

QUESTIONS

1. If Norm chooses to go ahead with the microprocessor conversion on the machinery without passing it by the team, what are the potential conflicts that might arise? What are the advantages of such a move?
2. If Norm decides to put the decision to the appropriate production team, what are the potential problems? What would be the advantages?
3. If the production team chooses to approve and implement this microprocessor conversion project, what form of project organization will this represent?
4. Given the size of this organization and the number of projects they deal with, would it make sense to institute a Project Management Office? Is there another arrangement that might be a good alternative?
5. How much impact might microprocessors have on production costs? Assume that variable overhead represents the same percentage of costs as fixed overhead. Find the net present value if the microprocessors cost \$25,000 and their installation runs another \$5,000. Assume a 10% margin.
6. Compare Norm's recollection of the division's productivity gains between 1985 and 1989 to Exhibit 2. Explain the inconsistency.
7. What would you recommend that Norm do?

The following reading discusses a new phenomenon in the increasingly global competitive environment—geographically dispersed project teams. The competitiveness of global firms is often facilitated by new electronic technologies, and these technologies are also useful to the success of globally dispersed project teams, as described in the article. However, other aspects of such dispersed teams are more problematic, and the article illustrates these, as well as approaches used by project managers for circumventing them. Finally, some of the advice given in the article should be useful as well for project teams that aren't geographically dispersed.

DIRECTED READING

THE VIRTUAL PROJECT: MANAGING TOMORROW'S TEAM TODAY*

J. R. Adams and L. L. Adams

Extraordinary demands are placed on project personnel—demands that require extraordinary commitments in order to accomplish the task at hand. Generating this commitment through the process of team building is a primary responsibility of any project manager. The processes of team building have been studied extensively by both academics and practitioners for decades, but until recently nearly all of these studies were conducted within the bureaucratic setting; that is, the team members shared a common workplace, saw each other frequently, knew each other well, and expected to continue working together for an extended period of time. The team building concepts developed within such an environment naturally reflect these working conditions as either stated or implied assumptions, and the concepts derived from

these studies can be assumed to hold only as long as these assumptions hold.

These concepts still hold for projects intended to support and improve bureaucratic organizations. In the vast majority of cases, however, the working conditions experienced by modern projects differ greatly from those surrounding traditional bureaucratic work. Nevertheless, the basic definitions of team building continue to emphasize the assumption of typical bureaucratic working conditions. For example, one leading textbook in the field (Kast and Rosenzweig's *Organization and Management: A Systems and Contingency Approach*, McGraw-Hill, 1985) states that "actual teamwork involves small groups of three to fifteen people that meet face-to-face to carry out their assignments." Even in PMI's current *PMBOKGuide* (pp. 99–100), one of the five basic "tools and techniques" of team development is called "collocation," which involves "...placing all, or almost all, of the most active project team members in the same physical location to enhance

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their ability to perform as a team.” In both of these publications, the concept of the virtual project is clearly ignored.

In the new, “virtual project” environment, team members seldom share a common workplace, may rarely see each other, may never have worked together before, and may never work together again after the project is complete. For an ever-increasing number of organizations, the world is represented by an environment of rapid technological advancement, particularly in the area of communications; complex organizational structures needed to deal with tough global competition; and dynamic markets that demand short production runs of unique products. Downsizing, outsourcing, and employee empowerment have become facts of life in the climate of many organizations, while job security is rapidly becoming a thing of the past. The survival of many organizations depends on the ability of the organization to rapidly change its structure, culture and products to match the changing demands of the environment.

Let’s explore the conditions faced by the modern project manager in developing an effective and productive project team within a “virtual project.”

The Virtual Project The virtual project, also known as a “distributed team,” is one in which the participants are geographically distributed to an extent that they may seldom, if ever, meet face-to-face as a team. The geographical distances involved do not have to be great; individuals who work in the same industrial complex may be functioning in a virtual project if their schedules do not allow them to meet face-to-face. As distances increase, however, the difficulties of communicating and building teams increase significantly. When team members are spread across several time zones, opportunity for direct communication is severely limited, and the associated costs of both face-to-face and electronic communications increase dramatically. Electronic communication takes on much more importance in virtual projects because electronic systems must assume the burden of making the development of effective project teams possible.

It is beyond the scope of this article to discuss at length the issues that are generating the need for virtual projects. Suffice it to say that the environmental conditions described above are precisely those that require project teams to be dispersed.

