Elements of Technology and Success in Virtual Teams

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Abstract

Virtual teams are the future and the future is now! Virtual teams are receiving high attention because they constitute new way of working. Characteristics of virtual teams, such as the maturity curve, the advantages and disadvantages are presented, along with the basic rules to follow in building successful virtual teams. The technologies involved in virtual teams are also presented. Teams are more likely to be effective when certain enabling conditions exist. Shared understanding, easy communication, integration and mutual trust are some of the main conditions. Trust is generally the hardest condition to achieve and this paper analyzes trust more in depth, providing advice on how to build trust within virtual teams. Virtual success stories of large international corporations are presented as that there is such a thing as successful virtual collaboration. The authors present results from using virtual teams in an online MBA course that suggest that such an experience was very positive. The paper concludes with what the upcoming future will bring in terms of virtual team development.

Keywords: Virtual Teams, virtual technologies, success of virtual teams.

1. INTRODUCTION

For over a decade, people have been talking about the potential of telecommuting and about different forms of electronically enabled remote work (Jones, Oyung and Pace, 2005). Virtual work is everywhere today. Business people read and send e-mails from home, from abroad, from the train, almost from anywhere. Small devices like mobile phones or laptops allow them to do so. Many meetings include people who are present by webcameras (webcams), or speakerphones or are held entirely as conference calls (Jones, Oyung and Pace,

2005). High end systems like Cisco's TelePresence make video conferences as realistic as almost being in the same room (Bielski, 2008). "Cisco's TelePresence 3000 unit makes face-to-face an option even when big distances are involved" (Bielski, 2008).   All these possibilities became feasible only in the past decade. With the help of the new technologies developed, people now experience some profound changes in how teams can and will work together.

Videoconferencing and video calls allow team members to interact in almost 'face-to-face' encounters (Nedelko, 2007). There are many benefits from video interaction such as

reduced travel costs, and increased interaction(Jones, Oyung and Pace 2005).

The use of virtual environments promises to revolutionize the ways in which humans live their lives (Hettinger, Haas, 2003). Hettinger and Haas, "virtual and adaptive environments are systems composed of humans, computers, and interface devices." The previously mentioned authors also believe that these environments are very likely to alter the behavioral landscape of work, recreation, education and also the way people routinely communicate and interact with each other. Because these new technologies will become part of people's lives, they have to make sure that these technologies will be used in a way that promotes maximal efficiency and safety for both the user and the society as a whole (Hettinger, Haas, 2003). Virtual environment is a highly innovative approach to the design of human-machine system. It is intended to significantly expand and facilitate human interactions with computer-based technologies (Hettinger, Haas, 2003). Hettinger and Haas, "virtual environments represent an approach to human-machine system design that seeks to produce a sense of immersion or presence within a computer generated environment."

This short introduction on virtual environments was necessary in order to understand from where the "virtual team" concept came. Virtual teams are part of the virtual environment; they are a "product" of it. In order for a virtual interaction to take place, the virtual environment's support is needed (Lisa Kimball, 1997).

2. VIRTUAL TEAMS – THE BASICS

The "virtual team" concept

The term "virtual team" can be broken down into the following components:

Virtual. This term is defined by the Free Online Dictionary as "created, simulated, or carried on by means of a computer or computer network".

Team. The definition, provided by the Wikipedia Encyclopedia is as follows: "a team comprises a group of people linked in a common purpose". Furthermore it notes that "a group in itself does not necessarily

constitute a team. Teams normally have members with complementary skills and generate synergy through a coordinated effort."

Nedelko (2007) defines a virtual team with these four characteristics:

*   Geographical dispersed
*   Using communications technologies
*   With a common purpose or goal
*   Collaboration across space, time and organizational structures.

Linking the previous terms together, a virtual team - also known as a Geographically Dispersed Team (GDT) - is defined as "a group of individuals who work across time, space and organizational boundaries with links strengthened by webs of communication technology" (retrieved April 11, 2009 from http://en.wikipedia.org/wiki/Virtual_team). Just like the members of a team, virtual team members have complementary skills, are committed to a common purpose, have independent performance goals and share a similar approach to work (Retrieved April 8, 2009 from managementhelp.org/grp_skll/virtual/defntion.pdf).

