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The Three Waves of HCI: A Perspective from Social Sciences

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ABSTRACT

This paper presents a preliminary discussion about the Three Waves of HCI in consonance with the theory of the sociologist Bruno Latour to point out the tension and approximation between Social Sciences and HCI field of Computer Sciences. To inform our discussion, we presented Latour's theory along with some major names to Social Sciences field as Umberto Eco, Clifford Geertz, Michel Foucault, Gayatri Spivak, Gilles Deleuze and Felix Guattari. With this reflection, we aim to start a path towards a transdisciplinary approach for inquiries on technology design and use in HCI.

Author Keywords

Waves of HCI; Modernity; Latour's Theory; Social Sciences.

ACM Classification Keywords

H.1.2 User/Machine Systems - Human factors; J.4 Social and Behavioral Sciences – Sociology.

INTRODUCTION

Social sciences have discussed and studied technology in human life for a long time. Computer Sciences, as a young and major field, has faced problems to include those discussions in their own practice and research. HCI, a discipline from Computer Science, has the responsibility to look at and understand the relation between individuals and their uses of technology. In this paper, we develop a preliminary discussion on some tensions between the Three Waves of HCI and Bruno Latour's theory. We also bring different authors and concepts that we are prospecting to build a conceptual framework intended to support a better problem understanding in design contexts. By doing so, we do not want to bring answers to the HCI field, but to increase discussion of how social sciences could help computer scientists in general to develop socially-aware computing systems.

THEORETICAL FOUNDATION

Since its conception by the formulation of the *Encyclopédie* by Denis Diderot in 1751, the Social Sciences had been worried with the implications of the technology and its developments in the society [2]. The opposition between the fields could be traced back by the distinction made between *Geisteswissenschaft* (science of the spirit) and *Naturwissenschaften* (natural science) by Wilhelm Dilthey [17].

In the work of the anthropologist Clifford Geertz [9], for example, the relations between the biologic evolution and the development of technological artifacts are not only direct related but also a necessary step for the organization of culture and society. There is no direct opposition between the domains of the natural and the cultural world. That been said, Geertz argument was produced in relation to the other fields of Anthropology in United States, specially Archaeology, Linguistics and Biological Anthropology. So, it draws from both fields of science, natural and social, to achieve a kind of synthesis.

Umberto Eco [5], in turn, argues that the capacity of suppressing the natural limits of the human body by the use of tools is an aspect of the *homo faber.* By the manipulation of technology, mankind can change its position in the natural setting. In this sense, the experience of culture is a kind of objectification that changes nature itself. The *homo faber* is not a concept or a notion that appears in the field of natural science but a way to think of the human organization of life after the fabrication of tools.

The common point between Eco and Geertz is the presence of a metaphysical registry of the nature as opposed to culture. As Michel Foucault [8] argued, this opposition is constitutive of the emergence of the sciences in the 18th and 19th centuries. This opposition is used by the State to legitimize the science, while is legitimized by it. Therefore, the forms of classification and characterization that emerges in the 18h and 19h are based on a notion of how people should be governed.

For Latour [13], this project of modernity started with the separation between the government of people (Thomas Hobbes) and the government of things (Robert Boyle) [15]. This separation however is artificial and does not work as it supposed to. This is the paradox of modernity – the process of purify things of the world in objects that could be analyzed in a lab must return, someday, to the world itself. When this happen, all the social and cultural aspects that are removed return as new set of problems.

Our definition of culture is based on Geertz [9] semiotic notion where man is surrounded by a network of meanings that he created as he lived. So our anthropological perspective here is that is necessary to understand the social

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expressions in its own practices, so we can interpret them as things that change constantly. As James Clifford puts it, culture is something that is "contested, temporal and emergent" [3:19]. Far from been something stable, culture is something that can only be understood and perceive as they occur in the world.

The use of the concept of "social" in this paper is somewhat similar to the culture itself. As Andrew Feenberg [6] argued, once understood as a constructive practice, "social" means that a group of technical aspects of an artifact is not something explained by itself, but that requires to consider combinations that allow it to occur, its success and problems, and also the space that it occupy in society. If the culture is the constant movement, practices and meanings of the human practice, the social is the content that emerges from it.

APROXIMATIONS AND TENSIONS BETWEEN THE THREE WAVES OF HCI AND SOCIAL SCIENCES

At first we should ask how HCI handle this nature-culture abstract division. The first suggestion of an answer is the search of an ontology that does not favor either of the terms. For Latour [13], it is necessary to project an alternative to modernity that takes into consideration both aspects — the subject (cultural) and the object (natural). However, other perspectives like those of Speculative Realism by Quentin Meillassoux [14] argue that we need to be more radical and abandon our kantian presuppositions so we actually discuss science. For Immanuel Kant [11], there is no such thing as a direct access to an object in the world. Every object appears to a subject and is something for him — this is the transcendental subject and the basis of his critic of both empiricism and rationalism.

