

Knowledge Sharing in the 3D Agora-world

Sisse Siggaard Jensen

Roskilde University

sisse@ruc.dk

ABSTRACT

This paper will first introduce a theoretical grounding for understanding knowledge sharing in avatar-based sessions in a 3D world. Secondly, it will present observations from 12 explorative sessions undertaken while building and exploring social interaction with avatars in a 3D Agora world. These observations are summarized in three scenarios: “Voyage of discovery”, “Playful meeting” and “Purposeful meeting” and in a conclusion suggesting a “reflective design” approach. Research has been carried out in a special interest group (Agora SIG 5) on “Knowledge sharing across knowledge cultures” in the EU project EQUDEL.

Keywords

Knowledge sharing, avatars, social interaction, 3D worlds, reflective design.

INTRODUCTION

In the EU project EQUDEL on quality in e-learning, the Agora SIG²³ explored knowledge sharing in 3D systems that are performative and avatar based²⁴, taking as their vantage point Active Worlds Educational Universe (AWEDU - www.activeworlds.com)²⁵. AWEDU is an online shared desktop 3D system which visualises the participant as an avatar that can be either a naturalistic or a non-naturalistic character. AWEDU is a relatively common, stable and explored 3D system (Schroeder, 2002; Becker, 2002; Hudson-Smith, 2002; Hansen, 2002). It is performative in the sense that participants can build their own universe, a landscape, a house, a sub-world or an abstract design as a framework for their social interaction (Goffman 1974/86) with avatars. AWEDU was chosen primarily because of the system’s performative aspects, as the objective of the Agora SIG’s study has been to experiment with social interaction and knowledge sharing.

The Agora SIG’s explorations have thus been undertaken in a process of building the Agora 3D world in collaboration with avatars communicating in chat while asking questions such as: Is it possible to support knowledge sharing in shared 3D virtual environments (VEs) based on interaction with avatars; building a meeting place not in bricks but with 3D building objects? How do avatars influence the knowledge-sharing process and collaboration? Is it possible for avatars to build a community of practice while building such a shared 3D world as a frame of reference for the activity of this community? With these questions in mind, this paper will first introduce a theoretical grounding for the explorative sessions undertaken by the SIG in three sections entitled: “*Knowledge sharing*”, “*Forms of Interaction*” and “*Avatars of the Self-conscious*”. Secondly, the explorative sessions are briefly presented in the section: “*Explorative sessions in 3D Agora*” followed by observations and reflections on three scenarios and two design examples in: “*Observations, scenarios and design*”, and finally the “*Conclusion*”.

KNOWLEDGE SHARING

In this paper ‘knowledge’ is understood as a living phenomenon that uses the human body and social interaction between people as its media (Mead, 1934/70; Goffman, 1974/86; Stacey, 2001; Jensen et al., 2004). In other words, in this paper the concept of ‘knowledge’ is based on interaction and not on the representational perspective that is often linked to information theoretical and systemic perceptions. Thus knowledge cannot be

²³ Members of the Agora SIG are affiliated with Learning Lab Denmark; Center for Knowledge and Design in New Media, Communication Studies, Roskilde University; Center for Studies in Advanced Learning Technology, Educational Research, Lancaster University; Center for Higher Education Development, Coventry University; Teaching and Learning Service, Glasgow University; Dept. of Learning, Informatics, Management and Ethics, Karolinska Institutet; and, School of Education, Sheffield University.

²⁴ An avatar is the figurative representation of participants in 3D worlds and environments.

²⁵ Activities are summarised in the Agora “The Cylinder” AWEDU: Here you can move up and down – as if you were in an elevator – and see examples of building activities from different phases in the Agora SIG, including short summaries from these.

shared unless the many processes inherent in social interactions are kept alive and constantly nourished. It is by securing the constant “flow” (Csikszentmehalyi, 1999) of human communication and interaction that the medium in which knowledge and creativity live can be created. A flow which also includes representations of knowledge or artefacts as a form of non-human actants (Latour, 1998) – meaning that they are important actants, however they *are* not the knowledge, they merely represent it.

In the interaction-based understanding of knowledge, *dialogue and knowledge communication* are essential for knowledge sharing – this also applies to social interaction mediated in 3D on the net as well as with avatars. This is not communication intended to explicitly convey tacit knowledge with a view to copying, storing and sharing knowledge, thereby making it available as organisational knowledge, for example via an intranet, as has characterised the theoretical discussion of knowledge sharing and knowledge management for many years (Dierkes et al., 2001). Rather, it is communication intending to nourish the dialogue about knowledge that is related to a certain user group and their practice, and therefore also the group’s ignorance, as these two sides of knowledge are closely linked.