The Technologies

Virtual teams have been enabled by changes in technologies. The main enabling technology is high speed internet, built on fiber optic technologies. This allows for video and audio communications that are not 'jerky' or difficult to see or hear. A second technology is with additional hardware – such as web cameras (or webcams). And the last enabling technology is software.

There are many levels for communicating with these technologies. The basic technology has been telephone calls. A second technology has been asynchronous email. The use of instant messaging packages is now more encouraged.

Companies like Skype and Google offer voice over Internet Protocol (VoIP) calls either free or at low cost. Skype and Google also have video calls. The advantage of a video call is that the two parties can see each other at the same time, and thus can observe 'body language' in addition to the spoken words. But, Skype and Google Talk frequently are

restricted to video between only two people. There are video conferencing options for groups of three of more – ranging in both functionality and price.

There are many other proprietary systems available. GoToMeeting is a Citrix product for team meetings. Elluminate is a web-based interactive meeting solution with 'white-board' interaction and the ability to share documents. Google Docs is web-based product for creating collaborative word processing, spreadsheets or presentation documents. Wikispaces (and other similar web-based wiki solutions) provide collaborative space for document sharing. A global virtual team can have access to shared documents anytime day or night. For the virtual team assignment described later, the authors used the Wiki function within Blackboard.

The importance of virtual teams

In today's business world, the importance of virtual teams is growing. Business success is highly dependent on the speed of the service. Faster service can be delivered through more effective information sharing across international boundaries (Building High Performance in Virtual Teams – Executive Summary, Career Innovation, 2006). Faster information sharing can be achieved with the help of virtual teams.

The findings of a study conducted by the Career Innovations serve as evidence.

"According to the survey, the business importance of virtual teams is high and rising. In 7 of the 41 global organizations interviewed, more than half of the total workforce is virtually employed. The vast majority (over 34 organizations) say the business impact of effective virtual team working is highly important already and set to become even more critical. Interviewed companies include IBM, Microsoft, Pfizer, Unilever, UBS, Nokia and Marriott (Building High Performance in Virtual Teams – Executive Summary, Career Innovation, 2006).

Stohr and Peterson (2000) list some of the changes that globalization brought with it and made companies want to create a more virtual workplace.

- Best employees may be located anywhere in the world.

- Workers demand personal flexibility.
- The global workday is 24 vs. 8 hours.
- Workers tend to be more productive when facing less commuting and travel time.
- Changes in workers' expectations of organizational participation.
- Workers demand increasing technological sophistication.
- A flexible organization is more competitive and responsive to the marketplace.

"We live in the time when many developed countries have entered the era of post-industrial economy. That means information becomes the most valuable and important recourse" (Retrieved April 12, 2009 from http://www.taskmanagementsoft.com/solutions/articles/ post-geographic-world-and-different-types-virtual-teams.php).

The rules for establishing virtual teams

Virtual teams, as defined, are teams, whose members have complementary skills, share a common goal, but are separated by time, distance and organizational boundaries. Besides the common goal, members are linked only by communication technologies. The concept of operating in virtual teams may seem simple, but with only a few elements creating the interconnectedness, several "rules" need to be followed in order to create a successful virtual environment. The approaches enlisted for building a strong foundation for a newly created virtual team are recommended by Noble (2004).

Rule 1: Establishing a well-understood purpose

Teams need to understand where they are going. Whether the team is local or global (and virtual), all members need to understand the purpose of the team and the project.

Rule 2: Clarifying stakeholder expectations

Every project has multiple stakeholders and each stakeholder has different expectations. In order to get a better understanding of stakeholder's needs, questions like the following should be presented to them:

- What is the purpose or mission of the team?
- What outcome is needed and/or expected from the team's performance?

- When should the team's work be completed? Are there milestones?
- To whom does the team report and how often?
- What resources are provided to support the team in its work? (Noble, 2004)

Rule 3: Understanding team membership

Most virtual teams have at least three types of team members: core, extended, ancillary (Duarte, Snyder, 1999). Duarte and Snyder, "it is important to identify those who will be fully accountable for the results (the core team) first, as well as recognize the value of adding know how to the team as appropriate (extended and ancillary)."

