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Fashion and Costume Design in Electronic Entertainment –Bridging the Gap between Character and Fashion Design

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Thomas Makryniotis has unique experience combining fashion design and digital 3D technologies. He has completed PhD research on the subject of Fashion and Identity in Virtual Environments, and has worked with many areas related to fashion media and technology. Thomas has previously worked as subject leader for Innovative Media Practice at the London College of Fashion. He is currently Director of Visualisation at Miximaliste, where he oversees

Abstract

The purpose of this article is to shed light on the history of costume design in computer and video games, and to examine the representation of clothing in the medium. It attempts to establish a classification of dress by examining the most representative genres and titles, and it classifies and describes various genres with regards to costume, and their historic preoccupation with certain styles of clothing. I examine costume design in video games, i.e. what is mostly observed in period character design, science fiction character design, and some avatar design by players; I also examine fashion design in the form of contemporary or post-modern

character design, as well as avatar design by players when preoccupied with the production of individual styles based on line, color, detailing and anything else outside character costume design considerations, which usually place a character in a narrative, world or era. Therefore, the article follows a trajectory starting with the exploration of costume design and moving towards the exploration of fashion design in the medium, eventually indicating ways in which video games and fashion can become mutually beneficial.

KEYWORDS: costume design, character design, fashion design, digital fashion, 3D design

the production of virtual garments for e-commerce.
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Introduction—Why is Digital Dress Important? (Identity, Representation, Commerce)

The observations in this article are the result of a systematic study of games that took place between 2007 and 2012 (Makryniotis 2013). I will only use literature from the field of electronic media, as it is the most fitting for my analysis of video game character clothing, while avoiding comparisons with other media such as film and theatre. While such comparisons are useful and can encourage interesting discussions, they are beyond the scope of this article, which focuses on the history and development of costume design for electronic entertainment by employing a medium-specific classification.

Digital dress can be examined as part of a performance within a computer game world. This performance is strategic and expressive, and it is related to the player's identity, which is flexible and contextual. Identity is regarded as emergent and socially constructed by theorists such as Voloshinov ([1930] 1973), Ricœur (1983, 1984, 1985, 1986, 1991), Bauman (1988, 2000, 2006, 2007), Giddens (1991), Lawler (2008), and Misztal (2003), as a result of identification and its consequences on autobiography. Ricœur (1991) in particular draws on Aristotle's notion of mimesis, also echoed in Caillois' mimicry ([1958] 2001), which puts weight on "pretending" and "acting". More recent theorists such as Turkle (1995, 1996), Fuss (1995), Stone (1995), Haraway (1991), and Waggoner (2009, 2010), regard identities as fragmented, complex, strategic, and always in flux. The main point that I adopt, however, is from Goffman ([1959] 1990) and his dramaturgic metaphor and discussion of masks, as well as from Branaman, and Lemert (1997), Butler (1990), 1993, 1997a, 1997b, 2004), and Lawler (2008), namely that identity is performed.

Identity is performed in a video game by means of controlling a character. Media theorist Rune Klevjer (2006, 74–114) believes that the player of the video game temporarily adopts a specific imaginary lifestyle through the embodiment of the avatar, which is a reflexive extension of its habitat. According to Klevjer, the player inhabits the environment through agency of the avatar and makes sense of the world via direct sensory data absorbed through the interface. Media and communications expert Frank

Biocca sees the body as the "fundamental communication hardware, a simulator for a mind" (1997, 13) – McLuhan ([1964] 2003, 8) has also pointed out much earlier that as interfaces augment the body, the media become extensions of our senses. Upon inhabiting an avatar, the user feels self-presence that is the effect of the virtual environment on the perception of one's body, i.e. one's body schema or body image. This happens through an exchange of signs. Issues of class, gender, occupational role, and body type are all raised within embodiment (Biocca 1997, 23). Biocca identifies three bodies present in virtual environments that involve embodiment: the objective body—the physical, observable, and measurable body of the user; the virtual body—the representation of the user's body inside the virtual environment, and the body schema—the user's mental or internal representation of his or her body—which is not stable and can be significantly altered by embodiment in virtual worlds (Biocca 1997, 22–3). Biocca argues that we are already cyborgs, as any piece of clothing, accessory, tool, or any other technology that attaches itself and augments the body, is of cybernetic nature, as the semiotic signs of the technology interface with the signs of the body (1997, 24). As cognition and identity are embodied in simulations run by our sensors and effectors, "the mind is adapted to the simulation of the cyborg body" and it is difficult to pinpoint where the identity is present (Biocca 1997, 24). Biocca (1997) claims that identity is not located in the human body, in its clothing, in the computer, or in its avatar in the virtual world, but rather in all of these. Identity is affected by anything that happens on every semiotic extension of our bodies. With regards to the avatar, changes in its appearance affect identity, as the body schema in the virtual, and therefore in the imaginal environment is altered (Biocca 1997, 20–1).

