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ABSTRACT

This document contains three papers on global team development. "Virtual Executives: A Paradox with Implications for Development" (Andrea Hornett), which is based on a case study exploring power relationships among members of a virtual team, demonstrates that members of a virtual team describe power differently for situations inside versus outside the team. Inside, the team's collaborative power innovates solutions; outside, the virtual team fails to survive continuous organizational conflicts. "Team Development and Group Processes of Virtual Learning Teams" (Scott D. Johnson, Jared V. Berrett; Chanidprapa Suriya, Seung Won Yoon, Jason La Fleur) reports on a study in which students enrolled in an online human resource development masters degree program were studied to understand how virtual learning teams develop and the processes and strategies used to accomplish team tasks in virtual teams. "Developing a Consulting Tool to Measure Process Change on Global Teams: The Global Team Process Questionnaire" (John W. Bing) describes the process used to develop The Global Team Process Questionnaire, which consists of 20 questions designed to analyze process effectiveness on teams and suggest ways in which ineffective or harmful processes can be reduced. All three papers include substantial bibliographies. (MN)

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Virtual Executives: A Paradox with Implications for Development

Andrea Hornett
Penn State University

This article derives from a case study exploring power. Members of a virtual team describe power differently for situations inside versus outside the team. Inside, the team's collaborative power innovates solutions. Outside, the virtual team fails to survive continuous organizational conflicts. These conflicts suggest virtual teams are not supplanting other forms of organizing and that executives operate in multiple, co-existing organizing systems. Accordingly, this article poses issues for further research on and practice with virtual organizing and executive development.

Keywords: Virtual Organizations; Power; Executive Development.

If virtual forms of organizing are replacing other forms (Duarte & Snyder, 1999; Fisher & Fisher, 1998; Grenier & Metes, 1995; Lipnack & Stamps, 1997), is power still defined as the ability to allocate resources (Pfeffer, 1981, 1992a & b)? This study interviewed executives in a large corporation to explore their understanding of power based on their experiences in a virtual team.

Virtual Teams

A virtual team is a geographically dispersed group of people who rely primarily on electronic communication to accomplish their common purpose (Lipnack & Stamps, 1997). While other business teams break down boundaries of departmentalization, chain of command, and hierarchy, virtual teams do that and more. They break down the boundaries of space and time (Doheny-Farina, 1996; Finholt & Sproull, 1990; Hiltz & Turoff, 1993; Jarvenpaa & Leidner, 1998; Lou, 1994; Mankin, Cohen, Bikson, 1996; Marca & Bock, 1992). In addition to changing relationships electronically (Fisher & Fisher, 1998; Grenier & Metes, 1995; Miller, 1996; Schrage, 1990; Zuboff, 1988), virtual organizing promises to be egalitarian (Rheingold, 1994).

While the expectation is that power can be shared in virtual environments, there is little empirical evidence. However, there is some limited evidence about power from the literature on teamwork.

Teamwork & Power

Clegg's work is directly concerned with clarifying power as a concept in organizational science (1989; 1994) and empirically identifying power at work in organizations (1990). However, he does not focus specifically on teams, nor does most of the teamwork literature isolate organizational power as a variable.

Teamwork literature focuses on dynamics inside teams (Banet, 1976; Dechant, Marsick & Kasl, 1993; Gersick, 1988; 1989; Gersick & Hackman, 1990; Guzzo & Salas, 1995; Hackman, 1986a & b; 1990; Hackman & Oldham, 1980; Kanter, 1979, 1983; Katzenbach & Smith, 1993; Lewin, 1947; Pinto, Pinto & Prescott, 1993; Tuckman, 1965; Wall, Kemp, Jackson, & Clegg, 1986; Walton & Hackman, 1986). There are some exceptions (Ancona & Caldwell, 1987) that consider the outside organization's perception of a team as powerful. In addition, considering teams as open systems (Ancona, 1990; Ancona & Caldwell, 1992; Gersick, 1991) reveals the power of environmental organizing dynamics.

This relative lack of focus on power and teams may stem from the paradoxical nature of power and teams (Smith & Berg, 1987). Teams can liberate power by breaking down external structures (Katzenbach & Smith, 1993), and control power by maintaining internal, latent hierarchies (Brooks, 1994). Teamwork can be both empowered by external authorities (Spreitzer, 1995) and dis-empowered by internal peer pressures (Barker, 1993). This study sought to ascertain how virtual team members themselves understood power.

Research Questions & Methods

This study was driven by three questions: does power function in virtual teams. If so, how? How do virtual team

members make sense of power? In order to try to understand both the ambiguous notions of power and the ephemeral nature of working virtually, I designed a case study (Miles & Huberman, 1994) of a virtual team.

I proposed to engage in iterative, qualitative interviewing with the virtual team members (Seidman, 1991). I selected a team of powerful executives in a Fortune 50 company based in the United States.

The Virtual Team

The team selected for this study had only four members but each held positions at a fairly high level, reporting to Vice Presidents and General Managers. Two team members had been with the company less than three years and two had more than twenty years with the company. All had worked in large corporations for more than twenty years. These team members knew corporate strategy and shared a mission that provided cohesion to the team (Lipnack & Stamps, 1997).

The team's mandate came from the company's Chief Executive Officer who served as the project's sponsor. The team's assignment was to solve a complicated, persistent, strategic problem with a long, difficult history of resistance to a solution.

The team in this study is distinguished from other electronic groups in the company by three characteristics. First, this team was not the exclusive method for organizing work; it was crosscutting (i.e. composed of representatives from various departments). Second, the virtual team was not the only assignment; members also held regular jobs with executive management and strategic responsibilities. Third, the team's purpose and the problem to be solved straddled two different businesses, each over $2 billion in size, each with different histories, priorities, and markets.

The complexity of the team's organization and its assignment indicated that it was breaking down several forms of organization. At the same time, this virtual team co-existed with on-going structures that were a complex mixture of line and traditional staff functions (marketing, budget, etc.), chain of command, and unique staff functions involved with proprietary technologies.

Approach

To understand the team's situation, I interviewed each member at least three times over a nine-month period and traveled to three locations to record most sessions in person. The interview approach was chosen because interviews provided opportunities for team members to share the language by which they make sense (Weick, 1995) of power and because this approach was used in empowerment research (Bartunek, Lacy & Wood, 1992).

The decision to interview on more than one occasion was motivated by accepted practice in interpretive studies and to mitigate moodiness and the idiosyncratic nature of phenomenological reports (Lincoln & Guba, 1985; Seidman, 1991). Multiple interviews provide the means to check for internal consistency on the part of the participant and among participants.

In this study, interviews provided a means to check emerging patterns with the participants in an iterative, on-going basis, as I traveled from one to another. Further, the rapport I developed with the participants over the occasions of the interviews provided an opportunity to hear their deep, personal thoughts, their 'inner voice,' as opposed to a 'public' voice (Seidman, 1991).

The first interviews were brief, introductory and procedural. The second interview sessions ranged from one to three hours in length with each member of the virtual team. The third round of interviews ranged from one to one and a half hours and were used to confirm or disconfirm emerging themes, clarify questions on organization and technology, and understand sequences of events and major players. The third round provided an opportunity to go deeper and to get more of the participant's own language in explaining phenomena. The interview format was constantly adjusted to pursue confirmation of data.

The participants were "proactive in defining their own issues in relation to the investigation" (Cassell & Symon, 1994, p. 6). For example, while they answered the questions defining teamwork succinctly, they went on at length in response to the questions about memorable moments and examined situations outside the team. Because the interviewees had energy and interest for discussing events outside the team, and because they reported no power issues within the team, the interviews quickly turned into opportunities to spontaneously 'follow the data' in an iterative fashion (Miles & Huberman, 1994) by asking follow-on questions to pursue the notions of power and conflict in the stories of events and forces outside the team.

