“Ceci n’est pas une...”

Visual Perception in the Digital Age
# Table of Contents

1. Introduction  
   1 - 2

2. The Reproducible Image  
   (i) How Paintings Lost their Original Aura  
   3 - 4  
   (ii) The Value of Digital Images  
   5 - 6

3. Pure Electronic Data  
   (i) The Differences between Analog and Digital  
   7 - 8  
   (ii) Representing Reality  
   8 - 11

4. Pop-up Generation  
   (i) Between the Dimensions  
   12 - 15  
   (ii) Printing the Future  
   15 - 17

5. Conclusion  
   18

6. Bibliography  
   19 - 20
Fig. 1 Unframed, Rad Hourani. Arnhem Mode Biennale 2011
1. Introduction

The twenty-first century witnessed unprecedented changes in our ways of perceiving: digital cameras, camera-phones, ipads, iphones, online sharing platforms like Facebook, Twitter, Instagram, visual blogs and online magazines, digital technology is extensively incorporated into our everyday life. Instantaneous, transportable, and easily reproducible, across geographical boundaries, our experiences of our surrounding world are increasingly filtered via digital mediums. In today’s hyper-visual digital age, “the screen has emerged as a primary setting for viewing images” (Marien, 2010, p.518). In fact, there is a tendency among us to routinely think about the digital appearance and communication of our works. Rather than exhibiting the actual garments during the Arnhem Biennale in 2011, fashion designer Rad Hourani chose to present his collection (fig.1) with a film that framed and collaged selected moments and perspectives.

This thesis explores the way perception has changed over the last 10 years, with a focus on visual culture, and primarily, images, in the digital context. I will examine the developments of visual culture by focusing on 3 main discussions. Firstly, the invention of the camera has changed the way we understand paintings, and the ‘value’ of images. I will use John Berger’s Ways of Seeing as a primary text to support these claims. Secondly, I will look at the differences between analog photography and digital images, and how the circulation of images in the internet has shifted meanings of reality and representation. Thirdly, the rise of digital visual culture has led to a generation that grew up almost entirely among screens - what trend forecaster, Lidewij Edelkoort, terms as the “pop-up generation”. One of the most noticeable feature of this generation is the attempt to merge the two-dimensional virtual and three-dimensional material worlds together. While Edelkoort projects an optimistic vision, there are some underlying contradictions with the concept of “pop-up” which I will address. Finally, what this thesis hopes to achieve is to show how the changes in visual perception, as embodied in the current “pop-up generation”, have future implications for new experiences, cultural forms and modes of thought.
2. The Reproducible Image

The invention of the daguerrotype and the first photographic image in 1839 was a significant moment in the history of visual culture. It marked the start of mechanically reproducible images as opposed to unique individual works of art. The introduction of photography also led to the use of commercial language in our perception of art. I will illustrate this by examining the differences in how we viewed European oil paintings before and after the invention of the camera. Although the first part of this chapter dates back to a time before the digital era, it reflects important changes in our relationship with images, and how we determine meaning and value in images. In the second section, the rise of the internet and digital information disrupts the way we attribute value to images, and this has a clear influence on our visual perception.

(i) How paintings lost their original aura

In John Berger’s *Ways of Seeing*, Berger explains how paintings lost their original aura when the camera was invented. “Originally paintings were an integral part of the building they were designed for” (Berger, 1972, p.19). Its meaning resided in the uniqueness of the place it belonged to, be it the church or the location it was commissioned for. The reproducible, repeatable image destroyed that intrinsic uniqueness connected to its surroundings and to its author. It “destabilized the very notion of ‘originality’ and blurred the differences between original and copy… what is called into question is the originality of authorship, the uniqueness of the art object and the nature of self-expression” (Wells, 2004, p.29). The meaning of a work of art was no longer restricted to its original context; It became open to multiple interpretations, and it became relative to other images that came before and after it.

