

Preparing to work in the virtual organization

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Received 3 February 2000; received in revised form 26 December 2000; accepted 16 March 2001

Abstract

Forming virtual organizations (VOs) is a new workplace strategy that is also needed to prepare information, technology, and knowledge workers for functioning well in inter-organizational teams. University information studies programs can simulate VOs in courses and teach certain skill sets that are needed in VO work: critical thinking, analytical methods, ethical problem solving, stakeholder analysis, and writing policy are among the needed skills and abilities. Simulated virtual teams allow participants to learn to trust team members and to understand how communication and product development can work effectively in a virtual workspace. It is hoped that some of these methods could be employed in corporate training programs also.

In an innovative course, inter-university VOs were created to develop information products. Groups in four geographically dispersed universities cooperated in the project; at its conclusion, students answered a self-administered survey about their experience. Each team's success or difficulties were apparently closely related to issues of trust in the team process. Access to and ease of communication tools also played a role in the participants' perceptions of the learning experience and teamwork.

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Keywords: Virtual organizations; Virtual teams; Knowledge workers; Information studies; Information management education; Inter-organizational work; Virtuality; Team building; Trust

1. Introduction

The modern business world has always worked in teams, but today the phenomenon of virtual teams and virtual organizations (VOs) is becoming common. Organizational members can be oceans apart or they can work in offices down the hall, but complex projects require collaboration and working across

boundaries. There is no place where teams and virtual teamwork are needed more than in the information field, where teams are created to evaluate, develop, and implement IS. Effective teams are important in the real world, and they are a part of the growing virtual environment for organizations that operate multiple sites or those that form international alliances. Virtual teams meet by using e-mail, teleconferencing, and often do their work by phone, fax, or compressed video; moreover they must learn to trust and to rely on partners that they may never see face-to-face.

Team learning has become common in graduate schools, since universities prepare students for working in the knowledge organizations that are dominating

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the work place today. Of course, these organizations may also be VOs with some team members telecommuting, others working out of client sites, or traveling from week to week to different work locations. Our concepts of time, place, and proximity have been transformed by the ability to work electronically using the Web and other information and communication technologies.

The purpose of this paper is to discuss methods and practices used in a cooperative effort to teach graduate students in four universities about working together to create an information product in a virtual environment. Faculty and students took the lead for the project in a graduate course at the School of Information Science and Policy at the University at Albany. The course, “Ethics and the Knowledge Organization”, helped students use critical thinking and analytical methods to approach ethical problems that they might experience in an IT organization. The students used cases, structured controversy, stakeholder analysis, implication exercises, etc. to understand issues and formulate ethical decisions.

Part of the learning process involved forming teams with students in three other universities: The University of South Florida (Public Administration); Carnegie Mellon (Management) and Indiana University (Library and Information Science). The students were charged with writing a white paper cooperatively with students in other schools that they met through the Internet. The faculty members involved had their own electronic discussion list for discussing the assignments and approaches to be used. The students used Web conferencing to plan their paper and exchange files. Student surveys submitted at the end of the course demonstrated the benefits and learning that took place as well as frustrations and difficulties.

2. VOs in theory and practice

The literature on the topic of work and work satisfaction is voluminous. This paper will only touch on some aspects of it, however. One assumption was that educators might change and adjust learning methodologies to prepare students for change in society and the workplace. Although VO research and writing is less plentiful than the published material on work, in general, it is a growing topic of interest.

2.1. A changing world of work

When Alvin Toffler wrote about the “electronic cottage” in *The Third Wave*, few people expected that his prediction of workers wired to their jobs from home would so rapidly become a reality [33]. This was before the proliferation of PC’s, the Internet, etc. However, 20 years later, such methods are integral to the life of business. Toffler’s follow-up, *Powershift: Knowledge, Wealth, and Violence at the Edge of the 21st Century*, pointed to the value of knowledge in a global economy [32]. Work has become mobile, and workers are often remote from each other. Thus, workers need mechanisms that give them remote access to knowledge repositories and networks that can connect novices with experts.

The Virtual Community [27] documents everyday life in cyberspace by recounting the human side of the electronic cottage. The workplace is also part of our social fabric, and being able to exchange information and knowledge rapidly has dramatically changed the power structure in companies, universities, etc. [31,37]. Now messages are often sent directly from upper management to the organization. Workers of any status have also been able to disseminate information electronically without having to go through hierarchical channels.

