

Embodied Aesthetics

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From Film Studies to Interaction Design— An Emergent Aesthetics View

Xin Xia, Nimish Bitoria and Bernhard Hommel

1 Introduction

People who look for symbolic meanings fail to grasp the inherent poetry and mystery of the image. No doubt they sense this mystery, but they wish to get rid of it. They are afraid. By asking ‘What does this mean?’ they express a wish that everything be understandable. But if one does not reject the mystery, one has quite a different response. One asks other things.

—RENE MAGRITTE

What Magritte is referring to is the aesthetics experience of paintings, however when we look at other artistic creative works—sculpture, music, film, theater and interactive art—it is also applicable. People often experience this ‘mystery’ in interactive art. When a clear instruction is missing and the ‘meaning’ is not obvious, one applies his or her memory and previous experience to making meaning, and by trying things out, one seeks for his or her own position in the piece.

Muscle Space’ project (Figure 7.1) was a student project by Hyperbody, a research group at Delft University of Technology. The aim of this project was to “design a passage that interacts with passers-by proactively. The movement of the actuated structure is a complex combination of scissoring, folding, bending and falling movements. Along the passage, pressure sensors laid on the floor register the steps of passers-by. Step patterns are fed into algorithms that affect the actuators and the spatial sound environment of the muscle passage.” (hyperbody.nl)

From the description of this work, we understand how this ‘Muscle Space’ reacts to a participant’s movement—The passage gets the input signals (the step patterns and walking speeds of the participant) through the pressure sensors and then this signal will be processed in the computer (brain of the passage) and generate the behavior of the body (of the passage).

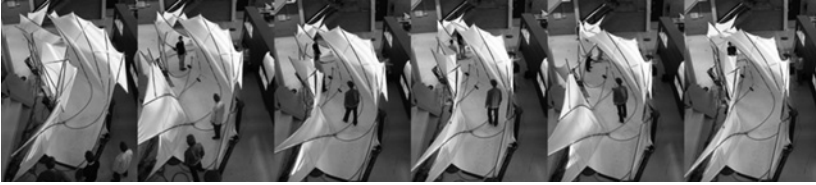


FIGURE 7.1 *Muscle Space, Hyperbody, TU Delft, 2007.*

This work aims to generate a conversation between the space and its participant, and it achieved this goal in a certain degree, so it can be considered as an interactive space. However, this interaction could be brought to a higher level, if there is more understanding in this conversation—if the step pattern and walking speed can convey the feeling of the participant and this feeling can be connected to the reaction of the passage. And even further, the participant's aesthetics experience can be changed by adapting the behavior (the movement of the actuated structure) of the space.

Many times, designers are too confident about their ability of predicting the reaction and emotion of the user or the participant. With some general knowledge or personal experience, they state, for example, “people feel welcomed and will be attracted by these opening wings”, without considering the possibility that people can also be experiencing a feeling of being lost or even want to escape, because the behavior of the space proposes a high level of complexity which could be beyond the participant's appreciated arousal level. This possibility should not be ignored during the design activity. We create a space to talk to people, this space should first be able to listen to people, try to understand people, and then it can give a response based on this understanding. The goal of our study is a fully interactive space design. For reaching that, we need to stay at a clear position, take the right perspective, have a good view of the whole picture, and then use a powerful tool.

2 Emergent Aesthetics and Interactive Space Design

“User experience design” and “emotion design” have become popular terms in the last decade, especially in the fields of industrial design and interaction design. In his earlier book *The Design of Everyday Things*, Norman emphasized the importance of functionality. “An aesthetically pleasing appearance is only a part of a successful product. The other part is understandability and usability, which are more important than attractiveness.” (Norman, 1990). While in