The final two interviews were redundant, in many respects. For example, 'conflict' stories were repeated from previous rounds, scenarios were re-stated depicting the difficulties the larger organization was experiencing

in grappling with the extensive nature of the problem to be solved, and the merits of the team's solution were reaffirmed. The last two interviews, while providing no new information, did confirm that I had reached the saturation point (Glaser & Strauss, 1967) where no additional 'data' is provided.

To reduce bias, transcripts were independently transcribed. In addition, my own coding was compared with coding by two other independent researchers using a coding structure designed to capture definitions of power and narratives of sense making about power and teamwork. Inter-rater reliability was eighty percent.

Researcher Bias

In selecting this virtual team, my preference for a cohesive, high-level group biased the study towards organizational issues of power. I wanted a virtual team that would know strategic intent and be empowered so that they could describe power to me in their own words.

As Duke (1976) says, when the topic is power, the researcher is ensnared by an orientation to power. To compensate for this trap, I employed several methods to establish trustworthiness (Lincoln & Guba, 1985), including the crosschecks on coding and additional interviews on findings with several corporate members outside the virtual team.

Delimitations

This study focused on one virtual business team. This team is not co-located. It has members who work for different organizations within a very large corporation.

Limitations

This study necessarily employed retrospective sensemaking (Weick, 1995). Participants told their own stories of situations as they tried to make sense of power.

This is one case. It was designed to try to understand some of the phenomena at work with a virtual team and power. It is neither feasible nor desirable to generalize to all virtual teams. However, findings can be explored for further study.

Significance

This study contributes to the literature on virtual teams by capturing the language by which virtual team members make sense of their work and power. Because the team members of this virtual team are also corporate executives, these findings suggest some significance for education and development of executives in virtual organizations and, therefore, are of significance to researchers and practitioners in Human Resource Development.

Findings

There are two key findings from this study. The first is that there is power in collaboration. This virtual team found a solution to a complex problem of strategic significance that the company had failed to resolve in two previous efforts. The team employed systems thinking and visual representation.

The second finding is that the virtual team members describe power as *outside* the team. This virtual team was frequently in conflict with pre-existing organizing structures, despite corporate policies of empowerment and despite having the CEO as a project sponsor. Participants saw real power as those activities outside the team disrupting the team's effort. The next sections provide more detail on these findings.

The Power of Collaboration

The virtual team worked together for approximately a year to develop a solution and present that solution to the organization. During that period, they twice met face-to-face. Subsequently, they communicated primarily by phone, occasionally by email, and by televised meeting technology with others outside of the team. They were guided in their deliberations by four management practices: empowerment, teamwork, a corporate problem solving process, and systems thinking. Each of these is discussed below.

Empowerment. Empowerment is an official (formal) approach to work in this company. Posters extolling the benefits of empowerment are on walls throughout the organization, including the offices of top-level executives. Employees are trained on its features and uses while interventions are provided to managers and teams to enhance empowerment practices.

Teamwork. Use of teams is part of the culture for accomplishing work. A participant said: *"There's a real expectation that people do work in teams."* Another felt: *"Some issues are best -- are only -- addressable by a combination of people."* One claimed: *It would be hard for me as a manager to imagine what I can do alone."* In addition, teamwork was fundamental to this virtual team's mission. Members solicited commitment from those outside the team by communicating the team's shared perspective. One participant said: *"Why our virtual team is here is to try and make sure that we all speak with a consistent voice and that we know how to represent this stuff."*

Problem Solving. The team members employed an official problem solving process whose roots are in a rewarding history of quality improvement efforts. The process is required training for all employees within their first 90 days with the company. The dominant assumption of this process is that solutions can be engineered; that progress is linear and can be "packaged" into discrete increments. In discussing the problem solving process, the team leader used the term *'shared language'* and others described it as the *'culture'* or *'the approach.'*

Systems Thinking. The virtual team devised a systems drawing that represented its solution in a holistic manner. *"It's a different mental model, a different systems model."* The team felt good about its concept. One said: *"That is an impelling power, this excitement that's generated because you're on the right track for a change."* And they believed in the power of their design to convince others. *"So any kind of system you can envision is incorporated by this particular picture." "So everybody ... is really thrilled now that we have one systems model that we can talk to. "They can talk to customers with this. It communicates."*

In addition to their pride in their product, the team members were proud of their process. They respected each other and believed they had a good balance of expertise and temperament in the team. Their conflicts with the outside organization strengthened the team. *"Through thick and thin, this little group has always come together."* The team does this with *"mutual trust, mutual respect and appreciation for the strength and weaknesses of each other and confidence, confidentiality."*

The team persisted, the members claimed, because they felt committed to their purpose: solving a problem. This commitment was so strong that one participant declared that it is not technology that creates virtual teams but empowerment. As proof of their beliefs, the team won an award for excellence. Perhaps that is why the team had such difficulty making sense of the lack of acceptance in the organization for their ideas.

The Power of Conflict

The virtual team members felt plagued by politics outside the team. They could not reconcile the organization's rhetoric about empowerment with their lived experience when they were instructed to change reports about their work, left out of important meetings, and had ideas misrepresented to key decision makers.

What were the sources of these conflicts? Some team members cited the different histories and purposes of the two businesses involved. One team member characterized the conflicts as a choice between long term planning and positioning for the market versus short-term sales and profit goals. Each of these is not an atypical corporate phenomenon. However, this company preached empowerment and the team believed that the conflicts were evidence that empowerment was not working. *"They beat up my message pretty well and it really impacted the credibility of the whole [name of project] initiative."* Empowerment was further eroded by the corporation's project management system that served to institutionalize conflicts for the virtual team.

The corporation's project management process initiates and tracks projects and is predicated upon a mode of thinking that expects periodic progress reports about discrete solutions. Often, progress reports are given by persons who are not members of the project teams but higher in the hierarchy or outside the chain of command in staff assignments. This process misrepresented the virtual team. *"So basically we did the work to put together the strategy and that's not what got presented and that's not what was approved."*

This corporate project tracking process is designed to secure multiple perspectives and these multiple perspectives created complex communication issues for the virtual team. One participant observed that after virtual team meetings, due to pressures and perspectives from outside the team, *"things would start to be unwound back to the different viewpoints."* He added: *"different people are exercising their power in different ways to control*

their own domains and on some level we're doing the same thing to try and drive the outcome that we're looking for." The team's use of a systems diagram to win support alienated outsiders who thought it depicted too large a scope, too ambitious an approach, by being holistic. However, the team persisted and in its ongoing conflict, the virtual team believed that the team's existence was evidence of corporate commitment to its approach. *"As long as the team remains functionally, then it's doing whatever it needs to do."*

While the team was unaware of this, there is some evidence that the virtual nature of the team might have masked the fact that its existence was being ignored. The existence of the team may have represented inertia rather than commitment. The team's geographic dispersion and periodic, rather than continuous, work effort may have meant that real commitment was not tested. It was assumed.

Virtual is vulnerable when the team literally lacks 'face time' for developing mutual understanding with others in the organization. Indeed, the team's vulnerability coupled with its inability to fully articulate the power and influence issues led me to a third finding.

The Third Finding

The third finding is less finding and more noticing that something is missing. The virtual team members lack language for talking about power. This surprised me since I was expecting leaders to volunteer information about power, as they had with McClelland (1955; 1975; 1987). Instead, these executives hemmed and hawed in response to follow-up questions and requests for clarification about power. They paused for long periods in contrast to their usually lively flow. When they did speak of power, they employed unsophisticated metaphors for force (*"drive to," "rub noses in," "counteract"*) and resistance (*"nothing is going to happen;" "they won't hear you"*).

When I compare the extent and nature of the language in the transcripts for discussion of technologies with the discussion of power, the team members are precise and clear about technologies and less voluble, more hesitant and limited with regard to power. This is similar to my comparison with their language for teamwork. They are confident and forthright when discussing the value of each member of the team and the nature of their work together. They do not pause, nor do they grope for words or ask me what I think. They know what they think and are positive and articulate in their opinions. In contrast, they are neither confident nor articulate regarding power.

