

VIRTUAL TEAMS: WHAT EXTENT OF VIRTUALNESS IS SUSTAINABLE?

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Abstract

Virtual work makes it possible for organizations to use the best knowledge with no regard paid to the geographical location of its bearer. In the paper we deal with the most relevant benefits of virtual teamwork including its positive impact on the environment on the one hand and with its limitations on the other hand. To avoid some of the problems connected with the virtual teamwork, face-to-face meetings would be helpful. Unfortunately, face-to-face contacts would spoil the advantages of virtual cooperation. An optimal extent of virtualness needs to be found. To increase both the extent of virtualness and the benefits of virtual work, we suggest applying of virtual teambuilding methods. We have developed such methods in the virtual world Second Life and some of them are presented in this paper.

Key words: management, sustainable development, virtual work, Second Life.

Introduction

The terms like telework, telecommuting, remote work, dispersed work or virtual work are used interchangeably with no unific definitions; however they always refer to the new forms of work characterized by the use of information and communication technologies (ICTs) for work purposes. In this paper we use the term virtual work, i.e. work with the use of web based applications. Virtual work makes it possible for organization to use the best knowledge with no regard paid to the geographical location of its bearer. Virtual teams can be created thanks to web applications and other ICTs. A virtual team is defined as a group of people cooperating on one and the same project across space, time and firms, using information and communication technologies for their communication [1]. The significance of virtual teamwork will further increase. According to forecast by Gartner [2] by 2015 the non-routine work will be 40% of the total work. In 2010 it was 25%. Non-routine work is usually knowledge work, which means it can be largely performed with the use of ICTs. Moreover people will work often in teams then solo. The use of virtual work is also cost effective as the team members can work from their homes or other places and do not need to commute. Over time many other benefits and also limitations of virtual work have been discussed.

1. The benefits of virtual work

In this chapter some examples of the benefits of virtual work are introduced. In its second part the impact of virtual work on environment is discussed [3]. Workers who are

supposed to be working from home do more than their in-office colleagues. For example, American Express virtual workers produce 43% more business than employees at the office, according to Colorado Telework Coalition. Productivity increased 31% among the 9 000 virtual workers in British Telecom's workforce of 80 000 and at JD Edwards, virtual workers are 20 to 25% more productive than office workers, according to the Telework Foundation.

The use of virtual work directly cuts costs. The companies reduce expenses on office supplies, energy or real estate. Other savings are achieved thanks to reduced absenteeism. Estimated annual savings per virtual employee in comparison with a traditional worker are \$5000. Much of those savings come from lower real-estate costs. According to Deloitte virtual work programs can create as much as 40% reductions in needed real estate space [4]. In Nortel the virtual workers are away from work due to taking care of a sick child, nursing a cold, or other events that might otherwise force an employee to take a day off only 1,5 day per year compared to 3,5 days of traditional workers.

One of the most discussed benefits of virtual work is the positive impact on environment thanks to reduced commuting of the workers. In the United States 3,9 million people in 2007 worked from home at least one day a week. By avoiding an average 22 mile commute to work (35 km), it was saved about 840 million gallons of fuel (3,2 billion liters), which is the equivalent of removing 2 million cars for a year. A million virtual workers can save nearly one million tons of carbon dioxide annually, i.e. one virtual worker one tone. In the

European Union 7% of workers are involved in virtual work at least a quarter of the working time and 1,7% of workers are almost full time virtual workers (the report was published in 2010, the research was conducted in 2005). The highest percentage of employees involved in virtual work was observed in the Czech Republic, where 15,2% of employees worked virtually for a quarter of the time or more. Bulgaria noted the lowest percentage, with 1,6% of virtual workers [5]. With carbon dioxide being one of the primary greenhouse gases targeted by the Kyoto Protocol and recent legislation, the potential of virtual work as a green strategy takes on importance.

