

Evaluative Ethnography and Systems Design: can it also be used to assess presence?

Luis Borges Gouveia, Feliz Ribeiro Gouveia
lmbg@ufp.pt, fribeiro@ufp.pt
University Fernando Pessoa
Pr. 9 de Abril, 349 P4249-004 Porto, Portugal

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Summary

Since the late 1980s an increasing level of interest has been shown in ethnographic approaches, derived from sociology and social anthropology, as promising means to provide some assistance in the complex and delicate problem of systems design. Such methods, a “*turn to the social*” within system design, are central to attempts to develop a new perspective upon the design of technology. Ethnographic methods, with their emphasis on the “real world” character of settings, are seen by many as the means for thoroughly contextualized enquiry which can overcome some of the problems of systems designed on the basis of abstract models.

This paper examines the use of ethnography as part of an “*illuminative*” evaluation [Parlett, 1974] of design practices, in particular looking at ViDESK – a visualisation design for sharing knowledge. We describe how ethnographic observation forms part of a much wider evaluation strategy, incorporating other qualitative and quantitative measures in assessing how users collaborate and take advantage of shared meanings in a visualisation design for learning support.

The paper includes a brief discussion on how presence can also be assessed along with the system itself, considering system goals and the importance of considering social presence in the context of virtual environments.

1 Introduction

As suggested by Fielding: “*The concern to balance detailed documentation of events with insights into the meaning of those events is the enduring hallmark of ethnography.*” [Fielding, 1993]

In “*Out of the Control Room*”, Hughes et al (1994) proposed that one general use of ethnography for systems design lies in evaluation, mentioning, for example, where the study is undertaken to verify or validate a set of already formulated decisions. The explicit use of ethnography in evaluation studies is, however, comparatively rare. Crabtree et al., (1999) provide one example of evaluative ethnography applied to virtual environments where the authors suggest that the design of such virtual environments requires explicit study of participants at very early stages of the project.

Currently, there is some pressure to improve learning environments and use Information and Communication Technologies (ICT) in innovative educational contexts [Goodyear, 1999]. However, current systems for collaborative learning [Britain and Liber, 1999] do not support the same knowledge-sharing environment that face-to-face situations enjoy. In particular, there are difficulties to representing context and abstracting information about the knowledge theme being discussed. This is the problem that ViDESK is designed to address in order to facilitate support for Computer Supported Collaborative Learning (CSCL).

The evaluation of the ViDESK prototype takes into account its own novelty and its impact on first time users as well as addressing the problems of: cognitive overhead, information overload and support for data source integration [Norman, 1991; Huhns and Singh, 1997; Baeza-Yates and Ribeiro-Neto, 1999]. As suggested by Calvey et al., (1997) users need time and practice to learn how to use a computer support tool and our evaluation documents some of the ways in which users adapt to and accommodate the tool in collaborative learning support.

Lessons learned from the prototype suggest that, taking into account presence metrics and measurements, ethnography approaches may help informing both design issues and data analysis. In fact, several studies reported settings where the resulting data have been combined together with direct observation of the ongoing experimentation and by self reporting of being involved in the experiment. Such examples are Bradner and

Mark (2001), for social presence with video and application sharing, and in many research conducted in the area of CSCW, as the case of the Hollan and Stornetta (1992) “*Beyond being there*” paper.

The use of an ethnographic approach provides additional evidence or, at least, more data to perform an analysis where underlying models for providing metrics and measurement are under definition or not widely accepted. However, a number of studies were conducted based on existing models and using data gathered from questionnaires such as Connel and Mendelsohn paper (2001) for measurement the effects of communication medium on interpersonal perceptions, and the Couper et al. (2001) work studying social presence in web surveys.

2 Using tasks to conduct the experiment

A recent study recommends that virtual design environments are very useful to convey complex educational design concepts [Kalawasky, 2000]. This seems to confirm the educational potential of such systems, which include the ViDESK prototype.