Of course, as Nonaka and Takeuchi point out, the de-valuing of middle managers may be a mistake [25]. The middle manager’s role has traditionally been to interpret the vision from top management within the constraints of day-to-day work. Then managers are key to knowledge creation for the organization, because they can help take the tacit knowledge possessed by front-line workers and translate it into explicit knowledge in the organization.

Technology has not been able to replace these managers because they are often the knowledge coordinators, and once they leave, organizational knowledge leaves with them [8]. Now organizations are working to capture the tacit and explicit knowledge, codify it, store it, and make it available to all employees [4]. As Winslow and Bramer state, “Knowledge, and knowledge work, dominate the value chains of virtually all companies, whether in services or manufacturing” [35]. Since the knowledge they have and use well makes organizations viable and profitable [9], it must be handled carefully.

Global competition, leaner work forces, and more knowledgeable customers have all had firms scrambling to provide better service and high quality. At the same time robotic mechanisms are replacing workers, ATMs are replacing bank tellers, and smart machinery is now doing the work of farmers, security guards, highway toll takers, and parking lot attendants. Economist Rifkin [29] cautions that we are losing thousands of jobs per year due to technological advances and other influences, such as re-engineering, and that the resulting unused human labor pool could be a force for destitution and lawlessness. On the other hand, he says that lost jobs might simply translate into shorter workdays or workweeks, and the resourcefulness resulting from dealing with a decline in “jobs” might be good outcomes. Harvard economist Juliet Schor argues that Americans work too much and that the time squeeze imposed on families and the general velocity of life caused by overwork is harmful in the long run [30]. Large numbers of workers are already realizing they can escape the nine to five “rat race” and earn a living independently from home. They can create new organizations that communicate, sell, and buy products and services through the World Wide Web.

The highly mobile or independent worker needs a different kind of management than those who work in a traditional environment [19]. Employees who cannot be seen need clear communication about expectations and need to be evaluated on outcomes. Managers also need to understand how to encourage trust and team productivity [34]. Despite the movement to independence and autonomy, begun with quality circles, work today is run by teams [6,10,12]. Alliances are finding that teams bring diversity and creativity to the work process. Innovation demands teamwork [1].

Teams do not necessarily translate into organizational loyalty, though. The present layoffs and those threatened by downsizing, re-engineering, and the constant activity of mergers and acquisitions has changed the loyalty factor for both organizations and workers. There is no such thing as lifetime employment anymore, and workers are willing and ready to switch jobs more frequently, because they feel that no job is secure anymore [7]. So, managing now involves overseeing projects where workers might be anywhere; they work in teams and there is a constant changeover of employees. Management by results has

replaced management by observation, but those who manage may not have the experience or background or oversee their employees in this way. Traditional hierarchies are certainly under pressure. As Zuboff says, “control relies on delicate human interactions. The challenge of how to manage and how to organize work in VOs is formidable”.

2.2. *Virtual organizations*

Though there are almost as many definitions of VOs as there are researchers, a literature review found Bultje and van Vijk’s definition to be rich, based on existing literature, and the result of careful analysis [5]. The first part of their definition is based on the primary characteristics of the VO. We will use this here.

A virtual organization is primarily characterized as being a network of independent, geographically dispersed organizations with a partial mission overlap. Within the network, all partners provide their own core competencies and the co-operation is based on semi-stable relations. The products and services provided by a virtual organization are dependent on innovation and are strongly customer-based.

It is interesting to note that even though they examined a set of 27 characteristics of VOs, they left out the *teamwork characteristic*: it will be included here. VO characteristics and the nature/value of the university virtual experience are shown in Table 1.

Virtuality, as a workplace process, requires new ways of thinking about management, communication, teamwork, and adapted skill sets to meet the needs of members who work at a distance.

2.3. *Skills for workers and managers in a VO*

What are the skill sets needed to work effectively in a VO? The ability to work in teams is especially important. Groups are often brought together on an ad hoc basis to respond to a need or a situation. In the business arena, Jones and Bowie [18] say:

... we believe that one of the chief differences between traditional strategic alliances and virtual alliances is that the latter will be fleeting and temporary. The *components* of any given virtual corporation may achieve some stability over time as they continually enter into new and changing

Table 1
Characteristics of the virtual organization and university preparation for virtual work