his later book *Emotional Design*, he agrees on “Usable designs are not necessarily enjoyable to use.” And “an attractive design is not necessarily the most efficient.” (Norman, 2004). However, many “experience design” and “emotion design” essentially classify users within categories of predictable behaviors and emotions. (Fiore et al. 2005) While we argue that human experience is more than a predictable calculation, which can be classified. No one can provide a “recipe” for evoking certain emotion by adding up certain colors, curves and softness. The “recipe” type of thinking “disregards the wealth of experience brought to the interaction by a person’s prior experiences and individual way of being, as well as an objects meaning-laden history and the uniqueness of a situation. It also fails to account for the inseparable integration of thinking, feeling and doing in an experience.” (Fiore et al. 2005) They stand from an analytic point of view of aesthetics, which emphasizes a view of humans as disembodied processors able to construct independent realities in the mind. Therefore, pragmatist aesthetics has been proposed for interactive design. Pragmatist aesthetics emphasizes how people experience the world dialogically as embodied subjects. “Functionality and clarity is not enough to meet human needs and desires when engaging with interactive system . . . Aesthetics is tightly connected to context, use and instrumentality.” (Petersen et al. 2004) In a pragmatist perspective, for anything to have value it must relate to human needs, desires, fears and hopes. (Petersen et al. 2004). Although in the last decade, several authors supported pragmatist aesthetics in the field of interaction design, to replace an analytic aesthetics attitude which is dominating, the voice of pragmatist aesthetics is still alone and weak. This is due to the fact that it explains a ‘Why’ with its rich philosophical nutrition, but does not provide a clear ‘How’. Why should we not try to ground aesthetics in psychology and find in this way a voice with matching tones? The mainstream cognitive theories, for example, cognitivism, see cognition as representative and computational, and see the mind as a processor plugged in the head, like a hardware plugged in the computer. (Protevi, 2011) However, cognition is much more than computation. It is not a slide between perception and action in the ‘Classical Sandwich Model’ (Hurly, 1998). For being able to reach a real interaction, which provides multiple and dynamic information process loops, which engage not only the mind, but also the body of the participant, and take into consideration the uniqueness of single situation, we embrace the 4EA cognitive approach, which argues that human cognition is Embodied, Embedded, Enactive, Extended and Affective. It regards the vast majority of cognition as real-time interaction of a distributed and differential system composed of brain, body and world. (Xia & Nimish, 2012) Embodiment does not only refer to the involvement of a human body or non-human body—an agency, but also refers to the perspective of the

body in a holistic system. Pragmatist aesthetics and 4EA cognition together can make a strong and convincing voice. We call it 'Emergent Aesthetics'. Emergent aesthetics embodies some specific characteristics, which also explain why pragmatist aesthetics and 4EA cognitive approach can be merged under this new term. These characteristics can be explained as follows:

2.1 *Embodiment*

Insisting that emotions are essentially bodily, William James notes that much of art's aesthetic appeal is due to the pleasing emotions it engenders through its wide-ranging excitement of 'the bodily sounding board' that the perception of beauty can produce: 'A glow, a pang in the breast, a shudder, a fullness of the breathing, a flutter of the heart, a shiver down the back, a moistening of the eyes, . . . and a thousand unnamable symptoms besides, may be felt the moment the beauty excites us' and fills us with pleasure. (pp. 1084) (Shusterman 2011). 'Embodiment' is one of the key elements in 4EA cognition. It also has been emphasized by pragmatists. Shusterman proposes to transcend the mind-body opposition in aesthetics with "a more constructive strategy by proposing an aesthetic discipline, which pragmatically unites the somatic and the spiritual through the integrated exercise of body and mind." (Shusterman 2000) For him, the feeling of worth must be somatic and not just intellectual. "As dancers, we understand the sense and rightness of a movement or posture proprioceptively, by feeling it in our spine and muscles, without translating it into conceptual linguistic terms. We can neither learn nor properly understand the movement simply by being talked through it." (Shusterman, 2000) Different from analytic aesthetics, which is preoccupied with separating humans into mind and body, one part for thinking and one part for sensing, in a pragmatist perspective the role of art and design is to give "a satisfyingly integrated expression to both our bodily and intellectual dimensions." (Petersen et al. 2004). According to the nature of interactive space, "embodiment" becomes a key element in the interaction design. Besides mental embodiment of their memory, previous experience and emotion, knowing the fact that oneself is supposed to 'do something back' to the space, one tries things out with one's own body: waving, pushing things which look like buttons, walk backwards and forwards, bending, jumping, making sounds . . .

2.2 *Unpredictability and Uncertainty*

"Meaningfulness and aesthetic experiences emerge in use, they are not predefined."

(Petersen, 2004) The bodily condition at that moment, the memory evoked, the expectation and imagination stimulated, the emotion influenced, the action

taken . . . are all the elements of forming up a unique experience in that unique situation. When this unique experience becomes a new input to the space, a new situation has been created, for a new experience. Aesthetics emerges during interaction processes and cognitive processes. The whole procedure cannot be predicted and repeated. Here the ‘unpredictability’ doesn’t mean out of control, but refers to ‘uncertainty’ and “possible instead of actual”. (Susan Hurly 2008). Sensory lights and sensory doors are not interactive for sure, because they generate thousands of times the same behavior (open-shut or on-off) to different people and different movements. While interactive responses never repeat, even to the same person, due to the differences within an experienced situation and the way they communicate. The “Muscle space” project mentioned earlier, as an interactive space example, proved this unpredictability, because its brain (the computer) generates new behavior in real time according to the new input.

