Changes in Group Communication in the Context of "virtual/real Ratio"

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It is generally perceived that within the everyday work, there is a growing level of both the abstract and the virtual, especially for the teamwork participants dispersed within the global network. Purpose of this paper is to "translate" this feeling into a systematic scientific apparatus.

The paper examines following factors: the time and place of mediation between participants, as well as personal and modal dimension. These factors are specified for communication tools used by architects.

Keywords: Communication tools, teamwork, taxonomy, virtual/real ratio, group co-operation.

Practical background

The problem of organizing teamwork has been first perceived by the author while three design-teams, working in the Polish cities of Warsaw, Gliwice and Wroc?aw, were trying to co-operate on a residential project located at Cz?stochowa. Average distance between the participants was approximately 200 km, and this made direct co-peration practically impossible. Already during the first phase of the design process, the designers discovered the depth of changes within the new approach as compared to the traditional one.
A high number of successful group co-operation may be already found in different parts of the world – just to mention Urs Hirschberg and VDS: Multiplying time (1997) or Eventspaces by Fabio Gramazio and Kerstin Hoger (1999-2000). (Engeli M; 2001). The Polish case was conducted for a practical purpose, but consequences formed during the analysis also have scientific values.

Theoretic background

The exact type of the mentioned co-operation took place only between different architect's offices. There was no need to engage other consultants, and the inner network has not been examined.

The second issue, which led to above work is the communication taxonomy. From comprehensive Shedroff's certain elements used by the design-teams have been chosen and explored as to which category (real/virtual) they belonged. We have used a taxonomy created by Nickerson, but replaced "collaborative application" with a "communication tool" and added new modal dimension : "personal-direct", as well as V/R ratio.

To operate virtual/real ratio the term: *virtual* has to be defined first. One doesn't have to quote neither Kant or Lanier, as the best description of the *virtual* is given by Michael Heim: *Virtual Reality brings together seven different ideas and technologies: simulation, interaction, artificiality, immersion, tele-presence, full body immersion, networked communication.* (Sullivan-Trainor; 1995). So V/R

ratio represents the extent to which all mentioned conditions are fulfilled. Final effect is not always measurable. V/R ranges from completely real to completely virtual. Numerical expression would require assigning to the seven mentioned conditions the values of 0 to 1, followed by addition and division of the virtual "value" by the value of virtual. It is clear, that such procedure has a low level of the scientific interest.

Present Group co-operation

E-mail, Internet and mobile phones have decreased the frequency of personal contacts and reduced direct data exchange. Although Internet connection is common, due to the narrow bandwidth, it is still difficult to establish video-conferences.

The time and place of mediation varies. They are different, if the co-operation is virtual (digital) and the similar, if it is a real (personal) co-operation. Media type also vary. Data, voice and video mix with traditional mail and personal contacts. One can assume, that it is a period before the appearance of the virtual society.

Interaction is limited, both – synchronous and asynchronous types of communication appear.

Tools used for teamwork differ. On one side there are LAN's and all relevant issues. On the other side is Internet (Text data shared by the network computers; ftp, telnet) evolved to WWW (multimedia), followed by VRML 1.0 (Three dimensional space and walk-through world) and VRML 2.0/97 (Movement & sound: Moving world). Some specialized groupware applications, like Citadon, eRoom, or Extranet World appeared on the market and are used by professionals.

Possible future co-operation

The possible scheme may be described as follows: the users will log on and move into a network, then meet as Avatars and discuss design process on a Virtual Building Site.

In this case, time of mediation will be the same as the virtual place of mediation. It is understood, that the real place of mediation might differ.

Media types, like data, voice, interactive presentations and video will be combined together. Personal meetings will be more and more occasional.

Interaction will be full and synchronous. It will depend on the refresh frequency and delay-time of reaction. Both of them require fast CPU, so it is very probable, that hardware will no longer cause problems.

Tools used for teamwork will possibly unify in a virtual world. As VRML evolved to VRML 3.0, real-time multi-user environments (e.g.: Active world) will be accessible to everybody. There will be one crucial condition – broad bandwidth. *"As the bandwith of online communication broadens, it is likely we will see an integration of whiteboard technology, video conferencing and virtual reality".* (Von Wodtke;1999)

Observed transformation routes

It is easy to observe that the changes in the group co-operation develop in two different paths: (1) dispersion provided by Internet and (2) multimodality, which is a result of the user-interface development.