Characteristics	Of the virtual organization	Found in the inter-university project
customer-based and mass customization	This characteristic refers to the ability to customize the product or service to the customer. Gilmore and Pine [13] suggest four levels of customization based on whether the product had been changed or not, and whether the representation had been changed or not	For the students there are two customers: their professor and the stakeholder group they are representing. Their mission is to lobby and speak for their stakeholders in such a manner that would satisfy the requirements of the course. In this way, each work team has to customize their “product” for the intended audience. The fact that one product may have to satisfy several different professors adds complexity to the class VO experience
Network of independent organizations	Virtual organizations are often considered a subset of the much older research area of networked organizations [17]. A network refers to a set of people or organizations that are tied by relational, positional, or spatial proximity [28]. For virtual organizations, focus is usually on networks that are created or controlled by technological means, and thus positional and spatial proximity is not considered important	Although each university and each course is an autonomous organization, the teams are tied together by the project and the task at hand. The challenge is to produce one paper together, even though each student is based at a distinct institution working under different constraints. Even the individual students’ departments or schools are distinct. Because of the diversity of organizations, departments, schools, and courses, most members of a group have different schedules and time commitments
Semi-stable relations	The literature disagrees about the temporal nature of virtual organizations, however, most researchers seem to agree that the virtual organization is a temporary structure [20]	Work teams are by nature temporary. Student class teams are organized around a project, and disperse when the project is complete. When students form teams within a department, a major, or a school, chances are they will at least see, if not work, with the team members again. In the course, however, students are not likely to meet or see any of their team members again. This very temporary nature of the class teams is at least somewhat similar to work teams in virtual organizations when groups of people around the world develop a product but never meet face-to-face
Geographical dispersion	The geographical dispersion of organizations may be one of the main differences between a virtual organization and other types of partnerships. Whereas other types of partnerships rely on co-locating staff, VOs avoid this by using information technology	Universities participating in this project were in geographical locations far away from each other, just like companies that form alliances with other organizations in various parts of the country or the world. Students need to communicate through e-mail, e-lists, and teleconferencing. Most likely, student commitment to the organization will be related to the richness of the communication media used
Based on core competencies	Most organizations, naturally, have areas where they have higher quality competencies as well as areas where they have lower quality competencies. The thinking behind virtual organizations is that several organizations should pool their talents, with each organization contributing their high quality competencies	Teams in this project were not chosen with competencies in mind. By nature of the various programs in which the students were enrolled, however, they brought certain competencies to the task of developing a stakeholder white paper. The cooperation between classes from divergent areas of study, by the nature of the different focus of prior coursework, will enable teams to work together in a manner displaying the importance of different core competencies. The nature of the VO project is important to ensure the above effect

Dependent on innovation	Some researchers see virtual organizations as a response to opportunities in the marketplace. When such opportunities arise, virtual organizations are created quickly to take advantage of the opportunities by creating unique and innovative solutions	Success in student projects is dependent on the ability of students to work in unconventional situations using methods that are different from other courses. Those with the ability to accept change, ambiguity, and to develop innovative ways to accomplish their work may find such an exercise interesting and challenging. By using the right case approach, the need for innovation may be simulated
Based on teamwork	Teams, the building blocks of a virtual organization have received much attention from researchers. Even so, many aspects of their dynamics continue to elude researchers. This is especially true for teams basing their communication on technology	Whereas some students have extensive experience in teamwork, others are novices, and have never produced major products through work in teams. Because of the importance of effective teams in today's knowledge-based organizations, extensive experience with this form of work is essential for most degree programs in information studies
Partial mission overlap	Partial mission overlap suggests that the VO partners are also doing business outside the context of the VO. Partners that are doing business only within the context of the VO would have full mission overlap	While students are working within the virtual organization, they also have weekly reading assignments/essays in information ethics and have to participate in small groups within the class. Each course has a variety of assignments and readings outside of the case study project. Students also have other courses and responsibilities within their respective departments, schools, and universities

alliances, but the virtual corporation itself will disappear once a given project is completed.

The speed with which VOs must form demands that workers can deal with rapid change. Although research on teamwork suggests that teams function optimally after they have worked together [15,16,22], teams in VOs may not have the luxury of establishing working relationships over extended time periods. However, this view may change if VOs are studied longitudinally. From the managerial point of view, knowledge of working in VOs will influence their approach to training, coordination and control.

2.4. *The matter of trust*

Teams brought together for temporary projects and the generally fast-paced nature of VOs in a business setting can be faced with what Jones and Bowie call the ‘virtual paradox’ that teams must work quickly and with flexibility in order to be innovative and meet the needs of the customer. This requires an environment of “high levels of trust and cooperation”. However, trusting, collaborative alliances usually develop only in long-term relationships.