3 Emergent Aesthetics in Film Studies and Its Inspiration

How to apply emergent aesthetics in interactive space design to involve more human cognition and emotion and therefore to reach a fully and meaningful interaction? Are there any examples in other fields that we can refer to? Let’s look at the field of film studies. Film studies and interaction design, the former being purely humanistic and theoretical, and the latter being technological and practical, seem as though they will never possess overlaps. However, an emergent aesthetic view already appears in film studies, and can become the first connection between film studies and interaction design. Film already has a history of more than 100 years and film theory has been built by generations of scholars. Hugo Munsterberg, Sergei Eisenstein, and other early film theorists initiated the study of the psychology of film from a broad cognitive perspective. There is a long tradition of thinking about the psychological effects and processes of film viewing from perspectives other than psychoanalysis. In the mid- to late- 1980s, the cognitive approach was introduced with a series of books and essays that began to make a decisive difference in how scholars think about the study of film. 1985 marked the appearance of two books: *Narration in the Fiction Film* and *The classical Hollywood Cinema: Film Style and Mode of Production to 1960*. These books make a powerful case for the study of film form and spectator psychology based on the kinds of mental activities described by cognitive psychology.

The Cognitive film theory today is primarily interested in how spectators make sense of and respond to films, together with the textual structures

and techniques that cause the spectator's activity and response. From the standpoint of the cognitive theory, Bordwell has established a constructivist approach and has developed an attractive and compelling theory of filmic narration. Bordwell's theory of narration is useful, for example, in distinguishing between classical Hollywood cinema and art cinema, and in describing the mental activities of the film spectator. We want to focus here on two characteristics of cognitive film theory, since they prove our view of emergent aesthetics.

The first is that cognitive film theory takes the perspective of the spectators into account. Cognitive film theory scholars look at film narration from the perspective of the spectators. They ask questions about "how information reaches the audience and is mentally or emotionally processed." (Elsaesser, 2002: 37–38) "Narration is variable distribution of knowledge among characters and between characters and audience. Narration is a question of how information reaches the audience and is mentally or emotionally processed. It is thus a key factor in how a film addresses, involves, implicates, activates, and manipulates the spectator. The function of filmic narration is to guide the eye and cue the mind, which might involve either an optical or cognitive centering of the spectator, drawing him or her into the picture, or a manipulation of the spectator's position of knowledge, playing either with his/her desire to see and observe (voyeurism, visual pleasure, scopophilia) or on his/her desire to know and infer (exploiting ignorance, anticipation, or superior knowledge vis-à-vis the characters)." (Thomas Elsaesser, 2002). The attention, memory and emotion that cognitive film scholars look for are not those in the persons performing the play, but in the spectator, and they "recognized that these mental activities and excitements in the audience were projected into the moving pictures." (Munsterberg, 1970:48). We understand that these 'attention, memory and emotion' form a unique aesthetics experience. This perspective taking in cognitive film theory just matches the view of pragmatist aesthetics.

The second is 'embodiment'. In the view of cognitive film theory, film is not made only for the eyes and ears, but "all the senses in our body work simultaneously, interwoven in a system that unites sensual impressions, neuronal processes, memory, imagination and momentary mental activity." (Dinkla Soke, 2003: 22). In cognitive film studies, there are three types of "agency" in narration: Narrator, Actor, Focalizer. A narrator offers statement about; An actor acts on or is acted upon; A focalizer has an experience of. Focalization (reflection) involves a character neither speaking (narrating, reporting, communicating) nor acting (focusing, focused by), but rather actually experiencing something through seeing or hearing it. Focalization also extends to more complex experiencing of

objects: thinking, remembering, interpreting, wondering, fearing, believing, desiring, understanding, feeling guilt etc. (Branigan, 1992: 101) The application of a focalizer, transfers the spectators into one of the character in the film narration. The spectators are not anymore there holding a can of popcorn, whispering with their neighbours, but intensively applying their attention, experience, emotion and expectation to making the narration. They are embodied.

