Participant Observation and Experiences in the Design for Affectibility

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Abstract. This paper reports on our experience as Participant Observers in a Project introducing the XO laptop at an elementary school in Brazil. Working together with all members of the school community, we experienced their daily activities with and without technology. Our objective was to build a better understanding of the affective and emotional relationships developed among the community. Moreover, we wanted to understand how users made use and sense of technology. In this article we investigate the presence of affect in our study scenario using the method of Participant Observation. This study was one of the initial steps towards the design of an educational system to be used at elementary schools.

1 Introduction

Understanding final users of a given technology within their social and cultural context, has recognized importance in the process of designing such technology [3,6]. Besides the technical comprehension needed, designers need to understand other informal aspects of use. In order to consider requirements from levels that go beyond the technical one, it is important that social-cultural strategies are adopted. Such strategies should amplify the vision of the general context of the problem and of the stakeholders involved in the solution.

In order to construct this social-technical view of the school context and of the educational technologies, we have adopted, among others, Participant Observation (PO) [1] as research method. In this method, the researcher becomes part of a group and he observes behavior as it happens in the real daily settings – and not only the behavior that is described in formal documents. The researcher interacts with the members of the group as if s/he was one of them. At the same time that s/he is interacting with the group, the researcher also observes their actions. This allows him/her to construct a view from his/her perspective as the human being that belongs to that group, sharing ideas, sensations and mainly living and understanding the affective relationships.

Affect in the educational context has been studied since long. Piaget, for example, argues that for the intellectual development to take place it is necessary to consider also the affective issues and not only the cognitive ones [9, 15]. However, designers of systems for the support of learning usually converge their efforts only to the aspects that facilitate the development of cognition. The aspects that support or facilitate

communication and expression of affect are frequently left aside. We argue that technology in education has the potential to benefit students' development to even higher levels if it considers the affective aspects of interaction, together with the didactic content and other requirements like usability and accessibility. One of the means to bring affect into the design process, especially in the earlier phases, is by adopting the PO as research method.

The work we present here is part of a research that investigates how affect (including emotions, feelings, opinions [12]) can be incorporated in the process of designing technology. We base our studies in the concept of Affectibility (related to the characteristics that help triggering affective responses during user's interaction [7]) to guide our system design, explicitly considering affect and the creation of affective responses. In this work we discuss the results of our experience as participant observer at a public elementary school in Brazil, in a context of introduction of the XO laptop. Our practices as observers had the main goal of understanding the diverse possibilities of manifestation of affect in the school practices, to inform a design process.

First we present, on Section 2, the school community and we describe our research plan. Then, on Section 3, we present the data collected during the PO of the students from the 2nd and 8th grades. In Section 4 we discuss the results and in Section 5 we conclude.

2 Participants, Material and Method

This research took place at an elementary school located at the city of Campinas in the state of São Paulo, Brazil. The school community is composed of around 530 people, including teachers, students, and other employees. Even though the school had a computer lab (with circa 15 desktop computers) and educational laptops (a little less than 500 XO laptops from OLCP), not all teachers were familiar with technology. While few students were not used to the computer mouse, most of them had basic computer skills and were familiar with communication technologies like smart phone.

We were present in most of the school activities and we were in touch with students and teachers from the 1st until the 9th grades. The deeper immersion occurred within two groups: the 2nd graders and their two general teachers; and the 8th graders and their science teacher. Due to absences, school transfers and/or dropouts the sizes of each group varied. It ranged between 25 to 30 students per group. 2nd graders ages varied from 8 to 10 years old and 8th graders, from 14 to 16 years old. We were part of their classes, as participant observers, helping teachers and students in their daily tasks, which included activities with and without technology.

Results from PO are usually saved as notes from the researcher [13]. Such notes include contents that go beyond the central point of the research. Our notes were transcribed, coded (i.e., keywords were attributed to blocks of texts) and categorized. Using specific software [2] we grouped codes and tested different associations. This process is commonly used in qualitative analysis, especially in social studies. From the categories generated from coding we were able to observe some recurring themes and important concepts. This process was the basis for the development of principles for the design that considers affective aspects of the interaction (more on this in [8]).

The concept of Validity, associated to quantitative analysis, has its equivalent in the qualitative analysis in the concept of Confiability [5,11]. Some techniques are suggested for the results of a qualitative research to present Confiability. These techniques are related to the constructs of Credibility, Reliability, Transferability, and Confirmability. According to the authors, Credibility (i.e., one can trust the results) can be obtained by a prolonged relationship with the observed community. Our participation at the school could be considered as of a 'prolonged relationship'. We had direct interaction with teachers, students and other employees for three times a week during two consecutive semesters - and with less frequency during two years at the beginning of the project. This should count for the Credibility of our work.