Jaelyn Kostner has written extensively on the virtual project. In *Knights of the TeleRound Table* (Warner Books, 1994), she documents the unique issues faced by project managers who must manage such a virtual or distributed project. The issues she defines are shown in the left-hand column of the accompanying sidebar.

Developing trust is the greatest challenge to the remote project manager. It’s difficult for distant team members to get to know each other well; consequently, they tend to communicate poorly because they often are less than comfortable

with each other. Both of these situations destroy the trust that is so essential to creating good teamwork. Developing a group identity across distances is also difficult because people normally associate with events that occur at their local level. Teams tend to have a problem sharing information effectively across distances. One reason for this may be the lack of informal opportunities for discussion at lunches or during coffee breaks. Developing clear structures is an issue for the virtual project manager because distant work groups need more than the traditional vision, mission, and goals that are important for all project groups. Members of virtual teams tend to develop relationships with those who are located with them rather than with those who are at distant sites. The formation of such “cliques” can create competition or antagonism between the project manager and/or team members located elsewhere. Lastly, each distributed team member tends to have information that is somewhat different from that held by others. More important, each team member views information from a different perspective. Such inequities of information frequently increase the opportunity for miscommunication among team members.

If issues such as these are not dealt with, the virtual project experiences management difficulties far in excess of the more “typical” project with higher levels of collocation. Fortunately, the technology that has made virtual projects both possible and necessary also provides opportunities for dealing progressively with these problems.

Implementing Virtual Project Teams The sidebar includes suggestions created by virtual project managers for using the advantages of project management team building to overcome virtual team difficulties. Generally, these suggestions encourage project managers to make creative use of modern communication technologies to bring the team together and encourage the participation and sense of ownership that generates commitment to the project and team objectives.

Since it’s seldom possible in the virtual project to meet face-to-face, experienced project managers recommend using a variety of electronic communications. Trust seems to develop as the individual team member learns more about the project manager, other team members, and the project. It’s therefore essential that team members be encouraged to communicate with each other frequently, as well as with the project manager and the team as a whole. Virtual project managers use all forms of electronic communication—cellular phones, pagers, faxes, e-mail, Web pages, and computer-to-computer transmissions across local area and wide area networks—to distribute everything from key reports to jokes, logos, and mottoes. These communications are specifically intended to increase the common experiences shared by the team members and thus increase the bonds among them. Regularly scheduled video and telephone conference calls increase team members’ exposure to project information, as well as to each other.

Virtual Project Management Suggestions

Issues	Problems	Suggestions
Developing Trust	Irregular, inconsistent communication; lower level of comfort and familiarity among team members; “us vs. them” attitude.	Provide and use a variety of communication alternatives. Communicate electronically except when signatures are required. Make project management software available to all team members.
Developing Group Identity	Fewer shared experiences; lack of cohesion; little understanding of other members’ roles and responsibilities.	Conduct regular teleconference meetings when the need warrants. Manage the agenda to include a variety of participants and ensure everyone is involved in the discussion. Use logos, mottoes, and creative humor. Stay in contact when meetings are not required. Note: Do not exclude anyone from group discussions.
Sharing Information	Difficulty sharing adequate levels of information across distances; lack of formal opportunities to discuss work-related issues; lack of a common system to transmit information across distances.	Use technology to develop additional information-sharing opportunities: cellular phones, pagers, faxes, telephones, e-mail, Internet, and computer-to-computer. Distribute all key reports to all team members. Put information at one central access point, e.g., a project Web page, a LAN account.
Developing Clear Structures	Uncertain roles and responsibilities of team members; clashing cultures create different expectations, few clearly defined processes for decision making.	Use standard formats for meetings. Define goals, objectives, problems, and concerns at the kickoff meeting, and reiterate them frequently. Have participants describe and define potential problems and concerns, and evaluate risks as a group.
Formation of “Cliques” or Informal Subgroups	Cliques tend to create antagonism and competition between the team and the project manager, between team members, or among the cliques themselves.	The project manager can’t prevent them from forming, but can manage these subgroups. Identify and keep track of them. Create subcommittees for dealing with problems, drawing members from the different cliques. Look for opportunities to mix participants from the different cliques, and initiate or create these opportunities when necessary.
Understanding Information	Each team member has different information (inconsistent); each member has varying levels of information (incomplete); each member has a different perspective of the information. All = inequities of information.	Ask members to explain their viewpoints. Ask members to describe the actions they plan to take, and solicit possible impacts to other involved parties. Use different levels of information for different participants, as appropriate.