Cognitive film theory is thus powerful in studying avant-garde films, art films and even in contemporary video art. Talking about engaging the body of the spectators and playing with the body, American video artist Bill Viola gives an example. When creating his video art installations, Viola often projects the figures in huge sizes. He calls these images “power pictures,” and he says “these ‘power pictures’ work like alarm calls, since before the soul can be aroused, the body must first be shaken awake.” (Viola, 1995: 66) Sometimes he applies actual human sizes, because he wants to create another reality that looks very realistic, to reduce the distance between the image and the spectator. In a dark museum surrounding, forgetting about the frame of the video and the other visitors, the spectator can get the illusion that the character is coming down from the screen standing in front of him or her, or the spectator himself is stepping into the video. A mental dialogue is thus created naturally. (Figure 7.2)

So it is clear that cognitive film theory and interactive space design share in many points a view of emergent aesthetics. It makes it reasonable to seek for inspirations in film making for interaction design. The relation between complexity and arousal is one of them. It can help interaction design to engage the participants bodily and mentally, moreover, this engagement will benefit the interaction and make it rich and meaningful.



FIGURE 7.2 *'The Crossing' [detail] (1996). Video/sound installation.*

4 Complexity and Arousal

At the beginning of the last century, people started, gradually, to get some experience of viewing films in early cinema. It was exciting to see the figures walking around on the screen, instead of being still on a painting canvas. In 1896 French filmmakers Lumière brothers had the first screening of his new film *L'arrivée d'un train en gare de La Ciotat* (*Arrival of a Train at La Ciotat*). (Figure 7.3) This 50-second silent film shows the entry of a train pulled by a steam locomotive into a train station. There is no apparent intentional camera movement, and the film consists of one continuous real-time shot. When the huge steam train slowly enters the station, towards the direction of the spectators (when shooting, the direction of the camera), the spectators got terrified by the accosting images, and was unable to grasp that the film was in another reality, many of the spectators screamed and ran for the exit doors.

The experience of the spectators more than 100 years ago was a completely new stimuli. It went beyond the level of arousal that they could handle with. The same film can hardly scare away the spectators today, even using advanced 4D cinema equipment. This means that there is a certain relation between hedonic value and complexity, and that this relation is situated. And it implies that experience changes the way we react to previously novel events.

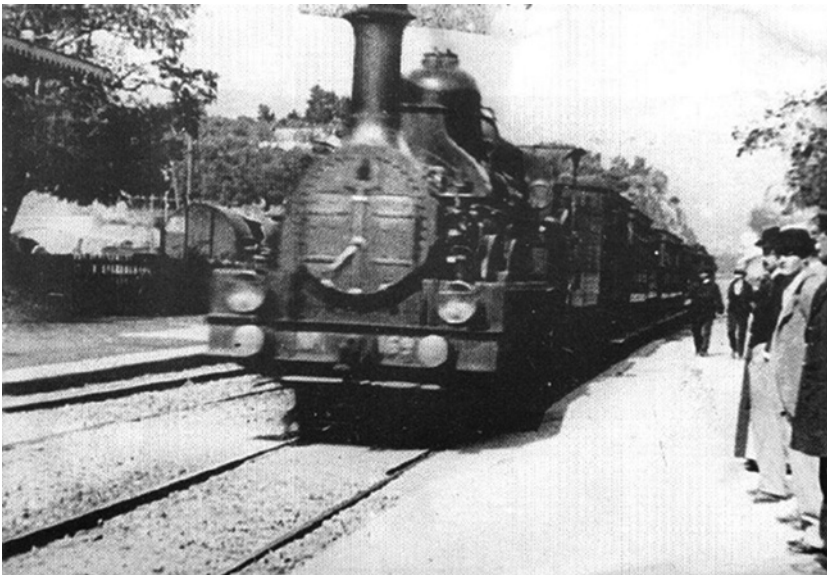


FIGURE 7.3 Film clip of *“L'arrivée d'un train en gare de La Ciotat (Arrival of a Train at La Ciotat)”*. Lumière brothers, 1895.

Daniel Berlyne investigated this complex relationship between arousal, hedonic value, complexity, and experience. He assumed that complexity increases arousal and that the function relating complexity to hedonic value has an inverted U-shape. (Figure 7.4) This suggests that medium complexity is liked best: people do not want to be bored by the absence of novelty but they also do not want to be over challenged by too much of it. Importantly, however, the amount of arousal that complexity induces changes over time through habituation. That is, the same level of complexity that has scared us in the beginning is something we like and expect after some experience, and the same level that we like in the beginning starts boring us after some time. In other words, aesthetic experience is dynamic. Berlyne defined his approach as empirical aesthetics “from below” in contrast to speculative aesthetics “from above”.