Common to Meillassoux and Latour is the need of an ontological plane that is flat. This means that subject (culture) and object (nature) will be allowed to have their own agency [12:171]. This could be extended for the HCI research that deals with the relations between subjects and objects in the so-called Three Waves.

The First Wave

To the First Wave, interaction is thought out in a cognitive way focusing on human being, studied by rigid guidelines [1]. The interactions between human and machine were then inspired by industrial engineering and ergonomics. The problem in the First Wave is the process prerogative where the human is reduced to the register of the object [10]. This process does not account for the fact that the human agency goes beyond a rigid guideline. It is necessary to understand the human as a diffuse concept not as an object.

In terms of our discussion, the problem of the First Wave could be understood in a latourian perspective as a practice of purification where the objects are not only removed from its social context to be later put back but there is an assumption that rigid guidelines of the object could be extended and applied to humans. Not to mention the fact that once in the world outside the lab the objects are surrounded by ethical and moral codes that are not easily translated into formal structures and representations, such as a programming code.

Latour's [13] theory is inspired by the Philosophy of Difference proposed by Gilles Deleuze and Félix Guattari [4]. They argued in their *magnun opus* that the "concept" itself is not something that exist only in the mind of the people or somewhere in the world. The consistency of the concept is structured both by the internal aspects, like individual psychology and behavior, and external aspects like society and culture. This discussion can also shed light on the problem in the "rigid guidelines" as their consistency is based only in a normative behavior and is not open for the possibilities of interaction in the world.

The Second Wave

The Second Wave in HCI focused on groups working with applications [1]. Its goal was to talk about the things that were at the margins of technological development recognizing their importance to present problems that were considered by the researchers as hard to solve. In this vision, the meaning is something that is interpreted in terms of information flows [10]. The result is that the context emerges as a possibility to the focus of analysis in HCI design [1].

The notion of information flow is also a kind of practice in the modern need for separating subjects and objects with the strategy of translation. For Latour [13], translation is the process when a social complexity is transformed into a single element or entity, possibly minimizing or even eliminating some aspects during the process.

To visualize the problematic aspect of the information flow, consider the argument of Gayatri C. Spivak [16] in the post-colonial studies. In direct opposition to Foucault and Deleuze [7], Spivak said that there is a difference between what we understand as the subject and the subjectivity itself that could be understood with the concept of the subaltern. That person is not a subject that is a coherent whole. His personal desires and interests does not coincide.

In the political aspect, that kind of person must depend on someone else to maintain and improve its rights. However, that person is also a treat to these rights. This is the constitutive contraction on the subject — when he must depend on its oppressor for his life. This is a practice of translation when the oppressor of a group was chosed by the group (there is no option in that matter) to argue in a big scene for that small community and both political and ethical aspects of its choice could easily become invisible.

If we bring Spivak's critic to HCI context, we can understand that the flow is not neutral just because it seems to be. The understanding of the design process and the social context of production of the technology could be not

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translated and understood in the same terms of a common receptor and user of those products. At the same time, the way how people locally will use a technology could easily go beyond its original planning. Therefore, it would result in a systematic contradiction between how people would want to live (desire) and how they should live to survive in that local context (interest).

The Third Wave

The Third Wave emerged when the interactive computing technology reached homes and the private lives of people. It is true that technology is always present in life, as both Geertz [9] and Eco [5] discussed. However, after the Digital Revolution there is a difference in scale and access. Taking this into account, the research in HCI had to change again. The Third Wave challenged the values that were related to technology as they are understood by the Second Wave. They now proposed [10] that the meaning is not a flow but is something that is built on the fly, collaboratively, by people in specific contexts, so interaction became "an essential element in meaning construction" [10:7].

The Third wave can be thought as the goal of Latour's [13] theory since it looks at interaction as created by contexts and people that are variable. Although it is a good way to think about a flat ontology that fills the gap between human and non-human relation in a positive way, the Third Wave brings an inherent risk: the hyper-relativization.

If the previous waves were doing translation and purification, on latourian terms, the Third wave brings the risk of opposing the translation that were made by the first one. Instead of creating systems that would dialogue with the previously cited "government of things", it can create systems oriented to the "government of people" [13]. On this sense, the systems are risked to be so focused to the needs of a specific context of interaction that becomes useless on another one. That would end the default user and replace it by another one that would be so specific that would be useless to someone that is outside its guidelines.