Trust may be an elusive factor, but it is critical in the operation of a VO. As Nonaka and Takeuchi point out, “... participants in the (virtual) project should develop a sufficient level of trust among themselves. Building trust requires the use of mutually understandable, explicit language and often prolonged socialization or two-way, face-to-face dialogue that provides reassurance about points of doubt that leads to willingness to respect the other party’s sincerity”.

Trusting relationships must be mediated by workers’ effectiveness and efficiency. Even in professions, such as journalism, where the employees are accustomed to being out of the office for extended periods of time, they are still expected to return to a central place for meetings, conferences, and reporting. In the past, managers have had to see people in the office in order to confirm that they are working [14].

Some organizations that employ telecommuters have a rule that they be available at their phones during the “usual” business day (e.g. 9 a.m. to 5 p.m.). In addition, some managers make it a habit to call to see if, in fact, employees are working.

The US Office of Technology Assessment reported that, in 1988, 10 million American workers were

monitored through video cameras or computer software [3].

Electronic monitoring is really counterproductive, however, because one of the advantages of virtual work, and one that employees really value is that workers have flexibility in their workday [21]. When working with virtual teams, there must be some element of trust to accomplish the goals and objectives. Charles Handy says, “If we are to enjoy the efficiencies and other benefits of the VO, we will have to rediscover how to run organizations based more on trust than on control”. Oversight must still be there, but it must be a different type of care taking.

Moral character can overcome the virtual corporation paradox. Traditionally, partners learn to trust each other through face-to-face contact and by learning about a firm’s reputation. Some research shows that when a temporary group is formed for a particular purpose, a kind of “swift trust” can develop that allows the group to function [23]. Economic self-interest and social embeddedness can explain some types of swift trust, but a moral character type of trust is needed to overcome the virtual corporation paradox.

Jones and Bowie caution that this is not blind trusting relationship, but one where partners are scrutinized rigorously and means are taken to safeguard a firm’s assets. It is mutually beneficial to operate with a commitment to trust, though, and VOs that develop a character of trust have much more to gain than to lose.

Handy points to several principles of trust that must be followed to realize a VO. One needs to know people in order to trust them, but getting to know them at a distance takes more effort and is more difficult. Trust also requires bonding for teams to coalesce and deliver results. Trust is also related to learning, so members of a VO do well to be nimble and flexible adapting readily to rapid change and innovation. Individuals need the capacity for self-renewal. Leaders rather than managers inspire the holistic view that is the mission of the VO, but they also take special efforts to make and retain personal contacts.

When the confidence or trust in an individual is misplaced because the person does not carry through on responsibilities, then the work team suffers. Leaders must serve as role models in work and communication; they persuade their teams to complete work as promised, and they can help their teams by offering opportunities for groups to meet “in person”

whenever possible. In person, or approximating *in person* can mean actual face-to-face meetings, synchronous teleconferences, or synchronous online chats and Web conferencing.

3. How can students prepare to work in VOs?

With few exceptions [11], little work seems to have been done on the topic of preparing students for work in the VO. The present belongs to traditional educational methods. Which methods of teaching will be successful in helping students? Foreman believes that ... a conventional knowledge transfer (either face-to-face or in a conservative distance learning form) cannot cultivate the complex set of behaviors and attitudes required in VOs. What is needed is a learning process that is experimental and that simulates what happens in 'real' VOs.

4. Project description

Our case study was associated with the course *Ethics and the Knowledge Organization* taught to allow students to approach ethical problems they might experience in their future work life. The students used cases, structured controversy, stakeholder analysis, implication exercises, and other methods to understand ethical issues and formulate ethical decisions. An equally important goal was to simulate VOs so that the students could prepare to work in such organizations.

4.1. Cybercity

The learning process involved forming teams with students in three other universities. The students were charged with writing a white paper cooperatively with students they met exclusively through the Internet. The students used Web conferencing to plan their paper and exchange files. Although students met in person at their own universities for regular graduate coursework, they formed VOs in order to develop the policy white papers in an electronically networked city: *Cybercity*.

All teams consisted of graduate students but they were enrolled in different degree programs. The five

courses were offered through different schools or departments also: Business Administration, Public Administration, Library and Information Science, and Information Science and Policy. Each team was assigned a separate stakeholder group to represent in the scenario's city:

- city residents;
- homeless people;
- city administration (manager and professional staff);
- city council (elected officials);
- schools (elementary and high schools);
- libraries;
- health services providers;
- telecommunications industry representatives;
- local universities and colleges.

