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Physical and Perceptual Boundaries over the Body in Interactive Surfaces

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Abstract

Body encounters the existing world since it was born. Every action becomes the very basis of its next step. It transforms its own experiences into information. It not only constitutes its own products but also benefits from traditionally constructed outer environment. Within this comprehension process, it also intervenes to its own space. At this point, the space which is produced by the body is seen as the result of interaction and motion. Existence of environmental conditions or desires of body determine the limits of spaces and creates the structural complexity. The gaining from the process of this realization is reflected to the whole space. Thus, spatial limits are composed as the results of this experience.

From this point, body is under the influence of daily life (personal, physical, etc.). Duration spent in the spaces of daily life shape the experiences and creates spatial data through intellectual activity. As the result of the repetition in this organization of space, body couldn't determine the limits and it faces the existing limits. This is not identified as an experience.

Interactive surfaces have perceptual, interdisciplinary existence but in spatial aspect, it has physical existence too. Between the range of space and perception, as an experience style body, even though being in physical space, interactive surfaces can carry the perceptual boundaries to different scales. In this way, experience is variable and it exceeds the spatial perception.

Keywords:	Spatial experience; Body-space relation; Spatial boundaries; Interactive structures; Public space
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1. Introduction

Life practices which have changed by the second half of 20th century produced new experiences as well. Fast moving technology, especially computer and digital communication devices' affecting daily life directly is the reason. This interaction offers a new perspective to the experience of dynamism between the body and the space. A different process from previous fractions of tools and production practices which is created by Body/Space relationship has been gone through.

The most important reason of that is concept of virtuality's being add as a layer to the physical reality. Even though virtuality isn't a new concept, virtual platforms are changing the daily life practices via digital technologies presented. This also forwards the space. While the body is tied to somewhere in its physical existence, it can be anywhere virtually. Yet another dimension for this relationship is the state of virtual reality's meeting a physical existence, a body. It is critical when body as an organic existence meets and communicates with an inorganic existence adorned with virtuality layers. It is inevitable for this situation to create new experiences.

Especially the speed of technology during the 21st century presents empirical data to new life practices. Knowledge is not stable. Notice's purpose at this point is to argue how this new experience may reflect on body/space practices and what kind of a change in terms of cognitive and structural this reflection may cause. To understand this experience range, second chapter is reserved for the relationship of body and space. The subject of the third chapter aims to examine virtuality concept's being added via technology tools to the relationship of body and space.

In chapter four, the example named "Hypo surface" is chosen as a reflection of all these relationships to the practice in the field of architecture. In the example, body experiences a new meeting describing the space and displaying a new behaviour but him. It's inevitable to

affect the processes of designing and experiencing. Via this example, the experiences presented by the dynamism between body, space and virtuality will be discussed. Trying to understand what it includes or not to the relationship between body and space is the purpose of this notification.

2. Body and space

Contact of the body with the existence except for itself makes its physical and psychological quality dynamic. This dynamic is basically related with movement and time. When the body moves physically or mentally, sense and memory are triggered. It starts to contact with other things. These contact types determines the actual attitude and intellectual attitude.

In the 21st century, one of the important effects of this dynamic is technological developments. The concept of this aged called as an Informatics Age. Technological devices are directive and effective. This affects a lot of discipline in many ways. Industrial Revolution can be defined as a start of modern technology. Scientific data reached through movement in The Movement Image book is explained by Deleuze as the following [5];

"The modern scientific revolution has consisted in relating movement no to privileged instants, but to any-instant-whatever. Although movement was still recomposed, it was no longer recomposed from formal transcendental elements (poses), but from immanent material elements (sections). Instead of producing an intelligible synthesis of movement, a sensible analysis was derived from it. In this way, modern astronomy was formed by determining a relation between an orbit and the time needed to traverse it (Kepler); modern physics, by linking the space covered to the time taken by a body to fall (Galileo); modern geometry by working out the equation of a flat curve, that is, the position of a point on a moving straight line at any moment in its course (Descartes); and lastly differential and integral calculus, once they had the idea of examining sections which could be brought infinitely closer together (Newton and Leibniz). In all areas, the mechanical succession of instants replaced the dialectical order of poses: Modern science must be defined pre-eminently by its aspiration to take time as an independent variable."

