other avatar would have known about. This caused confusion and a situation that Gwen had to carefully "repair." While conducting our research, we also found ourselves in similar situations to Gwen and had to carefully understand mentally which of our two avatars had met which individuals.

We also saw relationship issues arise from a mismatch in users' identity goals. For example, we met a Realistic named *Lola T* who had a boyfriend that we categorize as a member of the Fantasies group. Lola had the expectation that her boyfriend was experiencing a relationship with her that carried over into RL. Yet at one point, Lola's boyfriend failed to contact her for several weeks and did not come to SL. After this period, he returned and she found out that his RL had become too busy and he did not have enough time to come to SL. His RL situations were a priority for him over his fantasy life in SL. *Lady L,* our example of a Fantasy character, had a similar experience. She had to end a relationship because the person wanted to extend their relationship into RL, though she was against it.

7 DISCUSSION AND CONCLUSIONS

Our results outline the importance of appearance in the VW for identity construction. People construct their appearance to follow social norms in SL, dictated by the constraints of avatar creation, the pressures of others to update one's appearance, and the marketing pressures by store owners and companies to purchase appearance items. Yet, under the surface, not everyone in the VW has the same needs for their appearance. People aspire to form different identity patterns in the VW and this equates to a range of desired avatar appearances. Some people aspire to look similar to their RL self (Realistics), while others try to separate RL from their virtual existence and correspondingly construct avatars that look similar yet better (Ideals) or altogether different than a RL self (Fantasies and Roleplayers). Thus, users try to balance societal norms to look good and human-like with identity needs.

Existing studies of online identity formation show the potential for users to create multiple identities where identity may fluctuate more often than RL [10,18]. Our results confirm this by showing that there are some people who do create multiple identities that change frequently (Roleplayers). However, we also found that many VW users purposely aim to present a single virtual identity over time (Realistics, Ideals, and Fantasies). This suggests that although the potential is high for a multitude of identities and changing identities in the VW [10,18], the prevalence of this is actually less. Further longitudinal studies are needed to confirm this however. Studies of avatars in online communities (e.g., Yahoo! Answers) have shown that a high number of users create

avatars that reflect their own appearance and this causes heightened self-awareness [17]. Comparatively, our results show that this is the case for only one type of VW users, the Realistics. For this group, heightened self-awareness is likely a favorable attribute given that they want to overlap RL with the VW.

Our work also builds on the user classifications found in the related literature. Turkle's Ego Ideals are similar to our Ideals [16]. Our results have allowed us to subdivide Turkle's Roleplayer category [16] into two groups: Fantasies and Roleplayers. Bartle's Characters and Personas are similar in nature to our Realistics group [3]. The other two groups that Bartle identifies—Players and Avatars—do not map on to our groups for they do not actually illustrate VW user identities [3]. Thus, our work validates and extends the user types that Turkle and Bartle provide. However, what Turkle and Bartle do not do is show what the implication of their identity types is for avatar creation. That is, it is not clear how each of the identity types realizes their identity needs (or is limited) through the construction of their avatar's appearance. This is where our work provides a significant step beyond the existing literature for without this knowledge there is no way to know what tools should be presented to users from each identity type in order to adequately construct a virtual representation. Some of the design needs in this respect are certainly not obvious (e.g., realism *vs.* a lack thereof).

7.1 Design Needs

It may appear on the surface that SL provides all of the capabilities that one would need to construct an identity from any of the four identity types that we saw. After all, users from each of the four identity types exist in SL with an avatar to go along with them. Yet what is actually happening is that people are either challenged when attempting to construct their appearance (given limited tools) or they are compromising their identity needs and choosing less than ideal avatar designs. The tools available in VWs like SL need to make it easier for users to construct avatars that represent a particular identity type. Realistics require ways in which they can produce an avatar that looks the same as they do in RL. This may mean utilizing techniques similar to work by Hilton *et al.* [7] or Lee *et al.* [9] that permit users to create avatars based on RL video or images. Ideals require similar techniques as Realistics with the additional capability of building on top of avatars that are created from RL appearances in ways that refine them to be more ideal. Fantasies and Roleplayers need methods to match their appearance with their fantasy. This may mean techniques similar to those of Realistics that construct avatars from images of real people, yet here it could involve construction of avatars based on cataloged images of people fitting a particular fantasy. In the case of Roleplayers, this also means capabilities that permit the management of multiple identities so that these users can rapidly change between various identities and fantasies.