Rule 4: Clarity of roles and responsibilities

In order for a team to have a good start, it is important to understand and accept each member's know-how, role and responsibility. Team members have to be positioned in such way so that they maximize the utilization of their resources to produce results (Noble, 2004).

Rule 5: Building rapport and relationship

"Relationships among members are the bonds that enable virtual teams to do their work across boundaries." (Lipnack and Stamps).

Virtual teams are at a significant disadvantage, because they lack the regular, face-to-face social contact that can be helpful in the acceleration of the team's development and relationship building process (Noble, 2004). "A quality relationship supports the trust building that remains a cornerstone of effective team performance." (Noble, 2004) One of the reasons why team members are encouraged to build one-on-one relationships by video calls, team teleconferencing, exchanging e-mails or even simple instant messaging, is to get a better understanding of the person they work with. Some companies (like IBM) encourage their team members to interact on internal social networking sites. Thus the team knows that Bob plays softball; Yu-Ling plays cello in a symphony orchestra; Ahmad is a chess master; and Heidi likes to hike in the Alps.

Rule 6: Communication practices and protocols

"Communication is the lifeblood of any virtual team." (Noble, 2004)

Because communication within a virtual team can take place only virtually, these teams depend heavily on the support of technology (Jones, Oyung and Pace, 2005). These technologies include video and audio conferencing, instant messaging, the use of e-mail or voicemail, team spaces for document sharing, meeting management tools (Jones, Oyung and Pace, 2005).

Working in teams is not easy, it's a complex process and it needs the input of all team members in order to function properly. And, team work gets more difficult when the team is geographically dispersed. Team members should be encouraged to post in the team wiki daily and to interact even with more social email messages (like "I'm playing in a concert this evening").

Advantages and Disadvantages of virtual teams

Virtual teams, just like face-to-face teams, have their advantages and disadvantages. Some of the disadvantages of face-to-face teams are overcome by virtual teams, as for the disadvantages that come with the virtual teams – remedies can be found.

Advantages:

- Less travel
- Time independence
- Fast response/feedback
- Unlimited number of participants
- Membership based on knowledge and competencies
- Anonymity
- Enhanced sense of purpose (Rosencrance, 2005).

Disadvantages:

- Information overload
- Topic drift
- Technoliteracy
- Problems with the communication channels (e.g. live conference)
- Unique challenges (Rosencrance, 2005).
- Missing body language and voice intonation
- No social interaction

The disadvantages can be overcome with good leadership. Making information available on team wikis and websites can

help the 'information overload' issue. Good management can help keep the team focused on the project and topic at hand. Training on using webcams, VoIP systems, and wikis can aid the technoliteracy problem. And, fostering frequent video interaction (even one-on-one) will help solve the body language and voice intonation weakness. (retrieved April 15, 2009 from http://www.virtualteamworks.com/96.htm)

The most difficult problem to overcome has its origin in the lack of social interaction. Trust, or the "relationship of reliance" (Retrieved April 19, 2009 from http://en.wikipedia.org/wiki/Trust) needs time to be built and can be lost in seconds. The problems that have trust issues at their origin are the hardest ones to fix within a virtual team. Trust is not like an electronic item that can be fixed or changed if something goes wrong. The following part will talk about why it is so hard to develop trust within virtual teams, ways of building and maintaining trust. These elements are all essential for virtual teams to be successful in the long run.

3. TRUST IN VIRTUAL TEAMS

"Trust is the glue of the global workspace." (as cited in Gibson and Cohen, 2003, p. 62)

Trust is essential in any type of team, but "it is a critical enabling condition in virtual teams" (Gibson and Cohen, 2003). According to O'Hara-Devereaux and Johansen, "Trust can increase confidence, security and promote open and influential information exchange." (as cited in Gibson and Cohen, 2003, p.61) Increased trust also means reduced transaction costs, negotiation costs and conflict (Gibson and Cohen, 2003).

Trust is harder to develop in virtual teams, but it is also more critical to do so. Meeting and communicating virtually eliminates the cues about interpersonal affections such as warmth, attentiveness and trust (Gibson and Cohen, 2003).

