Cooperative Learning and Cycle Time Reduction

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Executive Summary

If cycle times are to be continuously improved upon, organizations must look beyond the process-oriented areas in the organization to other more non-traditional areas. In addition, to uncover opportunities that have gone unnoticed, different perspectives on cycle time reduction and a willingness to try different approaches need to be adopted. In this article, cooperative learning is presented here both as a non-traditional tool to uncover cycle time reduction opportunities as well as a non-traditional methodology that organizations can employ to achieve improvements in cycle times.

Cooperative learning exists when a group of people work together in an effort to maximize their own and each other’s learning while at the same time achieving the group’s work objectives. The argument to consider cooperative learning is a compelling one; the vast majority of research suggests that cooperative learning environments are more efficient and effective and produce products and services in a more timely manner.

The article follows with a real-world case study of cooperative learning in action. A software development and support organization is presented to show how cooperative learning can be incorporated into an organization to reduce cycle times and improve organizational performance.

The article concludes with lessons learned by the organization as well as recommendations for both management practitioners and researchers to consider.

Introduction

A great deal of interest has recently been generated about “learning organizations.” Senge (1990) suggests that organizations must adopt a learning mentality if they are to remain competitive in the future. Similarly, Meyer (1993) as well as Wetherbe (1995) have suggested that learning is a key ingredient in attaining a fast-cycle environment. In addition, Tracy and Wiersema (1995) suggest that many market-leading companies have improved their performance through the adoption of “shared learning” approaches. Clearly, if organizations are to continue experiencing cycle time improvements, the proactive structuring of learning in organizations will become imperative.
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Cooperative learning, defined here as groups of people that work together in an effort to maximize their own and each other’s learning while at the same time achieving the group’s work objectives, provides a good example of a shared learning approach that can be proactively structured into an organization’s pre-existing work processes. If learning is indeed critical to the future success of organizations, it becomes important for organizational leaders to determine if learning is occurring within their organizations. More importantly, practitioners and researchers alike need to determine the role learning plays in reducing organizational cycle times, and how to design working environments within which learning will occur. In this case, cooperative learning theory provides solutions to these types of challenges.

This article is organized as follows: First, the motivation for considering cooperative learning for cycle time reduction will be presented. Second, cooperative learning theory will be presented and described in detail. Third, the relationship between cycle time reduction and cooperative learning theory will be explored using a case study in which the experiences of a team within a software development and support company are shared and discussed. Finally, implications and prescriptions for both practitioners and researchers will be explored.

Why Consider Cooperative Learning?

Why should managers take the time to consider learning at all? Shouldn’t the prudent management team place a priority on addressing issues that are more “mission critical?” This section explores these questions and shows how cooperative learning addresses the challenges associated with the human resource and organizational performance.

The Human Resource

Regardless of the nature of the organizational endeavor today, one element remains essential to the endeavor’s ultimate success—people. In carrying out projects and initiatives in business today, people are not only a necessary ingredient, they are also one of the most costly. Given this situation, it is important that organizations provide a work environment for their people that maximizes their work performance, job satisfaction, and motivation to continue to perform at optimal levels. Organizations often focus solely on performance—at the expense of the psychological dimensions of work such as job satisfaction and motivation. This strategy is short-sighted since job
performance and job satisfaction are inextricably linked (Hackman and Oldham, 1980). Many companies have experienced this phenomena first-hand in the form of short-lived performance gains and long-term problems associated with employee burnout or turnover.

Given the critical nature of the human resource in organizations and our present focus on cooperative learning, a relevant question is, “How does cooperative learning address the psychological outcomes of people at work?” Research has shown that cooperative learning environments have a positive impact on several psychological dimensions. The outcomes which result when a group is placed in a cooperative learning environment include increased levels of job satisfaction and work motivation (Janz, 1995), as well as self-esteem and overall psychological health (Johnson and Johnson, 1989). In other words, cooperative learning may provide a means to experience performance gains while avoiding work-related stress and turnover.

