

# **Relationship of emotional Responses with the Activation of Sensory Mechanisms during Interaction Processes with Virtual Products of Mass Distribution**

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## **ABSTRACT**

Today it is clear that Virtual Products affect users in various dimensions from the activation of sensory mechanisms, the cognitive dimension, the execution of various temporary micro-

processes of interaction, the way in which they transfer information until the experiences generated on them. Through the observation of the interaction processes carried out by a group of users on a website with a specific use in a learning environment and with the assignment of a task., There were detected at the end of the interaction the following factors: 1. People consciously described their experience accurately. 2) The activation of three dominant sensory mechanisms and their relationship with the emotional responses., The responses were derived from the experience. Networks were used to display and describe the information. The intention of these studies is to analyze how emotional responses are systemically related during the interaction processes of a person with virtual objects.

**Keywords:** Virtual Product, Web Site, Focal Attention, Emotion, Human Interaction

## **INTRODUCTION**

The increase in technology is generating various effects on human beings. One of the least observed phenomena is the incorporation of new concepts that help us to better understand and describe the types of objects and the possible effects that they are generating in us. Not only in the way we relate to them but also linked to the emotional states that they are capable of generate in us. In this sense, various factors have been observed that contribute to the generation of emotional states in relation to these objects. One of these factors is the transfer of information linked not only to technological devices but also on various virtual products [1]. Another relevant factor is related to the activation of sensory mechanisms linked to the interaction processes carried out with a great diversity of technological devices, these interaction processes tend to vary according to the technological device used. Consequently, it is important to consider that the technological device is a factor that affects the interaction processes with various virtual products or, seen from a significant perspective, as meta-representations derived from new digital media. The intention of these studies is to observe the relationship of the sensory mechanisms and the emotional responses in a person during the interaction processes, the relevance is the massive increase of a great variety of these products in learning environments and where the person's emotional state is closely related to cognitive processes.

## **INTERACTION WITH A META-REPRESENTATIONAL UNIVERSE**

Today we can observe the incorporation of new concepts to our daily lives related to the integration of technology to various activities in very varied environments such as learning, cultural, economic, political, social among many others. One of the main problems faced especially in areas of design and art is referring to the objects with which we work and produce. The proposal has been to name them in significant terms as Meta-representations

derived from digital media. It is a typology of Meta-representations of a virtual type that subsist in a universe very different from what we call reality. In this sense, and given a great increase of various technological devices in the daily life of human beings, we can speak of two great universes with which human interact., The Physical Universe described by Turok as a universe with simple laws constituted by a diversity of objects [2] and a meta-representational universe, which is also integrated of a great diversity and expression of meta-objects and their genesis occurs in cognitive processes. Neal Stephenson was one of the first authors to use the concept of metaverse [3] in reference to a different universe than the real one. In the studies that we are carrying out, the meta-objects with which we interact in digital information systems, new media [4], are at least in a level number 4 (N4), which indicates their complexity and effects on a person. As they are N4 meta-objects necessarily there is a physical interaction with the object on the part of the user as well as a cognitive one, which impacts on emotional states of the user, one of the observations that is considered relevant is that users are not ambiguous in describing their emotional state at the end of the entire process. Based on Ekman, Em state can be classified as positive or negative, and in our studies we handle them as emotional poles linked to a data economy.

## **BEHAVIOR OF EMOTIONS IN VIRTUAL PRODUCTS OF MASS DISTRIBUTION**

Based on the studies carried out, various factors that can generate emotional responses in relation to an object can be distinguished: physical appearance determined by its physical attributes, the service-customer relationship, the history of the product, the function of the product [5]. These factors are also observed in relation to the meta-objects, however, another factors must also be considered like the relationship in the activation of sensory mechanisms, the interaction in real time, the activation of the focal attention subsystem as well as the typology of information transfer and that have been observed in previous studies [6]. Ekman and Davison told us that people are able to identify the object that generate the emotion [7], in our study experience with various meta-objects, people are also able to identify their emotional response accurately and unambiguously in relation to the interaction and function of this type of objects and describe in detail the polarity of their emotional response. Many of these descriptions cannot be given as precisely by the user with other objects.

Emotions are not easy to define, however various authors have contributed to providing us with two fundamental characteristics: they are responses to certain events, studies developed since Plutchick (1965) to Zajonc (1980). Another very important characteristic is that emotions are about of a mental nature, which we can find in studies from Kant (1970), Canon 1927, Schachter and Singer (1962), Pribram (1971), Nash (1989), Dantzer (1996), Perlovsky (1997), Juslin (2008 ). In this sense, if emotions are observed as models or objects, it is clear that they do not belong to a physical world but a meta-representational universe. They are meta-objects that are interrelated with other meta-objects at least in a level 4. In which there is an inter-relationship with physical objects and meta-objects, that is, with the interaction of

the physical universe and with the meta-representational universe. In these studies, the existing relationships with physical interaction and emotional response will be analyzed.

## **PROCESS DESCRIPTION**

To carry out these studies, it was determined to observe the activation of sensory mechanisms in a group of users in a learning environment and its relationship with emotional responses. In the Design and Artistic areas one of the information systems used as tools to organize the contents of the classes are the Websites, mostly used from flat screen technology. In previous studies it was described why the interaction processes with the flat panel technology work systems are not carried out continuously. But from a variety of inter-related Temporal Micro-processes of interaction [8]

The studies were developed from the observation of the interaction processes carried out by 12 Normal vision (Nv) users on a Website used as a virtual classroom in a design course. Networks were modeled to represent the process. In which the relationship between the sensory mechanisms and the responses given by the user during the process of interaction with the Website with an assigned task were shown. The process was analyzed in three stages: The first one where the relationship between the sensory mechanisms and the characteristics of the interaction process with the Website through a network were visualized in maximum and minimum interaction time. The second one where the relationship between the sensory mechanisms and the user's responses in the process of interaction with the Website through a network were visualized in maximum and minimum interaction time. And in the third stage possible patterns were analyzed.

