

Schemata as a framework for full body and physical design interfaces

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Abstract

Digital art interfaces presents cognitive paradigms that deals with the recognition of the symbols and representations through interaction. What is presented in this paper is an approximation of the bodily experience in that particular scenario and a new proposal which has the aim to contribute more ideas and criteria in the analysis of the learning process of a participant discovering an interactive space or interface. For that I propose a first new approach where metaphorically I tried to extrapolate the stages of the psychology of development stated by Jean Piaget in the interface design domain.

Introduction to the dichotomy mind/body

The dichotomy between mind and body, the privilege of symbolic knowledge based on the rationality in counter of the senses is an idea aroused in the ancient Greg philosophy of “the world of the ideas”. The truth could only be acquired by the power of mental activities, and the sensory and sensitivities feelings were only part of the illusions. With Descartes, the western philosophy shifts the same dichotomy to the realm of qualitative differences. The mind is *res cogitans* and the body, *res extensa*. [1]

With the states of the western philosophy, the western culture extended the dichotomies mind/body in most of the cultural expressions. The body feels and is something temporal; the mind thinks, it's the true essence of humans and it's the right way to know the truth because the body is lying us, etc...During decades the western culture fostered the intellectual in counter of the senses.

In the artistic domain those ideas imply a privilege of the gaze sense in front of the other senses fostering a contemplative role in the perception of a work of art. The gaze was the most rational sense among the others.

At the end of the nineteen century a counter vision appeared as a consequence of the critique of the rationalism which pointed out that knowledge is nothing more than the interpretation of the senses. Friedrich Nietzsche led the discussions of the crisis of the rationalism where doubts appeared about the role of the feelings and the senses in the acquiring of knowledge. Perceptual kinetics activities started to be considered as a form of knowledge of the world.

At this moment, the senses, the touch, the movement, and the smell, started to have an important role in the artistic domain. In the context of art installations nothing was planned as a contemplative experience, the body of the public was invited to be part of the art work and placed in the center of the work. There is no “god eye view” place where the public can see in a perfect way the piece as the Cartesianism states but instead of that the public is physically inside the piece and has to build their own experience depending on how they act and explore the work of art.

The experiences of the sixties and seventies in performances and installations pretended to reduce the physical presence and seeked in the audiovisual an expanded form of action. [2] The works of art were fields of potentialities. Those approaches to media brought us the first crossroads of expanded cinema and new media experiences where participants were placed in multimedia environments.

In that practice of multimodal representations the experience is mediated by the body in equal conditions than iconic and symbolic representations. We know the world through the exploration of the space.

Enactive model of representation

We nowadays use the term enacting knowledge to state that knowledge is gained by our perception in a circle feedback process of action and perception within the environment.[3] Perception, in a physiological approach, is a process of association and recognition of the scene as a result of the process where the stimulus are gathered in

our senses, converted in electrical signals and processed with our previous knowledge. That circle is constantly tied with our nerves and motor sensors which mean that not all the responses of our activities are previously processed and not all processed scenes are a matter of our previous knowledge. In that sense, a process of exploration and acquiring of significance appears and it's well studied in the kittens learning traineeship by Piaget. Their exploration of the world gives significance to that world.

Our body actions bring us the patterns of experiences, which Johnson called schemata, based on the Kant Shema and Piaget model of development psychology. [4] What Kant proposed was that works of art lied in offering ideas that could not be fit in a definite concept and that these ideas arose from the schema. [5] But towards what is the Schema built? Whereas Kant saw an unbridgeable gap between the rational and the body referring the mystery of the Schema, Johnson saw a continuation in which the body was used to connect the scene and the concepts.

These cognitive structures, the schemas, assemble networks and provide us abstract levels of rationing and conceptualization. The images of the schema act as a framework to interpret our environment. For every particular situation, we behave and interpret the scene depending on the assumptions that we have in our schemata.

Subjectivity window and bodily experience

If the abstract thoughts emerge from our bodily experiences, one could think that experienced participants have a wide schemata of the scene based on previous bodily experiences but novel participants have to build their own schemata.