One of the central themes in the literature on knowledge sharing and knowledge management is that it is difficult to be aware of one’s own knowledge, and ignorance (Davenport and Prusak, 1998; Dierkes et al., 2001; Gourlay, 2001). Agents of a given practice are rarely themselves aware of what they actually know. This does not become clear until others ask questions or problems arise that have to be dealt with in cooperation with others. This is particularly true if the cooperation takes place across practices or maybe even across knowledge cultures (e.g. practice/theory; natural science/the arts; artistic/commercial). *Knowledge communication* is thus a method to create the (meta-)consciousness or self-consciousness that enables the individual to be aware of his/her own knowledge and hence also ignorance. Dialogue and reflective practice that enable us to reflect on matters otherwise unreflected on in a process of reflection-in-(inter)action therefore form the basis of the understanding of knowledge sharing (Tsoukas and Vladimirou 2001; Jensen et al., 2004). The explorative sessions on knowledge sharing take place in a 3D Agora world and with avatars because computer media are an integral part of the knowledge-based organisation’s daily practice and meeting places. It is therefore essential to be familiar with the concept of knowledge sharing in relation to the different types of interaction and communication seen in these new media.

FORMS OF INTERACTION

It takes experience and new knowledge to develop the process competence that is required to create a shared environment based on knowledge sharing in the form of knowledge-based dialogues on the net, so that the environment remains alive, inspiring and motivational for the participants. This is the ‘lesson learnt’ from previous experience with computer-mediated communication in project-organised university study-programmes at master level (Jensen and Heilesen, 2004). Net-based communication creates new conditions for social interaction and therefore also for cooperation, coordination and dialogue, all of which play an important part in long-term projects and knowledge-based cooperation on the net – for example in study programmes and other types of knowledge-intensive activities. The computer media and the net have the potential to integrate or *remediate* (Bolter and Grusin, 1999) all other and well-known types of mediated interaction. However, there are several significant limitations to remediation, and furthermore, it leads to other and new considerations. So as to explore and get a clear picture of this, this paper aims at incorporating computer-mediated interaction into the media researcher John B. Thompson’s (Thompson, 1995) overview of the different types of interaction of modernity, see figure 1.

	I Face-to-face interaction (e.g. conversation, lecture, sermon, play)	II Mediated interaction (e.g. writing, texts, images, telephone)	III Mediated quasi-interaction (e.g. books, films, TV)	IV Computer-mediated interaction (e.g. chat, online conferencing, VEs)
Space-time	Context of copresence, shared spatial-temporal reference system.	Separation of contexts; extended availability in time and space.	Separation of contexts; extended availability in time and space.	<i>Changing between system time and practice time due to separation of context coupled with extended accessibility in a new shared context.</i>
Range of symbolic cues	Multiplicity of symbolic cues.	Narrowing of the range of symbolic cues.	Narrowing of the range of symbolic cues.	<i>Narrowing of the range of symbolic cues but with a broader spectrum.</i>
Action orientation	Orientated towards specific others.	Orientated towards specific others.	Oriented towards an indefinite range of potential recipients.	<i>Oriented towards both an indefinite range of potential recipients and specific others.</i>
Type of interaction	Dialogical. Immediate monitoring of responses.	Dialogical. Immediate monitoring and postponed reflective monitoring of responses.	Monological. No expectations of monitoring responses.	<i>Dialogue and monologue, with and without expectations of monitoring responses, both immediate and reflective monitoring.</i>

Figure 1. The media researcher John B. Thompson's categorisation of the different types of interaction of modernity compared with computer-mediated interaction (Thompson 1995; Jensen et al., 2004).