When talking about trust issues related to virtual teams, the question of why there is no initial trust among the members of the team arises immediately. One of the reasons is the simple fact that people do not know each other; they have never met, never

seen each other's face and most probably never worked together. Because of this, members did not have the chance to learn about the other member's personal values, priorities and even lifestyle. All these thing are very important when it comes down to working with somebody. Cultural diversity could constitute another reason for the lack of trust in virtual teams. Individuals from different countries vary in terms of their communication, group behavior, work pace and interpretation of facts. Because of these differences it is hard to say if an affirmation will be interpreted the same way by all of the members of the group.

There are barriers for building trust even within a traditional team. Past studies have shown that in the case of traditional teams, trust evolves in three stages (Stohr and Peterson, 2000). The first stage consists of the deterrence-based trust, where team members do what they say they will do just because they fear that they will be punished if they don't. Within knowledge-based trust, members become more familiar with each other, reaching the level where they are able to predict the other person's behavior. The last stage, called the identification-based trust, is where trust is built on empathy and shared values. All three stages of trust were observed in the case of virtual teams as well, but the development pattern wasn't evident (Stohr and Peterson, 2000). Rather, as Stohr and Peterson note, in virtual teams trust tends to be established right at the outset and that is why the first interactions of the team members are crucial.

Factors that influence trust building

There are several factors that contribute to trust building within teams, may the teams be traditional or virtual ones.

As noted above, "instant" or swift trust must be built immediately within parallel, project, action and networked teams (Stohr and Peterson, 2000). Studies have shown that all cultures report the existence of three factors in building "instant" trust. Stohr and Peterson (2000), these factors are as follows:

1) Competent performance

2) Acts of integrity

3) Concerns displayed for the well-being of others

Besides the "instant" trust building factors, there are other factors too, which are vital for building trust. (Rousseau, Sitkin, Burt and Camerer (1998) The two conditions considered by them as critical are risk and interdependence (as cited in Gibson and Cohen, 2003, p.62). Gibson and Cohen (2003) consider communication also as one of the critical factors contributing to trust building.

Gibson and Cohen (2003) list three main factors in trust building:

1) A healthy amount of risk
2) Building interdependence
3) Open and prompt communication

A certain amount of *risk*, otherwise perceived as the probability of loss, is capable of creating an opportunity for trust. Risk is always present, because tasks can't be undertaken with the complete certainty of the desired outcome. A situation where a healthy amount of risk is involved makes it possible for trust to develop (Gibson and Cohen, 2003). Gibson and Cohen (2003) state that, "only if some initial risk is taken is it possible for the trustee to demonstrate his or her trustworthiness".

But, On the other hand, distrust and suspicion often arise in groups where the individuals have different backgrounds, come from different cultures. There is a tendency for subgroup formation within virtual teams, based on nationality, organizational or functional roles (Gibson and Cohen, 2003).

Wageman notes that "interdependence captures the degree to which one party depends on the actions or information of another in order to accomplish work" (as cited in Gibson and Cohen, 2003, p.64). Within a group, members have flexibility in terms of whom they cooperate with. The development of collective trust requires opportunities to interact and exchange information. Interaction occurs less frequently when interdependence is low (Gibson and Cohen, 2003). In order to allow trust to be built, opportunities for interactions have to be built and strongly encouraged by team leaders.

The third factor contributing to building trust among virtual group members is *communication*. Kanter notes: "open and prompt communication among members is believed to be an indispensable characteristic of trusting relationships" (as cited in Gibson and Cohen, 2003, p.69). Without proper communication, cooperative relationships will inevitably suffer. Members need to sound off their differences in order to avoid serious conflicts (Gibson and Cohen, 2003).

Second, the members of the virtual teams need to gather information about the other members and make sure that they are credible and trustworthy people (Gibson and Cohen, 2003). This information exchange can't take place without communication.

Third, as stated by Gibson and Cohen (2003), communication helps build trust because it is the basis of continuous interaction, from which members further develop common values and norms. "Sustained interaction is a crucial mechanism for holding the members together." (Gibson and Cohen, 2003) With the help of information exchange, people find out more things about one another, identify commonalities and at the same time build trust.

