APPLICATION TO THE WORKSHOP: W3 TIME DESIGN

The motivation to participate at the Time Design workshop is to understand how time should be included in usability evaluation methods and guidelines for shared virtual environments (SVEs), and also in the studies regarding the use of them.

Shared Virtual Environments

Seamless collaboration has long been a research goal of shared virtual environments (SVEs). The particular characteristics of SVEs that differ from VEs are the multiple users, real time interaction, and combination of social and technical interaction that occurs in the environment during the time the users use it. In the SVEs the users are allowed to communicate, and cooperate instrumentally in a process of shared creation of results. In these environments the focus is on the kind of collaboration at a given moment; the users (co-located or distributed) can be present and have access to the same simulated environment.

At a certain point in their development, the user interface for SVEs reaches a stage when it is technologically good enough, and then the next step for improvements should come from the user (human) studies. At this stage it is not only the technology per se that should be the subject of importance, but its use and role. This does not mean that the next improvements in the interfaces should involve non-technical changes, but these improvements should result from direct requirements of the users for more usable interfaces. This need is even more urgent in the case of SVEs where a major part (in time, frequency, amount of actions) of the interaction is social.

A number of recent technologies, including immersive projection technology systems (IPTs) and head-mounted displays (HMDs), promise a new generation of systems that are more intuitive to use than desktop-based systems, or that can replace full-scale physical models. Intuitiveness and time are certainly connected.

Comparative studies

By the time there were examined given transferable factors influencing experiences in SVEs – such as performance, effectiveness, presence, copresence, immersion, collaboration etc. – it was concluded that for each application three main processes of (1) social interaction, (2) interaction via technology and (3) techniques to reach the goals in the environment are occurring and influencing experiences and effectiveness [1, 3, 5-7]. These studies were focused on examining the whole process when users spend time in the environments, and focusing on the problems and benefits which were distracting from and supporting the experience.

Three processes

Being in an environment and using an application, a user has to handle three cognitive processes more or less in parallel:

SI. To pay attention to and handle the partner(s), and to maintain social interaction.

TI. To handle the environment (interact with the available technology).

TG. To attempt to achieve the goal(s) within the particular application – solving the problems, socializing, learning etc.

These processes influence effectiveness and collaboration in SVEs [2]. After the data on comparative evaluation of different SVEs were obtained (from [1, 3, 5-7]), the three processes were identified as factors that influenced the collaboration and had impact on the outcome. In order to investigate how to include them in usability evaluation, and to show how the interruptions observed during one of these processes affect the other ones and the experiences in general time pays an important role.

Time related issues

As Nielsen pointed out in his book about Usability Engineering, the way people learn and how they handle systems over time varies [4]. This raises the question of how the collaborative systems can be in comparison with the single-user systems, and how handling the system during the time varies.
In the system design time variation contributes to defining more proper usability evaluation methods for shared virtual environments, especially when considering group characteristics. Groups and group work is influenced in a high degree by time. Besides the size of the group and how it is composed, the time spent together in the VE plays an important role, for example if it is time for learning, reflective restructuring etc.

In addition to the system, the users and applications the time pays an important role in the adaptation process, e.g. how long time a user can spend in the environment without side effects (sickness, comfort), how long time she or he needs to handle the system as an expert, and how long time she or he needs to can be treated as a member (roles, awareness of the others, sharing resources) in a collaborative group.

The users use differently the systems during an introduction phase, when they proper collaborate, and also when they are ending the collaboration [8]. If intuitiveness is associated with the usage time needed in the beginning, and with how well people handle the devices and the applications when they encounter the environment than time also has to pay different role for different technologies. To study intuitiveness for those networked environments which are not symmetric is important, since intuitiveness has different meanings at the different ends.

By analyzing the number of occasions a trouble (or ease) has to occur to be treated as a usability problem (benefit) or a usage pattern the time has to be taken into consideration too.

Potential benefits
As we described before there are three processes that a user have to handle during collaboration. Collaboration is affected to a large extent by these cognitive processes due to the fact that the volume, the quantity as well as the quality, of (social) interaction that has to take place in the SVEs differs substantially from single-user systems. This volume of social interaction, its duration, the nature of the social interaction, and the members who are involved in it - differ from one collaborative application to another, which is an additional reason to pay more attention to it in the design of the applications than others.

For example: Sometimes there is a very quick switch from social interaction to technical interaction, or vice versa. For a study for puzzle solving [2], when subjects were sitting with the desktop system observed that it was easier to ask their partners about colors of the hidden side of the cubes, they asked the partner more often than they found out the colors by manipulating the cubes themselves. According to the observations we made, the partners often decided that they should move their avatars in such a way as to stay in front of the other person’s avatar and have the model between them, thus making it easier to collaborate. Also for collaborative applications, there are activities that can invite to social interaction to a higher degree, and generate it more easily or for a longer time.

Another benefit to consider time variation as an important factor in design is to handle switches between social and technical interaction, and problem solving. For example there are phases in collaboration when people need more help from the other people or from the system, or there are phases when one is more silent in a distributed collaboration. By identifying these phases there would be easier to define proper feedbacks that supports better collaboration during these phases. The quick feedbacks are also important. It would be beneficial to measure how long a person can wait and not lose patience. Such measurements have been made with traditional interfaces for IT, but not yet for social interaction. To this end, the activities of thinking, for example, should be taken into account. One may lose patience because one does not know what one’s partner is doing, while the partner is thinking and would like a minute’s break to do so.

For SVEs the way of treating work as the result of three cognitive processes, viz. SI, IT and TG, and the possible divisions of them, or the switching between them and also including time issues offers another possibility of developing the usability evaluation concept and to know more on usage patterns.