There is a significant difference between F2F interaction (column I) and the three other types of interaction which are all mediated (columns II, III and IV). This is the decoupling of interaction and communication from the body. One can perceive the body as a medium for emotions (Mead, 1934/70; Stacey, 2001), emotions which are closely linked to the many rhythmic layers of the body. Examples of this connection between the body's mediation and emotion are when we smile and blush. The difference seen when the body is decoupled as the interaction's medium also applies to 3D environments on the net. Regardless of how many multimedia, web cams, video conferences or 3D worlds and avatars are included, the body is present in the interaction's background. The body itself is not the interaction's medium, however, it is of course a prerequisite for dealing with the symbolic mediation. In order to activate the mediation you must press the keys on the keyboard, control the joystick or click on the mouse. As stated above, decoupling the body is required in mediated interaction and communication. This means that the time and place of mediation can enter into new relations that are independent of the body. This independence is the entire point of the mediated interaction. Thus awareness and accessibility can be extended over time and place so that texts from the ancient past can still be read and remain vivid in the present. However, this also creates that the mediation must apply a smaller spectrum with regard to symbolic signs and types than those that are possible when we are physically present. This means that the types of interaction and communication of physical presence, where everyone can 'read and interpret' everyone else's responses all the time (figure 1, column I – "immediate monitoring of responses") have had to find new forms throughout history. We are familiar with reflective ways of monitoring response that are delayed in time and place from letter writing and other types of text as well as visual expressions (figure 1, column II), while the quasi-interaction of mass media, where no response is expected, is known from books, films and TV (figure 1, columns III and IV). What makes the computer-mediated interaction special is that it can integrate both the mediated and quasi-mediated interaction, and recreate or remediate them in a new medium, i.e. the net-based computer medium. This remediation entails a broader spectrum of symbolic mediation than is the case for the other mediated types of interaction, albeit a narrower one than is the case for physical presence. The decisive factor however, is the creation of a new context with new relations between time and place. In the computer-mediated interaction, physical presence has become F2I (face-to-interface), and this presence is a significant element of what can be perceived as *practice time* – a context of time and place that is local and meaningful (figure 1, column IV). However this practice time is in constant interplay with a *system time* which is abstract. System time can for example be a chat environment, an online community or avatar-based VEs. In computer-mediated interaction participants therefore constantly shift or oscillate between practice time and system time, which each refer to a different context in time and place (Jensen and Heilesen, 2004). It is in this oscillation between different references of time and place that the mediated types of

interaction's separation of context can now be coupled to an extended accessibility, so that a new context arises and is remediated; a context that is specific for computer-mediated interaction and communication.

AVATARS OF THE SELF-CONSCIOUS

In this way remediation creates a new spectrum in the different types of social interaction. The type of interaction where the different participants share a presence, yet at the same time remain separated is of particular interest. An example of this could be when young people play online computer games at an internet café. The boys (most often it is boys) sit next to each other in the same room and they each have their own computer. They share a practice time that is situated. They talk, eat potato chips, and act in a shared space online 'out there' in a system time, where they act together against another group that is situated somewhere else; a group who is their enemy in the online computer game. This is an advanced form of interaction that breaks all the well known types of interaction and integrates them in new ways. Here we have a decoupling that creates interactional distance alongside a coupling that synchronises the direction of the action. The participants are present and act as a group in a shared physical presence but at the same time they have a virtual distance.

A participant's identity is transformed or remodelled when there are changes in the time and place of the context, for example when entering into a dialogue and collaboration on the net. The simplest way to sum up this transformation is to introduce a distinction between the narrator and the author (Latour, 1998). The *narrator's* actions are real and take place in the living now – s/he sweats, cries, thinks, writes and contemplates on how to create a new meaning in and with a new text – in this context a media text in the broadest sense of the word. When the text is born so to speak, the narrator assumes a new identity as the *author*, and the text takes on its own life in a social interaction. The relationship between the narrator and the author can be said to reflect the "I" and "me" of the self-conscious; that is the "I" that others see compared with the way that the "I" perceives other people's perception of the self same "I". This is what the social psychologist and philosopher Mead calls the "me" (Mead, 1934/70, 1938). On the net, this relationship takes place as a dynamic shifting or oscillation between practice-time and system-time, and this shift creates *a marked shift* between the two sides of the self-conscious. This marking of the way that the self-conscious constantly shifts between the "I" and the "me" in social interaction on the net can be visualised through a designed character – an avatar. As mentioned social interaction can be acted out simultaneously in two different meetings: the physical presence and confrontations between avatars in a virtual world. In other words this type of interaction enables one to meet oneself in a situation on the screen in the form of an avatar, while at the same time meeting other people in a place 'out there' and in a simultaneous "here". This meeting between the two sides of the self-conscious can therefore be seen in new ways which make it possible to approach the different sides of the self-conscious reflectively and to do this with others (see also Taylor, 2002).

Several focus points have now been identified in the theoretical analysis of knowledge sharing and avatar-based social interaction. These focus points particularly concern the new context of time and place, which creates presence and distance in a simultaneous process, as well as the reflective potential which can be created in and with the marked shift between the two sides of the self-conscious in social interaction; a reflective potential that is well worth exploring so as to understand the conditions for knowledge communication and knowledge sharing in an Agora 3D world and thus in the meeting between avatars.