The scenario required each stakeholder group to take a position regarding the wiring of the city for high speed Internet access and telecommunications services among public buildings, schools, libraries, hospitals and clinics, and universities and colleges. They were to report in the form of a white paper, which was to consider implications for using city resources to accomplish access. The students started working on the project at the mid-way point in the semester, but technical difficulties arose. The *Cybercity* scenario was a public domain educational tool obtained from an Internet Web site.

The faculty chose education utility software that included group chat functions, e-mail, hypertext links, and archiving of communication. TopClass was the original platform chosen. However, it was very difficult to upload whole papers to the conferencing program. The next choice was NetForum, a public domain utility available on the Internet. This fulfilled most expectations. Students planned the project, discussed the issues, wrote drafts of their papers, and revised them using NetForum. Faculty were also able to participate and view the discussions, but they deliberately took an observer role after getting things started and posting details of the assignment.

5. Research method

In the MIS field, there are three generally accepted approaches to research; positivist, interpretive, and

critical [24,26]. Within each approach, many different methods may be applied. Because of the explorative nature of the study, a positivist case study approach [2,36] was selected.

With the student project designed to work like an educational simulation of several VOs, observation was an important element in researchers understanding of the situations. The observational data not only helped, but also enabled the development of a survey probing topics of special interest. Survey development also benefited from examination of NetForum logs and feedback from students.

At the completion of the course, the survey instrument was used to evaluate the learning methods and to investigate how well the educational simulation worked. The respondents were the student participants, all 34 of whom received the survey.

While participation in the survey was voluntary and in no way affected class grades, 29 students returned complete surveys for a response rate of 85%. The students from one university where papers were not required were not asked to fill out the survey. Students were asked questions on the following areas:

- the teamwork experience;
- the learning experience;
- satisfaction with the course;
- satisfaction with the team;
- satisfaction with NetForum;
- satisfaction with the final paper;
- trust among the team members;
- what they enjoyed most about the Cybercity assignment;
- the effort they expended;
- the time spent on the project;
- the nature of the team experience;
- the relevance of the course to preparation for professional work;
- communication obstacles;
- barriers to learning;
- how they would approach the assignment differently next time;
- how the project was different than working with an in-class in-person team;
- how much of the project the student actually did herself/himself;
- means of communication used and
- methods of collaboration.

The survey instrument contained a mix of quantitative, open-ended, and ranking questions. Some of the quantitative questions were measured with Likert-type scales; while others were measured with a 7-point scale anchored with “not satisfied” and “very satisfied”.

The evidence was examined using analysis of embedded units as suggested by Yin with the VOs from the educational simulation being the embedded units [36].

6. Analysis

The most interesting findings emerged from the open-ended and ranking question, whereas the quantitative measures served to establish baselines for follow-up work and replications.

Table 2 outlines the descriptive statistics. The average student had participated in approximately two to three teams in a University setting, and between three and four teams in the workplace in writing joint papers. The high level of experience was not surprising, considering that the students were in graduate classes. The experience, however, was quite unevenly divided among the students, as is clear from the high standard deviations. The “VOs” had approximately four students each. It is interesting to note that they were very satisfied with the course, but much less so with the VO experience.

Further exploration indicated that, on the average, students agreed somewhat that the VO exercise made the course both more interesting and more current, and that the exercise would benefit their professional work. The average student also claimed to have invested between a moderate and great deal of effort on the exercise.

Table 2
Participating students: selected descriptive statistics

Variable	Mean	S.D.
No. of teams in university experience	2.41	3.18
No. of teams in workplace experience	3.68	5.44
No. of people on virtual organization (VO) team	3.86	0.69
Satisfaction with course (7-point scale)	6.00	1.22
Satisfaction with VO experience (7-point scale)	4.79	1.68

6.1. The advantages of inter-university team learning

The respondents were asked to state three items that they would not have learned had they been doing the same project with people in their class. The results were organized according to the eight categories of VO characteristics.

The *customer-based and mass customization* category had no responses. This is not surprising, considering the task assigned. The *network of independent organizations* and *partial mission overlap* characteristics were considered similar enough to be treated together. Respondents believed that setting objectives and cooperating with strangers was the main learning experience.

The *semi-stable relations* category contained lessons about how to deal with time pressure, with time pressure more intense than in ordinary projects due to the asynchronous nature of the communication medium. Because a Web-based conferencing tool was used, respondents waited lengthy periods to get a response to their questions and suggestions. Some issues often resolved in the first face-to-face meeting were not resolved until later into the project.