Taking this into account, to the Third Wave proposals be accomplished, HCI researches have to increase their critical thought to understand a big diversity of actors and context of use of technology and then design something that can be used to a large range of people without minimize their subjectivity. This consideration about the context and subject does not mean a full resolution. It is also needed to consider the practical applications of this abstractions, so HCI researches of Third Wave won't fall in hyper-relativization, which is an actual challenge.

With this in mind, the need of a conceptual framework that deals with this constant changes and complexity of the context raise. We need to question HCI major concepts, like Human, Computer and Interaction, because they are not the same as they were when the area was created. With the increasing development of Internet of Things (IoT) contexts, everything that HCI has known is changing. This new level of interaction, brought by IoT, makes Latour's theory and Third Wave of HCI work, in terms of equate humans and machines at the same level of importance. It seems essential, then, to increase discussions about the relations between HCI concepts and those already developed by Social Sciences.

FINAL REMARKS

In this paper, we developed the first steps towards a conceptual framework able to bring a coherent and rich perspective to problem understanding in HCI. In the first section we exposed that modern science is created by a specific distinction between the realm of the Geist (Culture) and the Nature. With Bruno Latour's theory, we argued that this separation is problematic and is unable to work as it pretends to, which can be exemplified with the First Wave of HCI, as we demonstrated.

Still in the First Wave, we saw a standard practice of purification, in Latour terms, which means that HCI then did not think about the outside problems that could embrace the systems that it created. As the second wave brings the context and the information flow to the center of the discussion, we point out that this is a strategy of translation, another of Latour's concept that transforms a whole process in a unified entity, minimizing or eliminating some aspects.

By that diagnostic, we could go in the HCI domain of the Computer Science and saw how the practices of purification and translation appears in the Waves. Even if the Third Wave appears to be near an idealistic latourian proposition, we also warned about the inherent risks of a possible reverse purification that could also cause problems in the use of technological artefacts.

REFERENCES

1. Susanne Bødker. 2015. Third-wave HCI, 10 years later---participation and sharing. *interactions* 22, 5: 24–31.

2. Peter Burke. 2000. *A social history of knowledge: from Gutenberg to Diderot*. Blackwell Publishing, Malden.

3. James Clifford. 1986. Introduction: Partial Truths. In J. Clifford and G. Marcus, eds., *Writing Culture - The Poetics and Politics of Ethnography*. University of California Press, Los Angeles.

4. Gilles Deleuze and Félix Guattari. 2009. *O que é a Filosofia?* Ed. 34, Rio de Janeiro.

5. Umberto Eco. 1989. *The Open Work*. Harvard University Press, Cambridge.

6. Andrew Feenberg. 2013. Da Informação à Comunicação: A Experiência Francesa com o Videotexto. In R.T. Neder, ed., *A Teoria Crítica de Andrew Feenberg: Racionalização Democrática, Poder e Tecnologia*. Observatório do Movimento

pela Tecnologia Social na América Latina, Brasília, 119–152.

7. Michel Foucault. 1979. *Microfísica do Poder*. Graal, Rio de Janeiro.

8. Michel Foucault. 2008. *A Arqueologia do Saber*. Forense Universitária, Rio de Janeiro.

9. Clifford Geertz. 1973. *The Interpretation of Cultures*. Basic Books Inc, New York.

10. Steve Harrison, Phoebe Sengers, and Deborah Tatar. 2007. The Three Paradigms of HCI. *CHI 2007*, ACM Press, 1–18.

11. Immanuel Kant. 2001. *Crítica da Razão Pura*. Fundação Calouste Gulbenkian, Lisboa.

12. Bruno Latour. 2005. *Reassembling the Social: An Introduction to Actor-Network Theory*. Oxford University Press, Oxford.

13. Bruno Latour. 2011. *Jamais fomos modernos: ensaios de antropologia simétrica*. Ed. 34, Rio de Janeiro.

14. Quentin Meillassoux. 2008. *After Finitude: An Essay on the Necessity of Contingency*. Continuum, London, New York.

15. Steven Shapin and Simon Schaffer. 1985. *Leviathan and the Air-Pump - Hobbes, Boyle and the Experimental Life*. Princeton University Press, Princeton.

16. Gayatri Chakravorty Spivak. 2010. *Pode o Subalterno Falar?* Editora UFMG, Belo Horizonte.

17. Wilhelm Dilthey. 2002. *The Formation of the Historical World in the Human Sciences*. Princeton University Press, Princeton.