As previously mentioned, trust is an important element in the functioning of virtual teams. As seen, it is hard to develop and once it is developed, it needs to be cultivated. In order to facilitate this process, trust building strategies are presented in the following.

Strategies to create trust

Besides paying attention to the factors that influence the most the trust building process, there are additional ways that help an organization or a manager to build an atmosphere of trust in a virtual team. Some strategies include:

- The self-esteem of team members needs to be built by paying attention and taking in consideration their opinion and suggestion. Each member should be given the opportunity to contribute.
- Team members have to be provided with guidance and help if needed, in order to be able focus on the real problem.
- The managers should always serve as a role models, reflecting the desired behavior both by their statements and actions. If each member follows its own

commitments, people will be more likely to trust one another because they will feel that the members are competent.

- The manager needs to point out to the team members why trust is so important.
- Team members should be given time to familiarize with each other.
- Meeting face-to-face early in the development of the team is a good idea, if it can be carried out. Face-to-face meetings will help team members to develop relationships and trust more quickly.
- It is very important in a virtual environment that organizations establish a clear policy regarding communication privacy and then adhere to it. (Stohr and Peterson (2000)
- Use of technologies such as social networking team sites, webcams, team wikis and more can be used to break down barriers.
- Team leaders need to work at fostering open communication

The above mentioned strategies are based on the literature and the experience of numerous virtual teams. In order for virtual teams to be successful and to be able to operate at a higher technological level in the future, it is strongly recommended that they take the suggestions into account when working in a virtual environment. In teams, where most of the listed factors were implemented successfully, the results didn't fail to come. Teams that have been able to achieve a high level of trust shared some traits, and are presented in the following section.

Highest levels of trust

Stohr and Peterson (2000), virtual teams that have the highest level of trust share three characteristics.

First of all, they began their interactions with a series of social messages before focusing on the given task. This series of interaction included self introduction as well as sharing of some personal background. This action is called "electronic courtship" and it appears to be extremely important in establishing the already mentioned knowledge-based trust (Stohr and Peterson 2000).

After the introduction phase, clear roles were defined for each and every member of the group. The consequence of this action, as Stohr and Peterson (2000) note was that all of them were able to identify with one another, creating a foundation for identification-based trust.

Team members were observed to "constantly display eagerness, enthusiasm and intense proactive action orientation in all of their messages" (Stohr and Peterson 2000). The research also found that one pessimist has the potential to undermine the entire team.

In addition, high trust teams were observed to do the following (Stohr and Peterson 2000):

- display a task-oriented communication, but which is still emphatic;
- rotate leaders;
- discuss and clarify team goals;
- engage in time management activities;
- give substantial feedback oriented toward improving the content of another member's work;
- notifying members of their whereabouts and absences.

All of the listed things could be done only by communicating, interacting and sharing knowledge. All these information exchanges ultimately lead to a high trust level within the teams.

4. AN MBA VIRTUAL TEAM PROJECT

The authors have implemented virtual teams in a graduate Master of Business Administration (MBA) Management Information Systems (MIS) course at Quinnipiac University. The course, CIS 600 Information Systems Strategy were in an online only course. Students were paired in teams and were assigned a team project. Four options for a project relating to preparing a corporate policy on dealing with a pandemic health outbreak were given and students self-selected one of the options.

The students used a collaborative Wiki on the course's Blackboard site. Only team members had access to their Wiki site, other teams could not see or access sites other than their own.

The four teams self-selected one of the following topics:

- Create a corporate policy for Quinnipiac University in case of a major pandemic flu outbreak. Be sure to include technology solutions.
- Create a corporate policy for Yale-New Haven Hospital in case of a major pandemic flu outbreak.
- Create a corporate policy for Day-Pitney Law firm in case of a major pandemic flu outbreak. (Day-Pitney is a major law firm with nine locations, five of which are in Connecticut)
- Create a corporate policy for the Cintas company, who supplies uniforms and other appeal to businesses in the area.

The assignment specified that students needed to meet in at least one virtual team meeting using Microsoft Office Communicator.