Within a year of the completion of this study, the company officially reorganized. Persons in positions of hierarchy over this team were re-assigned. The corporation acquired a company whose technology held potential for meeting the same strategic objectives that had been the virtual team's goal. Reorganization and acquisition were implemented while the virtual team's solution was not.

Conclusions

At the beginning of this study, I asked: if virtual ways of organizing are replacing other ways, is power still resource allocation? The answer from this case is that the virtual way of organizing did not replace other ways of organizing. The corporation's hierarchy, project management processes, and acquisitions budget were all more powerful than the virtual team and its solution. And, yes, there is power in resource allocation.

However, there is also power in virtual teams. The virtual team literature (Duarte & Snyder, 1999; Lipnack & Stamps, 1997) is correct that these new ways of working can add value. This virtual team had the power to find a solution to a complex, strategic problem that the corporation had failed to resolve twice before. As a problem solver, the virtual team proved to be superior to two past approaches: one that regulated compliance to solve the problem and the other that created an organization of about a hundred employees to work on the problem.

So why did the virtual team's solution not win acceptance? Perhaps the literature is too optimistic about the ability of these new ways of working to supplant traditional methods (Lipnack & Stamps, 1997). The executives who participated in this study were members of *both* the traditional organization and the virtual team. Although they did not consciously acknowledge this, their allegiances were split, straddling both worlds. The expert power (French & Raven, 1959) of the virtual team could not completely supplant their positional authority (French & Raven, 1959) because their identity and membership in the organization lies in their positions. Their status is based on position. Their recognition and rewards are tied to their positions. Perhaps this dual allegiance is what caused them to pause and fumble for words to describe power. They were flummoxed by conflicting powers.

What about the CEO? He was the team's sponsor and the source of their cash award for excellence. Why did the CEO's involvement not tip the scales of power in favor of the virtual team? It appears that the CEO's

power was counterbalanced by his joint roles as both sponsor of the team and director of the traditional structures and systems. This is the essence of the executive paradox: the same individuals are both the administrators of traditional systems and pioneers of new approaches.

Executive Paradox

How does this case portray the 'executive paradox,' a phenomenon where the same people are in charge of change and status quo? In this case, there were two factors empowering the traditional organization. The first factor is the virtual team's use of systems thinking. This approach presented a different schema, a different way of framing and solving problems than the sequential, corporate approach. The traditional decision makers and decision-making processes could not accept this approach. It was too different, too apparently comprehensive, and, holism was perceived as excessive ambition. Second, the virtual nature of the team made it invisible in the corridors of power. The resource allocation power (Pfeffer, 1981, 1992a & b) of the traditional organization prevailed because the virtual team was, by definition, not a resourced entity. It was out of sight, out of mind, and out of budget. Further, the virtual team members had no corresponding, non-traditional vehicles or mechanisms outside of their team for gaining acceptance and resources. This virtual team was not an organizing component, nested in the middle of a hierarchy of organizing systems but, rather, a source of competing values. It was not in the breakdown or supplanting of bureaucracy, but in the conflict with it that power manifested. And, when it did, the virtual team lacked language for making sense of their dilemma.

While teamwork literature has not focused specifically on power, it assumes that teams add value to bureaucratic organization of work. Therefore, the literature holds an implicit assumption that the expert power of a teamwork approach to organizing opposes the positional power of the bureaucracy. Consequently, in these organizations employing multiple forms of organizing, executives should be prepared to recognize multiple, complex, co-existing value systems. And, executives should possess a rich language for power to enhance their ability to navigate these complex systems (Brown & Duguid, 2000).

Implications for Executive Development

Evidence of the paradox emerging from this study is that the virtual team was *both* egalitarian and hierarchical. The members were egalitarian in their dealings with one another and hierarchical in their membership and involvement in their corporation. But, they could not sustain the tension. They could not maintain and balance competencies for both situations. Eventually, the teamwork ended and the bureaucracy prevailed. If virtual teams such as this one are to be successful, they need to find a way to sustain being both competent egalitarian collaborators and competent positional power brokers, without having to choose between the two roles.

As organizations increasingly use virtual teams, executives will have to learn how to identify and use which competencies when. Increasingly, the jobs, titles, and positions in traditional organizations will compete for allegiance and resources with the needs, deadlines and expertise necessary for projects. Both systems will co-exist and may, as in this case, co-exist in conflict.

Already, the strains between these co-existing systems are evident in the call for compensation reform (Crandall & Wallace, 1998), but compensation is only part of the solution. If executives are simultaneously sources of new solutions and barriers to innovation, they need to be developed to manage within their paradox. They need to acquire language for expressing conflicting power dynamics. Without a language for power, how can they make sense of their dilemmas? How can they both innovate and stabilize? How can they maintain global reach while maximizing personal understanding? This one case cannot answer these questions but it serves to provide some understanding of what is at work inside the paradox.

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Team Development and Group Processes of Virtual Learning Teams

Scott D. Johnson
Jared V. Berrett
Chanidprapa Suriya
Seung Won Yoon
Jason La Fleur
University of Illinois at Urbana-Champaign

This study describes the community building process of virtual learning teams as they establish group roles and norms. Student teams in an online HRD masters degree program were studied to understand (1) how virtual learning teams develop and (2) what processes and strategies are used to accomplish team tasks. The results show that virtual teams collaborate effectively from a distance by using a set of processes and sharing the leadership role among team members.

Keywords: Virtual Teams, Cooperative/Collaborative Learning, Online Learning

In the approaching 21st century, organizations face many challenges from increased globalization and rapidly changing technologies. While technological advancements in the workplace continue to be the primary factor in maintaining a competitive advantage, organizations also recognize the need to address the technical knowledge and skills of the workforce. This has led to an increased emphasis on the role of learning in organizations, where individuals must view learning as a major component of their work responsibility within the organization. The nature of work within organizations is also changing from individual assignments to team-based activities. The change toward increased team-based responsibilities has paralleled the growth of communication technologies that can be used to support work teams. Teams are now able to communicate, collaborate, and perform irrespective of time and space.

The role of teams is not confined to the workplace. Today's workforce and education providers are realizing the benefits of collaborative teams in the learning process. Hundreds of studies have demonstrated that learning is most effective when students work in groups and verbalize their thoughts, challenge the ideas of others, and collaborate to achieve group solutions to problems (Johnson & Johnson, 1989). While the benefits of collaborative learning have been established for face-to-face teams, the impact of distance and time on virtual team roles, functions, and processes has received little attention. Working in a virtual team is unique because of the physical separation of the group, yet little is understood about how distance and time affects their ability to make plans, communicate, and work to accomplish team goals.

The purpose of this study was to describe the community building process of virtual learning teams as they form, establish roles and group norms, and address conflict. The goal of this study was to generate recommendations for integrating successful virtual learning teams into Internet-based training courses. This study was guided by the following research questions:

- How do virtual learning teams develop and determine their group process?
- What processes and strategies do virtual learning teams use as they carry out their team tasks?

Theoretical framework

Understanding teams, collaborative learning, and team environments is becoming more important because of advances of technology, globalization, and because organizations are moving toward utilizing more network structures and team-based functions (Lipnack & Stamps, 1997). The term "virtual team" is becoming more prevalent as teams move from being primarily co-located, where team members are located in one physical location, to virtual, where team members are geographically unrestricted.

Collaboration studies have overwhelmingly shown that cooperative learning situations promote student achievement within problem solving settings as well as higher productivity, greater social skill development, and increased self-esteem (Johnson & Johnson, 1989). Work groups, or teams can be defined as "interdependent

collections of individuals who share responsibility for specific outcomes for their organization" (Sundstrom, DeMeuse, & Futrell, 1999, p. 120). Definable characteristics common to all collaborative work groups include: (1) a definable membership, (2) awareness of one's membership, (3) a shared sense of purpose, (4) member interaction, and (5) ability to act as an individual unit as well as a unit of individuals (Knowles & Knowles, 1959).