EXPLORATIVE SESSIONS IN 3D AGORA

The Agora 3D world sessions have been both explorative and experiential, and the SIG members participated themselves. Inspiration was found in an auto-ethnographic method (Howard, 2002; Baym, 2000), and an attempt has been made to integrate video as an analytical medium (Banks 2001; Grimshaw 2001; Jensen et al., 2004). This approach has been applied based on the assumption that in order to understand the interaction and communication in these new systems and media, one has to have experienced them oneself. Only by having first-hand knowledge of the experience and emotions that can be achieved through participation in the 3D avatar-based worlds is it possible to design and deal with explorative sessions which also include other participants in the actual exploration process. These thoughts form the basis of the explorative design which lies within the qualitative "tradition" of participatory observation in the exploration of VEs (Schroeder, 2002).

The explorative design has been planned with a view to observing and analysing social interaction, communication and knowledge sharing in relation to three analytical levels: at the first level (*A*), AWEDU in its entirety is seen as an extensive knowledge-based system containing many worlds, universes, founders, builders and experts at building 3D worlds and communicating via chat as well as interacting with avatars. The EQUEL SIG has become part of this system through its own Agora world, and the group has had to learn and therefore

also obtain knowledge about how to build your own 3D world at ADEWU. This process of inclusion and “entry”, or the process of becoming a member of this extensive system is seen as an intensive process of knowledge sharing and knowledge dialogues. At the second level (**B**), the EQUER SIG’s activities, chat and interaction in Agora AWEDU were observed in three different phases: 1) introduction to the system; 2) net-based shared sessions and; 3) exploration of design examples: the voyage of discovery and the visualising meeting. The third level (**C**) is added to these observations, including observations that have been made through other participants’ access to the SIG’s 3D Agora world. Initially level C was the primary focus for the analysis. Levels A and B were seen as necessary in order to actually implement exploratory sessions with other participants who had been invited. However, in the process level B became the centre of analytical interest, and this paper is based on the most important observations from level B.

Twelve explorative sessions were carried out with varying contexts, objectives and participation. A chronological overview of the sessions with a short summary of the observations made can be seen in figure 2.

	<i>Context</i>	<i>Objective/ participation</i>	<i>Observations</i>
1	F2F workshop/ net-based session	Introduction to the AWEDU system. Agora SIG 5	It took a lot of preparation, time and support to introduce AWEDU. Too short time to really try out the system together. Had a feeling for the system after the workshop, had fun, felt that navigation and movements of the avatars were under control.
2	Net-based session in Agora	Navigation and interaction with avatars. Agora SIG 5	Avatars joined in at different times. Problems with gathering the avatars at the same place and at the same time. Difficult to get avatars’ attention and chat communication was also very difficult. The chat was new for most avatars. No exploration, no fun and play. Avatars kept falling (gravity-problem), not possible to discuss aims.
3	Net-based session in Showcase	Knowledge sharing; avatar meeting with AW expert. LLD/ Showcase	Learned about and decided on a chat dot system. Were told about 3D object market places on the Internet and visited the Showcase 3D object warehouse.
4	Net-based session in Agora	Information centre and voyages of discovery. Agora SIG 5	Technical problems with “gravity” left little time to take avatars on the recommended tours or to see how bumps and clicks could be built into signs. Difficult to coordinate avatars’ interaction and to focus communication in chat.
5	Net-based session in Agora	Avatar meeting about chat norms and chat language. Agora SIG 5	Difficult to coordinate avatar interactions and negotiate a common understanding of chat norms and language. Technical problems with “gravity”. Building activities introduced during the last 5 minutes.
6	Net-based session in Agora	Joint building activity with avatars. Agora SIG 5	Building activities take place collaboratively and in a fun atmosphere. Technical problems for one participant are dealt with by one of the other avatars. Different roles thus develop, which means that building activities can take place.
7	Net-based session in Agora	Joint building activity with avatars. Agora SIG 5	Building activities continue collaboratively with avatars now experienced in navigation and building. Still technical problems for some avatars. One avatar takes other participants on a tour to Showcase, while technical problems are dealt with. Very difficult to build together – using each other’s objects. Rules are needed like “don’t change objects make copies before changing them”. Also, the building space is limited when it comes to number of objects.
8	Net-based session in the EQUER project’s collaboration system	Evaluation. Agora SIG 5	Much harder to operate the worlds than first anticipated – feelings of being a novice, the multitasking aspect is difficult to deal with – very difficult – feelings like being neglected come from this. You can’t just build – it takes time to learn how to navigate and communicate.
9	Net-based sessions in Agora	Joint building activity with avatars. LLD	Very hard to build collaboratively – technical limitations and no set of rules even for experienced avatars.
10	Hotshop/ presentation	Presentation of Agora SIG 5 activities. <u>e-learning</u> <u>Øresundproject</u>	Still working up data.