When cliques form as subgroups of the project team, these subgroups are managed, not ignored. Subcommittees are created to resolve project problems, specifically drawing members from different cliques together so that they learn more about each other. Team members are frequently asked to explain their viewpoints and to discuss their plans with the team at large to improve the common understanding of information about the project, its progress, and its prospects.

Four specific types of electronic communication, which didn't even exist just a few years ago, are being used extensively by managers of virtual projects to help overcome the lack of formal and informal personal contact among the team members.

The Internet. As technology creates conditions that demand faster reactions, team building over extensive distances, and ever-more-extensive communications, that same technology provides new approaches with which to deal with these issues. The Internet provides a means for communicating quickly and inexpensively throughout the world. It is essential for all participants in virtual project teams to have access to the Internet and e-mail. The virtual project manager relies on e-mail to exchange project data with the dispersed team, especially when team members or clients are internationally located. E-mail is a particularly good tool for exchanging the detailed information necessary to update the status of project activities. This task is difficult to accomplish verbally via telephone or videoconference because of the detail involved and the difference in time zones. Transmitting such data by facsimile can be expensive due to the volume of data involved, the frequency of needed updates, and the requirement for consistent information flows.

With e-mail as the primary mode of communication, information flows easier and faster, and the difference in time zones is less likely to be a critical failure factor. The ease of communication encourages the team to communicate more often and in more detail. Team members get to know each other more personally, and therefore develop more cohesive working relationships. One word of caution, however; many companies, in a misguided attempt to economize, are limiting the use of e-mail to "official" business, and eliminating personal comments, jokes, and other "non-essential" communications. It is precisely these "informal" transmissions that can at least partially make up for the lack of personal contact. Informal e-mail communications can replace some face-to-face contact and help generate the close working relationships, commitments, and friendships that are traditionally considered to be characteristic of successful project teams.

The Pager. A byproduct of today's business environment is that technical specialists (team members) frequently are working on multiple projects, and are considered highly valuable resources. The time of these "highly valuable

resources" may be quite limited. Though regularly scheduled project meetings are critical throughout the project life cycle, these valuable resources may often be required elsewhere, and the project manager may need to help conserve their time.

One way to make the best use of a team member's time is to use a paging system. Each team member carries a pager, and the pager numbers are published with the team roster. When agenda topics don't directly relate to a particular team member or function, that person can be released from attendance, freeing up time that can then be used more productively. If an issue surfaces that requires that person's attention, he or she can be "paged" into the teleconference call. This allows for quick responses to problems and issues, and limits the number of "open action items" on meeting minutes. This procedure must be established at the project's kickoff meeting, when the project manager discusses team roles, responsibilities, and expectations. A culture must be developed within the project where each team member is expected to respond quickly to paging, especially when a 911 code, meaning an emergency needing immediate response, is attached to the pager number.

Teleconferencing. Teleconferencing is not as new as some of the techniques noted above, but its use has expanded dramatically in recent years along with the increase of virtual projects. Everyone thinks they understand teleconferencing, but few are able to use it effectively. The lack of visual communication means that only the spoken word is available for the transfer of information, so individual speakers must identify themselves when contributing to the discussion. The medium was originally designed to provide communications between two people. When more people are added to the conference, managing the conversation flow rapidly becomes a complex issue. The goal is to assure that everyone has an opportunity to contribute and that all issues are dealt with in a reasonable period of time.

Using telephony technology for communicating among several people requires careful management and control of the communication process. The project manager cannot manage the results of the communications, but must manage the process of getting to those results. The conference needs to be well-organized and structured. A detailed agenda is essential to a productive conference call. The project manager should schedule the call in advance so that an agenda can be published and distributed at least two to three days prior to the meeting. The agenda should always include specific items of information: purpose of the teleconference, day-date-time of the call, call-in number, expected duration of the call, chair of the meeting (the project manager), a detailed listing of items to be discussed, and *the key participants for each item noted*. The project manager can then facilitate discussion among these key players, solicit input from other team members,

and maintain a solution-oriented attitude. This structure allows all essential persons to share in the conversation and present their viewpoints, while keeping the team focused on the critical issues at hand. The structure also prevents side conversations and keeps the team from straying from the intended topic until a solution has been achieved.

The checklist in the accompanying sidebar is useful for developing a successful teleconference.