Focusing on Berlyne’s theory, it will be useful for interaction design studies to apply experimental psychology (behavioral and neuropsychological) methods for measurement and quantification, and to provide the necessary empirical grounding. Before getting there, one question is left: “How do we adapt and control complexity?” Berlyne (1963) noted that “the concept of complexity included different aspects: the irregularity of the arrangement of elements, the amount of elements, their heterogeneity, the irregularity of the shapes, the degree with which the different elements are perceived as a unit, asymmetry, and incongruence of the elements.” This rule was applied to many visual art works, while for film and interaction design they are not

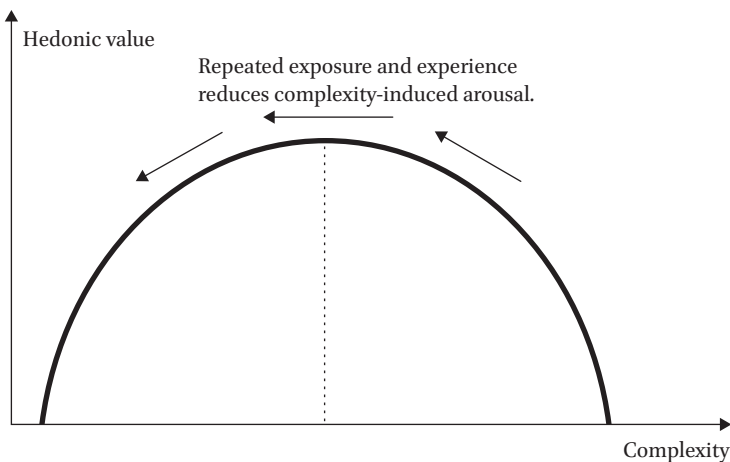


FIGURE 7.4 *Inverted U shape by Daniel Berlyne.*

yet sufficient. Berlyne proposed three elements to embed complexity in the stimuli for changing. 1. Surprise and incongruity: When a stimulus pattern fails to agree with an expectation that was aroused by what preceded it, we call it “surprising.” 2. Uncertainty: A basic resource of all narrative art forms is what commonly goes by the name of “suspense”. 3. Absence of clear expectations: Authors of plays and stories often create situations in which no plausible outcome at all can be readily recognized. (Berlyne, 1971, pp. 145–148)

Avant-garde films and contemporary video arts took these elements to extremes. They use montages which seem less (or even not at all) connected to show surprise and incongruity; they use slow motions to give time to the spectators to involve more memory expectations, imaginations and to increase the feeling of uncertainty; they create more and wider ‘gaps’ (absence of clear expectations) in the narration for the spectators to make up their own versions of the story.

5 Discussion

If ‘sound’ is basically adjectival while ‘vision’ is a noun (Branigan, 1977:98), we would like to add ‘space’ as the verb. Dealing with interactive space design, we are not only dealing with image and sound, but also with the space. Space is a reality that our body is physically situated in and interacts with. The interface of an interactive space is much different from the cinema screen, or computer screen, even if it involves touch screens. The interaction in an interactive space is therefore more dynamic and multi-dimensional.

There is a major difference between film and interactive space. Film, with the playing of montage, applying the role of focalizer, creating surprise and gaps for changing the level of arousal, can in a large scale influence the emergence of the aesthetics experience. However, the film itself cannot be changed by those aesthetics experiences. Interactive spaces, on the other hand, can adapt in real-time to dynamic aesthetic experiences. Therefore, the emergent aesthetics experience in an interactive space is more active and dynamic. There is huge potential to apply artificial intelligence technologies and empirical methods in interaction design and there are various ways to test it.

The methods that film developed to change complexity can be used in design and for testing an interactive space. In our current research, to establish a real time adaptive relation between gesture (bodily posture and movement) and complexity in the interactive space, we have introduced the following three steps. (Figure 7.5)