11	F2F workshop/ net-based session	Design of the voyage of discovery and the visualising meeting. Agora SIG 5	Many differences appear. 1) Different preconceptions and meta-understandings of Agora activities; 2) Different approaches to research; 3) Different perceptions of design: the analogy- to-real-world design versus the abstract design different-from-real-world. One avatar brings up issues in the avatar meeting not discussed in the F2F meeting. Issues not pleasant but necessary to discuss. Things that might be avoided in F2F situations due to politeness and eagerness to avoid conflicts. The avatar meeting allowed this to appear.
12	F2F workshop/ net-based session	Design of the voyage of discovery and the visualising meeting. <u>Young researchers on computer games and math</u>	The participants navigated, talked and had an insight in the features and functions which seemed as familiar to them as social rules and interaction in a F2F environment. The participants found AWEDU an insufficient virtual environment with not enough features. They also found the design of AGORA too abstract. The participants did not seem restricted in acting in this kind of setting. They felt at home.

Fig. 2: Overview of 12 explorative sessions in 3D Agora AWEDU. (Source: EQUER, 3D Agora SIG 5, Documentation: chat logs, walk-throughs, video recordings, evaluation sessions on the net and F2F).

OBSERVATIONS, SCENARIOS AND DESIGN

The initial session in the Agora SIG took place as a workshop in Lyon where the SIG members were gathered. The session was planned as an introduction to the newly acquired Agora world. There are several things that stand out when watching the video material from the workshop. The activities within the Agora took place in a single shared room where all the participants each had their own computer. The atmosphere was very intense, however, it is clear that the participants had a good time 'playing' with their avatars while navigating the various 3D worlds. As the Agora AWEDU was still new, it was still an uninhabited and empty space which had to be built-up. Many of the avatars were therefore encouraged to go on voyages of discovery to other developed and imaginative worlds. The playful atmosphere on these voyages of discovery was partly because the participants were able to communicate and interact across two time and place zones. There was a constant commentary between communication and interaction across two times and worlds in the virtual 3D Agora system-time, as well as in the concrete practice time in the shared workshop room. That is a 'setting', a situation or context which has many parallels to the setting that constitutes the context for players of online games, who sit together in a local context while they act in union in another 3D world somewhere 'out there', where they simultaneously interact with other participants.

The playful atmosphere of community changed in the second phase of the experiment, which took place after Lyon. The SIG continued to have a number of distributed and net-based shared sessions, where all the participants entered the Agora together from different physical locations with the objective to experience and build. A feeling of being lost spread among several of the SIG members, who were also experiencing technical problems which prevented them from participating in the activities. Some members began to feel being left out and neglected, while others were rendered powerless as they were having problems navigating or communicating in and with the chat. It was difficult to multitask when the level of complexity increased in the transition from "embarking on a voyage of discovery" with a view to experiencing the interesting and imaginative ideas in advanced worlds to actually coordinating a building activity alone, yet as part of a group. It turned out to be difficult to coordinate the avatars' attention in this system, even though it is a system that places emphasis on the intensity of the experience. At one and the same time, the avatar must be navigated at several levels, the participant must keep an eye on what the other avatars are doing, while at the same time communicating in the new language used in the chat. If you can keep up, it is a lot of fun, if you cannot, then it quickly becomes very cold and lonely in an AWEDU world.