In order to understand the extent of this disruption to the original meaning of a painting, a key point to note is the way people defined “perspective” before photography: “Perspective makes the single eye the centre of the visible world. Everything converges on to the eye as to the vanishing point of infinity” (Berger, 1972, p.16). This means that people believed that all perception was organized by the human eye; what they saw was everything there was. The invention of the camera, a mechanical eye “freed from the boundaries of time and space” (Berger, 1972, p.17) with the ability to record and communicate more than what the human eye could visibly perceive, challenged traditional assumptions of perspective. The camera showed that there was no “centre”, and that what we saw was relative to when and where we were. This factored into the demystification of paintings that used perspective to depict reality and construct the human eye as a unifying force of the visible world.
Since paintings had lost their aura, the status of the original work was no longer defined by its unique message but by its existence as a rare, authentic object - “the uniqueness of the original now lies in it being the original of a reproduction” (Berger, 1972, p.21). Berger gives the example of the famous “Virgin on the Rocks” by Leonardo da Vinci (fig.2). Hung behind bullet-proof perspex glass in a room of its own in the National Gallery, the painting gained a religiosity enhanced by the atmosphere of its new location and by descriptions of it as a unique Da Vinci painting. Furthermore, the authority of the painting was now dependent on proofs of authenticity and the price it fetched. In other words, its “market value had become a substitute for what paintings lost when the camera made them reproducible” (Berger, 1972, p.23). The way we perceived paintings now had an added meaning to it: value. This commercial desirability is also deeply tied to the sense of tangibility associated with the painting – the solidity, the weight, the gloss, the texture – the material realness that gives us a feeling of ownership.
(ii) The value of digital images

In comparison, these notions of tangibility and ownership are brought into question in the digital realm. With the introduction of the internet to the public sphere in the late 1990s, programs such as open source, web 2.0, search engines, have led to the democratization of information as well as images. As immaterial electronic data, we can not physically own digital images as we might with a painting or even a photograph. Even with copyright laws, the increased ease and speed of accessing, downloading, manipulating and circulating images endlessly and repeatedly, suggest that we no longer have full control and possession of electronic images.

On one hand, the lack of material ownership undermines the value of digital images, and the credibility of our knowledge through such images. While the distrust of images is not exclusive to today’s visual world, the relentless production and consumption of images that circulates within a virtual hyperspace is. In the “The Treachery of Images” (fig.3) by French artist Rene Magritte, the depiction of a pipe with the line “ceci n’est pas une pipe” (this is not a pipe) brings our attention to the ambiguous nature of images: what we see is a painting of a pipe, not a pipe itself. In a world saturated with images, Magritte’s painting also points to an unstable perception of the world based on our tendency to easily regard surface impressions as truth. This disjunct between the image and the object becomes even more obvious today: unable to fully grasp a concrete form and an assurance of tangibility, our perception of reality through digital images is seen as unreal and unreliable.
Hussein Chalayan's Autumn/Winter 1998 collection, “Panoramic” (fig.4) further demonstrates the blurring of boundaries between the real and the signified in the digital realm. Models walk along a mirrored catwalk, moving “in and out of set, appearing to disappear into walls and reappear in mirrors, until the difference between illusion and reality was effaced and their bodies became mere patterns in a moving picture” (Evans, p.74, 2007). Chalayan alludes to the fragmentary and elusive nature of our relationship with images and contemporary image-making. There is a sense of dislocation in time and space, a visual confusion, as we lose sight of the original and the reproduced. At the core, meaning is reduced to bits and pixels as the only embodiments of this virtual space, as the show ends with models carrying identical 3D pixel forms.

On the other hand, the photographic image has also brought about a condition where we “prefer the sign to the signified, the copy to the original” (Wells, 2004, p.283). With the convenience of the internet, many prefer to see art through digital representations rather than through live experiences. There appears to be a greater freedom in the digital space where the meaning of a work of art is even less dependent on the original context, as compared to a photograph. The appeal of the digital medium is that it enables us to see a multitude of images, combined with reviews and interpretations, simultaneously and instantaneously, thus providing us with a greater range of choices. In this technological age, there is a need to revisit the ways we confer value to the reproducible image, in relation to the definition of value as commercial and material ownership.
3. Pure Electronic Data

Our perception of the world through images has evolved along with the changes in image production. According to Liz Wells in *Photography: A Critical Introduction*: “traditionally, images have been analogue in nature. That is, they consist of physical marks and signs of some kind (whether brush marks, ink rubbed into scored lines or the silver salts of the photographic print) ..They are also continuously related to some perceivable features of the object they represent” (Wells, 2004, p.254). A digital medium, however, is a conversion of electronic data, which takes a virtual and malleable form. This chapter discusses how the transformation of photography from analog to digital has affected the way we interpret the meaning of images and as a result, how this has challenged our perception of reality.