Nevertheless, the approach to the environmental consequence of virtual work has to be more complex [6]. When related to economic and environmental criteria, virtual work can be profitable for all parties involved, organizations, individuals and society. We have to admit that the source data are often scanty, not very precise and comparable with difficulties. Kitou and Horvath combined the knowledge from the previous research with new information and economic and statistical theory to estimate public, private and individual costs of virtual work. They set the standard conditions of virtual work and traditional office work like type of transportation, commute distance, equipment of company office and home office and also heating, cooling and lightening in home office and in company office and analyzed several virtual work scenarios. According to their conclusions the effects of virtual work are complex, difficult to predict and quantify. However they identified the key elements that have to be considered when implementing virtual work: extent of virtual work (proportion of virtual working time), climate conditions and state of residence of the worker and the company (or its branch). The analysis proved that significant benefits can be expected from virtual work programmes but the details of implementation are crucial for success of a program.

2. The limitations of the virtual work

Despite all the benefits of virtual work we have to consider it has its limitation. There are many challenges and obstacles connected with virtual work which have to be solved. Some of the most serious are discontinuities of geography, time zones, national cultures, work practices and available technologies [7]. For virtual team members with no prior relationships it is difficult

to build trust across distance. ICTs can be insufficient to bridge cultural differences. The reduction of knowledge sharing can arise as a result of low level of trust and cross-cultural misunderstandings between virtual team members. This way the main advantage of virtual teamwork, gathering the best knowledge bearer from around the world together, is lost.

This is one of paradoxes of virtual team work. Virtual teams are geographically distributed by definition and their members can not be physically present at the same place in the same time. However, face-to-face meeting is an efficient way to build trust and understanding between team members. Also according to our own survey among the students, who were participants of the research seminar Virtual Work in 2010 at the Philosophical Faculty, Palacký University, the face-to-face meetings are important for the team cohesion.

Now another paradox appears: to establish virtual team is beneficial for above mentioned reasons but the performance of a team is dependent on the personal contacts between team members. To make the view of virtual team work more complex, we have to examine the extent of team virtualness.

3. Virtualness

Virtualness is continuous variable ranging from 100% virtual to 100% face-to-face. However, even collocated people can feel certain distance between each other and on the other hand people with a shared positive history can feel close to each other even if they are geographically dispersed. To estimate so called Virtual Distance™ between the subjects we can use Virtual Distance Index™ [8]. Virtual Distance is defined as the perceived distance between two or more people, groups, teams, organizations, or networked enterprises, brought on by pervasive electronic communication and resulting changes in behavioral norms, regardless of whether people are separated by millimeters, miles, or continental masses. Virtual Distance is measured using the Virtual Distance Index.

To specify the Virtual Distance Index of the team, the set of eleven factors divided in three groups is scored: Physical distance factors – geographic distance (the degree of real physical distance between team members), temporal distance (the degree of time zone differences), organizational distance (from how many organizations the team members are).

Operational distance factors – communication distance (the frequency of face-to-face and electronic communication), multitasking (the extent of competing projects the team members are working on), readiness distance (the extent of the capability of team members to use virtual collaboration tools), distribution asymmetry (the extent of individual team members distribution).

Affinity distance factors – cultural distance (the extent of cultural differences of the team members), interdependence distance (the extent of the sense of shared goals in the team), relationship distance (the extent of previous shared experience between the team members), social distance (the importance of formal position and titles versus contribution and work effort).

Research by Lojeski shows that teams with high scores on Virtual Distance are quantifiably less successful, had relatively poor leader effectiveness and demonstrated less innovative behavior.

4. Conditions of effective virtual cooperation

The best virtual work practices and specification of the activities that enable to achieve full potential of virtual work were published in 2010 by Evan H. Offstein, Jason M. Morwick and Larry Koskinen [9]. According to their findings the most successful companies initiated virtual work not as a way to reduce costs but as a source of competitive advantage. They realized with the virtual work the pool of talented recruits is global. A major finding from their research is that the most important variable in predicting virtual work success is leadership and also HR strategy matters.

It is necessary to pay attention and dedicate time and money to recruitment and selection of virtual workers and virtual leaders (leaders of virtual teams). Virtual workers have to be socially agreeable, extroverts and independent with high level of communication skills. These personality characteristics are more important than technical abilities. People can learn how to use technology but they can't change their character.