## **METHODOLOGY**

In these studies, the relationship between the activation between various sensory mechanisms and its relationship with the emotional response given by the person during the interaction processes were observed. The tests were carried out with a group of university students between 20 and 39 years in a local environment of a Public University in Mexico. The characteristics of the human component that designed the website is a professor in the area of Arts and Design.

Therefore, the methodology used for these studies was the comparative analysis of data and the use of networks and statistical techniques for data's visualization.

**Table 1.** General Nomenclature

| Sign | Description             | Sign  | Description             | Sign | Description            |
|------|-------------------------|-------|-------------------------|------|------------------------|
| Iv   | Visual Interaction      | Prop  | Propioception           | Pd   | Digital pressure       |
| Em   | Emotion                 | ElemV | Visual Element          | SV   | Visual Symbol          |
| Img  | Gross motor interaction | PAF   | Focal Attention Process | Imf  | Fine motor interaction |

For this study, the interaction processes carried out by the user from the Website and the answers given during the process were considered in the construction of the networks. The users performed the following tasks: 1. Locate the Website on a flat screen device 2. Enter the Website object. 3. Explore the Website.

In Figure 1 an example of the decomposition of the systemic process carried out in the user is shown 4. The activation of various sensory mechanisms can be perceived.

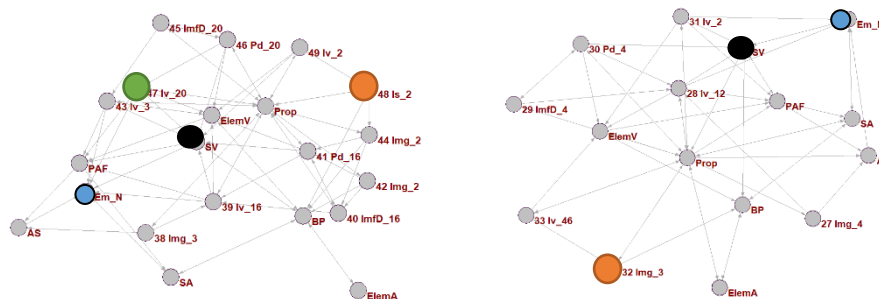


Figure 1. Networks show the relationship of the sensory mechanisms with the assignment of a task in the work system. User 4. The maximum (R) and minimum (L) times are displayed. Elaboration: L. Olmos & J. Gil 2019.

From data visualization in a first stage, it was observed that the interaction processes were not carried out continuously but through multiple temporal micro-processes of systemic interaction and the integration of multiple groups of Sensory Mechanisms (MS)., Once subsystems of micro-processes that change over the time a product of internal and external factors to the user, a behavior pattern observed in other studies [9] and it continues to be conserved as a constant. These interaction characteristics were observed in both the maximum and minimum times. Likewise, it could be seen that the dominant mechanisms during the interaction process with the virtual product were Visual Interaction (Iv), Proprioception (Prop), and they were the processes with the highest degree. The second group of active MS were ImfD and Pd. However, despite the fact that two groups of active MS were detected, the ones that were most directly related to the Em responses were relative to the Iv. The focal Attention subsystem was also directly related to the Em responses. The meta-representations that were most closely linked to the Em were the SVs. In a second stage, it was observed that the sensory mechanism that was most closely associated with the

Em was the Iv at the maximum time, with an interaction time of 20s. Likewise, SVs were a factor directly related to Em. While the ElemVs were factors that were not related to the Em. In the case of minimum times, a closeness of the Em with the SV was also observed by the user with an interaction time of 2s. While the ElemV were factors that were not related to the Em in the minimum time.

A relevant factor to mention is that in the maximum times the BPs were perceived to be further away from the Em, and in the minimum times the BPs were closer to the Em response. Likewise, the BPs in the maximum times were related to factors external to the individual from the activation of the MS of the Is. While in the minimum time the activation of MS related to processes internal to the individual were recorded from the activation of the MS of the Img. Likewise, the user gave a clear negative Em response in relation to the task assigned with the Website.

## DISCUSSION

With the results obtained, it was observed that the user in an academic environment using the Website, in both maximum and minimum interaction times, showed a relevant closeness with the Em responses in relation to the SVs, which in other studies have been referred like open linguistic forms that integrate the information system. This can indicate the complexity in the interaction with meta-objects, from top to bottom, which is linked to the understanding of the content and the emotional response. In this sense, negative Em responses were derived from the understanding of symbolic information. Which gave the user clarity to give a precise answer, in the case of user 4 it was because he found a lot of information and that the topic was not of personal interest. At no time did the negative answer refer to the interaction processes with the work system of the technological device. The response seems no describe whole process. Basically describes the interrelation with meta representational objects and their understanding.

## CONCLUSIONS

In previous studies before a given task, it has been observed that the particular characteristics of the technology as well as the virtual / digital meta-objects influence the interaction processes of a person as well as their experience. In these studies, the Em seen from the perspective of a given response after the realization of multiple temporary micro-processes of interaction with a certain device and a digital meta-objects, seem to occur in relation to the understanding of the information. Where the emotional pole was linked to the personal interest of the person and the MS was directly related to the input information channels as well as fine motor interaction directly related to the intention of the person. Consequently, the interaction of a person with various digital meta-objects and their meta representations or mental models is linked through the interaction with an object. It is important to consider that with the advances in artificial intelligence, machine learning and adaptability studies,

both types of objects (meta representations and digital meta-objects) have the fundamental characteristic of being in constant change.

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