According to this, it is seen that the body contacting with the factors except for it produces its own attitude with different experiences. It's critical to make match between the body and the space and also existence of the body physically in that space. In addition to its existence, the body also is trying to understand the space and producing a mental activity. In the space, especially volume between limiting factors like surface is seemed like emptiness. However meaningful the dimensional contacts in the space are made in this emptiness [3]. Rudolf Arnheim's approach to the emptiness concept in the area is as the following;

"The effect of emptiness occurs when the surrounding shapes e.g. the contours, do not impose a structural organization upon the surface in question. The observer's glance finds itself in the same space wherever it tries to another, one space being like the next; it feels lack of spatial coordinates, of a framework for determining distances. An object can be undefined due to it's own space" [1].

Merleau-Ponty explains the perceptive relation made with dimensions with lamp example in his "The World of Perception" [13]. As an observer, what the body sees when looking through lamb is actually reference of the situations. What kind of perception will be got at the back of the lamp is based on a guess. Triggering is done by the previous images in the memory. The possibilities about the what is the image of the background will be on. To reach certainty will be done by going to a space in which that you can see the background [13]. In this point, perception will be still less because when the background is seen then the front side will be unseen. The body perceives the space with some certain perceptions. However its dynamism will need time to perceive its space, about perception thesis Bergson says;

"We perceive the things as they are. Sense makes us meet with the material directly, it's not personal, it overlaps with the perceived material. With the help of the emptiness between action and reaction made by brain, perceiver existence success to take only the part that interests it. While material identifies itself with and pure virtuality, our reality perception is overlaps with the part that is not our concern" [4].

The matches which will occur in the space are related with the time passed to gain a seat in the memory. Except for the concrete relation between time and space, abstract qualities are the most important connective between memory physics and space. The memory away from the control of the reality is on more slippery space than perception. The virtual information gained in the past does not only help for to realize the nature of the act or object, but it also helps to gain a seat of the available material in the system creating our world-view [2]. Hence, the comparison between body and space is limited by memory and perception. It identifies and codes it with the gained data. It gives meanings in structural way. (Door, Window, Wall, Eaves etc.) What makes difference while having relation with them are light and tissue etc. Likewise having a relation with the other things except for itself is based on interaction and movement. Constant point position is completed with the other data in the memory. And this does not create a new experience.

"*Until now, a very serious data bank of architecture has been created. A consideration life has been created with the same seriousness, richness and valuableness. Architecture is saving consisting emotional qualities of area having the least produced information and the most developed also least talked branch. Up to now, these savings created different discussion area and they tried to not involve to each other. In fact, what has to be done is to look a situation from all sides and responsibilities. Norms of the architecture are the substructure of the emotional and logical saving which can bring all savings together"* [16].

When we look at the traditional and space practice up to now, architectural items are identified, stable and it has movements in the meaning of virtual effects. From Plato's cave allegory to the invention of the perception an interaction can be defined based on movement. Even after the development of building materials are ready to supply height and transparency, space dynamic will be shaped over the possible results of interaction and design. In that point, subject is the body. The moment when the space gets rids of its stability; the experience becomes plural but spook. Spuybroek explains on the architectural idea in which the body is a subject;

"This architecture reifies the undetermined, decided not by giving them name by connecting by joints. It shapes the unshaped and unconstrained and it finds the structure of experience which is especially not defined before. It maps some liquid the potentials with high constructive. It constructs these potentials by coordinating and never comes back from the same way. Now, experience and geometry is in the material. With this cognitive perception, combining the act, perception and structural area becomes possible" [15].

At this point, the space becomes a "thing" that defines the limits of the space and recalcitrates to the body. According to Lefebvre, the space is neither a subject nor an object. According to this idea, the space is the construction of the relation between things [12]. While matching the body with the other things except for itself, the important things are action and reaction. Through this match's result communication and relation type is shaped.