Communication skills are particularly important for virtual leaders. Virtual leaders are more effective when they use several mediums to communicate – phone calls, e-mails, chats, web conferencing including video conference and we can recommend also meetings in virtual worlds. It is important to use not only written

communication but also voice communication because it deepens human context of the communication. Also scheduling is of big importance namely if the team members are dispersed across time zones. Virtual meetings should be rotated as the time is reasonable for everybody and more suitable and less suitable times (early morning, late evening) alternate.

A good virtual leader is more results oriented than processes oriented. The reason is that in a virtual environment it is nearly impossible to monitor processes and leaders must focus on results. This approach is based on strong trust between the leader and team members. Trust is demonstrated in the manner the leader evaluated performance. It is inevitable to establish, communicate and regularly evaluate measurable performance metrics.

Another condition of effective virtual cooperation is to develop a sense of team cohesion. Social support of the team members is very important, purely task driven relationships are not effective in a virtual environment. Developing a sense of the team is in a virtual space extremely difficult. According to Offstein and al. one of efficient ways is to support blended experiences of the team members, it means to combine virtual and physical interaction of virtual workers. However, as explained above, it is not always possible to bring the team members physically together. Our suggestion is to replace face-to-face meetings with virtual teambuilding meetings in the virtual world Second Life (SL).

5. Teambuilding in the virtual world Second Life

To extend the virtualness of virtual team cooperation and to decrease its Virtual Distance (Virtual Distance Index) in the same time, we recommend virtual teambuilding. Virtual worlds are advisable platforms for virtual teambuilding. Virtual worlds are three-dimensional environments accessible on the internet. The users are represented by unique avatars which are human-figures or other beings that have their own names and the user can create their unique look. There are many virtual worlds available on the internet; as mentioned above, we have chosen SL for our virtual teambuilding research. SL users communicate together, build everything they have on their mind, including schools or companies, they talk, educate and do business in the same way as in the real world, however, without its physical restrictions – distances may

be bridged by e.g. teleportation. SL has its own economy with its own currency, the Linden Dollar. This name is derived from SL creator, the Linden Lab. Linden Dollars are exchangeable for USD and progressively for other currencies as well. SL economy is run by the ability of users to create and offer virtual products.

SL can be considered as a special type of social medium with very suitable conditions and tools for socialization, relationships building and also for teambuilding. SL allows certain range of nonverbal communication which is higher than allow other ways of internet based communication. Avatars can present information solely by appearance. Written chat and voice chat are possible (public, group or private), avatars can use gestures and other ways of self-expression. We can say that communication via avatars in SL falls somewhere into the assumed continuum between face-to-face communication and asynchronous written communication. The possibilities to customize the appearance of avatar, build and share objects and interact with others predetermine SL as a suitable platform for virtual teambuilding.

Philosophical Faculty of the Palacký University in Olomouc built its seat in SL at the end of 2008 (Fig. 1). The seat is used for whole range of purposes such as virtual lectures, occasional public discussions, for faculty promotion but mainly for research. We deal with the research of virtual teambuilding and virtual team management in SL within the frame of the research seminar Virtual Work.

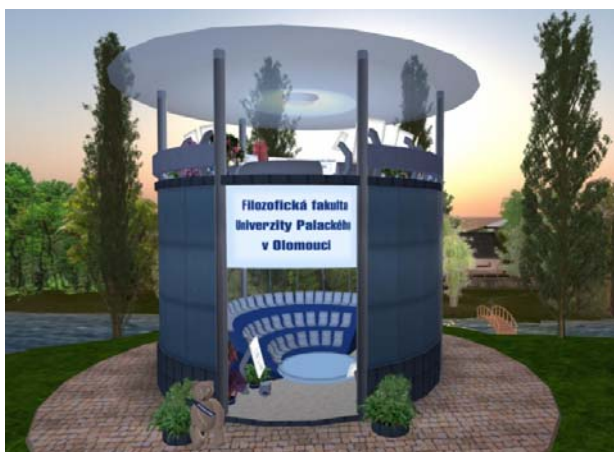


Fig. 1. The seat of Palacký University in Second Life

First task of every session is to establish communication between participants, i.e. voice chat and/or written chat. Unfortunately it is not

as easy as it may seem. SL has its technical limitations which can cause difficulties for the users. It is necessary to consider this possible problem when the schedule of SL activities is prepared. When the participants can communicate smoothly, first short activity starts. This activity has a character of an icebreaker game. Whether the participants of the group know each other or not, an icebreaker helps ensure everyone is feeling comfortable, energized and ready to get started the main activity.