Many researchers have studied how groups develop into functional teams and select group processes to accomplish their tasks. Tuckman (1965) introduced a widely accepted model of the way groups develop and work together. The model highlights the four stages of forming, storming, norming, and performing. *Forming* refers to a period in which members try to determine their positions in the group, procedures to follow, and the rules of the group. The second stage, *storming*, starts when conflict arises as team members resist the influence of the group and rebel against accomplishment of the task. The *norming* stage begins when the group establishes cohesiveness and commitment to its tasks, finds new ways to work together to accomplish the tasks, and sets norms for appropriate behaviors. The final stage, *performing*, occurs when the group shows proficiency in working together to achieve its goals and becomes more flexible following the procedure for working together. Each stage of Tuckman's model is an essential step for a team and much like other linear models, if the first step is not accomplished, the latter stages will not be successful.

Another contemporary framework of group development, presented by Gersick (1988), is called *Punctuated Equilibrium.* This framework suggests that regardless of group structure, tasks, or deadline; groups work on their tasks in the same temporal pattern. Gersick found that internal group processes focused primarily on the time frame set for a team project. Five time segments characterize her framework: three brief transition periods at the beginning, mid-point, and the end, and two long work periods between the transition points. The first transition point starts when the group has its first meeting and immediately establishes its strategies and approaches to accomplish its tasks during the first long work period. Then, at the mid-point of the group project time, the group goes through the second transition that sets the direction for the second long work period. The mid-point transition involves the reexamination of group strategies, procedures, and goals. The second long work period is similar to Tuckman's performing stage, where the outcome becomes the focus of attention. The last transition point is the completion period where the group finishes its tasks and adjourns. It is clear that the effectiveness and outcome attainment of teams is dependent upon the resolution of conflict, developing roles within the team for working together, and supporting one another as individual learners.

Virtual teams are groups of individuals who interact through various communication technologies to accomplish its common goals. Virtual learning teams are being used in education as well as corporate training programs in an attempt to enhance collaboration and cooperative learning experiences. In the expanding market of virtual universities and online degree programs, virtual learning teams are being used to increase collaboration, communication, and ultimately student learning (Bailey & Luetkehans, 1998). These virtual teams rely on Internet technologies such as videoconferencing and chat rooms to interact and become functional work teams. Virtual teams allow instructors of online courses to assemble effective teams in a short period of time, enhance the utilization of external resources, and increase team member interaction and collaboration (Townsend, DeMarie, & Hendrickson, 1996). Using virtual teams also promotes knowledge sharing and enhances the application of knowledge and skills (Horvath & Tobin, 1999).

Even though various studies of teams using computer-mediated communication have contributed to an increased understanding of both face-to-face and virtual teams, the results are inconclusive (McGrath & Hollingshead, 1994). Most studies comparing face-to-face groups and virtual groups using communication technology suggest that face-to-face teams are more effective. McGrath and Hollingshead (1994) examined fifty studies on computer-assisted group performance and found that computer-mediated groups tend to have fewer interactions and less information exchange among members than face-to-face groups. Virtual team members can exchange verbal information as efficiently as a face-to-face team, but their ability for non-verbal exchange is severely limited, which can contribute to increased misunderstanding among members (Warkentin, Sayeed, & Hightower, 1997). In another study, traditional teams were found to have better internal leadership and coordination than virtual teams (Burke & Chidambaram, 1994; Eveland & Bikon, 1989).

Theory development and empirical research are needed to better understand and respond to the challenges that virtual teams face (Furst, Blackburn, & Rosen, 1999). Although there have been several related studies in this area, few research efforts have focused on the virtual team within the formal online education context. Online learning teams are usually more unique than those created in more traditional educational settings. Often these students are working professionals who have a limited history of working together, and few prospects of working together in the future. Thus, further understanding of group formation and team dynamics in virtual environments is critical to the integration, creation, and support of online learning teams.

Methodology

This study was guided by an inductive analysis to understand the dynamics of virtual learning teams. Both quantitative and qualitative methods of inquiry were used to capture the dynamic interaction within groups and the underlying factors that guided group process and decision making. The analysis was aimed at discovering the critical elements that emerged during team development and an analysis of factors that influenced team process.

Participants

The participants in this study were students enrolled in an HRD masters degree program that was taught entirely online. Thirty-six graduate students were enrolled in the course, representing ten different states and two countries. The class was divided into seven virtual teams comprised of five or six team members. The groups were formed based on geographical location to reduce the impact of disperse time zones on group interaction. The exception to this was a group comprised of two Koreans, two students from Florida, and one student from Connecticut.

Technologies for Virtual Team Support

The Internet-based technologies used in the online program were specifically selected to support communication and collaboration within the virtual teams. The online course supported the direct use of e-mail, a collaborative web forum (WebBoard™), synchronous text chat, and Internet pagers (i.e., Instant Messenger™, Yahoo! Messenger™, ICQ™). The virtual teams also had the opportunity to use other collaboration technologies to support their work. These technologies ranged from traditional forms such as conference calls to multimedia forms such as NetMeeting™.

Instrumentation

Several established instruments were used to assess virtual team development and process. Lurey's (1998) *Virtual Team Survey* was used to obtain information on the team's process, leadership, technology use, and perceptions regarding overall team performance and individual satisfaction with the team. Nemiro's (1998) *Background Survey of Virtual Team Members* was used to assess the team member's feelings about working in a virtual team and to identify the typical types of interactions that occurred. The online versions of these instruments were identical to the paper versions in both format and content. In addition to these administered instruments, electronic logs of interactions among the team members were captured and analyzed. These included the archived logs from group chats, e-mails, and discussion board postings. An interview guide was developed to ensure consistency during the follow-up interviews of the team members.

Procedures

Data were collected over a three-month period following the completion of the six-week online course. Virtual team members were sent an e-mail message that asked them to complete the instruments within a set time frame. The subjects completed the forms online and submitted their results electronically. All instrument data were entered into a statistical software package for analysis.

Following the collection of survey and course data, three members from each team were interviewed. Two members of the research team conducted the interviews over the telephone. Having two researchers participate in the interviews facilitated the process of note taking and allowed the interviewers to compare notes and discuss the information obtained following each interview. The identification of strategies and problems that influenced team performance was determined by open-ended questions asked of each team member during either phone interviews or follow-up personal e-mail exchanges.

Data captured electronically using internal data logs from various communication technologies were downloaded and formatted for analysis. Determining the purpose of each of the messages sent using the various technologies involved an initial summarization of the message content followed by a classification based on the purpose of the message. While the set of purposes used to classify the messages were initially organized according the established models of group interaction, the final classification was allowed to emerge from the analysis.

Results

Team Development

The students were assigned to a virtual team at the beginning of the course. A web page was posted a week before the class began that showed who was assigned to each team. This listing included the Instant Messenger™ screen name and e-mail address for each team member. No formal guidance was offered to the teams in terms of their formation and development other than a due date for the first team assignment, which was approximately two weeks after the online course began. This led to different rates of development for the teams as each virtual learning team evolved and defined their group protocols/norms and leadership.

One team established contact prior to the beginning of class while the rest of the class members waited until the first formal class synchronous session to begin to interact socially online. The teams initially tried to define their group norms by discussing team purposes and goals and performed some informal team building activities. This involved getting "acquainted with one another, sharing what we knew about the course, and setting up a tentative schedule/procedure." Although this seems relatively straightforward, these preliminary activities were often the source of much difficulty, as shown by the comments provided during the interviews:

- "It was tough getting together with the technology. It took awhile to get used to."
- "What took 10 minutes face to face took an hour online."
- "It was hard to make decisions. Not having nonverbal cues made it harder."

During the first online meeting, the teams tended to have one individual accept responsibility for coordinating and compiling the first team assignment. This became a standard for later assignments. It was also during these first meetings that the majority of the social networking began. This "getting to know you" interaction continued for several team meetings, and gradually diminished over time. Some of the comments made by the students during the interviews regarding team formation included:

- "Talking about a forming or storming phase, we didn't really go through that, or if we did, it was very rapid."
- "The first couple weeks were hit and miss ... it was hard to coordinate everyone's schedules"
- "I met one team member on AIM before class began. I took the initiative 'Hi, I'm Mariah, your future teammate ...'"
- "I think we met after the first class. We talked a bit about ourselves, our backgrounds, what we thought of class. We familiarized each other with technology ... Informal teaching and instruction of other team members. We talked about assignments and how we would do them."
- "It was difficult negotiating to meet online ... what night and time worked best for everyone varied with children, work schedules, etc."