I think that environmental factors have always been influencing our experience. Even in a contemplative scene there are always factors that surround us and affect our experiences. It doesn't only depend on our gaze sense. If for instance we consider thinking about the experience that one has visiting the *Capella Sistina*, we can observe that environmental factors such as space, temperature and the orientation of our body looking to the *frescos* take part in the construction

and the meaning of the scene. Then note that even in those art experiences that have a priory no aim in bodily acting exists some sort of bodily enactive experience.

The difference between the *Capella Sistina* and a digital interactive space in terms of bodily experiences is that the window, through which participants perceive and construct the idea of the world, has an artificial form and usage that is designed by the author of the work. We could say that the window is not only a result of the capabilities, the moment, and the experience of the participant, it is also a designed artifact that constraints, modifies and mediates the experience of the participant.

The interface is a form of representation of a subjective viewpoint. The interfaces draw the boundaries through which the participant constructs the experience. It's a way that the designer can't manipulate the viewpoint thus manipulating the experience. At the same time, participants are constantly changing the window (viewpoint) in a sort of a circle enactive feedback loop. The action of the participant creates a response to the system, it changes the viewpoint and in most cases, it is placed in the interface itself, so the reception changes again, creates a new action of the participant and so on. [6]

As Kant said in *Critique of the Pure Ration*, there is no content in the things unless we fill it in with our reflections and our interpretations. [5] That process of abstraction is accompanied by actions and gestures that help us to recognize the scene. In gestural terms we usually say, hold, subject, manipulate, and this is a sort of translation from our gestures to our mind.[7] It's a process of construction of a model of thought. We start with our intuition to generate cognitive actions that proceed to explore the scene to build the abstract meanings.

Summing up the ideas that I have presented above, we can assume that an interactive space has two relevant paradigms to resolve. The first one is that the scene is an unknown space that we must explore with actions in order to get significance because we don't have any schema of it. The second one is that those meanings are

mediated through the interface, the window that the participant has to explore the world.

Applying Piaget stages of development

As is well known the design of interactive installations can't have too many restrictions because we don't know a priori anything about our participant. Gender, size, behaviors, cultural skills, non verbal communication skills...

At the same time art context has nothing to do with efficiency and keystrokes models of evaluation so there is more freedom that allows the creation of worlds completely different from other experiences. In the other way around participants have no idea about the world, where the boundaries are, which is their "window" and how they have to use it.

The factors of an unknown world and the bodily acting needed to get significance are the essence of cognitive process of a baby. These conditions seems similar than the process that a participant deals in an interactive space. That idea encouraged me to consider the schemas that Piaget proposes in baby's development psychology stages [8] as a guideline for an interface design in art context.

The first stage is based in our instinct to explore the world, the interface, with our gestures in the space. Notice that gestures never are pure; they have goals and unconscious intentionality for learning purposes.[7] In that exploration arouse the outcomes from the scene and unconscious reflexes from our body.

Once we have discovered them we assimilate them and try to create generalizations. Find rules that works in the whole scene. For doing so we repeat the same actions that produced the previous outcomes, which are the second stage in Piaget theory. If the responses are right we build the firsts simple schemas.

After that, in the third stage, we try to structure in more complex way the schemas looking other subjects and trying to interpret the responses of the interface without intentionality. That is because we don't know where the limits are.

From here the experimentation is more active and has clear intentionality. We know a priori that is going to happen with and we test it.

We combine schemas and invent new ones. That was the fourth stage that brings us the mental representation of the scene, or part of the scene.

Once we arrive to that moment we will never pass again through that process. The symbolic function has created the meanings and it's not necessary to explore it again. Nevertheless there is one factor that breaks down our schemas that is the irregularities and the unexpected outcomes. As I said that process provoke an immersed an enactive circle where our actions changes our window, the interface, so we are constantly formulating new schemas of knowledge.

What this framework is trying to recall and expose is that the difference between an art interactive scenario that is interpreted as a game or an effective, emotive and deep art work is a matter of the design of the author.

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