The standard form of the medium in the 1980s and early 1990s was flat 2D graphics, where character clothes were mostly illustrated on bitmap graphics editors such as *Deluxe Paint* (Electronic Arts). The first anthropomorphic characters started to emerge in the early 1980s, as the arcade machines and home computers and consoles became powerful enough to use animated sprites (2D pixel art). The first examples, such as Miner Willy from *Manic Miner* (Bug-Byte 1983) only make use of one color. As the technology of the hardware advanced, sprites gradually became increasingly colorful and detailed, and clothing became more distinct. Even in the late 1990s, characters were represented within a small area of the screen and in a limited color palette. In side-scrolling games such as *Megaman X* (Capcom 1993) in particular, the character can only be seen from the side, slightly turning so that part of his front is visible. As we move to sprites with more states and frames, as in tile-based top-down games like *Secret of Mana* (Square 1993), the characters can be viewed from different angles.

With the advent of 3D graphics in the mid-1990s, the video game gradually changed to follow an expanding set of cinematic conventions, the use of cameras and actors positioned in 3D space being among the most obvious. Technological restrictions in 3D modeling and animation meant that the characters had to be modeled with their clothes on the same surface

as their bodies, and not as separate layers. Garments were also designed to be tight and rigid, as animating clothing frame by frame was difficult, while cloth simulation initially did not exist and later was too expensive computationally. This factor has historically restricted the practice of costume design for games, and therefore it has had a profound effect on the development of the discipline.

But while theorists often use the term identification to explain what the viewer experiences when watching a film—for example, French post-structuralist film theorist Christian Metz signals identification as one of three main cinematic processes, the other two being voyeurism and fetishism (1984, 69)—games also progress due to the player's agency, and so identification is probably not the right term to describe what the player engages in. Klevjer (2006, 90) argues that it is rather embodiment that the player experiences, and theorists like Grodal (2009, 129–156) have discussed the characters of video games simply as cursors, vehicles for gameplay, who become independent round characters only during filmic cut-scenes. Perhaps more accurately, Filiciak (2003, 87–102) uses the term "introjection" to describe the intimate connection between player and character, and Calleja (2011) proposes that both experiential phenomena described by the antithetic metaphors of presence and immersion, and sitting between embodiment and identification, culminate in the notion of incorporation.

As video games depend on such notions, and as they feature characters and more or less tell stories (either emergent or scripted), the notion of representation (of gender, race, sexuality, and social groups in general) arises. In the social world, key aspects of identity that culminate in a person's individuality are partly communicated through clothing. The aforementioned literature indicates that it is the same for game characters and virtual world avatars, but do the designers of games really consider the individuality of each character based on the character's imagined identity, and does their individuality show in their clothing, or do they resort to stereotyping and otherwise problematic representations? Also, are gamers allowed to express the individuality of their avatar through clothing choices? Are the options there for them to take? There have been many studies on representation in video games (see *Gaming Representation: Race, Gender, and Sexuality in Video Games* by Treaandrea Russworm and Jennifer Malkowski for a recent example), and so I will not stay on the subject.

A third reason besides identity and representation for the analysis of dress in computer games is that they are an extremely popular and lucrative medium, currently without any successful channels for fashion retail. It is worth asking the reasons why: whether fashion commerce could be beneficial for the medium, and vice versa. Gamers usually pay money for the games themselves, for additional levels, characters, weapons, outfits, and other items. Presumably, they would also purchase branded clothes and accessories if they were available. But fashion brands shy away from the video games medium, although it can offer very dynamic representations of their products.

As a vehicle of identity, representation and commerce, digital dress is important in that it has the potential to become a strong link between the electronic entertainment world and the fashion world, both of which incorporate these three aspects to certain degrees. More to the point, the virtual aspect of digital dress lends itself to experimentation with costume design, fashion design, and the personal and interpersonal effects of clothing.

The Three Dimensions of Digital Dress: The Programmatic, the Visual, and the Social

Video games are computer programs. It therefore makes sense to question how dress is expressed in terms of programming, and by extension how this programmatic expression is connected to the visual dimension of dress on-screen. Primitive dress systems have been long implemented in computer games. In digital role-playing games (RPGs), for example, and in action games with role-playing elements, the character develops over time by means of power-ups and new items, and becomes the "embodiment" of the player's experience of playing the game. These power-ups and items expand the character's abilities so that it can surpass increasingly difficult obstacles. Most games work similarly, even if they hide such internal mechanics from the player under visual representation, i.e. graphics and animation. Such systems allow players to construct their characters by means of management of resources and symbolic consumption.

These mechanics are communicated to the player mainly visually through the character's appearance, but character costume also places the game mechanics in a narrative or at least in the context of a comprehensible situation. Reading outfits on-screen belongs to a large extent in the realm of traditional semiotic interpretation.