However, using a 3D space as the basis for the visualisation design brings some, as yet, unsolved problems concerning both the user and the platform to test the system [Erickson, 1993; Hubbard et al., 1995; Ingram and Benford, 1995]:

- user disorientation, leading to user confusion and spatial unawareness;
- novelty of the user interface, which differs from current available systems;
- the need for the user to learn symbols and navigation tools;
- processing and response times;
- interface limitations on the prototype, lack of adequate peripherals;
- hardware limitations on the prototype, (e.g. input/output devices).

Instead of dealing with each of the above issues separately, a task approach was followed. A number of tasks were designed for conducting the experiments. This focused user interactions on the more important issues regarding the research objectives

and allowed direct observation of user activity. Concerning the hardware issues, the evaluation focuses mainly on testing the ViDESK approach without concern for using the best interface possible or trying to optimise system response times. However the reported issues must be taken into consideration for the evaluation design.

To test the ViDESK approach a number of different experiments were conducted to evaluate different parts of the system. The use of three distinct experiments allows concentration on particular issues needing evaluation in order to assess how the system can be used to support user learning.

3 Experimental Methodology

Evaluation in educational systems requires a good amount of effort. Both quantitative and qualitative studies need to be conducted in order to deal with different variables that must to be considered to test an educational system [Cohen et al., 2000].

The notion of the role of evaluation in increasing our understanding of educational innovations is not new and was defended by Parlett [Parlett, 1974]. The adopted evaluation strategy takes into account results of other studies in virtual learning environments [Britain and Liber, 1999], 3D virtual environments [Kalawsky, 2000] and visualisation systems [Swan et al., 1998].

The tools used included records of user activities, pre and post-experiment questionnaires, user observation and system logs. Also included were pre and post-tests to assess knowledge embedded in task checklists. These tools were developed following the guidelines proposed by several authors [Britain and Liber, 1999; Cohen et al., 2000].

However, evaluation of collaborative technology is best done through field evaluations because these can be used to assess social-psychological and anthropological effects of the technology [Grudin, 1988]. An attempt to analyse all the dimensions involved in ViDESK usage would have lead to a huge amount of gathered data, much of it irrelevant to the learning process.

Moreover, ethnography is an intrinsically descriptive task that resists formalisation and its methods rely on the study of people and their activities in their natural environment.

The method relies on understanding the setting from the point of view of those involved in it [Jones, 1998]. Hughes and other assert that the aim of ethnography is to see activities as social actions, embedded within a socially organised domain and accomplished in and through the day-to-day activities of participants [Hughes et al., 1994].

An ethnographic application in system design described by Hughes and other as evaluative ethnography, where the study is undertaken to verify or validate a set of already formulated decisions [Hughes et al., 1994]. Crabtree and other provide an example of evaluative ethnography applied to virtual environments where the authors claim that the design of virtual environments involves a significant degree of novelty and requires explicit study of participants at very early stages of the project [Crabtree et al., 1999].

The evaluation of the ViDESK prototype must take into account its own novelty and its impact on first time users. As asserted by Calvey and other, users need time and practice to learn how to use and become experts to take advantage of a computer support tool [Calvey et al., 1997]. As expert users they can both take full advantage of the system and discover new functions and applications.

The resulting experimental data must be summarised both quantitatively and qualitatively. User activity patterns must be analysed (e.g. from video recordings). Video observation is also important, since responses to questionnaires could be biased (e.g. towards positive responses) rather than objective (accurate reflection of levels of contribution). These responses need to be compared with video evidence to check consistency. The data gathered from all the post-experiment questionnaires takes into consideration the positive response effect that is minimised by performing a data transformation from a five scale variable for rating like – dislike, to a two scale variable (dichotomise the variable). This transformation takes two of the scale values as positive (only one in experiment 2) and considers the other values as negative. A complete discussion of methods for data gathering using different strategies applied to education is presented by Cohen, Manion and Morrison [Cohen et al., 2000].