The first route is described below. It is unbelievable, how deep Internet affected the way of the group co-operation and how fast it has spread. Tools like e-mail, chat, Usenet, whiteboards, newsgroups, virtual meetings and video-conferences via ISDN are considered as natural, while only a few years ago people worked in a digital isolated environment. The web is an abstract, absorbing and, gradually immersive. Therefore, it can be said that it is virtual, and that its utilisation increases the V/R

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ratio.

The second route - multi-modality – implies, that the user interface evolves from typing via 2D GUI to the utilisation of multimedia and 3D GUI (e.g.: Personal infostructures by Michele Milano;1998). The evolution of the User Interface evolves from the virtual and abstract behaviors to the invisible extensions of the human-body. The final stage is voice-controlling and VRD.

Both routes will probably finally meet and flower as a "virtual society", where the distances and the place of work will not form a barrier to the co-designers, and techniques of VR-interface supported by a broad bandwidth will simply "cheat" our senses.

This could further cause the increase of the V/R ratio on the V-axis (a more and more virtual way of work), but – except for the distances – the process of the group co-operation will not change from the Architect's perspective.

Virtual or real

Changes in the group co-operation methods increase the virtual factor not only due to the appearance of the new tools, but because of new approaches and possibilities of utilization.

In the table below, columns are sorted according to Nickerson, but the modal dimension has been extended. Collaborative application has been replaced with the means of communication chosen from Shedroff, as well as the personal dimension. Analysis enabled the selection of the most popular communication tools. Certain tendencies found in the collaboration methods might be suggested: from direct to indirect, from proximal to distal, from focused to dispersed, and combining both – synchronous and asynchronous collaboration.

The conclusion of the above data may be shown as a graph, where chosen communication tools are selected according to the V/R ratio. It is difficult to define this ratio numerically (e.g. fraction), but the purpose of the graph is clarification of the fact that every newer the tool assumes a higher level of virtuality.

Conclusions

The question, why the Architects start to work in a more and more virtual environments may be associated with two main reasons: (1) changes in User Interface and (2) changes in communication tools. Presently, GUI offers different ways of 3D representation, being interactive and immersive (VR,

Communication tools used at architectural studio (chosen)	Personal dimension			Temporal dimension		Spatial dimension		Modal dimension			
	One to one	One to many	Many to many	Synchronous	Asynchronous	Proximal	Distal	document	audio	visual	Personal - direct
Discussion+meeting	x			x		x					x
Mail	x				x		x	x			
Telephone call	x			x			x		x		
Fax	x				x		x	x			
SMS	x	x			x		x	x			
e-mail	x	x			x		x	x			
chat	X			x			x	x			
Discussion group			x		x		x	x			
Video-conference			x	x			x		x	x	
Virtual meeting			x	x			x	x	x	x	

Figure 2.Taxonomy of selected architectural tools in their dimensions: personal, spatial, temporal and modal, which serve for the V/R ratio.
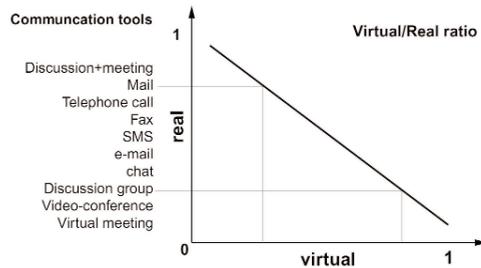

Figure 3. V/R ratio – contemporary procedures of teamwork become more and more virtual.

CAVE) and finally, more intuitive. The same has taken place within the communication environment, where it is easier to use 3D representations, than to operate on an abstract text level. Finally, the predicted way of the future group co-operation will be a result of human tendency to create easy and intuitive procedures.

Group co-operation can no longer be avoided. This has been obvious for the past five years (e.g.:Kosco;1997). Presently it is most important which tools are used and how they gradually evolve from the direct and synchronous participant interactions (which is in fact real), to the indirect and asynchronous ones, which may be assumed as virtual. In these terms the level of the virtual within the virtual/real ratio increases. This affects not only the teamwork and it's tools, but it needs to be developed further in the context of all tools used at the design studios.

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