In the third phase of the explorative sessions experiences and observations have been summarised in three scenarios which distinguish between different types of activities and modes of orientation in 3D Agora: 1) the voyage of discovery, 2) the playful meeting and 3) the purposeful meeting. *The voyage of discovery* is the first activity that springs to mind when you log on to AWEDU. It is a voyage through the many different worlds in AWEDU, full of experiences, surprises and inspiration due to the many both imaginative and innovative ideas that have been visualised. You can embark on the voyage of discovery on your own, or you can travel with other participants in small groups of 2-3, and you can meet other travellers. There is also *the playful meeting*, which expresses a desire to meet other avatars. In the playful meeting, it is the meeting itself, through avatars and in chat, that motivates activity. You chat together to explore and experiment with the new mode of communication itself; this also applies to the interaction between avatars. You can dance, wave and imitate others to experience how the movement develops and affects the meeting between avatars. Building activities

can be done just for fun, so experiments can easily be deleted or associated to one another. The objective is to have fun and to meet in a new way. Finally, there is *the purposeful meeting*. When the meeting includes planned activities where the avatars meet to do something together, that is when the meeting has a defined objective, and in particular if this includes building activities, a learning element of knowledge communication and knowledge sharing is linked to the otherwise playful activity. Examples could be meetings where the objective is to build something in particular together, or meetings that deal with navigating and building in AWEDU, or it could be a meeting that uses the system to visualise ideas or develop role plays based on different avatars. Further to the three scenarios, two examples in 3D Agora have been designed: the “*cube*”, based on the voyage of discovery scenario; and the “*visualising meeting*”, based on the purposeful meeting scenario. The two designs have been developed, explored and discussed in the final phase of the Agora SIG’s explorative sessions, particularly at a combined F2F workshop/net-based session (session 11). Several underlying differences in the way the Agora SIG collaborated and communicated emerged at this session. Differences that were expressed emotionally between the avatars in the 3D world and that were difficult to express F2F and therefore were expressed indirectly during the avatar meeting. Exploration of the two design examples also led to the expression of two different perceptions of 3D design: on the one hand, there is the need for design that draws analogies from real-world settings in order to create a familiar framework for social interaction. On the other hand, a design that emphasises the difference between VE and real-world settings is needed in order to exploit the reflective potential found in creating a new and unexpected framework for social interaction, i.e. a design that places emphasis on conditions that are otherwise taken for granted.

CONCLUSION

The explorative sessions have shown that it is difficult to get avatars to meet, to coordinate their attention and to create a shared focus point *in a larger group of avatars* (4-9). When avatars meet two at a time, they can work together with no problems. Groups of up to four can just manage, however, when bigger groups of avatars get together, they often experience difficulties when coordinating, focusing and communicating if they are doing anything more demanding than playing and exploring or going through the rituals of meeting. This is particularly true when they cannot split up into onlookers and active participants. These conclusions supplement experience from other research projects in 3D and avatar-based interaction (Schroeder 2002). It is difficult to create an actual dialogue that can uphold a longer chain of thought between two or more avatars in AWEDU chat. Moreover the avatar’s movements are a poor reflection of the signs and symbols that the body uses to coordinate social interaction as the participant has so little control over the movements. Also, the 3D building objects are not designed for collaboration. This soon becomes evident when requirements and complexity increase. This is typically the case for purposeful activities that require knowledge sharing and collaboration, e.g. building a new world together in the shape of a meeting place. The building activity in the sessions started from scratch: the participants had no designs as their starting point. This made the Agora SIG’s task very complex and difficult. As a result of this, the philosophy had to be changed mid-passage: the two design examples – the “*cube*” and the “*visualising meeting*” – were first developed and subsequently explored and discussed in the Agora SIG. It turned out to be too demanding a task to build a world from scratch and in a community of avatars communicating through chat.

The design examples can be seen as an “intermediate form” (Latour, 1998): they visualise an idea or a scenario as the foundation for social interaction while at the same time eliminating the self same foundation. In this sense, they express a conclusion that on the one hand emphasises the necessity of a minimum design, which helps shape the social interaction between avatars. A design that can be seen as a basic framework (Goffman 1974/86), which connects the design with familiar forms of interaction. On the other hand, the two examples are also shaped as *reflective designs*, which are abstract and “contra-intuitive”; designs that emphasise the difference from the real-world settings with a view to seeing what is otherwise taken for granted with new eyes. In this sense, they build on a perception of design, which stresses that the virtual meeting between avatars can contribute to rendering the unreflected reflected, because it is possible to experiment with social interaction in the new VEs. Social interaction where the significant shift between the two sides of the self-conscious can unfold in a new context of simultaneous physical presence and virtual distance as the participants constantly shift between practice time and system time. In other words, it is a design that inspires new knowledge about the balance between firstly, the basic frameworks of the minimum design, which shapes the social interaction, and secondly, the reflective design that adds dynamism to the same basic frameworks. It also inspires knowledge about the social interaction between avatars in groups of varying sizes, where participants have different qualifications and different roles as well as motivation for participation. This knowledge does not exist yet, however, it requires further research.

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