**Organizational Performance**

Enhanced organizational performance is probably the most easily-identified prerequisite for cycle time initiatives today. Given the need for and importance of performance to cycle time objectives, it is useful to highlight the relationship between cooperative learning and performance.

Wetherbe (1995) points out that the primary focus of cycle time reduction should not be on time reduction alone. Rather, he suggests that reductions should be made to organizational processes, “in a way that reduces cost and/or increases customer service”. Encapsulated within this focus are three dimensions which relate directly to enhanced performance: *timeliness* (that is, doing something faster), *efficiency* (that is, doing something with less—in this case reduced cost), and *effectiveness* (that is, doing something better—in this case providing better customer service).

Research suggests that a statistically significant positive relationship exists between the level of cooperative learning employed in groups and these three dimensions (Janz, 1995). Specifically, when customers of groups were asked about the groups’ performances, those groups exhibiting high levels of cooperative learning were rated more positively in terms of efficiency, effectiveness, and timeliness. These findings are not unique. Johnson and Johnson (1989), in surveying almost 400 research studies, found that in general, significant positive relationships exist between cooperative learning and productivity, achievement, and the overall quality of problem solving.

**Learning to Learn**

In addition to addressing human resource and organizational performance issues, cooperative learning provides for people the added benefit of *learning how to learn*. This kind of adaptive learning is often referred to as double-loop learning (Argyris, 1993).

Consider the following example:

Organizations often consider a college degree a minimum requirement for
newly-hired employees. Typically, it is not the new employees’ content knowledge gained through college classes that organizations desire (employees can always learn content knowledge once they are hired). Rather, given the pace of change in technology and work processes today, organizations want employees that not only can learn new information but can adapt to or learn new ways of learning as changes in the marketplace accelerate. The time spent learning while getting a college education gives individuals ample opportunity to experiment with different learning styles (e.g., “cramming” vs. paced learning). This opportunity increases the probability that individuals will become double-loop learners. Cooperative learning provides similar opportunities. As cooperative learning groups share their experiences of teaching and learning, they are able to see different styles of learning and discuss the effectiveness of these various styles. In essence, cooperative learning forces double-loop learning to occur.

The motivation to develop a cooperative learning atmosphere in organizations interested in reducing cycle times is a compelling one. The following section explores the key characteristics of cooperative learning in more detail. Cooperative Learning Theory

As previously mentioned, cooperative learning describes groups of people that work together in an effort to maximize their own and each other’s learning while carrying out a task (Johnson, Johnson, and Smith, 1991). Cooperative learning is not new. Because of its emphasis on learning, it represents one of the most well-researched theories in the fields of education and educational psychology (Johnson and Johnson, 1989; Johnson, et al. 1991).

In order to determine if cooperative learning exists in your organization, or if an organization is interested in developing such a learning atmosphere, several specific characteristics must exist. The following section presents these characteristics in more detail.

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1. Positive Interdependence
2. Social Skills
3. Face-to-Face Promotive Interaction
4. Group Process
5. Individual Accountability

Figure 1: Elements of Cooperative Learning
The Elements of Cooperative Learning
The five characteristics or elements that are essential for cooperative learning to exist are listed in Figure 1.

Positive interdependence. Positive interdependence refers to members of a group that are linked so that each member feels that he or she can not be successful in their job unless all other members of the group are successful in their jobs (the three musketeers’ “all for one, and one for all” typifies this kind of interdependence). In practice, setting goals or objectives based on overall team performance for each team member is one way to achieve positive interdependence.

Social skills. In order for a group to cooperate effectively, group members need be skilled in communicating effectively. Skills in listening, negotiating, managing conflict, providing and receiving feedback, problem determination, and decision making all fall under the category of social skills.