The technique recommended for Reliability (i.e. verify that the results or conclusions reflect the data) is the Internal Audit. In his technique, a different researcher observes the activities from distance (he does not participate directly). He also guides the process and reviews results and conclusions. The Transferability refers to the capacity to apply the conclusions or results in different situations. This is different from the concept of Generalization from quantitative approaches, which seeks to make sure that it is possible to generalize results that were obtained in small groups to the population as a whole. The idea behind Transferability is to encourage readers to articulate elements from one study to the elements from their own experience. For this to be possible, it is important that researchers provide a detailed description of their research context and participants. Finally, Confirmability (i.e., how well findings are supported by the data collected) can be obtained by Audit trails. This technique consists in the description of the research process so that other researchers are able to understand the path followed [5,11].

Our participation at the school started in 2009 and was followed by a certain distance by an experienced researcher, who guided the process and reviewed the data collected. This provides for the reliability of our work. Due to space restrictions, we were not able to inform here all the details needed for Transferability and Confirmability. Such information, however, are provided in separate publications: [4] and [8]. Table 1, however, already provides for Audit trail.

3   Results and Discussion

The manifestations of affect are inherent to human beings. It is present in all social interactions, being influenced and influencing the behaviors of each person and of the group. Filtering this information to direct to the development of digital artifacts can be a challenge. In the design of educational technology, we used PO method to collect data. The data was then coded and categorized. Table 1 shows results of this process.

Fondness, care, kindness, eagerness, fear and all other forms of manifestation of affect cannot be substituted by technology. What technology can do is to present itself in a way to awaken affective responses from users during their interaction with such technology, according to their contexts and needs. It can also allow or support the expression of affect - at least, it should not prevent its manifestation. How to design and develop systems in line with this mindset is a challenge for the designers of educational technology. The qualitative method of PO was of vital importance for us to better identify affect in daily interactions. The final objective is to include similar affective interactions in the design of a system.

Table 1. Examples of extracts from field notes and their coding

Extracts from field notes	Coding	Subcategory	Key Category
The unexpected arrival of different children in the classroom caused great commotion among the students.	Presence of strangers in the group.	Self x Group	Awareness of others
(…) she [a student] constantly looked around to see if other students were looking at what she was doing.	Need of acceptance/approval from peers	Self x Group	
Students from grade 9 demanded to be recognized as such. They valued being in the 9th grade and they were very proud of it.	Sense of belonging; Age as status	Pride as a social value	Social values
Their [group of girlfriends] place of chatting was the girls' restroom, since they could talk without the presence of the boys.	Sense of belonging; Privacy	Privacy as a social value	
A student drew hearts on the blackboard, expressing her affection to another person.	Expression of affect; drawing	Expression of affect	Communication/ expression and interpretation of affective states
The students welcomed the researcher with hugs, kisses and compliments on her look.	Expression of affect	Expression of affect	
The "S2" meant "heart", which in turn, meant "loves".	Expression of affect; Interpretation	Communication and interpretation of affect	
Students felt a positive sense of accomplishment when they were able to help their peers in the use of the laptop.	Collaboration among peers	Collaboration	Collaborative construction and participation of adults
Students were experiencing technical difficulties. Frustration and deception might had arisen if a researcher had not helped them.	Adult participation in learning process	Collaboration	
A text read by the teacher about a Chinese tale seemed more interesting and made students more curious when the researcher, who has oriental looking and roots, entered and joined the classroom.	Content in context; Meaning and understanding	Context	Context-rich environments
Two kids started to sing. Soon the entire group was singing, building an informal and fun atmosphere in the classroom.	Rhythm; mood contamination; music	Atmosphere/ environment	Media contamination
One girl started to cry when she saw her friend in a convulsion seizure. The class was calm until then, but then they all became nervous and out of control.	Mood contamination	Atmosphere/ environment	

Observing and participating together with users in their activities allowed us to see clearly the presence of affect in the interactions. By including such affective interactions in the system we expect to design systems that are more meaningful to the users. PO resulted in a vast material of field notes that highlight affect. The process of coding the notes and its categorization resulted in key categories (Table 1). The concepts from these key categories should now be translated into requirements or guidelines that should direct the design of a system that we will develop for use at the school. For example, we noted the importance of social values (e.g., pride, privacy) for users. Therefore, we shall consider what are valuable for those users when designing for them. 'Awareness of others' is another concept or key category that emerged from PO. When designing for these users we shall think about means of letting people know about other users' (presence, intentions, moods, emotions, etc.).