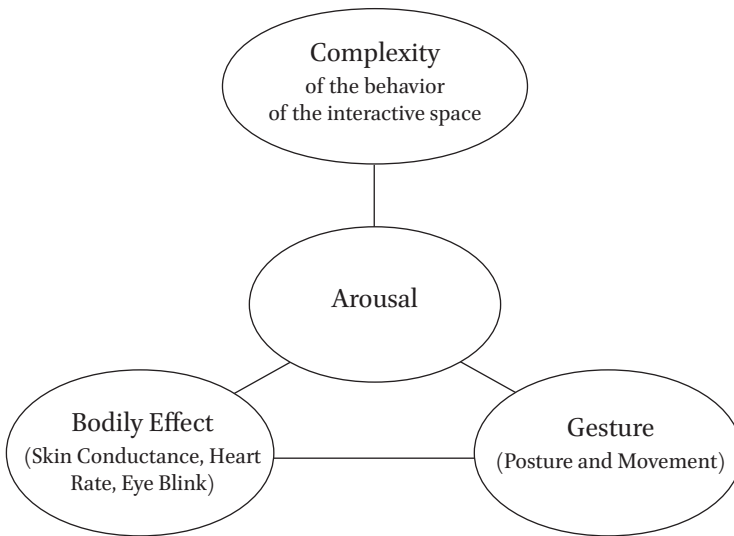


FIGURE 7.5 *Connections among arousal, bodily effect and gesture.*

1. Step one: By running empirical experiments in a one-way reactive (not yet interactive) stage, we provide different levels of complexity, and record the bodily effect and gesture.

Studies have proven that the arousal level can be measured in many bodily effects, like skin conductance, heart rate and eye blink. When participants perceiving a stimulus with either stable or changing levels of complexity, their skin conductance, heart rate and eye blink will be recorded and their posture and movement will be recorded, coded and interpreted. When the relation between arousal and bodily effect is known, and when the relation between bodily effect and gesture is found, then we have a connection between gesture and arousal.

Gesture includes body movement and posture. According to Berlyne, bodily changes indicative of heightened arousal have been found to depend on a group of interacting structures in the brain that are collectively know as the “arousal system” or “ergotropic system.” Berlyne introduced the term “Arousal potential” which denote something like the “psychological strength” of a stimulus pattern, the degree to which it can disturb and alert the organism, the ease with which it can take over control of behavior and overcome the claims of competing stimuli. “Arousal potential” includes psychophysiological properties such as intensity; ecological properties such as association with biological gratifications or discomforts and collative properties such as novelty, surprisingness, and complexity. (Berlyne, 1971, p. 70)

2. The second step is to run bi-directional reactive experiments: we make the interactive space adaptable (physical and ambient) by receiving the signal of changing bodily effects (eye blink, skin conductance, and heart rate). People interacting with the space and their dynamically changing bodily effect will be fed back to the space in a looped fashion, thus enabling the space to change its behavior accordingly.

3. The third step involves cultivating a real-time interaction scenario, thus making the interaction more alive and intuitively as well as physically felt by the user. Instead of communicating with the space via bodily effect, which requires sensors, stickers and wires attached to the body, people will be directly communicating to the space with their intuitive gesture (via ambient sensing methods). Based on the previous experiments and studies, the gesture carries information about their arousal level. The space can interact with the sensed arousal level of the participant by adapting its spatial and ambient complexity. This arousal is related to the aesthetic behavior “through which the appreciator seeks exposure to works of art.” (Berlyne 1971, p. 7)

Getting back again to the ‘Muscle Space’ project, from the perspective of artistic creation and technique achievement it is a great piece of design work, and it reached “interaction” at a level that many other so-called “interactive” projects did not reach. If we ever have the chance to redo it by involving more human cognition and emotion, by embedding the relation between arousal and complexity, and applying empirical methods during the design process, the interaction will be richer and more powerful.

Conclusion

Don’t think beauty in appearance, think beauty in interaction.’ (Djajadiningrat et al. 2000, p. 132). Aesthetics not only exist in interaction, but also makes the interaction existing. An interaction which excludes the aspect of aesthetics cannot be alive. With the term ‘Emergent aesthetics’, we refer to two interconnected notions: pragmatist aesthetics and 4EA cognition, and we emphasize that aesthetics experience emerges in a fully interactive system, which comprises the body, mind and the environment, without a starting point nor an ending point.

A truly interactive space is a space that encourages the dynamics of emerging aesthetics, then listens to it and interacts with it. It is a space that can shape the experience of the participant. In shaping the experience, film studies provide us with examples, both in perspective and in methods. To

apply the emergent aesthetics view to interaction design, and answer the questions of how to involve human mind and body in the interactive space and therefore to reach a true interaction, we thus need to find out how an interactive space can influence the emergent aesthetics, and can be changed by the evoked emergent aesthetics in the multiple dynamic loops of interactive and cognitive systems. Berlyne's theory of arousal and complexity is a powerful tool for reaching that goal.

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