Furthermore, the bodies and attires of the characters largely contribute to the signs communicated in multiplayer games and virtual worlds in a kind of social performance, which is largely strategic and expressive—it involves the selective exchange of several kinds of signs between the participants. Multiplayer gaming adds a social dimension to digital dress. Online social environments are ideal for experimentation with the avatar's appearance, as they are usually built for communication between the users, and the user has a certain amount of choice concerning the appearance of their avatar. The reasons why players use clothing in online worlds are similar to the ones in the real world: individuality and belonging. Dress is a cue to identity, and affiliation and alignment with or against groups and trends are fundamental aspects of identity. Most decisions for character appearance are based upon considerations of self-identity and social identity, as characters provide "access points" in the creation of identity and social life (Taylor 2002, 40), and often confer a persistent identity upon regular users (Childs and Peachey 2011, 2, 22). Consumption seems to be central here. Online worlds constitute a market of identities, and there is an inherent status-oriented socioeconomic system in virtual worlds. Fash-

ion has always imposed rules in the real world (from shaping gender to underlining class, age, subcultures and other social groups), and, in online virtual environments, restrictions in dress come from their designers as well as their players. The players are allowed to express themselves through their avatar's clothing, but only so far as this is supported by the virtual world's design and society. Facebook and mobile fashion games like *Me Girl* (Funcom 2012) and *Covet Fashion* (Crowdstar 2013) have a strong social aspect, revolving around achievement (successfully completing tasks in the game) and taste (players voting on other players' styling choices).

A Classification of Dress in Electronic Entertainment

The only published classification of clothing in games that I have found to date is from the article "Playing Dress-Up: Costumes, role-play and imagination" (Morie et al. 2007, 4–5), where the authors identify two modes of dress-up play, which depend on the relationship between the player, the costume, and the game character. These two modes of dress up play are: doll-play, where the player is "dressing up a character that is distinctly not herself, but over which she has (often god-like) agency," as in *Barbie Fashion Designer* (Mattel Interactive 1996) and *The Sims* (EA 2000–2017); and identity/avatar/costume, where the player is the character (as in open-ended metaverses, where identity is a form of personal expression, but does not have an effect on gameplay). The second mode may contain one or more of the following mechanics: armour/instrumental, where dress-up is an instrumental part of gameplay; acquiring/trying clothes, mostly done as a social activity; twinking/gifting/trading, e.g. giving items away to lower level players. The first mode (fashion oriented activity software such as *Barbie Fashion Designer*) obviously contains fashion design/creation mechanics.

This classification is very useful, but for the purposes of this article, I will try a different approach, based not on the actions of the player, but on *type* and *theme*. As in other media, dress in games is linked to genre, and the video game genres derive from commercial factors and the medium's history. Waggoner (2009, 46) points out that discourse within a video game genre influences identity as different genres demand different strategic approaches. Genre in video games can be categorized by type (RPG, fighting, virtual worlds, sandboxes, RTS, third-person action, sports, graphical and text adventure, etc.), that is the gameplay mechanics, the kind of simulation; and by theme (for example medieval, futuristic, fantasy, mixed/post-modern, historic/period, military, sports, contemporary/realistic), i.e. the "skin" or representational content of the game. There may be nearly any combination of type and theme, where the former refers to the modes and dynamics of dress as specified by Morie et al. (2007) mentioned above, and the latter will of course influence the kind of clothing or costume. Medieval RPGs, for example, utilize the identity/avatar/costume mode, and contain the armor/instrumental mechanic—and also

the acquiring/trying clothes dynamic and the twinking/gifting/trading dynamic if the game is an online game. They also, by thematic definition, feature medieval costume. There appear to be three main non-abstract themes throughout the medium, particularly connected, but not exclusive, to specific kinds of simulation, dealing, respectively, with the science fiction/futuristic, the mythological/historical, and the contemporary/fashion-oriented. This is why I separate my historic analysis of digital dress into titles that feature fantasy settings and narratives, and titles that deal with realistic contemporary settings and narratives.

Costume Design in the Fantasy Genres

Conflict and the cyborg

One of the most common costumes in games, the futuristic body suit, mainly draws its influences from the American and Japanese comic book and animation traditions, as well as science fiction film. There is a trajectory of the superheroes and their suits from the static pages of comics (as two-dimensional illustrations), to 3D statues and figurines, to their animation in cartoons and animé, to their hyperreal representation in cinema, and finally to their availability as characters in video games. Among other things, this remediation propagates the dramaturgic, militarist and industrial ideologies of earlier media: the logic of conflict is prominent in the majority of media, whether it is the battle between "good" and "evil" or between "us" and "them," and it creates tensions and sets the ground for eventful narrative; war was a favorite theme in boys' play in the form of toy soldiers and superhero figurines before the time of home computers and consoles; video game technology partly derives from military technology, one of its first applications being military simulation (Galloway 2006, 71; 141); and Baudrillard [1981] 1994, 81) asserts that such elements in science fiction are a projection of the real world of production. Space exploration has also been an influence.