Our results show that Realistics, Roleplayers, and some Ideals want avatars to appear more realistic than they already do. On the other hand, Fantasies and some Ideals do not necessarily want this. Instead, the latter group prefers a constant reminder that the VW is just that: virtual and not real. Naturally, asking people want they would want in the future is potentially unreliable. People may not know what they want and could certainly change their minds once a technology is available. Yet in the least, the desires expressed by our participants show that VWs and avatar designs need mechanisms that will provide those who want them with evidence that the VW is not RL. This may mean non-photorealistic avatar designs, although other visual cues may become more desirable. This in turn brings a further dimension to the design needs expressed in the preceding paragraph.

Researchers and designers are presently creating methods for users to construct more realistic-looking avatars that are based on

the RL appearances of users (e.g., [1],[4],[7],[9]). This coupled with social science research that illustrates the positive effect that realistic human-like avatars have on social interactions (e.g., [2],[21]) suggests that the future trajectory of VW avatar design is on a path to photorealism where avatars map visually to the real people who control them. Yet the challenge is that this path focuses predominantly on one type of VW user group: Realistics. Future work should extend this path to new trajectories that map to a wider range of user needs and behaviors. If this does not occur, it is likely that the social norms of SL will evolve along with the graphics capabilities and people will begin to feel social pressures to appear even more realistic and match their avatar's appearance to their RL one. This will create further mismatches for users between their goals and societal norms and constrain the virtual experiences one can have.

There is also a question of how designers can balance the needs of each group within the same virtual environment. Users from each identity type have their own expectation as to how one should behave and present themselves in the VW based on their identity goals. This has been found to create social conflicts between different types of users. Currently, these problems are exacerbated by the fact that each group is manifested in avatars that do not look visually different from avatars in other groups—on the surface, avatars of Realistics appear no different than avatars of Ideals, etc. Without actually asking others how they project their identity in the VW, it is nearly impossible to find common ground. Designers of VWs need to be aware of this and creatively design to address these social mismatches. In some ways this may be more of a social challenge that can only be answered through the evolution of social culture in VWs in such a way that identity goals become more transparent.

7.2 Limitations

The strength of our typology is that it presents a way to represent a set of appearance needs that match user behaviors. This suggests ways to design VWs and avatars. Yet we recognize that our typology also has its weaknesses. It does not take into account other identity aspects such as gender, race, sexuality, commodification, etc which may also affect how one chooses to look. Future studies should explore these aspects and build on our typology and those of others to understand how these additional factors affect user needs for avatar appearance and identity formation. We have also only studied one VW. It is likely that our findings extend to other VWs aimed at socializing, though this should be confirmed with cross-VW studies.

It could also be the case that there exist users who fall into an identity category that we did not find. We similarly recognize that our methodology does not explore long term changes to avatar identity. The duration of time spent in SL by our interviewees varied and only a few had been in SL for several years. It could be the case that virtual identities are more influx than we found with our participants. This would lead to more people being similar to Roleplayers where identities are repeatedly changed. Yet we caution that the Roleplayers we found changed identities on a very frequent basis (e.g., daily, weekly) which would distinguish them from other identity types that may change but much less frequently. Even if players move through these different identity types over a longer period of time, the main message coming from this work would not change. That is, there are a variety of user needs when it comes to avatars and these needs are reflected in the identity that one attempts to present. VWs that allow users to easily construct all of the identity types we articulate will meet the needs of users regardless of how often users move between identity types. Any VW that focuses on one user type at the cost of another will cause challenges for at least one of the user groups we identified who may desire to participate

in the space. Of course, VW designers may have to choose one target audience over another. In this case, our results allow designers to understand the user populations who may participate in the space, given the avatar creation possibilities, and potential challenges that could arise if users aim to create an identity type that is not inherently supported by the specific VW.