Face-to-face promotive interaction. In striving to achieve a shared goal, team members will bring different levels of knowledge, skill, and ability to bear on the task. Face-to-face promotive interaction is the degree to which members of the group identify the individual strengths and weaknesses in the group and seek to assist others through explaining or teaching to develop the skills necessary for the group to achieve its goal. For example, by requiring certain levels of cross-training, or structuring groups such that members serve as back-up for other members, promotive interaction can be enhanced.

Group process. Group process refers to the group periodically assessing: (1) those things it has done effectively, (2) those things it has done ineffectively, and (3) the measures the group might take to remedy the identified weaknesses. In essence, group process activities help cooperative learning groups improve past performance by learning from their learning experiences, i.e., double-loop learning.

Individual accountability. Within the group context, individual accountability exists to the extent that each group member feels personally responsible for the group’s performance. Assessing an individual’s performance and sharing it with the individual as well as publicly with the individual’s group is a mechanism which allows higher levels of accountability to be achieved. This allows the group to better identify weaknesses (thus pointing out where promotive interaction is necessary) and helps to prevent “social loafing.” In addition, individual accountability is often a by-product of structuring goals in a positively interdependent way (as described earlier). In these situations, group members tend to feel individually accountable to the group as well as for the group’s work product.

In summary, if the work environment is designed to include these five essential
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characteristics, cooperative learning theory asserts that individuals will feel more satisfied, and group and individual performance will be enhanced (Deutsch, 1973; Johnson and Johnson, 1989). Personal research supports these assertions. Teams exhibiting cooperative learning characteristics were found to have higher levels of motivation, personal perceptions of improved team performance, as well as having the more positive reports on team efficiency, effectiveness, and timeliness from external stakeholders (Janz, 1995). In the following section, a case study of how a cooperative learning environment was established in a software company is presented and discussed.

Cycle Time Reduction through Cooperative Learning: A Case Study

The preceding discussion of the potential benefits of cooperative learning suggests that organizations should seek to integrate cooperative learning into their organizational design. A key question remains: How do organizations translate cooperative learning efforts to organizational cycle time reductions? This section addresses this by reporting how one company developed a cooperative learning environment and at the same time realized significant cycle time-related benefits. Throughout the case, a running commentary is provided in order to highlight key points related to cooperative learning.

Background

The study focused on a team of workers within an organization that provides administration software products for the health care industry. These software products are typically installed in physician's offices and clinics, small to medium-sized tertiary hospitals, and large metropolitan medical centers and research hospitals. The diverse product line is differentiated primarily on the level of administrative function that the systems provide and the size of the health care facility; typically, products with more function are destined for larger medical organizations. The team with responsibility for the design, development, marketing, and support of one of the company’s oldest and largest products was the focus of this study.

The team consists primarily of knowledge workers performing knowledge work. That is, the workers’ raw material is the knowledge they bring to the job and the product is the information they create, e.g., software applications. As suggested in the introduction, cycle time reduction opportunities exist in non-traditional areas; knowledge work environments are an example of this.
The overall organizational design of the company centers around self-directed, team-based, and product-oriented work groups. That is, rather than having functional “stove-pipe” organizations (e.g., marketing, finance, product development), highly-autonomous cross-functional product teams are responsible for all aspects of a specific product.

The transition to cross-functional teams was motivated by the realization that the functional gaps that exist in “stove-pipe” organizations result in poor hand-offs between functional groups, objectives that are not shared between functions, and ultimately sub-optimized resource utilization and performance. Today, objectives are shared and span functional boundaries, and everyone on a product team is considered a product “owner.”

The formation of cross-functional teams with shared team objectives helps to engender the feeling of positive interdependence since any one worker cannot possibly know all job functions. In the course of working together, opportunities to teach each other (i.e., promotive interaction) abound. By giving workers increased responsibility through self-direction and by letting them know they are product “owners,” workers will begin to feel the individual accountability necessary for cooperative learning to exist.