The authors received the following comments from students on the project:

- "The assignment was a good tool for illustrating the potential for using the video capabilities of Communicator to support a team. The short duration of the assignment did not really allow us to gel as a true team but it did allow us to introduce ourselves, get organized, and produce a deliverable."
- "I enjoyed the assignment and would recommend that you continue offering this for your classes. The web cam meeting, and the wiki were a great experience and got us interacting with our classmates which is rare in an on-line environment. I felt a connection!"
- "I think it worked great. Virtual teams might be the new thing!"
- "Great learning experience, the use of Office Communicator was excellent.

In a feedback survey to the professor, 83% of the students indicated that "Excellent assignment - learning to work in virtual teams is important", the other 16% said "Good assignment - we maybe didn't work as well in a team.

The feedback survey also revealed some complications, such as the difficulty in getting a time that all team members could agree upon for a virtual team meeting as well as some students having technology troubles with internet connections or with the Office Communicator software.

The authors feel that the evidence suggests trying the virtual team project again, possibly with a longer lead time (this was a seven week online course, and the assignment was introduced in the third week and the final collaborative document was to be completed by the end of the fifth week).

5. THE FUTURE OF VIRTUAL TEAMS

According to Jessica Lipnack, "the future is now" in terms of virtual teams. (Lipnack, 1997)Virtual worlds are indeed a necessary next step in helping collaboration among team members and businesses.

A recent Forrester Research Inc. report argues that the 3-D Internet will be as important to companies in five years as the Web is today (as cited by Havenstein, 2009). Just as the Internet revolutionized the way we communicate and collaborate with each other, virtual worlds and the 3D World Wide Web will soon have the same transformational effects on communication and collaboration.

The "Getting Work Done in Virtual Worlds" report released by the IT research firm at the beginning of 2009 concludes that "executives should begin investigating and experimenting with virtual worlds soon because of their promise for remote collaboration, training and the ability to build and share 3-D models." (as cited by Havenstein, 2009)

In a virtual world, people can have their name, job title and business unit associated with an avatar. This avatar can attend meetings and have access to virtual buildings, rooms, equipment and people, Forrester said. The research company also notes that "the avatar is controlled by information in an enterprise directory and access control system."

Avatars can be directed to express gesture and emotions. In meetings all of the participants know who is talking and who would like to desperately share something with the others, since avatars can express states of mind, like anxiousness, with the help of different actions and body movements (Havenstain, 2009).

Further advantage of the virtual world is that participants can see who is present in the meeting room, but also who is multi-tasking or who has been away from their computer for long, pointed out by the sleeping avatar (Havenstain, 2009).

Taking it further, the use of virtual world also offers the benefit of releasing near-final designs to a limited group of external users and solicit feedback before starting fabrication, the Forrester report said. This could lead to large amounts of cost savings.

"Virtual worlds can also eliminate the expense of remote training and provide a better experience by simulating on the job experiences as well as recording the training so that multiple sessions can be run across time zones and different job descriptions", according to Forrester.

One concern of the authors of the "Meetings in 2020" was that new etiquettes and rules will have to be invented. Considering the fact that human kind was able to invent technologies that allow people to build virtual worlds, creating sets of rules, based on which to operate, shouldn't create serious problems.

Some people were skeptic about virtual teams taking the place of traditional teams. Slowly, the majority of the multinational companies are relying on the benefits provided by these global virtual teams. Based on the Darwinism principle, if they use it, it has to work properly. As technology improves, other, even more convenient ways of doing business will be brought to light. It will be just a matter of time until companies and people switch from the old one and start using whatever the new technology has to offer. This is just the way the world works now.

Even though Jessica Lipnack's quote was in 1997 "The Future is now for Virtual Teams", with faster and better technologies, virtual teams are becoming more the norm

6. CONCLUSIONS

As a company embarks on implementing virtual teams, there are advantages and savings and there are problems and pitfalls. The growth in fiber optics, memory and technologies like webcams and video conferencing have made virtual teams a reality.

The authors have experimented with virtual teams in a graduate MBA MIS course where the feedback was very positive. They plan on continuing with virtual teams in other online courses in the future.

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