(i) The differences between analog and digital

When photography was introduced in the nineteenth century, it was celebrated for its ability to produce accurate images of what was in front of its lens. Photography was given the task of presenting factual and objective images of its subjects, a task once attributed to paintings. Despite the debates that surrounded the role of photography – as mentioned in chapter 1, the reproducible image destabilized the meaning of paintings – it is still recognized as a material form dependent on objects in the real world. As Susan Sontag states, “the fact that a photograph exists testifies to the actuality of how something, someone, or somewhere once appeared” (Wells, 2004, p.41). In this light, the photograph is a witness that testifies to an actual source in the historical world. Seeing through a photograph “establishes our place in the surrounding world” (Berger, 1972, p.7). In addition, there is a sense of authenticity and familiarity in the materiality of the analog photograph, which is “caused by a particular conjuncture of circumstances (including subject-matter, framing, characteristics of the lens, chemical properties and darkroom decisions)” (Wells, 2004, p.5). The analog photograph which bears traces of its technical process is a physical proof of a particular moment in time.

In contrast, the digital photograph lacks traditional photographic referent as it is not caused by light, but it is a conversion of pure electronic information, processed within the computer. In its digital format, an image can be easily created, manipulated, reproduced and distributed in the internet. Furthermore, the digital image is often accompanied by sound, graphics, and words so that it becomes a multimedia moving image, rather than a still form. As such, the image is even more removed from its original context as new layers of meaning are added onto it.
For example, Stilla is the latest iPhone application which layers multiple image perspectives into a navigable 3D object within a virtual space (fig. 5). Stilla enables users to rotate, explore and stage their own vision of an otherwise stationary image, and share this with other users. Like many other digital programs, Stilla enhances our range of vision and perceiving consciousness, beyond the limitations of analog. This technologically mediated experience also suggests that the coherence of visual experiences today has become largely “a function of the technologies that organize the gaze and the image world it surveys” (Macphee, 2002, p.7), rather than a self-directed experience. It is not the individual, but the mechanical eye of the iPhone, that captures and creates this new exciting world as a result of its digital applications.

(ii) Representing Reality

Liz Wells poses an important question: “can we still understand the ‘image world’ in which we live as continuing to refer beyond itself to a prior reality?” (Wells, 2004, p.256) This points to the problematic assumption of reality as a fixed external entity; rather than “a system of subjective perceptions and conventions” (Oosterbaan, 2011, p.49). In today’s visual culture, images have developed into a world of their own. The digital image which has no traditional photographic referents
exists in a separate virtual time and space, and can only be understood on its own aesthetic terms. The direct link between object and image is lost; not only is it difficult to trace the original source, questions of ‘real’ or ‘unreal’ become almost irrelevant.

“Bildbauten” by Philip Schaerer is a series of images of architectural buildings (fig 6). These frontal views and consistent compositions of buildings attempt to reproduce a neutral and objective aesthetic associated with the “object-like appearance and formal language” (Schaerer, 2007, Philip Schaerer) of contemporary architecture photography. The surprising part is that these images are constructed from scratch entirely out of image editing. Bildbauten challenge the idea of photography as factual representations of reality. It blurs the boundaries of a digitally simulated ‘reality’ and the idea of reality as a prior entity. The way in which images (be it analog or digital) are highly orchestrated to project selected perspectives reveals the way we construct and determine reality. The repetition of techniques – visual textures, colors, shapes, lighting, photographic framing – turn the series into concrete evidences of a reality. “Repetition turns speculation into proposition” (Herschdorfer, 2010). It may lack the material marks of an analog photograph, but it reproduces a world of form, color, and structures, that could very well be taken as truth. “The artist does not need a camera, the manipulation of pixels being his domain” (Herschdorfer, 2010). What this also implies is that the artist does not need to photograph a “real” subject-matter, but can assemble a compelling reality entirely from computer graphics. This shift to images and multimedia formats created entirely from digital tools reconstructs our perceptions of reality as fluid, malleable and constructed.
The changes in image production in the digital age exemplify postmodern theories – the loss of a single, grand narrative and in its place, the fragmentation and multiplication of meanings, and the apparent transition of digital images into a self-contained universe with its own aesthetics that have little or no connection to the material world. Besides looking at the representation of objects such as Philip Schaerer’s architectural buildings, we also question the position of the individual, the perceiving body who organizes these thoughts, within the digital context.