The Human Resource Perspective

From a personnel perspective, the company has two parallel thrusts deriving from the transformation to a self-directed team-oriented environment. First, with the increases in autonomy, the company is attempting to enrich the employees’ job functions, providing a more positive work experience. This goes hand-in-hand with the second thrust: improving employee (and in turn) organizational performance. To this end, the company’s management is striving to develop what they referred to as “hybrid employees.” Employees of this type have a broad base of skills and also have a more comprehensive view of organizational processes and their role in them.

Throughout the course of working on cross-functional teams, team members that display strengths in areas like leadership, interpersonal skills, or technical skills become informal leaders and are looked upon to provide skills transfer to their teammates whenever possible. Furthermore, in an effort to encourage employees to broaden their skill base, the company instated profit-sharing and gain-sharing and is currently in the process of developing a skill-based compensation system.

Identifying skill leaders and encouraging skills transfer not only supports promotive interaction, they also provide a cost-effective means to provide training and allows the company to realize the benefits of having “back-up” capabilities in crucial skill areas. Further encouragement could be provided in the form of teaching incentives for skill leaders. Profit and gain-sharing again encourage positive interdependence and individual accountability. Skills-based compensation systems clearly indicate the
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priority that demonstrated learning has with the company.
The added responsibility and cross-functional work environment has allowed the team members to develop a better understanding of the overall organization. For example, in a company-wide meeting, the CEO presented financial projections for a particular business unit which were provided to him by the vice president from that unit. One of the team members from the unit, a member whose role did not include financial forecasting, stood up and began a dialogue with the CEO about the projections to show that the projections were much too conservative, a result of middle-management “sandbagging.”

This conversation over cash flows and forecasted revenue streams exemplifies the breadth of skills that can be learned, as well as the comprehensive systemic view that workers can develop. This is a good example of what Senge (1990) terms “systems thinking.”

Employee job satisfaction improved as a result of the move to self-directed cross-functional teams. Surveys conducted during the case study showed that on a five-point scale (with five being most satisfied), job satisfaction jumped from an average score of 3.08 to an average score of 3.54. In addition to the team-based environment and added responsibility, several team members remarked how good they felt about the progress the team has made. One team member went on to say that for several weeks before the case study research, the team felt like their progress had stagnated. By taking the time to talk about their progress and what they had learned during the process, the team realized that although progress would occasionally plateau, it would eventually resume, and overall it was fairly impressive.

This is precisely what is meant by group process. In addition to reflecting on what is learned by the team, areas for improvement can be identified and put in perspective. Furthermore, it is important to acknowledge those things that the team has done well.

Organizational Performance

From an overall performance perspective, there have been several significant results. One of the areas with the most dramatic improvements occurred on the team’s ability to develop new versions of their software products—referred to as the release-to-release cycle time. Prior to the transformation to a team-based organization, new releases of the team’s products had never shipped on schedule. Since the transformation, new releases of their products have never been late. Team members explained that they have become more cognizant of product schedules and they are committed to working together to adhere to them. Reduced cycle times here
translate to reduced time, cost, and increased service to the customer. According to Wetherbe (1995), cycle time reduction is concerned with reducing processing time, “in ways which reduce cost and/or increase customer service”. The product release performance described above reflects cycle time improvements in all of these areas.

Another significant improvement occurred in the area of product quality. There are three statistics that reflect the improvement in quality. First, “base problem requests” or “BPRs”, which are opened by customers that have found errors in the product, have been reduced in number by 86 percent from year to year. Second, the closure rate of usability problems identified by customers (referred to as “system support requests” or “SSRs”) have improved 73 percent from year to year. The third area concerns new product testing. The company historically had a difficult time finding existing customers that were willing to “beta test” new releases of products since historically the beta versions of products were of questionable quality. Since the transformation to a team-based organization, customers are demanding to be put on the beta test program. Again, quality improvements translate to cost reductions (less support time required) and more satisfied customers. Finally, customer satisfaction with the company improved since the move to teams. Two statistics reflect this improvement. First, customer satisfaction surveys show that satisfaction with the team’s primary product, their service, and their support averaged 4.2 on a 5-point scale (where 5 = very satisfied) in the month preceding the transformation to teams. In the month following the transformation, customer satisfaction averaged 4.8.