War games like *Medal of Honour* (EA 1999–2012) and *Call of Duty* (2003–2016) have been among the most popular titles on the market. Military science fiction is a futuristic extension of these, and it is a constant thematic preference in contemporary media. The cyborg suit of the video game character is also the imaginary manifestation of the cybernetic symbiosis of man and machine. Be it military gear or futuristic robotic suits, this body suit is both a symbolism and a literal representation of the enhancement of human life by means of technology. Futuristic attire involves metallic armors whose shape mimics the musculature of the body, and high-tech fabrics. *Metroid's* Samus Aran (Nintendo 1986–2016), *Halo's* Master Chief (Microsoft 2001–2017), and the characters of *Gears of War* (Microsoft 2006–2016), *Crysis* (EA 2007–2013), *Mass Effect* (BioWare 2007–2017), and *Deus Ex* (Square Enix 2000–2017) belong in this category. For an example, see http://images.fanpop.com/images/image_uploads/THE-Master-Chief-halo-547518_283_330.jpg.

Costume in futuristic science fiction games is often masculinized or sexualized by exaggerated body contours. This is very characteristic of the *Metal Gear* series (Konami 1998–2015), for example: black leather clothing completely covers the character's body and it is so tight as to highlight and exaggerate the musculature of the body. There is also phallic imagery in the form of guns and boots. This is the "fetishised" body suit, a suit that contains connotations for the fetishisation of body parts and ultimately the whole body, usually tightly wrapping it, highlighting its lines, and strategically exposing or covering areas, in order to attract attention to specific parts. In another example, Nova, a protagonist of *StarCraft* (Blizzard 1998–2017), wears a body suit, which is partly covered by hard body armor. The costume is obviously armed with technology, which grants the female protagonist superpowers. However, it is also designed carefully to reveal her body's contours and draw attention to her waist, buttocks, and thighs.

History and mythology

Another common theme—which can also be partly attributed to the upbringing of game designers (see Kirkpatrick 2011, 175)—is historical and mythological fantasy. The fantasy theme is very common in both Eastern and Western RPGs, the latter of which are direct descendants of tabletop RPGs such as *Dungeons & Dragons,* mainly influenced by Anglo-American romantic literature, such as the works of William Morris, C.S. Lewis, Edgar Rice Burroughs, and J.R.R. Tolkien (Huber 2005, 169). Tanya Krzywinska (2008, 123) points out that myth and mythic play perform a structural, a stylistic, and a rhetoric function in virtual worlds, which are extensions of a "blueprint formulation" that is expanded from fictional worlds common in the fantasy, horror, and science fiction genres. These worlds are in turn derived from pre-existing mythological traditions, such as the Celtic, Greek, North American, and Nordic (2008, 125). What Krzywinska calls "the hero quest format" is a modern adaptation of the heroic literature of ancient civilizations, partly formulated by American writer Joseph Campbell ([1949] 1988).

Most RPGs, but also many games of other genres, offer options for the creation and development of the avatar. In most RPGs, there is a choice of profession or class, to accommodate the player's playing style and preferences. In the *Baldur's Gate* series (Bioware/various 1998–2016), the player can play a fighter, a ranger, a paladin, a barbarian, a cleric, a druid, a mage, a sorcerer, a thief, a bard, or a monk. Each class has different advantages and disadvantages. Where allowed, subsequent dress choices during gameplay depend on the personality and the playing style of the player. For example, "role-playing" gamers (gamers who like to project a certain consistent identity) in *World of Warcraft* (Blizzard Entertainment 2004) develop an image for the avatar outside function (Tronstad 2008, 249–50). This image may have been chosen for intimidation or for sociability. The appearance of the avatars of "non-role-playing" gamers, on the other

hand, develops in parallel and as a result of functional choices based on gameplay needs, e.g. questing and leveling up (Tronstad 2008, 249–50). As a basic example, a gamer focusing on gameplay may enhance her warrior with a bigger sword and harder armor, and may focus more on the specifications of the items and how they may help her progress in the game. On the other hand, a gamer who tries to project a certain identity may choose a sword and armor not only for their functional attributes, but also largely because they may enhance a specific visual aesthetic for the character by being a specific color or visual style, thereby making the character look more impressive, intimidating, or stylish. For an example of this fantasy type see http://tamrielfoundry.com/wp-content/uploads/2013/02/lfP7Rv6.jpg.