Masha Reva, an upcoming fashion designer, explores in “Merging” how a human personality is transformed amidst various digital visual streams. She describes how social networks and online platforms have given us the opportunity “to create a superficial representation of ourselves in the webs. Become a part of virtual reality, a computer data, we merge within the boundless informational field that is the internet” (Reva, 2012, Masha Reva). Her collection (fig. 7) portrays the fashion body blending seamlessly into its surroundings; it is not a body which we are used to seeing, but a body which is artificially constructed only as a function of an aesthetic composition.

In The Architecture of the Visible, Guy Debord mentions that “everything that was directly lived...has moved into representation (Macphee, 2010, p.69). Like Schaerer, Reva makes use of the repetition of photographic techniques – neutral lighting, lack of active movements, blending the model's outfit with an illustrated background – to reproduce a visually arresting hyperreal world. In this frame, the 3-dimensional body is reduced into a 2-dimensional simulated object. As such, there is a loss of a personal and recognizable identity to an overwhelming saturation of visual entities. “Merging” highlights a contradictory merging of self into virtual reality, and the uneasy disconnect between visual representation and materiality, virtual body and physical body.

Fig.7 Merging, Masha Reva, 2012.
The developments from analog to digital has brought us to question images and their depictions of a subject-matter; even more, the concept of “reality” itself becomes highly unstable in the digital context. Today, the issue at large is perhaps not questions of “real and “unreal”, but the gap between a technologically mediated virtual world, and a live, physical experience. Even though digital mediums allow for new forms of creative expression and communication, the idea that they only exist an an immaterial form within the confines of the screen, continues to pose a challenge to our visual perception. This tension between virtual / material and how it affects our way of seeing will be further explored in the following chapter.

Fig.7 Merging, Masha Reva, 2012.
4. Pop-up Generation

Our visual world has become far more complex and multilayered with the introduction of digital mediums. Perception is constantly changing and it is no longer as clear and easy to delineate virtual and material realms. In 2011, trend forecaster Lidewij Edelkoort created an exhibition called “The Pop-up Generation: Design between dimensions” at the Museum of Moving Image in Breda. She invited several designers and artists who merged 2D and 3D thinking in their works. From multi-media installations, 3D animations, pop-up animals, mushrooms, fashion, and furniture that shift between computer graphics and 3D forms, the combination of different disciplines demonstrated a dynamic versatility and optimistic vision of our world today. Edelkoort explains the emergence of this new generation that grew up almost entirely among screens, from television, computer, gaming technology, and now, ipads and ipods. They are a group of creative people who “move fluidly and easily between 2D and 3D as though they no longer notice that there is a difference. Their brains are trained to see volume in a flat sketch or to discern structure within volume” (Edelkoort, 2011, p3). This concept of pop-up is fascinating as a manifestation of the creative zeitgeist but it also reflects several problems of our generation which are overlooked in Edelkoort’s thesis. This chapter addresses the various issues brought up in Edelkoort’s essay, and the far-reaching implications these have on our ways of perceiving.

(i) Between the Dimensions

Visual culture is very much rooted in two-dimensional representations; from paintings, analog photography, digital photography to total digital image synthesis, there is always an attempt to capture the world around us in a framed flat image. However, the pop-up generation reveals something more: the longing for a synergy of different mediums so that we are no longer confined to the notion of 2D and 3D, virtual and material, analog and digital as fixed, separate realms. As Edelkoort claims, this desire and ability to switch instantly between 2D and 3D – seeing volume in flat sketches and recognizing flat schematics within material shapes – puts us in a sort of 2.5 dimension.
“Wandering Territory” by Anna Garforth in collaboration with Vinke Display is one example of a 2.5 dimensional design (fig.8). It is a digital model of a bear which was converted into a 3D printed cardboard sculpture. The image on the bear is an image Garforth took of the British coastline, which is the intersection of an industrial shipyard and the open sea. For Garforth, this “represents the crossing of environments and temporary shifts in the daily landscape (Garforth 2011, Anna Garforth). More significantly, the process of creating the bear reflects a multi-dimensionality: a bear which is associated with wild life is converted into a digital file, rendered into bits and pixels to prepare for its prototyping into a 3D cardboard form. In contrast to the digitally perfected nature of the bear, the use of cardboard is interesting as a natural material which gives an unpolished hand-crafted feel. Finally, the print which is a flat, still image becomes 3-dimensional when it is developed and shaped around the polygon contours of the bear. Symbolically, Garforth’s idea of crossing environments can also be seen as the crossing of visual disciplines, from 3D natural creatures into 2D processed electronic data into a 2.5D personal creation. At the same time, the concept of “Wandering Territory” is indicative of our way of thinking today: we are constantly shifting between the dimensions; but we are also restlessly searching for new forms, new realities, that can connect the dimensions.
The problematic aspect of the 2.5 dimension is that it is a sort of floating world that lacks a definitive contextual narrative. Technological advancements gives us greater insight into our surroundings, but it also leads to “a loss of visions’s locatedness in the world” (Macphee, 2002, p.7). When we think about paintings before photography as explained by Berger, they had a unique aura affirmed by their location and the painter. Although we have progressed beyond the way meaning was constructed and represented then, the existence of an original context provided a crucial sense of belonging to its surroundings. In today’s digital age, this connection between image and object is completely lost. Even though Garforth’s bear refers to the form of a bear, it is a new sculpture which questions our perception and puts us in a different space that is neither virtual nor real (as a familiar object which we instantly recognize). “Wandering Territory” which shows our need to keep moving and creating also reveals an anxiety and dissatisfaction with what today’s technological world can provide for us.