Verbal and non-verbal cues played a role in the overall social team building process and interaction. For instance one team member stated. "We never got too personal – others in the team did not know I was pregnant until the last week of class. This is something that would have been obvious if we were meeting face to face, but it just never came up online." Others, as they began to depend on one another to develop and create deliverables for the course, felt like they could trust their teammates, but one in particular stated that they were "Craving human contact – such as a team member looking me eye to eye and saying 'I'm going to take care of this.' As much as I want to trust team members, I don't know them as well. I have concerns about accomplishing a large team project – especially one that might require a physical product."

Team Norms and Processes

As in traditional face-to-face teams, norms were developed to facilitate team performance. The responses received in response to several questionnaire items indicate this. For example, punctuality was indicated as being important for team communication and teamwork ($M = 4.27, SD = 0.51$). Other team norms, such as knowledge and information sharing ($M = 4.46, SD = 0.50$), requiring active participation ($M = 4.07, SD = 0.52$), and timely response in terms of feedback ($M = 3.82$, $SD = 0.42$) all indicate a high expectation of adherence to team norms by all individuals within teams.

Although each team was unique, there were commonly shared elements in their process, especially the work procedures for completing team assignments. Generally, the teams settled into a work process similar to the one described below after the first two or three assignments. Of course this varied between teams, with some teams meeting less and others meeting more often (up to three or four times a week).

1. Meet after the class synchronous session to define roles for the assignment and discuss timeframes for completion.

2. Do reading individually and get together by Monday and post individual input on WebBoard™.
3. Meet synchronously as a team two days before the assignment was due and refine input.
4. The team compiler would draft and post with revised input.
5. Assignment posted for final approval and additional comments one day before due date.
6. Any additional comments would be added and posted into a final draft

Each team's process was continually refined as the teams progressed through the class and became more efficient in assembling their work. The students made several interesting statements unique to specific team group processes and procedures during the interviews:

- "During the WebBoard chat, one person would tend to lead the group discussion by keeping the team focused on the task at hand. There seemed to be a split between males and females within the group."
- "For conflicts, we'd speak to the person individually on private chat (AIM) and not discuss it in front of others. It is difficult to resolve communication issues [online]."
- "If someone missed a meeting, a summary would be posted or forwarded to him/her. There was an expectation to check the WebBoard 5-6 times a day. We developed our own language and abbreviations to ease communication."
- "Coming up with a document took awhile online initially, but we got more efficient. We came up with our own abbreviations – own language (p = paragraph, s = sentence). We had our own jargon as a team."
- "We had a captain each week. We didn't meet much. We used the WebBoard more, and our meetings were short."

Team Leadership and Roles

The role of leadership was an interesting aspect of the virtual teams. Surprisingly, only two of the seven teams had a leader emerge in the group. Most of the groups shared the leadership role between everyone, often rotating on a weekly basis. Responses to the interview question, "Did you have a leader in the team?" are shown below:

- "Those who were experienced with technology were more dominant."
- "Leader, gatekeeper (reminding when assignments were due). There were different roles at different times. These roles shifted informally. It was very much like an actual team, except roles emerged virtually."
- "One person emerged as the leader for the team, and this person would keep the group on task. This person had strong opinions and personality."
- "We did not have a leader, and this was problematic ... It's difficult to [form a team] face to face, and even more so with a virtual team. People are too polite and don't resolve conflicts."
- "No. Roles varied based on what the assignment was, because we all had different backgrounds. Everyone had a specialty; there was an English reviewer, two people to write-up the assignments, two people to critique. It depended on personal scheduling."
- "No. The person who compiled was kind of a 'leader for the week.' We didn't designate, but shared it throughout the course."

Comparing the results of the questionnaire to the statements made in the interviews resulted in some seemingly conflicting responses. For example, the questionnaire item, "The team leader was appointed by team members" received a low value (M = 1.54). This initially can be interpreted negatively, but the response may have been due to the fact that the role often shifted through the team. Additionally, the item "Team members alternated their role to be team leader (M = 3.22, SD = 0.82) conflicted somewhat with the interview responses. However, there was a general consensus that whoever the leader was, they "kept individuals working as a team" (M = 4.31, SD = 0.55). One result of the lack of consistent leadership may be seen in the responses students gave to the statements "Team members had a shared understanding of what the team was supposed to do" (M = 2.84, SD = 0.50) and "Team members used their own judgment in solving problems" (M = 4.14, SD = 0.54). This may be indicative of a task-oriented approach to team performance resulting in less of a "team" and more of an individual work group.

Team Interaction, Interdependence, and Trust

Virtual teams are uniquely dependent on team interaction and individual acceptance as they collaborate from a distance in their individual social network. As mentioned above, each of the teams formed in a uniquely different way, which fostered varying social interdependence from group to group. The teams' perceptions of their effectiveness and cohesion also varied from team to team. In general, each team exhibited a collectively positive team perception of individual teammates and their willingness to contribute to a common vision and commitment in

achieving team goals. As a member of one team said "We worked very cooperatively. Each of us has the capacity to trust each other explicitly to do well." Another student claimed, "It was a team thing - we all made suggestions, we all contributed. It was a group effort and it was shared leadership."

However, not all team member perceptions of whether or not their teammates were contributing to effective team outcomes were congruent. For instance, during an interview one team member suggested that there was cohesion and team effectiveness when leadership emerged and "everybody in the group found a role as a communicator, giving feedback, providing content, or writing the drafts" within the team. In contrast, one of her teammates made the claim that "We never became a team. There was spotty participation throughout, and things were often left in a half finished state."

Conflict resolution stemming from lack of willingness to participate, lack of planning, or individual disagreements seemed to be three social issues that influenced the successfulness of building team trust and unity. In two of the teams, bad feelings about an incident were never resolved. Individuals were able to simply log off of the chat sessions at any time they felt like it and could virtually disappear if they chose to. When conflicts were not resolved effectively it hampered the progression of the team. One team found that "it was difficult to resolve communication issues" but when they occurred, they would "speak to the person individually on private chat, keep on private chat, and not discuss it in front of others" which was a problem one of the teams ran into – a public dispute. Overall, teams found that they "Had to have a lot of trust with other members" and although the majority of the teams had no real problems with this, any type of trust issue made collaboration very difficult.

To better understand the students' social interaction needs, they were asked to respond to the question "Did you feel the need to meet face to face?" Respondents repeatedly claimed that meeting face to face was unnecessary. Out of 20 interviews, 17 students felt that it was not necessary to meet face to face. They felt that, in general, everything that was required of them was accomplishable virtually without the face to face interaction. However, there were discrepancies in some of the interviewee responses. One student said "No – it is not necessary to meet face to face, we got an idea of each other's personalities online," but later the same student said "One of the biggest drawbacks is the distances apart from each other. You can't get together and discuss over coffee or exchange information. This hampers getting it all together." In fact, three of the teams had some team members meet face to face at different times where it was geographically feasible and suggested that these meetings were beneficial in building social relationships with their colleagues. Individuals who were left out of the face to face meetings summarized their feelings well by saying, "It would have been fun or great, but wasn't necessary. Those who met face to face had a better relationship. But they didn't let it hinder other relationships."

Several benefits of not meeting face to face emerged, including (1) not meeting face to face enabled more flexibility in scheduling meetings, (2) people were less inhibited from a distance, and (3) in the long run, it is less time consuming because of "less socializing and more focus on the task." It appears that even though meeting face to face was not necessary for most of the course requirements for these participants, there is evidence that it is still desirable when possible. One team member stated "Collaboration is enhanced by face to face. You can do anything if you are paired up right – it's more or less a comfort level. The most significant thing I discovered is that I am a social learner, and the WebBoard™ doesn't fulfill that need. I realized that we as a society have moved on though, and I have to adapt." Perhaps those who are ready to meet the changing dynamics of business and education will be those that can adapt well to the changing nature of communication and information delivery.