Teleconferencing Tips

- Include an overall time limit for scheduling purposes (for yourself and for your team). Anything over 1.5 hours tends to become unproductive because of the high level of concentration required to communicate in an audio-only format.
- Organize the meeting in two sequential categories. In Category 1 are those activities that on the project plan should be completed by the time the meeting occurs. In Category 2 are those activities that need to be completed prior to the next meeting.
- Have one major agenda topic called “deliverables,” where the deliverables that are due or past-due are listed, along with who is responsible for completing those items. The items can be statused and assistance can be solicited from the team to expedite completion.
- Always have an “open discussion” section at the end of the agenda. Do a round-table roll call of each person to see if anyone has comments or concerns that need to be discussed or documented in the minutes. Putting the open discussion section last also keeps the focus on issues that are critical to the project, rather than on issues that may be critical to an individual. If time runs out, at least the necessities have been covered.
- Invite team members to call in or e-mail additional agenda topics, and then add these topics to the agenda for discussion. If people can’t submit topics prior to agenda distribution, introduce new items only during the open discussion section so that the flow of the meeting is not disrupted.
- Talk about any major changes to the schedule, such as slippages or early completions that affect the schedule or multiple departments, at the beginning of the conference. These changes could drastically affect the items on the agenda, the flow of the conference call, or even the flow of work for your whole project.

Videoconferencing. With a geographically dispersed team, the cost of travel, including the cost of team members’ time during travel, is too high to justify having the team involved in periodic face-to-face status meetings. However, current issues may be too critical to rely on e-mail, teleconferencing, and one-on-one voice contact. This is a time when videoconferencing is the most appropriate form of communication.

A capability not present in other forms of electronic communication, videoconferencing allows participants to feel more involved with each other because they can communicate on many different levels. Body language and facial expressions can be observed and interpreted, in many cases transferring more meaning than the actual words. Full team participation in developing the initial work breakdown structure and the project plan, both of which occur in the kickoff meeting, is crucial to developing the commitment to the virtual project team. It is particularly appropriate to have the kickoff meeting in a site that is videoconference-accessible, if possible, so that if some people can’t attend then they can still be involved.

Despite all its good points, there is a downside to videoconferencing. Some of the common problems and barriers are logistical. For example, all participants must be located at pre-arranged receiving/transmitting sites; and, although the cost has been decreasing slowly, videoconferencing is still quite expensive, especially when numerous sites and satellite-based communications are involved, so these sites may not be readily accessible.

Also, even though technology is gradually moving forward and the signal transmission speed is increasing, videoconferencing uses a wide bandwidth, which translates into a significant delay in viewing the movements and expressions of participants. This delay as well as an individual’s tendency to be uncomfortable in front of a camera frequently combine to make the whole process somewhat stiff and stilted. This seems to be a particular problem in systems where the participants can see themselves and worry about how they look to the others.

Since the purpose of this extraordinary use of electronic communications is to increase the stability of the virtual project, it is particularly important that all team members be able to work with the detailed project plan. All team members should have access to whatever software is being used to plan and control project activities. They should also have easy access to the project files. The liberal distribution of project documentation provides enhanced communication as well as an exposure to the project cultural structure.

A basic knowledge of team building is essential to the effective management of any project. With the advent of the virtual project, however, the methods and techniques necessary for implementing the project team building process have changed. Face-to-face communications are obviously desirable, but they may no longer be possible because of

time or cost constraints. Fortunately, the same technologies that have made the virtual project a possibility also provide the methods for developing effective teams of dispersed project participants.

Virtual project managers must be both knowledgeable and creative in using the modern communication technologies available to them for the purpose of enhancing the common experiences of their project team members, and hence the commitment that can be generated for the project's objectives and goals. Perhaps more important, however, is to recognize that the ability to effectively use all of the current electronic communication techniques available to the project manager is rapidly becoming a mandatory skill for anyone likely to be involved in virtual projects.

This topic deserves some extensive research in order to help the virtual project manager develop more effective methods and techniques for dealing with the task of

building effective project teams from dispersed project participants.

Questions

1. Which virtual project problems are unique to the phenomenon of being dispersed and which are common project problems in any project?
 2. What new electronic technologies have contributed to the problems, and solutions, of virtual project teams?
 3. Of the solutions to virtual team problems, which would apply to regular project teams also?
 4. Which problems described in the article are the most serious for virtual projects? Which might be fatal?
 5. How might the difficulties of matrix organization change when implementing virtual projects?
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