Other games play with references more freely. The characters of RPG series *Final Fantasy* (Square Enix 1987–2017), for example, have many different cultural and mythical elements, which vary from game to game in the franchise. In *FF VII*, the costumes of the characters are equally influenced by the attire of Japanese warriors, Western Medieval warriors, modern street wear, modern casual wear, and modern sportswear. This is a very postmodern approach to character costume, and it is very characteristic of Japanese games. The mixed influences derive from contemporary Japanese pop culture, such as manga (comics) and animé (animation), which are in turn based on Japanese myth, legend, and philosophy, as well as a very idiosyncratic adoption and adaptation of American pop culture, most notably action films, comic book superheroes, and Disney's animation. Another example of this approach is *Chrono Trigger* (Square 1995), which mixes science fiction with the aforementioned elements of Japanese and American history and pop culture. For examples see https://vignette.wikia.nocookie.net/finalfantasy/images/f/f8/LR_Garbs.png/revision/latest?cb=20141021175457.

Costume design in martial arts games

As games have formed genre definitions and history, they make use of traditional intertextual references based on the lineage of the medium. Even though such anachronistic references are showing their age today, the intertextual constants within a franchise, as well as the identification of specific target groups for the products, keep them alive. Fighting games are an especially useful case study for this phenomenon. The characters are seen from the side, as the camera occasionally switches and revolves around the characters for dramatic effect. The costume of fighting game characters has evolved at a fast rate, due to the nature of the gameplay, which usually only presents two characters at a time fighting. For this reason, the computational power available to the designer of the characters is greater, and there are more possibilities regarding the characters' appearance, including real-time cloth and hair simulation. In this respect, the fighting genre offers the best possibilities for dress representation, especially as the body of the fighter, and not the environment, is the focus.

Chinese and Hong Kong martial arts films are one of the main influences of character costume here. The first titles of the genre were two-dimensional, and the fighters were usually dressed in martial arts uniforms. *Karate Champ* (Data East 1984) and *Way of the Exploding Fist* (Melbourne House 1985) are two examples of this. Karategis, judogis, and kung fu uniforms could be depicted relatively easily in two dimensions and in very low resolution, as they consist of very simple loose lines and are uniformly colored. However, the fighters became increasingly superhuman as the genre kept absorbing cultural elements and gradually developed a specific self-referential look. There were intertextual references between the franchises, and increasingly exaggerated character abilities and appearances, as every series attempted to compete by impressing the consumer with its characters.

Modern fighting games such as the *Street Fighter* (Capcom 1987–2017), *Virtua Fighter* (Sega 1993–2012), *Tekken* (Namco 1994–2017), *Dead or Alive* (Tecmo 1996–2016), *Mortal Kombat* (1992–2016) and *Soul Calibur* (Namco Bandai 1996–2014) series, typically offer a variety of characters, all with different costumes, influenced by their nationality, ethnic traditions, style of fighting, as well as action and fantasy genre elements. Chinese Chun-Li from *Street Fighter*, for example, wears a blue *qipao*, an early 20th century Chinese dress. The traditional dress has been modified to allow for easier movement. She also wears white combat boots, brown tights, silk brocades and ribbons in her hair, and spiked bracelets. In most such titles, fantasy elements are mixed with traditional elements, i.e. the myths and legends of the countries and periods the characters hail from: some of the characters have Victorian, some Medieval, and some Chinese references. However, this happens at the expense of cultural accuracy and wealth, as Hutchinson points out:

> Although most of these constructions may be described in terms of stereotype, it is apparent that archetypal figures are also present … Such mythic timelessness is a hallmark of essentialization, in which the core features of a particular culture are presented to the exclusion of other features, gradually coming to stand in for the culture as a whole. Thus, Japan is boiled down to images of ninja and samurai, whereas ancient Europe can be represented by pirates and courtiers … Over time, these essentialized images become stronger and more pervasive in the consuming culture, through the process of repetition, reinforcement, and naturalization… (Hutchinson 2007, 286–8)

Fashion Design

Fighting games aside, the evolution of sports games in general has occurred at an impressive rate, as they are extremely successful commercially, and large funds are injected in their production. Current sports games

feature graphics almost indistinguishable from photography. The athletes' movement is motion-captured and the athletes' kits closely reproduced. Even the athletes themselves are digitized and reproduced as 3D models. Apart from field and court sports, which of course feature uniform rather than costume design, a popular genre has been skateboarding, with games like *Tony Hawk Pro Skater* (Activision 1999–2015) helping put street fashion in games.

However, contemporary costume design in games has mostly developed not in sports, but in action and action-adventure games. A large part of the action genre, which includes fast-paced games, where the emphasis is on running around, shooting or melee fighting, involves casual contemporary dress: the protagonist of *Contra* (Konami 1987) is typical of the characters of early side-scrolling shooting games, wearing blue jeans and a bandana; *Final Fight*'s (Capcom 1989) Cody is characteristic of the "beat-em-up" arcade games of the late 1980s, similarly wearing a white t-shirt, blue jeans, and wrist bands. This generic action look appears to have been influenced by 1980s action movies such as *Rambo: First Blood* (Orion 1982), *Top Gun* (Paramount 1986), as well as martial arts films. Many martial arts-themed games have also featured Japanese interpretations of 1980s punk styles: the characters of *Double Dragon* (Taito 1987) wear wrist bands, tight trousers, and have punk hairstyles such as mohawks. The video games industry first prospered and started to expand in the 1980s, and as many companies made their debut in that era, some of the original intellectual property originates then. The action hero has gradually been elaborated with more complexity and detail, as for example in action-adventure *Shenmue* (Sega 1999), but some of the stylistic roots remain unchanged to this day. Even *Grand Theft Auto IV* and *V* (Rockstar 2009 and 2013) and Sony's *Uncharted* series (Sony 2007–2016), which are famous for their attention to detail, follow a similar style.