Second, the company’s annual user conference was voted the “best ever” by its customers and the number of customers attending the conference for the team’s primary product doubled.

**Lessons Learned**

As a result of the transformation efforts to date, the management and team members of the organization have learned many lessons. Some of the key lessons are outlined below.

- **Never underestimate the importance of training.** One of the most important lessons learned by the company is that the training need can easily be underestimated to the detriment of team performance. Training in social skills is not only important for cooperative learning, but also for day-to-day teamwork.

- **Team members...no two are alike.** Teams and members of the teams must be viewed as having varying degrees of organizational and interpersonal maturity, and thus must be managed differently.

- **Autonomy improves one’s vision.** By letting teams operate more autonomously with less hand-holding, inefficiencies in organizational processes and skills needs are more evident and become noticeable.
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sooner. With the addition of a cross-functional approach, it becomes easier to gain an appreciation for a system-wide view of the organization.

✓ Pursue conflict, for efficiency's sake. Team members are learning that team work often results in conflict. Rather than shying away from it, they are learning to pursue conflict aggressively. This strategy results in the expending of less personal resources and time. As team members mentioned, “If a conflict comes up, just handle it.”

✓ More heads are better than one. The team has become aware of the impact that skill mix has on getting things accomplished. Where skill gaps exist on a team, decisions are made more by committee and initially may tend to take longer to resolve. These kinds of contingencies are now being planned for and team members typically search out members with cross-functional skills that complement as opposed to replicate existing group skills. Overall, even though team decisions may take more time to make or certain problems longer to diagnose, a better job of problem definition is being done and more potential solutions are being generated. This ultimately results in better decisions, increased learning, and problems that get solved completely the first time they are addressed.

Conclusions and Recommendations

This article poses the argument that in order to sustain cycle time improvements over time, all areas of the organizational system should be considered. Cooperative learning theory was presented not only as a way to approach the cycle time challenge from a different perspective, but also as a tool to be used to realize cycle time improvements. The case study was presented to illustrate how organizations can foster a cooperative learning environment while striving to improve organizational performance.

For practitioners charged with improving organizational performance and/or reducing cycle times, I suggest they strive to create an environment within which cooperative learning can exist. Some possible steps to consider include:

1. Do the team thing. Teams have become the fundamental building block for future organizational performance. If you have not yet moved to a team-based organizational structure, now is the time.

2. Promote positive interdependence. Set team-level performance objectives such that individuals can only succeed if the team succeeds. Create cross-functional teams where possible. In addition, focusing all
goals and performance toward those goals known by the group (in a supportive team environment) helps to encourage individual accountability and promotive interaction.

3. **Support training in soft skills.** Skills in effective communicating, listening, negotiating, and feedback need to be learned through training and follow-on practice. Cooperative learning groups provide an effective means to practice and cross-train in these skill areas.

4. **Encourage skills transfer.** Identify resident “experts” on teams and provide incentives for them to teach others through informal workshops, mentoring, or on-the-job guidance. Stressing the importance of having back-up capabilities not only helps to encourage a teaching/learning environment, it also provides assurance that critical skills will be available.

5. **Provide time for reflection.** Learning organizations will only exist and performance will only improve if a priority is placed on having groups take time for reflecting on their performance. During these group processing sessions, it is important to celebrate areas of strength as well as focusing on areas for improvement.

These guidelines will help foster a supportive, cooperative learning environment which will assist organizations in achieving the positive business results which result when motivated, systems-thinking individuals come together to create high-performing, learning organizations.

For researchers, I recommend that further research on cooperative learning theory is needed within the context of business organizations in order to strengthen the theory by broadening its generalizability. Furthermore, I believe cooperative learning theory provides a robust framework for follow-on research related to learning organizations.

**References**


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