Central activity of a seminar session is a longer strategic game. The scenario of a game supports team cooperation and team development. The group of participants fulfills one common task or the participants can be divided into smaller competing groups. The game scenario is based on three principles: 1) everyone in the group has to participate, 2) communication is critical for the team success, 3) it is difficult to fulfill the task if the team fails to work together.

These principles are relevant for teambuilding activities in general but there are some specific conditions in SL. The creation of strategic teambuilding games in SL is influenced by technical facilities of this virtual environment. For instance it is not possible in SL to exercise with a rope, which is an often used item during teambuilding activities. In return the team can create all sorts of objects and buildings, watch pictures etc. The preparation of the teambuilding games for SL platform is extremely demanding task for the research team: the games have to contain all the team cooperation supporting elements and they must be feasible in SL even for players without long experience in SL.

We use several methods to examine the effectiveness of developed methods. Before the seminar began, the participants filled in an electronic questionnaire based on the sociometric rating questionnaire (SO-RA-D, by V. Hrabal). The questionnaire focuses especially on the character of a work team and social atmosphere in the group, trust in a team, support between its members, cooperation and its forms, communication etc. The brief version of the questionnaire is filled in before and after individual sessions [10]. After the seminar a focus group is organized. Processed data offered the evidence on the effectiveness of our developed methods from both short-term and long-term perspectives.

6. Seminar session – case study

A program of one of the seminar session is described below. We introduce only the teambuilding games, not the parts of the program focused on evaluation of the activities. The activities mentioned below required some level of common experience of the participants in SL.

6.1. Icebreaker game: *The place on my right hand is free*

The participants sit in a circle. One place is free and the participant to the left of this free place starts the game “The place on my right hand is free, I would like (name of some colleague) sits there because (the reason of the choice).”. The game continues in line with this principle until all participants make their choice. The aim of this game is mutual understanding and self-understanding of the participants. This game has more aspects in SL then in the real world. For example the task “Sit down in a circle” is not easy to fulfill in SL. The avatars

also have to create some easy objects to sit on (plus the instructor creates one free stool). Only to start the game, broad communication and cooperation in the team is necessary.

6.2. Strategic game: *The Bridge*

Our game The Bridge is inspired by the game Crossing the Ravine by IBM experts [11]. We have simplified this game so that it is possible to play it everywhere in SL and its preparation is very quick. The game is based on a dramatic story about the group which wrecked in some dangerous hinterland and it is necessary to cross the river full of ogreish creatures. The group has a set of irregularly shaped planks and the only way how to go over the river is to build a rectangular bridge from all the planks. To build the bridge is very demanding task, to be successful strategic thinking and perfect team cooperation are unconditional. Two competing groups of students building the bridge are caught in the figure 2.



Fig. 2. Strategic Game The Bridge in Second Life

Conclusions

Virtual work is a relatively new way of knowledge work with very big future potential. Thanks to ICTs the best experts can be gathered in one virtual team and to cooperate across all the world. Many benefits and also problems connected with the virtual work are discussed and there is still no clear consensus of opinions. However, it is possible to identify several factors which are crucial for efficient virtual team work: extent of virtual work (proportion of virtual

working time), climate conditions and state of residence of the team members and the company. Very important are also HR strategies and leadership style as well as the personality of the leader. Virtual work is connected with some paradoxes. To establish virtual team is beneficial for many reasons but the performance of a team depends on the personal contacts between team members. However, virtual team members are geographically distributed by definition and can not be physically present at the same place in

the same time. Virtual teambuilding can help to overcome these paradoxes. We have developed virtual teambuilding methods in the virtual world Second Life. According to our research virtual teambuilding is a useful tool for improvement of social atmosphere in the virtual team, trust in a team, support between its members, cooperation and its forms, communication etc. Our present research is carried within the research seminar Virtual Work at the Palacký University and the number of participants is limited. The majority of them are students. Next more extensive research is required to confirm our findings.

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