The students learned about the *geographical dispersion* of VOs through the communication barriers they encountered. They had to develop trust with people they could not see and with whom they had never shared the same physical space. One respondent suggested that an important lesson was that “you never have to physically see the person to get things done”. The respondents learned that “online computer communication is frustrating and a waste of time”, that face-to-face communication is more effective, and that it is not always easy to explain things in text. On a more positive note, the respondents suggested that the specific technology makes “a big difference”, and that the project taught them how to deal with new types of technology. One respondent also liked having responses verbatim, allowing re-analysis of personal and other people’s styles of communication.

The responses to the *based on core competencies* and *dependent on innovation* categories were merged because the responses were found to be quite similar. One of the main ways to bring about innovations is to mix different core competencies. The respondents pointed out that it was “interesting” to work with strangers, that the VO project enhanced creative think-

ing, and that “different ideas came from different areas of the country”. Students merged the knowledge and expertise of all the members (at least those who participated fully) with research findings to create new knowledge about the Cybercity. This is the knowledge creation process recommended by Nonaka and Takeuchi.

That VOs are *based on teamwork* was learned through developing teams at a distance, a task found to be quite a challenge. An aspect of teamwork is managerial, and respondents sometimes felt ignored and that they needed to be heard.

One respondent pointed out that it was a great challenge to try to make sure that everyone “did their share without stepping on anyone’s toes or being too pushy”. The two major learning experiences, however, seemed to stem from finding out how to “alter the direction of the group to take advantage of strengths rather than butting heads”, and that “things are not always as out of control as they seem”.

6.2. The obstacles to product development in a virtual setting

The respondents were asked to name three communication obstacles. These results were organized according to the eight VO categories.

With respect to the *network of independent organizations* and *partial mission overlap*, a few respondents pointed to problems in understanding who was in the group and what it was. Many of the obstacles may stem from the fact that the respondents had different schedules and missions both inside and outside of class. The *semi-stable relations* caused unique problems: it was very hard to communicate; finishing one “chain of thought” could take 1 or 2 weeks. Because the students were not accustomed to this way of communicating, they adopted a real-time discussion approaches. They would ask a one-dimensional question, and log out of the system while waiting for an answer. This led to confusion and slow progress.

The *geographical dispersion* of the students led mainly to technical problems. The specific tool seemed to lack the speed needed. Another major problem was the time lag; students were not notified when a new posting had been made, they had to check as often as they had the opportunity or interest.

This is likely to have had a demoralizing effect. In terms of general technology problems, platform incompatibilities were listed as the main problem.

Students in professional schools face some of the same challenges as those knowledge professionals who work away from their offices and need to log into remote servers through Internet Service Providers that may be slow and inaccessible. Even workers in Fortune 500 companies find that they work odd hours, and they need good equipment, high bandwidth, and technical support when things go wrong.

The dimensions of the workday are no longer limited to nine to five, 5 days a week for professional information and knowledge workers. Telecommuters, for example, do not differentiate between work-time and time at home. Students work long hours to be able to pay tuition; they often have family obligations and they are expected to use technology tools for research and creative work. Like many others who experience an increased velocity in their work lives, students in VOs feel the tension and stress that VOs present.

The *based on core competencies* and *dependent on innovation* characteristics were not considered to be a source of problems. Only two respondents pointed to differences in goals between people from the different classes. *Based on teamwork* was cited as one of the biggest obstacles. It was especially difficult to get used to not having real time conversations. One student claimed that his team members did not post unless someone else was also online. It is therefore not surprising that several groups found one self-appointed leader, in essence becoming the “benevolent dictator”.

6.3. Overcoming the obstacles

The respondents were asked to name three things they would do differently, given the same assignment with different teammates. It is important to note that some are lessons that students learn by experience.

In the *network of independent organizations and partial mission overlap* category, the respondents wanted a clear definition and their roles needed to be clearer; one respondent mentioned that their paper was changed at the last minute by one person, leaving the rest of the team frustrated and angry.

Two major issues surfaced in terms of how to deal with *geographical dispersion*. First, the need to ensure

better communication through the use of all alternative media was expressed. In addition to specifying designated times to meet on the Web-based forum, suggestions included extra use of the phone, and use of Internet chat rooms. The few items about *based on core competencies* and *dependent on innovation* characteristics focused on making sure that the team members had certain core competencies such as technical abilities and writing skills.

6.4. The importance of trust

When asked, “How much did you trust your team members?” the mean response of respondents was 4.9 on a 7-point scale, consequently, it seems like most of the participants had some level of trust. When dividing the respondents into low, medium, and high level of trust, only two individuals fell into the low level of trust category.