Discussion

Although the Tuckman and Gersick models were considered to serve as frameworks for structuring the findings of this study, the data are insufficient to claim that they do or do not fit. Further research will be needed to determine this. However, virtual learning teams do seem to evolve around project timelines, group processes, and interpersonal relationships much like face to face teams. These processes included the activities identified by Tuckman in the terms of Forming, Storming, Norming, and Performing. The concept of stages also seems to be relevant to virtual learning teams as it was evident that the level of performance did seem to be dependent on how well the teams were able to establish procedures, resolve conflicts, and collaborate to bring about a successful task.

Typical situations for the teams emerged as well and were found to be interesting. Initial meetings in the teams seemed to involve the creation of group norms and procedures in order to set the directions in which teams will accomplish their tasks. Since the first assignment was due two weeks after the course started, the first team meetings occurred within the first week of the course. Team members generally tried to get to know each other quickly and get right on task. For some of the teams, an individual in the team tended to emerge as a team coordinator and initiated the interaction. Then, they developed a procedure for how the task should be accomplished. This procedure was later used as a team standard for working on subsequent team assignments.

It is also interesting that all teams went through a task process that is similar to Gersick's (1988) framework, although the time element differed as a result of the compressed nature of the assignment time frames. This typically included team interactions online and decisions on how the procedures and timeframes would be established for working on team assignments. Each member individually completed course readings and posted input in the class WebBoard™. Then, they met again online to integrate all their postings. A team compiler revised a final draft and posted it on WebBoard™ for other team members to review before submitting it to the instructor. The team task processes were developed as the teams went through the first class assignment and the teams became more efficient in their work process with later assignments.

Another interesting finding was the emergent roles of shared leadership in the team–as a coordinator and compiler. Four out of seven teams mentioned that leadership of the team was shared among team members, but they indicated that the compiler of each assignment became the team leader during that week. This resulted in the leadership role rotating among members for each assignment. The other two teams saw the team coordinator as a leader for the entire time, and they also served the role of facilitator and coordinator. They kept track of the assignment due date and often initiated the first interaction among the team.

Problems in the virtual teams came from a lack of willingness to participate, lack of planning, conflicting schedules, or individual disagreements. Most of these are social interaction issues. Lack of non-verbal cues made those issues invisible to other team members. While most participants mentioned that they missed face-to-face meetings, they said it was not necessary and they could accomplish all of the assignments without face-to-face interaction. It is likely that non-verbal language played an important role in social interaction and team building but not in the task process. It seems that with a short period of time for team building and because of the limitations of the distance education environment, team members did not spend much time on social tasks. The virtual teams needed to be quick in defining their processes, be familiar with the various communication technologies that were available, and be efficient in collaboration among team members in a virtual environment.

Recommendations

Several strategies appeared to be important to virtual learning teams for improving team development and group processing. The primary issues to be considered include:

1. *Team Building and Collaboration Skills.* Virtual teams need more time in the beginning to coordinate their first task and establishing relationships and protocols in their initial meeting. Instructional material on team effectiveness, formation, planning, and facilitation should be included early in online programs. Instructors must become a mediator and facilitator of virtual teams. The tendency is to form the teams and assume that people know how to interact and efficiently operate in "virtual teams" but it is not so. The majority of good teams do not occur out of happenstance - they are developed.
2. *Timeframes for Task Completion.* The timeframe for course projects should be reasonable and allow enough time for students to adjust themselves to work in a virtual environment. Working together online appears to take longer than face-to-face.
3. *Virtual Learning Team Assignments.* In many online courses, team projects have been used to evaluate student performance. As with any collaborative learning project, the types of assignments or work assigned in teamwork situations should be carefully considered. There should be a clear objective and benefit established for using group assigned tasks, especially in a virtual environment. They should not be assigned just because and assignment is expected. The majority of the interviewees suggested that if the task was too complex, it would be difficult to accomplish without the option of face-to-face interaction.
4. *Team Member Readiness in Technologies and Virtual Collaboration*. Team effectiveness in using collaboration technologies can determine the effectiveness of virtual teams. The better the team members are in using communication technologies, the more efficient in teamwork they should become.

This paper provides a glimpse of how online virtual teams develop and carry out their tasks. Like many descriptive studies, the results of this study were not meant to be generalized to other virtual teams, although the uniqueness of these virtual learning teams and their environment provide insight into how they develop and progress throughout their team life. Further research should address the issues of dynamic interaction during online meetings, the role of the instructor in establishing and supporting virtual learning teams, how teams select and use technology to support the group performance, and what actions help teams better collaborate and lead to greater team performance and individual learning.

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Developing a Consulting Tool to Measure Process Change on Global Teams:The Global Team Process Questionnaire™

John W. Bing
ITAP International, Inc.

As international organizations strive to improve their global reach, the role of distributed teams and the role of human processes in improving performance on these teams are important success factors. However, there are few studies of such teams using instruments whose psychometric properties are understood, instruments that can both measure changes over time and compare teams. The Global Team Process Questionnaire™ is described and researched in this paper to identify its properties.

Key Words: Consulting; Teams; Intercultural

Companies using global teams (this term will be used for teams distributed regionally or globally) have found that such teams are required to expand internationally with effectiveness. "For the first time since nomads moved into towns, work is diffusing rather than concentrating. . . . In all industries and sectors, people are working across space and time." (Lipnack & Stamps, 1997, pp. 2-3) Global teams are utilized for research and development, to operate lines of business in a networked or matrix fashion, to serve the requirements of global customers in their locations and to implement innovations and change on a wide-scale basis. Organizations have found that global teams can be a competitive advantage and that not all teams are equally productive, even though they may be similarly constituted in terms of the professional qualifications of team members

Managing such teams requires understanding the relationships between the following areas: (Rhinesmith, 1993):

Personal styles
Stages of team development
Effective team functioning
Stage of professional development
National culture
Corporate culture
Functional culture

Rhinesmith notes that it is a mistake to automatically assume that "cultural differences [are] the *primary* driving forces in multicultural interaction. Many observers have found, however, that most multicultural teams are driven *first* by personal factors and issues of team development such as roles, responsibilities, power, and conflict." At the same time, culture plays an undeniable role: "The mistake made by many managers is not that they leap to cultural solutions from personal differences, but that they do not know enough about cultural differences to determine whether or not they are a factor." (Rhinesmith, 1993, pp. 131-2).

In the face of the complex factors influencing the functioning of global teams, some kind of method is required to disentangle the threads of interactions. Team Leaders and their managers cannot be assumed to be experts in this area; if help is not forthcoming, leaders, managers, and team members must peer into the "soup" of such relationships and guess which ingredients are contributing to, and which detracting from, team effectiveness. Such guesswork may often be misguided and in any event guesswork is difficult to standardize. Great team leaders may be intuitive, but intuition cannot be passed on to others and is often inconsistently effective.

The Global Team Process Questionnaire™ (referred to below as the "GTPQ") is a device which has been designed to identify those factors contributing to and detracting from team effectiveness for both team leaders and members. These factors include communications, roles and responsibilities, leadership, trust and other factors (see the list of questions in Table 1) identified as critical to healthy team process.

Using such a tool as the GTPQ, improvements can be made through a targeted and efficient approach. Some of these improvements may be in the training and development of the team leader and team members; some may require personnel changes; and some organizational development interventions. The GTPQ is a diagnostic tool which allows decision-makers to take actions using better, more targeted information.

Five years ago a Swiss-based pharmaceutical company asked ITAP International, a consulting firm located in Princeton, New Jersey, USA, to develop a method for measuring process performance on three global teams. The teams were composed of scientists from Europe, the Americas, and Japan. They met four times over a period of two years, and continued their team responsibilities during the intervening periods. Their purpose was to reduce research and development time in three drug delivery areas: Oral, skin, and subdermal. The teams were tasked with similar assignments and because the composition of the teams was similar, they became ideal candidates for studying differences in human processes on global teams.