8 REFERENCES

[1] Ahmed, N., Aguiar, E., Theobalt, C., Magnor, M., and Seidel, H. Automatic Generation of Personalized Human Avatars, *Proc. VRST 2005*, ACM Press (2005).

[2] Bailenson, J., Beall, A., Lomis, J., Blascovich, J., and Turk, M., Transformed Social Interaction: Decoupling Representation from Behavior and Form, *Presence*, Vol. 13(4), MIT Press (2004).

[3] Bartle, R., Designing Virtual Worlds, New Riders Publishing (2004).

[4] Benford, S., Bowers, J., Fahlen, L., Greenhalgh, C., and Snowdon, D., User Embodiment in Collaborative Virtual Environments, *Proc. CHI 1995*, ACM Press (1995).

[5] Brown B. and Bell, M., CSCW at Play: 'There' as a CVE, *Proc. CSCW 2004*, ACM Press (2004).

[6] Goffman, E., The Presentation of Self, Doubleday (1959).

[7] Hilton, A., Beresford, D., Gentils, T., Smith, R., and Wei, S., Virtual People: Capturing Human Models to Populate Virtual Worlds, *Proc. IEEE Computer Animation*, (1999).

[8] Kolko, B., Representing Bodies in Virtual Space. The Rhetoric of Avatar Design, *The Information Society*, Vol. 15, (1999), 177-186.

[9] Lee, W., Gui, J., and Magnenat-Thalmann, N., Generating Animatable 3D Virtual Humans from Photographs, *Proc. EuroGraphics 2000*, Vol. 19 (3), Blackwell Publishers (2000).

[10] Matusitz, J., Deception in the Virtual World: A Semiotic Analysis of Identity, *New Media & Culture*, Vol 3(1), (2005).

[11] McDonough, J., Designer Selves: Construction of Technologically Mediated Identity within Graphical, MUVEs, *Journal of American Society for Information Science*, Vol.50(10), (1999).

[12] Nardi and N., Harris, J. Strangers and Friends: Collaborative Play in WoW, *Proc. CSCW 2006*, ACM Press (2006).

[13] Rosen, C., Virtual Friendship and the New Narcissism, *Technology & Society*, Vol. 15, (2007), 15-31.

[14] Strauss, A., and Corbin, J. Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory, SAGE Publications (1998).

[15] Taylor, T., Life in Virtual Worlds: Plural Existence, Multimodalities, and Other Online Research Challenges, *American Behavioral Scientist*, Vol. 43(3), (1999), 436-449.

[16] Turkle, S., Constructions and Reconstructions of Self in Virtual Reality. Playing in MUDs, *Mind, Culture, Activity*, Vol. 1(3), (1994).

[17] Vasalou, A., Joinson, A., and Pitt, J., Constructing my Online Self: Avatars that Increase Self-focused Attention, *Proc. CHI 2007*, ACM Press (2007), 445-448.

[18] Waskul, D. and Douglas, M.,Cyberself. The Emergence of Self in On-Line Chat, *Information Society*, Vol. 13, (1997), 375-397.

[19] Yee, N. Motivations of Play in Online Games. *Journal of Cyber Psychology and Behavior*, 9, (2007), 772-775.

[20] Yee, N. and Bailenson, J., The Proteus Effect: The Effect of Transformed Self-Representation on Behavior, *Human Communication Research*, Vol. 33, International Communication Association (2007), 271-290.

[21] Yee, N., Bailenson, J., and Rickertsen, K., A Meta-Analysis of the Impact of the Inclusion and Realism of Human-Like Faces on User Experience in Interfaces, *Proc. CHI 2007*, ACM Press (2007).