An action sub-genre, "survival horror" has its own parallel tradition. For some reason most likely linked to the horror narratives, these games feature more formal costume design than other genres. *Alone in the Dark* (Various 1992–2015) was the first of the kind, and while the original featured formal dress, later attempts to make the series commercially successful have dressed the character in a conventional action style (white t-shirt/blue jeans/leather jacket). The *Resident Evil* series (Capcom 1996–2017) involves different player characters in every game, but they all have similar stylistic references: some of them wear police uniform, some are dressed casually, and some formally, in long dresses and high heels. The *Silent Hill* games (Konami 1999–2012) also feature formal dress and uniforms.

Of course with time, more realistic interpretations of fashion emerge in the medium. *Life is Strange* (Square Enix 2015) is an adventure game that features a fairly realistic representation of youth culture, including dyed hair, tattoos and piercings, beanies and printed tshirts.

Fashion and costume design for online avatars

So much for off-line single-player games that are designed with specific characters in mind, but what about on-line multiplayer worlds? We can learn much about fashion and dressing in general by observing it in virtual environments, which are controlled and easily observable. Boellstorff (2008, 237) writes, "the virtual is the anthropological" and education researcher Anna Peachey (2010, 37) sees virtual worlds as social laboratories for identity study. Identity seems to be performed through clothing in similar ways on and off-line, so we can ask questions such as "Are there similarities between on and off-line styles?", "Are those two persistent, or do they vary, accounting for different needs?", and "Where is the crossover between fashion in the two worlds?" And based on research by Kafai, Fields, and Cook (2007, 5–6), players dress themselves and their avatars based on similar reasoning: based on the virtual world *Whyville.net*, teens listed six reasons for creating their avatars the way they did: "the pure aesthetics of a look, to make it in part like their 'real' self, to affiliate with something or someone, because they can't have it in real life, and to align oneself for or against a popular trend."

Let us look at *Habbo Hotel* (Sulake 2001), a popular virtual world, where the user can choose the sex, skin tone, face, hairstyle, clothing and accessories of the avatar in the built-in avatar editor. In "Virtual Consumerism: Case Habbo Hotel", Lehdonvirta, Wilska, and Johnson (2009) present the findings of their research on *HH*. They argue that digital representations of goods are not perceived as media surfaces, but as commodities (2009, 8). This is due to *artificial scarcity* (Castronova 2005), i.e. making specific items rare in virtual worlds, even though the cost of reproducing digital objects is next to nothing. What "were previously media become things" (Lash and Lury 2007, 8), which have use-value and exchange-value. In *Habbo Hotel*, there is a "virtual economy", where items are traded based on supply and demand. And even though the purpose of virtual items in *Habbo Hotel* is aesthetic, they are in practice pieces in a status game (Lehdonvirta, Wilska, and Johnson 2009, 16).

Similarly, Neustaedter and Fedorovskaya (2009, 7) found that avatar appearances in *Second Life* (Linden Lab 2003) are affected by the social environment. There are societal norms in place, which are evident in the appearance of the avatars. There are shops selling specific typified items, and avatar interaction, i.e. approval or disapproval, define what is accepted and what is not. A refusal to update the appearance of the avatar carries social stigma. There is a clash, therefore, between projecting a specific identity and complying with the rules of the social environment:

> 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. (Neustaedter and Fedorovskaya 2009, 7)

There are also meta-systems dedicated to consumption in such worlds, which further reinforce social norms. In addition to the numerous fashion stores in *Second Life*, there are blogs and on-line advertising, as well as on-line publications (*Second Style, Linden Lifestyles, Pixel Pinup*), which promote *Second Life* fashion designers. These electronically distributed magazines feature the fashion of *Second Life*, and mimic the structure and layout of established fashion magazines, like *Vogue* and *Harper's Bazaar*. They use an established format to showcase an alternative fashion.