“Play-Create” is an ongoing interactive and generative series from computer graphics artist, Daniel Brown (fig.9). “Each image frame illustrates a mutation of the infinite generative design” (Clarke, 2012, p.148). The infinitive generative art form, a digital hyperreal world which reproduces upon itself in a loop, is representative of a prevailing online visual experience, and a way of seeing.

Fig. 9 Play-Create, Daniel Brown, 2001. Digital Visions for Fashion and Textiles: Made in Code.
Dr. Martine Naillou, who contributes to Edelkoort’s book, describes our way of thinking as “in-front-of-the-screen intelligence” or “horizontal intelligence” (Naillou, 2011, p. 47). This refers to the manner in which we scan multiple online data, skipping from site to site simultaneously, with a lack of analysis and a need for depth of information. There remains a feeling of superficiality in the way we perceive via digital tools without seeking to clarify the nature of these information. Our knowledge has broadened but it has not deepened; instead, it has taken the form of something which is immaterial and temporal, rather than that of a lasting and tangible quality.

In Edelkoort’s introduction, she mentions that the pop-up generation “need new stimuli that will often be manifested via a definitively temporary, often immaterial or sustainable re-usable nature” (Edelkoort, 2011, p.8). This is an important point which Edelkoort fails to further explain. While the idea of temporality in the concept of “pop-up” gives us more freedom of choices as well as freedom of movement, it is also deeply connected with a lack of rootedness and hence our sense of restlessness. The rise of “pop-up” - pop-up shops, pop-up events and guerilla brand strategies adds on to the mobility we desire but also reflects the fleeting manner in which we consume products, images and information today. The rapid pace of new technological developments, the speed and ease of downloading and uploading information, the overwhelming production and circulation of works of arts, have perpetuated our desire for more, but have failed our needs for deeper emotional and intellectual connections and attachments. Perhaps what is necessary beyond a 2.5 dimension is to be aware of these contradictions within it and to source for a more integrated experience that is lasting and substantial.

(ii) Printing the Future

With technological developments moving at an increased pace and level, digital visual culture can no longer be restricted to the boundaries of the screen. One such development is 3D printing. Not only does 3D printing strongly tie back to Edelkoort’s “pop-up” thesis, it also moves the virtual back into the material, thus creating a more immersive experience that bears the uniqueness of the maker, and contextualizes the object within its environment, albeit a newly reconstructed environment. In an ironic sense, 3D printing almost brings us back to the original aura that paintings lost when photography came into place; at the same time, it brings representation back to life, back to a tangible form.
Dutch fashion designer Iris Van Herpen embraces the possibilities of 3D printing in her designs. As an extension of her Spring Summer 2011 “Crystallization” collection, she worked with Nick Knight from Showstudio to create a dress modeled on splashing water (fig.10). Using high speed cameras, Knight photographed black and clear water thrown at actress Daphne Guinness; this image was then 3D printed into a unique couture piece eventually displayed at Showstudio’s gallery, and later, Centre Pompidou in Paris. The entire process was filmed and streamed live on Showstudio’s website, made freely available to the public.