3. Virtuality and space

While technology changes the daily living practices, the relation between the environment and us change in the same percentage. This situation brings new dimension to the habitual basic definitions. The space one of the basic definitions got new meaning and started to have new definitions. While mentioning about the existence of concrete space, it gets diversified as virtual space, perceptional space, logical space, public space, personal space, existential space, Cartesian space and abstract space.

Especially from the second half of the 20th century, with the help of development of the technology, virtuality has had a larger usage area. Virtual museums, virtual dwellings, virtual bodies, virtual chat rooms and virtual architecture definitions are the definitions which are invented in the era and topics of a lot of conversations. After the technology got a life in the digital spaces, the space definition showed that it can be an abstract. Virtual space is one of the concepts that digital technology made actual.

In the dictionaries "Virtuality", is described as "the thing which is not in the reality and designed in the mind, fictitious, imaginary, and estimated" [11]. In that meaning is virtual space a fact which is not real and imaginary? The acts which are done in virtual spaces are the real acts which are done in the person's brain. Merleau Ponty [13] explains body and space's existence and reality contexts with these words;

"A homogenous extension thought lying in front of the bodiless mind replaced with a heterogeneous extension which has special direction and having a relation with our situation for us like we are thrown to the world with the specialties of our body. Human is not a soul or a body it is a soul with a body. We can reach truthful because our body is fixed with the things. It is not only for extension, we can reach everything through our body; every existence out of us is getting a combine with soul and body with human specialties."

In this meaning, the experiences in the virtual worlds are real experiences. The thing directing our body is recognized with mind and happens in mind. In virtual space, there is a mentation instead of physical movement. Also, in the virtual space physical body does not create the space, mental space is created. Virtual space creates its own time flow and space meaning. In the real time flow, the virtual space empiricist is also his/her own creator.

Even if the reality and virtuality look like they are against each other, they have possibilities to turn into each other. Deleuze [6] explains between those two like this;

"Every reality is covered itself with virtual image cloud. This cloud is happened over the virtual images and turned around term series which can be narrow or large. Virtual ones show distinctness with their close degree to the reality. They are called as virtual because they are absorbed, spreaded, become or disappeared in the shortest time than ever imagined."

In that way virtual space has virtuality and reality at the same time. Actually our existence is real when we have relation with virtual spaces and this existence experiences us real things. Artificial Intelligence

products turn architecture's physical areas to cognitive areas and this turns physical spaces to virtual spaces [14]. This change in the production practice is caused artificial intelligence technology products as much as possible.

4. Impartial interaction: Hypo surfaces

21st century's space production is not only created over architecture but also it is created in an interdisciplinary platform such as IT and material engineering. This creates a plural relationship instead of an absolute one between body and space. Virtual platforms do not produce a physical environment. Experiences in virtual platforms mostly give empirical results. Especially products, which belong to IT, make virtual environments groundless in physical terms. However, the body is able to space attachment and gain a seat in terms of perception. It brings the question if it is possible to combine all these technological developments and physical perceptions. It is partly possible in today's world to produce spaces which can be seen as a science-fiction scene in previous phases. Spaces which are adorned with tools with artificial intelligence can also produce the space itself. In the light of all these developments various examples may have the power to change/to convert common spatial practices. All the practices acquired in the context of body-space relationship are always dynamic. However, the spatial practices which can be produced with today's opportunities may have the power to uncanny these situations [9].

These space and mechanisms', which presents mutual dynamism, relationship between body and memory is critical. Today's combination of IT systems may lead to question spatial items' common practices. A device continuously refreshing all the data body acquired via memory will form new relations in terms of space attachment. To explain these affects a project produced as a prototype and named "Ascending Hypo surface" can be given as an example (Figure 1).

Ascending Hypo surface is made of physical movements of three dimensional screens brought together in order to create a fluid surface. It is a flexible architecture surface with IT systems' having dynamic variables on surface creating behavior possibilities. System is made of little metal plates, controlled pneumatic constituent parts which are interacting with electronical data. Surface is designed with an expressionistic approach and has an organic display [10].