One respondent explained his/her low level of trust by saying that this student had “difficulty trusting someone I don’t know, someone whose work I have never seen before”. Other students explained a low level of trust by saying that there was a lack of communication and too long a time lag in responses. Among the reasons cited for having a high level of trust in the team members was a belief that everyone had an equal stake in the project or the team had split up the assignment in such a way that each one could do his or her own part and expect other team members to do their parts too.

While the level of trust was reasonably high, this may have been due primarily to the shared background of the participants. VOs may be implemented internationally where cultural or organizational boundaries may exist.

Walt Disney’s animation studios use communications technologies to connect people working on movie projects from geographical locations such as California, Florida, France, Canada, Japan, and Australia. Individuals from many of those locations find themselves working on movie projects using technologies such as e-mail, phone, videoconferencing, and courier pouches. These individuals are likely to become teammates of people they already “know” from earlier projects. It is quite likely that VOs will experience similar reconstitutions, and this is likely to increase levels of trust.

6.5. Implications for project management

In this case study, no team leaders were assigned, and the respondents pointed out problems caused by this lack of leadership. During the *initiation phase*, goals need to be clearly defined and communicated to all participants. At the same time, ground rules must be specified. Another important factor to consider is the allocation of people with different skills and abilities to make the project “well rounded”. An important lesson learned by some of the participants who felt they needed to become de-facto project leaders was how to change the direction of the group to take advantage of individual strengths. While the respondents considered having equal stakes in the project is important, it is unlikely that practitioners will all find their partners having equal stakes in the project.

During the *work phase*, the tasks need to be defined and assigned to participants, giving each task its deadline. With individual participants having different missions and schedules, some individuals were not properly utilized, whereas others received too many tasks to handle.

7. Conclusion

Clearly, work practices in our time have changed dramatically. Work teams often have members who are at a distance and communicate using information and communication technology. These teams are often called virtual organizations or VOs. The educational simulation involving faculty and students in four universities was an effort to help students learn how to work in VOs.

The VO educational experience was a partial simulation of the characteristics of a VO creating a customer-based and customized product within a network of independent organizations that have semi-stable relationships. The teams, working on a white paper representing a city stakeholder group, were geographically dispersed and brought core competencies to the project. Although the teams shared goals, their organizations’ missions overlapped to some extent. Effective teamwork skills, tools, and strategies were critical to a successful completion of the project.

No doubt the graduate students with varied backgrounds were influenced by previous experience, but

this was the first time that these individuals had participated in a project with members from different universities. On the whole students were quite satisfied with the course and indicated that they learned a great deal, however, their experiences were also marked by frustrations. Trust was critical to the work teams, but some students had difficulty in trusting colleagues whom they had never seen nor spoken with in real time. The other major problem involved the management of time, especially when communication was asynchronous. The experience of the participants paralleled the literature on trust and VOs.

References

- [1] C. Argyris, *Integrating the Individual and the Organization*, Wiley, New York, 1964.
- [2] I. Benbasat, D. Goldstein, M. Mead, The case research strategy in studies of information systems, *MIS Quarterly* 11 (3), 1987, pp. 369–386.
- [3] N.E. Bowie, *Business Ethics: A Kantian Perspective*, Blackwell, Oxford, 1999.
- [4] M. Broadbent, The phenomenon of knowledge management: what does it mean to the information profession? *Information Outlook* 2 (5), 1998, pp. 23–35.
- [5] R. Bultje, J. van Wijk, Typology of virtual organisations, based on definitions, characteristics and typology, *Virtual-Organization.net Newsletter* 2 (3), 1998, pp. 7–21.
- [6] P.M.J. Christie, R.R. Levary, Virtual corporations: recipe for success, *Industrial Management* 4 (4), 1998, pp. 7–11.
- [7] N.F. Crandall, M.J. Wallace, Inside the virtual workplace: forging a new deal for work and rewards, *Compensation & Benefits Review* 29 (1), 1997, pp. 27–36.
- [8] T. Davenport, L. Prusak, *Working Knowledge: How Organizations Manage What They Know*, Harvard Business School Press, Boston, 1998.
- [9] P. Drucker, Beyond the information revolution, *The Atlantic Monthly* 284 (4), 1999, pp. 47–57.
- [10] M. Duffy, Ten prescriptions for surviving and thriving in the virtual organization, *Public Relations Quarterly* 39 (2), 1994, pp. 28–32.
- [11] J. Foreman, Distance learning and virtual organization, *Virtual-Organization.net Newsletter* 2 (4), 1998, pp. 21–25.
- [12] L.R. Frey, D.S. Gouran, M.S. Poole (Eds.), *The Handbook of Group Communication Theory and Research*, Sage, Thousand Oaks, CA, 1999.
- [13] J.H. Gilmore, B.J. Pine II, The four faces of mass customization, *Harvard Business Review* 75 (1), 1997, pp. 91–101.
- [14] C. Handy, Trust and the virtual organization, *Harvard Business Review* 73, 1995, pp. 40–50.
- [15] A.P. Hare, *Handbook of Small Group Research*, Free Press, New York, 1976.

