

Using E-Teams

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Abstract

Teams have become a mainstay in the workforce and teamwork is essential within modern industry. As more and more companies require employees to function in teams, engineering schools have begun to use teams as part of the training for careers in industry. The formation of teams can easily utilize the talents from different functions, locations, and organizations. Now the functioning of industry in a global environment has led to formation of virtual teams. As more schools incorporate distance education into their setting, virtual teams or e-teams are becoming a part of engineering education. The use of the e-team technique in a distance education engineering course is not without problems. Since there is no timeworn body of experience to draw from, team members and the professor have to be open to experimentation, often discovering in hindsight what makes an e-team successful.

I. Introduction

For the last two decades teams have become an integral part of the workforce and teamwork is essential within modern industry. One of the eight guiding principles for management of the modern enterprise that Betz gives is teaming.¹ Workers today must be able to work together in interdisciplinary teams to carry out and coordinate the operations of the enterprise. As more and more companies require employees to function in teams, engineering schools have begun to use teams as part of the training for careers in industry. The formation of teams can easily utilize the talents from different functions, locations, and organizations. Now the functioning of industry in a global environment has led to formation of virtual teams. These virtual teams, unlike traditional teams, must accomplish their objectives by working across distance and time and by using technology to facilitate collaboration.

In the last few years higher education has undergone many changes, but a significant change has been in the increased use of technology in the classroom. Now faculty on many campuses deliver instruction with the use of technology rather than the traditional lecture approach. Education at a distance is one of the ways technology is used and there are a wide variety of distance education approaches. This continuum ranges from the paper-based correspondence courses to the more technical approaches as two-way video/two way audio real time courses.⁵ As an increasing number of schools incorporate the many approaches to distance education into their setting, the virtual team of industry has become the e-team of engineering education. One of the main reasons teamwork has been able to become virtual is because technology has advanced to make cyberteaming possible.³

There are two primary categories of variables that make virtual teams more complex. These are:

the crossing of boundaries related to time, distance, and organization, and the communication and collaboration using technology. For the reasons stated above, virtual teams are far more dependent upon having a clear purpose than face to face teams. Purpose defines why a particular group works together. As important as positive relationships and high trust are in all teams, they are even more important in virtual teams. The lack of daily face to face time, which normally offers opportunities to quickly clear things up, can heighten misunderstandings.⁴ Research indicates that even virtual teams must have an initial face to face meeting.^{2,3,4} This paper explores the use of virtual teams or e-teams in distance education without any face to face meetings.

II. Theoretical Construction

Virtual teams in industry or e-teams in distance education work across space, time, and organizational boundaries with links strengthened by webs of communication technologies. What is new is the array of interactive technologies at their disposal. The structure and process may be different for industry and education.

Lipnack gives these basic elements of the virtual team process:⁴

1. Communication

- Give the team a name.
- Develop list of key players, and contact information.
- Develop a clear statement of purpose. (Even when the team receives its purpose from the professor, a team must interpret and express it in its own terms.)
- Set up delivery dates.
- Select a leader for each phase of the project

2. Planning

- Agree on tasks.
- Clarify responsibility within the group and identify leaders for the tasks.
- Create a plan for the kind of technology that will be using within and without the group.

3. Managing/Action Phase

- Review your process and create a model for the control of the various tasks.
- Review technological tools, and organizational system.

Added to these elements the complexity of e-teams is increased by the number of different choices for team interaction. Traditional teams typically interact face to face, at least some of the time. E-team interactions are almost always mediated by electronic communication and collaboration technology. E-team interaction in the classroom falls into topical areas which are organized around four technology-enhanced environments. These environments represent the combination of place dependence and place independence with time dependence and time independence. The selection of technologies and choice of meeting tools varies according to the team members' access to technology and time schedule.

		dependent	independent
		Place	
dependent	Time	face to face	chat room telephone
independent		shared files	e-mail web CT fax

Figure 1
Distance Education E-Team Matrix

Time-Dependent and Place-Dependent

This environment is the most prevalent type for typical team meetings. Even with e-teams it is recommended that the initial meetings be face to face, if possible.