Interactive systems enable the surface to be a temporary media tool with motives spreading as rhythm and graphics and transferring surface from the second dimension to the third dimension. System offers a wide matrix with its advanced prototype. It brings a physical existence to knowledge. This surface has a physical transformation with special software using the changes of what it perceives in terms of sound, light and movements. The area it is spaced becomes a dynamic space which is changing and transforming according to users' movement, amount, population and sound level and different time of the day. This situation can be defined as surface's gaining behaviour. The system enables data to transform into graphics and video visuals with productive algorithmic programs and some three dimensional schemes' copying. This "digital ocean" creating fluidity with countless combinations and activating with motion and sound also is used as a visual instrument (Figure 2).

Ascending Hypo surface is designed by Geulthorpe. In this design Geulthorpe presents his discomfort of technology's being interpreted in technical way and expressing in designs with developing the idea of Ascending Hypo surface. Geulthorpe tries to associate architecture's paradigmatic change with society's electronic environment to cultural adaptation instead of architecture's representing program's use. However information textures hybridized with surface in Ascending Hypo surface are different from material's

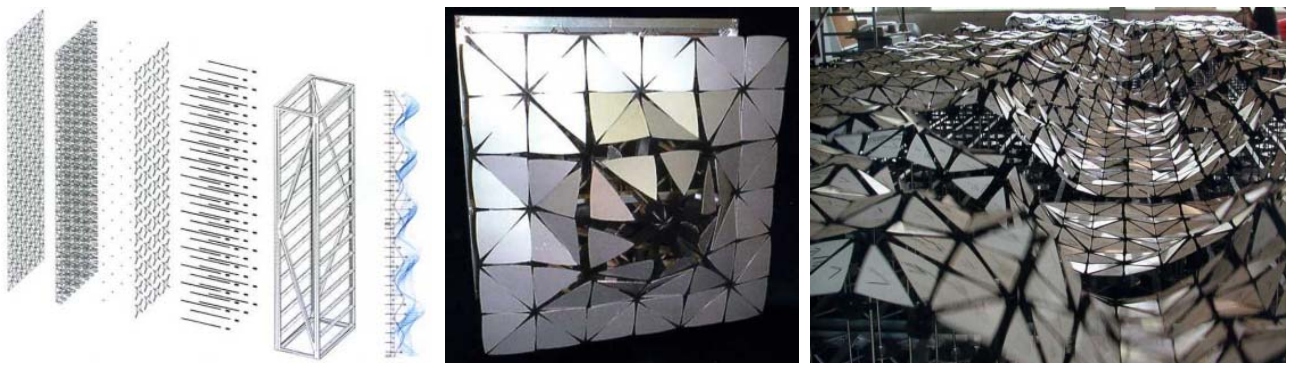

Figure 1. Structural Details belongs to Hypo surface

(Source: PRAXIS: Journal of Writing + Building, Issue 06, 2004)

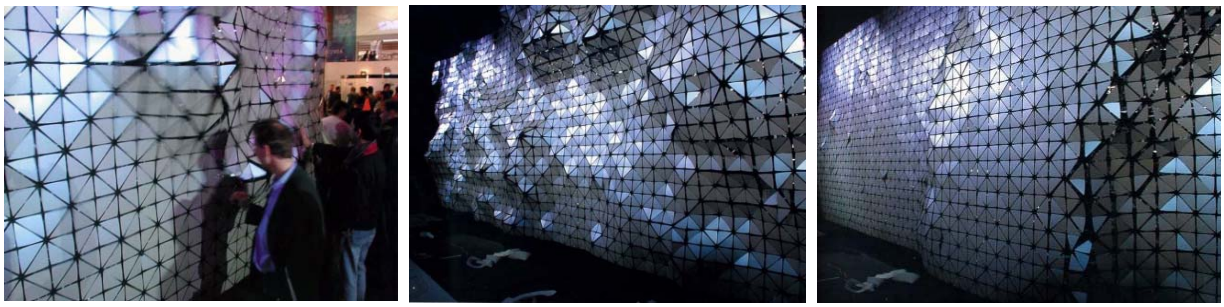

Figure 2. Hypo surface and Body Encounters

Client: The Birmingham Hippodrome Theatre; Design: Mark Goulthorpe of dECOi Architects;
Location: Birmingham, UK, Duration: 1999-2001; Source: PRAXIS: Journal of Writing + Building, Issue 06, 2004

attribution and its change ends with its being something else. For this adaptation Geulthorpe says;

"If we consider a culture's basic texture as 'technology', every new development's effect will cause renovation of this area with new technical webs" [8].