Perhaps what is difficult to comprehend is why we require these external tools, such as the web, digital programs and social media to experience materiality when we already belong to a physical 3-dimensional world. Why do we desire to translate 3D objects into 2D graphics and recreate it back into 3D forms? One possible way of understanding this is to see that digital technology has become so much a part of perception that we are unable to experience our material world without connecting the experience to digital visual imageries. Secondly, we no longer see reality as an external, objective given which is subjective, malleable and constructed. As such, we feel a need to re-contextualize our perception.
3D printing offers us the option of materializing a new reality with the possibility of adding another dimension to the original object. It is inconceivable for us to physically grasp flowing water; we can only go so far as to capture a still image of flowing water. Beyond what our physical world can offer, 3D printing enables us to actually touch the material shape of flowing water as we see or imagine it to be. It gives shape to what is otherwise confined to a virtual and intangible form.

For Van Herpen, her designs are about translating “abstract ideas and new techniques” (Van Herpen, Dexigner, 2013). She does not usually start with a flat drawing of a design, but allows the material to take its own shape. Van Herpen enjoys the fact that she can “let go of (her) work at a certain point...to create something that afterwards gets its own life and (she is) not part of it anymore” (Van Herpen, Showstudio, 2013). The digital image of moving water is no longer bounded to pure electronic data but takes a concrete life of its own that is later incorporated into the narrative of its environment, in a shop, a gallery or the museum.

“Crystallization” becomes representative of a changing attitude towards design, as well as our surrounding environment. Central to this project is the live streaming of the creation of the water dress. This allows viewers to watch the dress develop from flowing water into still imagery into an actualized shape. It relates to our longing to be a part of the process of creation in order to feel more connected to the final product. Our visual perception is not limited to the end product, as we are used to with images, but it evolves along with the transformation of a digital file into a material garment.

In relation, the concept of autopoeisis can be used to describe the collaboration between Van Herpen and Showstudio. In autopoeisis, “each antibody belongs to an army of antibodies organized in networks” (Naillou, 2011, p.48). Inherent to today’s digital culture are the communication and distribution of information. Perception is not built up from an individual’s eye, but it is very much a part of a collective consciousness. The meaning of a work of art is not restricted to the screen or the analog photograph or even a painting located in the museum; meaning is extended into the communication of the process – the story, the material, the technique, the collaborative efforts, the documentation itself – and this allows for a more active and inclusive way of seeing.
5. Conclusion

In the age of digital visual culture, we have to rethink conventional assumptions of perception, meaning and reality. The speed and ease of an endless production, reproduction, circulation and consumption of images have demonstrated how fluid, malleable and subjective visual perception can be.

The invention of the camera – a mechanical eye – presented fresh perceptions of the visible world. It destabilized the belief in the human eye as a unifying gaze which everything converged upon; and showed that visual perception shifted according to when and where we were at a given moment. In relation, the reproducible image caused paintings to lose their unique aura which was deeply connected to its original context. As a result, commercial value associated with tangibility came into place and redefined our relationship with images. Yet these notions of value and tangibility become seemingly irrelevant in the digital context where nobody can really claim ownership and possession of an image. While these may lead to a greater distrust of images, there is also a need to revise the way we attribute meaning and value to visual imageries.

As we move further into the digital era of the last ten years, the shift in image production from analog to digital photography to complete image synthesis has affected our understanding of our surrounding world. The second chapter highlights the volatile argument of “real” and “unreal” in relation to the virtual world. Digital imaging shows us that we can no longer treat the image world as an accurate representation of a prior, fixed reality. As explained in this chapter, the digital image as a self-contained technological universe is to be understood on its own aesthetic terms. However, the gap between a virtual narrative and a material world continues to be a challenge to our visual experiences.

This brings us to Edelkoort’s concept of “pop-up generation” which reflects our desires to merge multiple dimensions – virtual/material, 2D/3D, digital/analog – into new possible realities. Central to this generation is the collaboration between different disciplines and the communication between the maker and the viewer. At the same time, “pop-up” also underlies uneasy notions of temporality and a constant need for stimuli, which suggests a need to stay aware of the manner in which we receive and transmit images and information.

While today’s visual perception is largely confined within the digital screen, 3D printing, which takes the virtual back into material forms, could be the future of this technological age. This transformation of real / virtual / real predicts new creative and cultural practices and modes of communication that combine flat, visual representations and material experiences for more active and integrated ways of seeing.
6. Bibliography