Time-Dependent and Place Independent

The barrier to most adult and/or working students continues to be the time dependent aspect of this environment. There is a degree of flexibility with this mode, but many e-teams still find it difficult to use the chat room or the telephone at a pre-assigned team time. In businesses audio-conferencing and video-conferencing may also be used.

Time-Independent and Place-Dependent

The most common example of this environment are shared files maintained by the instructor. This environment offers students control of their time schedule while limiting access to data bases. This form has not been fully utilized by this professor.

Time-Independent and Place-Independent

This environment provides the greatest amount of flexibility and convenience for the e-teams and is the most used. The environment includes electronic mail, bulletin board private team forums (WebCT, in this case), and fax (which is rarely used). This system empowers students by removing barriers and fostering interactivity. A requirement of the course is access to a computer and the World Wide Web.

III. Case Study

All the preparations needed to plan for traditional teams are applicable to forming e-teams. Virtual teaming calls for more activities not related to the conventional team. Hagan³ states that a virtual team's first activity should be agreeing on how it will work together. However, e-teams in the distance classroom need other activities first.

In the course used for this study students not only are in the live classroom, but are scattered throughout the state of Florida and take the course by video. The average age of the class is 34 and all the distance students work full time. Almost a third of the live students work full time, and thus even in the classroom some students do not know each other. Initially students were told to get to know their fellow teammates electronically. No specific guidelines were given. The approach was not successful since some e-teams learned a great deal about each other, and in other e-teams only names were learned. This past semester guidelines were given for initial e-team communications. These included:

- Leader of first project
- Method of communication to use. (For example the web Forum, email)
- Time/days of communication
- What computer skill level team members are
- Who writes first report, second report
- Name of team
- Personal information: expected graduation, whether working full or part time, travel plans for work, family, where located, major
- Name of team

All of the results of the team communications were summarized by each team and reported to the class and instructor via the bulletin board. After using these guidelines the teams functioned in a more timely fashion and had more consideration and respect for their fellow team members.

The objectives for each of the e-teams are initially stated by the instructor and then restated by each team. After the students had worked on their e-teams for a month, the instructor asked the class for their views on using the e-team technique. The comments spanned the entire continuum, although students that were already using virtual teams in their employment consistently supported e-teaming.

The following comments are taken from the on-line discussion page of the course.

What I find good about virtual teams is that it is preparing me to communicate worldwide in the most economical and fast way.

I think this application of a team format is unrealistic and not of great use.

I believe the virtual team technique works well for projects. The problem some people have is computer access time. Therefore, I believe the exercises should be geared toward use of the WebCT forum or E-mail and not chat rooms.

It seems relatively easy because we are in constant communication with each other and are sharing information.

I think this virtual communication is virtually impossible. There is absolutely no substitute for the real thing. (This student lived 90 miles away.)

I work at the Cape (Canaveral) and it is one big Virtual Team these days. With the procurement of instrumentation systems that affects both Launch Ranges here and in California our teams stretch shore to shore.

Adding to the frustration of students learning how to cope with e-teams separated by time and distance is the occasional technology failure. This often proves to the recalcitrant student that e-teams will not function effectively ever.

IV. Conclusion

Even though e-teaming in the engineering classroom has extensive benefits in distance education, some students continue to resist it because they are unfamiliar with the necessary technology. Most of these problems will disappear as all students become familiar with every aspect of the technology and as the technology becomes more fail-safe.

The use of the e-team technique in a distance education engineering course is not without problems. Tolerance for the unexpected is an important feature of working at a distance. Since there is no timeworn body of experience to draw from, e-team members and the professor have to be open to experimentation, often discovering what makes an e-team successful in hindsight.

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