If it is considered this renovation causes technological developments' transitions and changes in not only cultural production but also cultural perception, the project will get critical in both ways. First, it requires a technological structure which, in terms of technical, can transform stability in physical means into movement. Second is what the psychological effects might be. The relationship between body and surface gets critical the moment behavior such as losing/changing direction is met. Again it can be explained with Goulthorpe's explanation as follows:

"If it is considered that the cultural tendency is traumatic, in terms of production and perception it can be said that there is a transformation from autoplastic to alloplastic. People start taking action in an alloplastic space increased capacity with exemplification and regulation, answering, conditioned. This expands determination concept spaced in fluidity and physical concept which can be formed with increasing interaction. There's an uncertain interaction and a mutual examination between people and the area surrounding them" [8].

The project both has a simple structure and enables a new communication area. Metallic and on way surface is stable. Body gains movement with the interaction of light or sound. A real time physical habit and dynamism is discussed and action acts mutually between body and surface. Geolthorpe says the following for this situation;

"Trauma does not occur with overabundance or excessiveness of meaning, it occurs with cognitive negligence's intensity. This shortage/inefficiency and flaw, implies subconsciously c characterized hypo-front appendix and this way when the effects of these kinds of surfaces which are created numerical, exorbitance or maximum statements seem more suitable than hyper-front appendix" [8].

With all this potential, Ascending Hypo surface is separated from other exampled by its standing between virtuality and reality and containing both, combination of physical environment and digital technology. Despite its structure tariffing experience, with complicating prediction, common time and space relationship gains another dimension. Surface decided how and when to react. This situation brings the question "is it possible for body to gain a space by creating a perception against surface's imaginary value when the body and the surface meet?" The answer to that is, it will only show up as an experience when a fiction is included to the life practices. In this context the space it will be used or according to opportunities of the system editing changes and the results and environment will be able to identify.

Physical existence has virtual relation with the surface which was covered computer system. Although some possibilities have changed (smell, sound), the body is limited with the virtuality of these surfaces. Especially in daily life, the space of the survival conditions on the space is still a question for cyberspace. On the other hand; it is a result of looking for a solution virtuality in the physical body, the surface becomes a behaviours producer against the surface and it brought lots of questions to lead lots of discussion understanding the time and space. Especially, this question should be asked; how these behaviours and reactions will affect the designing process? According to that, can it have the potential to affect the whole existence psychologically, time wisely and spatially? Or is it an illusion? This question should be asked first.

In the graphic(Figure 3), linear line is described as surface section and tried to understand if the movement is real or virtual and how far it can go. In the Figure 3 a, b, c, d and e, the matching described as a graphic, is happened in the surface section including colours. These colours are colour codes in the numerical area and these

create the image on the computer system. As these surfaces are interface of digital virtuality, they do not get differences in the matching between body and physical except for virtuality. When the distance between the surface and body gets closer, virtual image disappears or blurs.

It is seen that the behaviour in the cut and on the surface progress simultaneously and act upon the body. The computer system that forms the organization can record these actions and exhibit new behaviour. However, apart from these features it is certain that it contributes new alternatives to the surface. When looking at these new alternatives it is observed that it contains the behaviour potential on the Figure 3. The relationship with space occurs when the surface encounters the body. Based on this for example it can have the power to abolish the enter concept. If evaluating on the same example again, the space which enter takes space does not have importance any more. In this situation being included in the space can be achieved from any point. With changing the position of the movement ıt prepares an area which questions the time. The designs to be made within all these possibilities will not be similar to the common ones.