A questionnaire was developed to measure human process on these teams, and was administered four times over the two-year period that these teams met together. At the end of the two years, specific questions from the GTPQ were compared with peer rankings provided by the participants and these correlated positively; in other words, the highest-peer ranked team also had the highest GTPQ results on the questions tested. In addition, measures on team process on all teams fell when the teams' parent company was merged with another company, providing support for the notion that the questionnaire results were reflecting the impact of "real world" events. (Bing & Smith, 1995).

Over the past five years, the questionnaire has been further developed and provided to other global teams, many of them working in the pharmaceutical industry, and it has also been provided to employees in the consumer products and information technology fields and to the United Nations Industrial Development Organization (UNIDO).

The research outlined in this paper was conducted within the past year on two sister teams within a pharmaceutical company. Each team is focused on coordinating drug development within a single therapeutic area, or closely related area. The teams consist of representatives from traditional departments within the pharmaceutical company but the primary coordination and focus for drug development within therapeutic areas are the responsibility of the team and the team leader. These traditional departments include marketing, operations, clinical trials, regulatory affairs, and so on.

The stakes for the team, for the team leader, and for the company, are large. Very few compounds survive the rigorous weeding process required for registration and successful marketing of a drug, and generally there are few teams which manage to pull off such a success. Success is, of course, impossible with a compound which does not survive the process. However, in an odd way, certain kinds of failure are shadow successes; for failed compounds must be identified quickly and accurately to insure that the team accomplishes its mission of bringing only safe and effective drugs to market. Conversely, long, drawn-out processes which eventually lead to the withdrawal of a compound cost the company time and money and are double failures.

The teams studied herein completed the questionnaire for the first time some months ago, and the results are compared in this study. The questionnaires were administered electronically. Each team consist of about ten members. The results of this first iteration of the questionnaire has been reported to the team leaders.

Problem Statement

Teams are one of the principal mechanisms by which the operations of organizations are globalized, that is to say, are carried out internationally. It is likely that those teams that have the most effectively levels of human process will assist the organization as a whole to be more productive. However, in order to test this hypothesis, it is necessary to develop cross-team human performance metrics and then to statistically compare these metrics with other measures of productivity. This paper presents an approach to the first half of this challenge.

A global team is defined here as a team which is located in more than one country, or that has participants from more than one country temporarily working in the same location. Pharmaceutical teams of the kind described in this paper typically have both configurations.

Theoretical Framework

Various superb quantitative and qualitative approaches have been undertaken to better understand national cultural differences (Hall, 1976; Hofstede, 1984; Trompenaars, 1993). These studies have been successful in widening awareness of the influence of culture on relationships, performance and effectiveness within organizations.

Group dynamics within a multicultural and global context has also been explored for some time, often in the context of studies on management and human resources (Adler, 1986; Hofstede, 1991; Odenwald 1993; Berger, 1996; Harris & Moran 1996; Black, Morrison, & Gregersen, 1999). In some of these studies, the influence of culture on organizations was studied primarily in terms of the entire organization or upon individuals working within the organization. It is only within the more recent past that the importance of global teams has been recognized as a key factor within international organizations.

Since the Global Team Process Questionnaire™ was created it has been utilized with global and multicultural teams in the pharmaceutical, chemical, consumer product, and information technology industries. There have been over twenty teams studied. Team sizes range from 4 to 32 members.

The Global Team Process Questionnaire™ is constructed of three parts. The first section consists of "base" questions which are used with all clients. These form the statistical core of the questionnaire. These questions have been developed and redeveloped over time. For example, the question: "Are the objectives of your team clear?"was originally written: "Is the agenda of your team clear?" and was revised because the word "agenda" was sometimes taken to refer to the more limited sense of "calendar." Other questions were similarly revised over time. The questions have always been written in English because it has been the business language utilized by all of the teams studied.

The second section of the questionnaire consists of questions requested by different team leaders. These are typically related to process on one specific team, and are therefore unavailable for comparison with teams in other organizations, although they may be utilized for statistical comparisons on the same team over time or on a sister team in the same department or organization which uses the same question set. This is in fact the case reported in this paper.

Of course there are qualitative measures which provide insight into the processes and issues on these teams but which are not suitable for statistical manipulation. Therefore questions which require written responses are utilized to expand the information provided by the Likert-response questions and to serve as a check against the natural limits of closed questions.

How would measurement results from a questionnaire of this type differ on global and multicultural teams from domestic or monocultural teams? There is very little in the literature on this subject. However, landmark studies on national differences on questionnaire surveys by Hofstede, André Laurent, and Trompenaars have shown that certain questions will provoke responses that differ along national lines. For that reason the next step in questionnaire research on this subject should be to compare results based on demographics of global team members. These demographics will be added to the next iterations of the questionnaire mentioned herein. In the meantime, questions on communications and other human processes (goal-setting, trust-building) which have been shown to be especially sensitive to cross-cultural differences will likely indicate cultural differences; however we have no way of knowing whcih component is cultural, and which should be attributed to other causes. Even a question in this survey specifically related to culture, "What impact have cultural differences had on team performance?" is interpretational in nature and responses depend upon the respondents' concept of, for example, the roles culture and personality play in everyday life. Therefore, the data we now have available will not answer the question of the extent to which culture influences human processes on teams; that must follow the addition of demographic variables to the statistical analytic process.

This is an important theoretical question. From a practical point of view, however, team leaders and their managers are not particularly interested in the extent to which, for example, culture influences communications on their teams. They are very interested, however, whether communications as a whole on such teams are good or bad because in general they believe that this will effect the productivity of those teams. And when other forms of analysis implicates cultural factors, then in general managers and team leaders appreciate interventions to raise the awareness and skills of team members to understand and positively utilize these differences.

Methodology

Table 1 lists the questions utilized as "base" questions in the version of the GTPQ used in this study. Respondents use a six-level Likert Scale in assigning values as answers.

Two global teams performing similar work within a pharmaceutical company (developing discovered compounds from clinical trials through regulatory approval to market) were administered the GTPQ with the same questions within the same time period of one month. The teams contained twelve members each in number and were composed of medical doctors and professionals with doctorates in related fields. At the time the questionnaires were administered, both teams had members located in the U.S. and Belgium. The team leaders were also located one in Belgium and the other in the U.S. The questionnaires were administered by email and returned by email. The results were provided to the teams within one month of the initial administration of the questionnaires. These results were provided in two formats:

1. For each question, statistical averages for the team's response and in addition, where available, pharmaceutical industry averages on the same questions. Comments were also collected and anonimized to provide an additional level of meaning to each question.

2. "Spidergrams," sometimes called radargrams, were produced. These showed how each (anonymous) respondent had answered each question, and whether the respondents were in agreement or disagreement on the response to these questions.

One-way ANOVAS were run for the groups. The results were compared in order to determine the significant differences between the two teams on specific questions. The measurement level requirement for a data analysis with ANOVA is an interval scale. Although Likert scales are strictly speaking not interval scales (the difference between the scale items is not exactly the same for all respondents because of their assumptions), scales like the one used in the GTPQ are commonly treated as if they would provide this measurement level. The ANOVA table was chosen to display the significant differences between the two teams here in this report. To check the significance of differences on a higher statistical level a General Linear Model (GLM-Univariate) was computed for each question. The reported results were confirmed. (Krukenberg, 2000).

The results are compared to determine if these can yield recommendations to the team leaders to improve process effectiveness on the teams. Since neither group is a "control" group, and since neither group received an experimental treatment, the purpose of the comparison is not to determine whether a specific treatment did or did not have an effect, but rather to take a first look at whether the questionnaire can discriminate between teams in a useful way. "Useful," in this sense, means that recommendations for improvements in team process can be made from information provided through the use of the questionnaire.

Results and Findings

The following questions showed significant differences between the two teams at the .05 level.