- [16] A.P. Hare, H.H. Blumberg, M.F. Davies, M.V. Kent (Eds.), *Small Group Research: A Handbook*, Greenwood Press, Westport, CT, 1994.
- [17] H.P.M. Jägers, W. Janson, W. Steenbakkens, Characteristics of virtual organizations, in: P. Sieber, J. Griese (Eds.), *Proceedings of the VoNet Workshop*, Ben, Switzerland, 28 April 1998.
- [18] T.M. Jones, N.E. Bowie, Moral hazards on the road to the “virtual” corporation, *Business Ethics Quarterly* 8 (2), 1998, pp. 273–292.
- [19] R. Lally, J. Kostner, Learn to be a distance manager, *Getting Results for the Hands-on Manager* 42 (7), 1997, pp. 6–7.
- [20] K.R.T. Larsen, Virtual organization as an inter-organizational concept: ties to previous research, *Virtual-Organization.net Newsletter* 3 (1), 1999, pp. 19–35.
- [21] C.R. McInerney, Providing Data, Information, and Knowledge to the Virtual Office: Organizational Support for Remote Workers, *Special Libraries Association*, Washington, DC, 1999.
- [22] L.K. Michaelsen, R.H.L. Fink, What every faculty developer needs to know about learning groups, in: L. Richlin (Ed.), *To Improve the Academy Resources for Faculty*, Instructional and Organizational Development, New Forums Press, Stillwater, OK, 1996.
- [23] D. Meyerson, K. Weick, R. Kramer, Swift trust and temporary groups, in: R. Kramer, T.B. Tyler (Eds.), *Trust in Organizations*, Sage, Thousand Oaks, CA, 1996, pp. 166–195.
- [24] O.K. Ngwenyama, A.S. Lee, Communication richness in electronic mail: critical social theory and the contextuality of meaning, *MIS Quarterly* 21 (2), 1997, pp. 145–167.
- [25] I. Nonaka, H. Takeuchi, *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*, Oxford University Press, New York, 1995.
- [26] W.J. Orlikowski, J.J. Baroudi, Studying information technology in organizations: research approaches and assumptions, *Information Systems Research* 2 (1), 1991, pp. 1–28.
- [27] H. Rheingold, *The Virtual Community*, Addison-Wesley, Reading, MA, 1993.
- [28] R.E. Rice, Using network concepts to clarify sources and mechanisms of social influence, in: W. Richards Jr., G. Barnes (Eds.), *Progress in Communication Sciences*, Vol. 12, Ablex, Norwood, NJ, 1993.
- [29] J. Rifkin, *The End of Work: The Decline of the Global Labor Force and the Dawn of the Post-Market Era*, G.P. Putnam’s Sons, New York, 1995.
- [30] J.B. Schor, *The Overworked American: The Unexpected Decline in Leisure*, Basic Books, New York, 1991.
- [31] L. Sproull, S. Kiesler, *Connections: New Ways of Working in the Networked Organization*, MIT Press, Cambridge, MA, 1993.
- [32] A. Toffler, *Powershift: Knowledge, Wealth, and Violence at the Edge of the 21st Century*, Bantam Books, New York, 1990.
- [33] A. Toffler, *The Third Wave*, Bantam Books, New York, 1980.
- [34] H. Voss, Virtual organizations: the future is now, *Strategy & Leadership* 24 (4), 1996, pp. 12–17.
- [35] C.D. Winslow, W.L. Bramer, *Future Work: Putting Knowledge to Work in the Knowledge Economy*, Free Press, New York, 1994.
- [36] R.K. Yin, *Case Study Research, Design and Methods*, Sage, Beverly Hills, CA, 1994.
- [37] S. Zuboff, *In the Age of the Smart Machine: The Future of Work and Power*, Basic Books, New York, 1984.

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