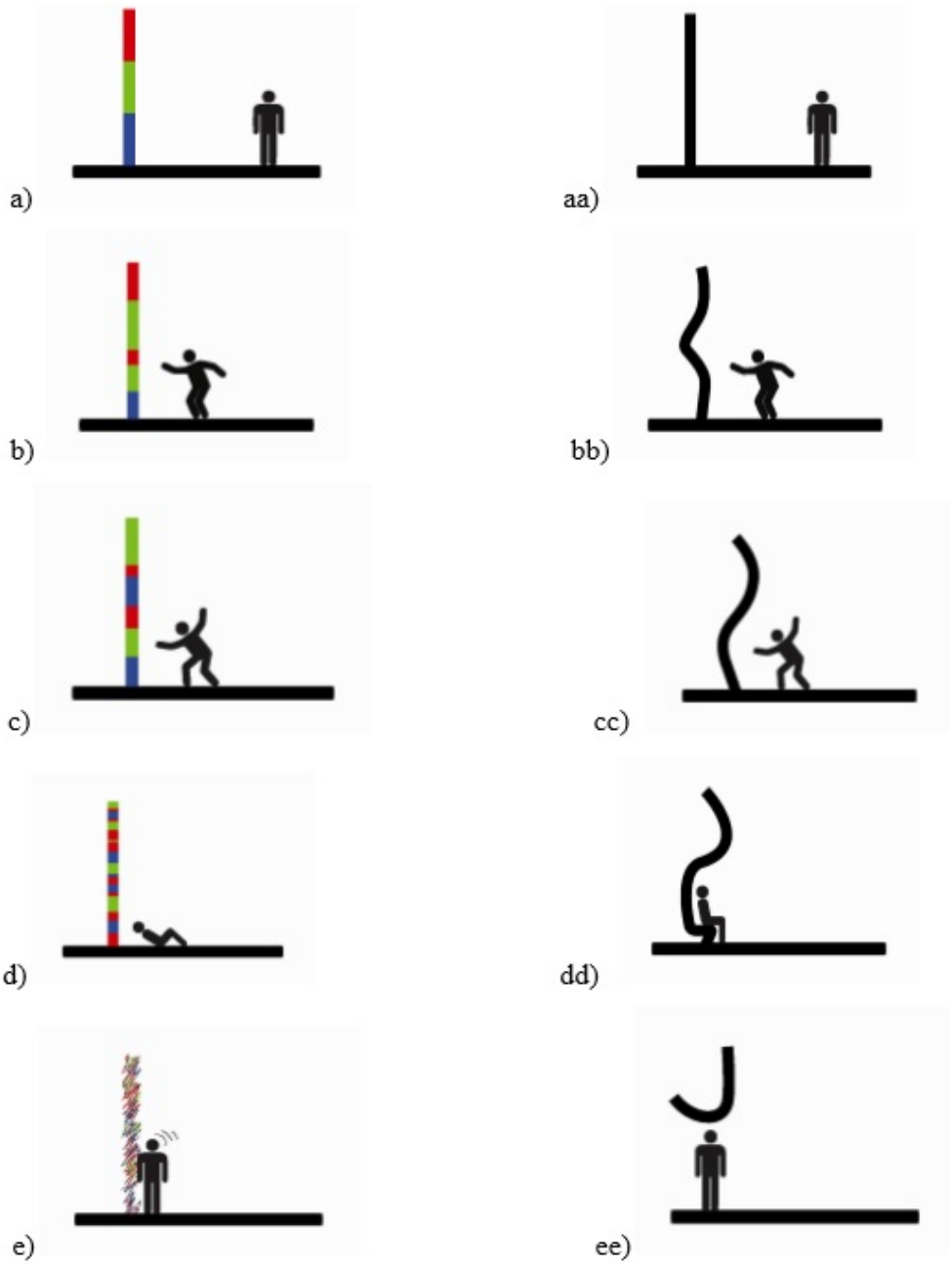

Figure 3. Body–surface interaction

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