Bridging the Gap

Although video games exhibit a wealth of fascinating costume design, it can be argued that costume is not currently as central an aspect, and it does not usually enjoy as much attention, as other elements, such as settings, architecture, vehicles, and weapons. For one, very few costume designers are currently employed by the video game industry, although things are gradually changing. Emmy winner costume designer Lyn Paolo is one of the few examples of such a role employed in the development of characters for a video game, in this case Rockstar Games' *Gran Theft Auto 5*. Companies are beginning to realize the potential of utilizing costume designers, as opposed to character or concept designers, to raise production values. Although the latter are skilled at creating worlds, creatures, and characters, they do not have an understanding of costume history, garment construction, and clothing psychology that costume designers do. Interviewed by Joe Kucharski in 2013, Lyn Paolo recalls the process:

> The team from Rockstar Games did most of the digital work. After they handed me the boards, I then went to work finding an array of clothing that defined each character. I sketched my idea of what each of these characters should wear. Then the Rockstar team created the scans of each individual and with each character we did several 3D scans of each person in the game, changing clothing accessories, shirts, shoes, glasses, hats and on and on. We also created a database of many accessories so that Rockstar would have a lot of images to pull and add to each character as the game progressed through production. (Paolo 2013)

For Lyn Paolo, the main difference between costume design for games and for other media is that fit is not as important in games, and that things such as color and texture can be tweaked retrospectively, after a scan or after a 3D model has been produced. Such technologies offer many new possibilities for fashion design, and although they have already started being used in the fashion industry, there are next to no fashion brands involved in games. Can fashion brands be included after all, and what would the commercial potential for this be? A lot of money is made from games daily, but interestingly, consumption is not usually expressed with the adoption of real-world brands. Few fashion companies have tried to enter

this domain, and today the presence of clothing brands in virtual worlds is extremely limited. Past, unsuccessful attempts include the now closed American Apparel in *Second Life*, moderately successful attempts include H&M in *The Sims 2*—in 2008, H&M even held a *Sims 2*-based fashion design contest displayed and judged on an online virtual catwalk, whose winner, a 21-year-old man called Beau Fornillos, was invited to make a physical version of his creation for the H&M stores (Wilson 2009)—and a more recent example is Diesel on the now closed *Playstation* Home.

Fashion activity titles such as *Barbie Fashion Designer* (Mattel 1998), *Barbie Fashion Show* (Mattel 2004), the *Bratz* series (THQ), *Project Fashion* (Empire 2007), *Fashion Designer Style Icon* (505 Games 2007), and *Imagine Fashion Designer* (Ubisoft 2007) have been around for many years. Basic scenarios may be given, but the main goal of such software is to teach young fashionistas how to create clothes, how to combine styles, and how dress affects social interaction. More recently, fashion-themed games operating on Facebook, such as *Me Girl* (Funcom 2012) and *Fashion Week Live* (Funcom/505 Games 2012), have become popular with slightly wider demographics. Mobile phone fashion games are also very popular—California-based Crowdstar published *Top Girl*, *Top Stylist*, and more recently *Covet Fashion*, with great success. Founded in 2008, the California-based company has collected $43 million in funding to date. The company's early games *Top Girl* and *Top Stylist* have attracted 30 million mobile users and 25 million Facebook fans. Jeffrey Tseng, CEO and co-founder of CrowdStar explains "We can see if certain brands or styles or colours are being used a lot in New York versus Los Angeles" and "We can see if certain types of shoes are being paired with a top from Joie, for example, and what kind of bag was most often used to complete a look" (Lipke 2013). Blair Ethington, vice president of studios and marketing at Crowdstar, believes that *Covet Fashion*, which is a game based on real-world brand fashion styling, offers brands an effective marketing tool without obstructing the user experience, as shopping *is* the game, and the brand *is* the experience (Lipke 2013). Crowdstar's revenue comes from users who purchase virtual currency for use in the game. Digitally rendered illustrations of each brand's in-season collections can be purchased by users with virtual currency. Brands also benefit from analytics users generate by combining products. Still, attempts like these are limited in scope compared to the full market potential of the medium, and they address a very specific demographic, mostly pre-teen and teen girls, who are not usually in the position to make considerable purchases.

As for established fashion designers making use of gaming technologies for marketing, this still happens rarely, but at an increasing rate. As an example, Karl Lagerfeld is featured in his online game *Je Veux Les Lunettes De Karl*, where players try to steal his trademark glasses (Mattie Kahn 2013). Another example is the digital reproduction of a digital fashion show by fashion director Nicola Formichetti for Thierry Mugler, featuring model Rick Genest, based on the technology of the online game *Eve Online* (CCP Games). These are clear indications of things to come. Perhaps

a more significant move is that of Louis Vuitton in employing Lightning, a character from RPG series Final Fantasy, as the face of their S/S 2016 campaign. Their video advertisements feature Lightning in Louis Vuitton clothes and with Louis Vuitton accessories, see http://vignette3.wikia.nocookie.net/finalfantasy/images/9/9d/Lightning_Louis_Vuitton_Fashion.jpg/revision/latest?cb=20151231002639.