4 The notion of Presence

According to the *International Society for Presence Research* (ISPR – <http://www.ispr.info>) presence is the “psychological state is a psychological state or subjective perception in which even though part or all of an individual's current experience is generated by and/or filtered through human-made technology, part or all of the individual's perception fails to accurately acknowledge the role of the technology in the experience”. It can be also be defined as “*the perceptual illusion of nonmediation*” [Lombard e Ditton, 1997]. Presence can be considered as an individual characteristic from the point of view of the user; it can vary from individual to individual and with time.

Lombard e Ditton (1997) propose six different perspectives concerning the presence concept: (1) presence as a social asset; (2) presence as realism; (3) presence as a transport medium; (4) presence as an immersion technology; (5) presence as an inside medium occurrence; and (6) presence as a medium [Lombard e Ditton, 1997]. Following the these dimensions, IJsselsteijn et al. (2000) present two broad categories: physical presence and social presence [IJsselsteijn et al., 2000].

According to ISPR the notion of social presence occurs when the user has no perception of role associated with the technology being used and allows the communication between the individual and other people or entities. The social presence can result from (1) the social actor within the medium (the user has the feeling of bidirectional communication with others); (2) a shared space (when the user feels to be in a the same space or environment than others; and (3) the medium as a social actor (where the user feels to be engaged with the technology itself).

Giving the notion of presence, it seems that ethnography can provide qualitative insight in the way how people really feel presence. In fact, ethnography techniques allow collecting data from ongoing experiments and provide qualitative data, who gives additional results to inform used metrics and refine the presence measurement.

Ethnography can be considered as the reporting and analysis of fieldwork study – qualitative methodology – thus providing a “*human touch*” in a human related issue such as the one provided by the notion of presence. The resulting data collections can include a wide range of subjective impressions such as the case of qualitative anecdotes

or critical incidents that capture user experiences. The ethnographer participates, overtly and covertly, in people's lives for a period of time that allow them to obtain relevant data needed to influence a redesign [Hughes et al., 1995].

5 Final remarks

The success of a given virtual environment is normally linked with the feel of presence that its users experiment. As a result from the effort resulting to assess ViDESK as a virtual environment to support knowledge sharing and support learning among a small group of users, results shown that [Witmer e Singer, 1998].

The ViDESK system addresses the needs of sharing knowledge by allowing a group of students to share meanings and elaborate a common ground for understanding and “*think together*” about a knowledge theme or context. The ViDESK system proposes a virtual environment approach to introduce the co-construction of knowledge and provide the experience of discussing and enhancing a context following a constructionist approach.

- the ViDESK concept space visualisation provides a context representation as a network of concepts. By exploring it, a number of users were able to support their reasoning. They also were able to consider and discuss concept relationships, developing a new understanding of concept meanings and its impact within the represented context. A number of learning effects were observed as the case of users engaged on experimenting ViDESK, gain the capacity to propose new valid structure elements and discuss among them its impact. In this case, they learn by doing, constructing and arguing
- resulting from using the ViDESK system both in stand alone or collaborative mode, a number of learning episodes were identified. Asking users to describe the learning outcomes from using the system, some of them reported learning effects. In particular one user reported that it was just when proposing a new concept and arguing about its need that he realised that another concept fulfils the need, showing him a perspective that he was not able to follow without been involved in discussing it. Another example was provided by a user that reports

to gain an approach to organise and structure information about what to know within the context. This user adds: “I now realised that what I really know about this context needs to be thought through and further developed”.

As a result of using a mix between an ethnographic approach and quantitative research, a number of conclusions were obtained, making possible to list a number of design requirements and assess the system. Also, considering both the user engagement within the shared space and the use of the medium as a social actor, the ViDESK evaluation proved to be a valid one, at least to research how a 3D interactive visualisation can assist the sharing of knowledge and thus support collaborative learning among a small group of users.

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