5. How effective is the work of your team?
9. Group communications: My team has excellent / fair / poor communications.
10. Relevance of my team's work to the company's strategic goals?
11. Level of trust on team.
12. Ways of resolving conflicts.
13. Problem resolution on team.
16. Effectiveness of team leadership.
17. Consistency of direction from team members.

All of the significant results were on the positive side for one team (Team A), and negative on the other (Team B). In other words, Team A showed consistently higher scores on team process than Team B for those questions which reliably distinguished the two teams. (For questions at a lower level of significance, the results were more scattered.) What kind of conclusions can be made from this limited information?

First, there is a difference in perceived process effectiveness between these two teams. The members of Team A clearly have a better opinion of their team's work than members of Team B. Interviews with members of both teams conducted during a preconference needs assessment confirmed these findings.

Second, there were broad areas cited for problems on Team B, including leadership, trust, and conflict resolution. Two months after the administration of this questionnaire, the leader of team B was reassigned to another position.

Table 1: One-way ANOVA

		Sum of Squares	df	Mean Square	F	Sig
1. Have your skills and capabilities increased through participation in your team?	Between Groups	.01	1	8.929E-03	7.87E-03	.93
	Within Groups	21.56	19	1.135		
	Total	21.57	20			
2. Do you have time for work on your teams activities?	Between Groups	.01	1	8.929E-03	8.25E-03	.93
	Within Groups	20.56	19	1.082		
	Total	20.57	20			
3. Are the objectives of your team clear ?	Between Groups	.02	1	2.480E-02	1.64E-02	.90
	Within Groups	28.78	19	1.515		
	Total	28.81	20			
4. Are the roles and responsibilities of the team members clear ?	Between Groups	3.11	1	3.111	2.05	.17
	Within Groups	28.89	19	1.520		
	Total	32.00	20			
5. How effective is the work of your team ?	Between Groups	5.00	1	5.001	4.33	.05
	Within Groups	21.95	19	1.155		
	Total	26.95	20			
6. Have you had the opportunity to inform others in your functional area of the work of your team ?	Between Groups	.04	1	3.571E-02	1.84E-02	.89
	Within Groups	36.92	19	1.943		
	Total	36.95	20			
7. Have you had the opportunity to learn of comments on the work of your team from others in your functional area ?	Between Groups	1.02	1	1.016	.32	.58
	Within Groups	60.22	19	3.170		
	Total	61.24	20			
8. How do you rank the importance of the team to your company's future success?	Between Groups	1.59	1	1.587	1.70	.21
	Within Groups	17.72	19	.933		
	Total	19.31	20			
9. Group communications: My team has excellent / fair / poor communications.	Between Groups	22.92	1	22.921	18.36	.00
	Within Groups	23.72	19	1.249		
	Total	46.64	20		7.87E-03	
10. Relevance of my team's work to the company's strategic goals ?	Between Groups	7.68	1	7.683		.02
	Within Groups	23.89	19	1.257		
	Total	31.57	20		8.25E-03	
11. Describe the level of trust on this team (strong - moderate - weak).	Between Groups	9.53	1	9.528		.01
	Within Groups	20.14	19	1.060		
	Total	29.67	20		1.64E-02	
12. Are ways of resolving conflicts within the team clear / somewhat clear / unclear ?	Between Groups	12.44	1	12.444		.01
	Within Groups	30.22	19	1.591		
	Total	42.67	20		2.05	
13. When problems have arisen, have the team members resolved them effectively / somewhat effectively / not effectively ?	Between Groups	10.94	1	10.938		.01
	Within Groups	24.56	19	1.293		
	Total	35.50	20		4.33	
14. What impact have cultural differences had on team performance ?	Between Groups	1.65	1	1.648		.11
	Within Groups	8.47	15	.565		
	Total	10.12	16		1.84E-02	
15. Is your functional area management aligned with the goals of the Global Team ?	Between Groups	1.43	1	1.433		.26
	Within Groups	19.81	19	1.042		
	Total	21.24	20		.32	
18. How effective is the team leadership ?	Between Groups	15.50	1	15.501		.00
	Within Groups	24.95	19	1.313		
	Total	40.45	20		1.70	
17. Are team members pulling in the same direction?	Between Groups	13.35	1	13.349		.00
	Within Groups	10.72	19	.564		
	Total	24.07	20		18.36	
18. Do the teams goals align with the business strategy ?	Between Groups	.55	1	.546		.22
	Within Groups	5.36	16	.335		
	Total	5.90	17		6.11	
19. Is your functional area integrated into the team's overall activities ?	Between Groups	.52	1	.525	.48	.50
	Within Groups	20.78	19	1.094		
	Total	21.31	20			
20. Do you feel that much of your time is spent listening to issues not relevant to your functional area?	Between Groups	3.57	1	3.571	1.22	.28
	Within Groups	55.67	19	2.930		
	Total	59.24	20			

The purpose of this questionnaire is to analyze process effectiveness on teams and to suggest ways in which ineffective or harmful process can be reduced. By identifying specific areas for improvement, targeted change interventions can be made, either through training and development efforts or through other approaches. Conversely, the topics embedded in questions that elicit a positive response are not good candidates for useful interventions to improve team performance, since they are already highly rated.

For example, one of the areas that often comes up in the GTPQ analysis as one for improvement is question #3: "Are the objectives of your team clear?" However, in this case, there was very little difference between the two team responses, and the responses were within the normal range for pharmaceutical teams. (ITAP International has established a database of responses for teams by industry so that industry averages can be computed.)

On the other hand, another question (Question #9 in Table 1) which has in the past correlated with team performance (Bing & Smith, 1995) refers to the quality of group communications. Here, Team B's score is both significantly lower than Team A's response, and it is also significantly lower than the pharmaceutical industry average on this question. Therefore, any work with the team which focuses on communications has the assurance of targeting a significant problem. Other problems on Team B that can be approached to improve process effectiveness on the team are leadership, trust, problem and conflict resolution, and team cohesiveness.

Such a targeted approach can save an organization both time and money, since team leadership and upper management can make decisions on change and interventions based on a more assured understanding of the problems on such teams.

Conclusions and Recommendations

Clearly, this is only the beginning of research to determine both the effectiveness of this tool and what can be accurately described in terms of process effectiveness on global teams. Here are some areas which need to be researched:

1. Demographic research: How do nationality or cultural difference influence the process effectiveness of teams? Do teams with members of many cultures have significantly different results on group process than do teams with fewer cultures? How does homogeneity or heterogeneity of age or gender influence processes on such teams?
2. Measures over time: Do teams tend to improve their functioning in general over time without interventions?
3. What is the relationship between types of interventions to improve team effectiveness and GTPQ-measured changes in effectiveness?
4. Relationship of teams to the larger organization: What conditions in the larger environment foster team process effectiveness? What conditions can decrease such effectiveness? Are global teams in merging companies generally negatively impacted (replicating an earlier study)?
5. Relationships of teams to each other: Can teams with high process effectiveness mentor those with lower effectiveness?

How this research contributes to new knowledge in HRD

Although there has been much research conducted on teams with respect to process effectiveness, there is less research in the area of global or cross-cultural team development, with some notable exceptions. (Berger, 1996; Devereaux & Johansen, 1994, Saphiere, 1996). However, little emphasis has been placed on two aspects of global team development: Long-term, longitudinal studies of individual teams, and cross-team comparisons. This paper focuses on cross-team comparisons; longitudinal study of teams is in progress utilizing these same two teams. There is some evidence already that longitudinal studies will detect both internal team changes and external influences on these teams.

Second, team development is typically handled through generic training courses, in which principles of good team development are provided. The same has been true for global team development. The approach taken through the GTPQ and documented in this paper offers the opportunity for team members, leaders, and managers of these teams to take specific steps both to remediate problems on such teams and potentially to have effective team leaders assist other teams in their business or academic areas with ways to improve process. Such targeted intervention should be both more effective in bringing desired results and in addition should be an investment to improve productivity.

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