There was a precedent to this, when *Arena Homme+* published a spread featuring Final Fantasy characters wearing Prada's S/S 2012 men's collection in 2011. Can we dare to expect the collaborations working the opposite way, i.e. to see Louis Vuitton or Prada items in the next Final Fantasy game? Interestingly, there are publications dedicated to video game dress styles, e.g. Console to Closet (consoletocloset.com), a blog that finds inspiration in game characters and creates ready-to-wear looks based on them. Magic Fabric (magicfabricblog.com) also features fashion designers inspired by games, but in addition, it showcases games with notable costume design and character customization features.

At least with respect to contemporary and futuristic/postmodern character design, more fashion designers could be employed and more collaborations could be sought with fashion brands. At any rate, new fashion designers are increasingly influenced by gaming culture. For blogger and writer David Walmsley (2015), designs by Rick Owens, julius_7, The Viridi-Anne and Zam Barrett owe a lot to videogame characters such as Altair and Ezio Auditore da Firenze from *Assassin's Creed* (Ubisoft 2007–2016), Sub-Zero and Scorpion from *Mortal Kombat* (Midway 1992–2016), Rikimaru and Ayame from *Tenchu* (1998–2009), and Cloud Strife from *Final Fantasy 7* (Square Enix 1997).

Digital fashion technology can now support these changes. Software such as *Marvelous Designer* (CLO Virtual Fashion) and *DC Suite* (Digital Clothing Center) is used by fashion and game designers alike, and there are current and emerging technologies that facilitate the incorporation of fashion expertise in games, as well as of 3D graphics in fashion. Many industrial solutions for fashion design and production (Browzwear *V-Stitcher*, Optitex *PDS* and Lectra *Modaris 3D*) now feature a 3D visualization aspect, as well as digital pattern construction. On the side of the game engines—currently *Unreal* (Epic Games), *Cryengine* (Crytek) and *Unity* (Unity Technologies) being the most prominent—NVidia *Apex* cloth physics, Cloakworks *Shroud* cloth physics, and FXGear's *ezCloth* are among the real-time cloth simulation solutions that allow for—admittedly still basic—cloth simulation. The Valentino Garavani museum (www.valentinogaravanimuseum.com) was made with Unity, and although it does not feature cloth simulation or animation, as an explorable gallery, it is significant in that it was made with a standard, freely available games development tool. Virtual fitting mirrors in stores and virtual fitting rooms on e-commerce platforms make use of similar real-time technologies. And virtual reality—Oculus Rift (Oculus), HTC Vive, Sony Playstation VR, Samsung Gear VR, Microsoft HoloLens—will add an extra layer of immersion in the next wave of digital fashion experiences.

Perhaps what is most significant of the changes to come is the emergence of companies that specialize in fashion and lifestyle product visualization. For instance, designer Christopher Raeburn teamed up with digital innovation agency Thomas Traum for the production of futuristic fashion film *Meridian*, which was created using techniques for character design and animation, as well as digital garment creation and cloth simulation, which have been used in video games for quite some time. Finally, Miximaliste.com is a company that relies exclusively on 3D visualization, both pre-rendered and real-time, for its fashion e-commerce operations.

Conclusion

In this article, I have attempted a classification of costume in video games and virtual worlds. I prepared the ground to do so by arguing that there are reasons why attention should be paid to digital dress, namely: the relation of the appearance of a game character or avatar to the performance of an imagined identity, which evidence suggests it may have repercussions on the player's real identity; representation; and commercial potential. To make the classification easier, I further separated the concept of digital dress into three distinct dimensions: the programmatic; the visual; and the social. The actual classification then focused on the analysis of the latter two, the first being outside the scope of this article, and more of a programming enquiry—see my article "Game Design with the Aid of Computer Semiotics" (Makryniotis 2014) for a study on the subject.

The classification of dress in electronic entertainment was developed in this article based on the type and theme of a number of titles. A wide array of games was surveyed, of which the most representative of each genre were mentioned, and a number of persistent themes were eventually identified that appear to permeate the medium. The clothing of the characters was mainly categorized as either fantasy-oriented costume or realistic contemporary fashion. Futuristic, historic, and mythological fantasy are prominent, and so game character costume design is by and large influenced by popular tropes of fiction and by concept art styles that have been typified by the illustrators in the industry and academia. Fashion design, on the other hand, as contemporary costume design but also as a creative statement, seems to be present in many action, activity, casual and adventure games, as well as in online worlds.

Finally, I have demonstrated some ways in which the fashion and gaming worlds can benefit from each other. These reflect my three reasons for discussing digital dress (identity, representation, and commerce). The inclusion of costume designers, fashion designers and fashion brands, could be beneficial for the medium, provided that the collaborations are appropriate in terms of style, and that the promotion of brands does not overshadow the experience of playing a game, but is instead transparent in the form of licensed content. One the other hand, fashion will no doubt continue to employ video game technologies to promote, and increasingly to sell products. These technologies will become more and more

immersive, until one day in the very near future the consumer of fashion will be able to experience a fully interactive, realistic fashion experience, which will rival or even surpass the physical experience of attending a fashion show or an exhibition, and that of shopping.

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