PO also provided us with insights about the importance of considering users affective response during the design process. How they felt during the PO activities, their opinions on their participation in system design activities (e.g., participatory practices) as well as their willingness or not in participating must be considered. It is important to mention that all students were aware of our purposes and their parents signed official permissions for their involvement. They all were aware of the fact that they could interrupt their participation whenever they felt like. The principal and pedagogue of the school, as well as a few parents, followed some of the activities and agreed with them.

Considering the affective responses of students in this process seems to have bestowed on students with confidence, pride and self respect. They seemed to have enjoyed being considered and cared for. The researcher's affective responses were present during the interactions within the school but they were left aside when taking notes and analyzing results. Having one researcher following the process from distance helped keeping the analysis within a certain degree of objectivity.

4   Conclusion

The understanding of the context of use and the affective interests of a community of users demand an approach that allows close and deep investigation of that community. In this challenge, we found in the qualitative research method of Participant Observation a strategy to interpret and understand, under the perspective of the community of users, the interactions that take place at the school. This paper described the process and results of the application of the PO within a public school in Brazil. Our objective was to propose new ways of treating design of educational technology, aiming at the explicit inclusion of affect in the design process.

As a contribution to the community of HCI, this paper pointed towards the importance of affect in the process of designing of technology. We presented examples of the use of PO in this context. PO helped us to gather information, unveiling elements that are particular to the culture of that specific community and untangling the real practical implications of the introduction of a new computational system into the organization of the community. The mapping of main concepts resulting from the coding of notes from PO would then serve as basis for us to define requirements for the design and development of educational application (i.e., design principles [8]).

Our challenge and goal was to think about technological solutions in a way that the affective responses from the stakeholders were a priority. This way of approaching design, working within the school community may represent an important differential, especially to the most excluded parcels of the population.

References

1. Atkinson, P., Hammersley, M.: Ethnography and participant observation. In: Handbook of qualitative research. Sage, Thousand Oaks (1994)
2. ATLAS/ti, `http://www.atlasti.com` (last accessed: October 2012)
3. Baranauskas, M.C.C.: Socially aware computing. In: ICECE 2009 VI International Conference on Engineering and Computer Education, pp. 1–5 (2009)
4. Baranauskas, M.C.C., Martins, M.C., Assis, R.: XO na escola: construção compartilhada de conhecimento - lições aprendidas (2012)
5. Denzin, N.K., Lincoln, Y.S.: Introduction: Entering the field of qualitative research. In: Handbook of Qualitative Research, pp. 1–18. Sage Publications, Thousand Oaks (1994)
6. Friedman, B.: Value-Sensitive Design. Interactions 3(6), 16–23 (1996)
7. Hayashi, E.C.S., Baranauskas, M.C.C.: The affectibility concept in systems for learning contexts. International Journal for e-Learning Security 1(1/2) (2011)
8. Hayashi, E.C.S., Baranauskas, M.C.C.: Design Principles for Affectibility. Technical Report IC-13-17 (2013)
9. La Taille, Y., de Oliveira, M.K., Dantas, H.: Piaget, Vygotsky, Wallon: teorias psicogenéticas em discussão. Summus editorial (1992)
10. Macaulay, C., Benyon, D., Crerar, A.: Ethnography, theory and systems design: from intuition to insight. Intern. Journal of Human-Computer Studies, 35–60 (2000)
11. Miles, M.B., Huberman, A.M.: Qualitative data analysis: A source book of new methods. Sage, Beverly Hills (1984)
12. Ortony, A., Norman, D.A., Revelle, W.: Effective functioning: A three level model of affect, motivation, cognition, and behavior. Who Needs Emotions, 173–202 (2005)
13. Smith, L.M.: An Evolving Logic of Participant Observation, Educational Ethnography, and Other Case. Review of Research in Education 6, 316–377 (1978)
14. Tedlock, B.: From Participant Observation to the Observation of Participation: The Emergence of Narrative Ethnography. Journal of Anthropological Research 47(1), 69–94 (1991)
15. Wadsworth, B.J.: Piaget's theory of cognitive and affective development: Foundations of constructivism. Longman Publishing (1996)