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Building the Problem Solving Machine:
Team Building Guidelines for Project Managers

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Abstract

Projects in every field depend on technical mastery and the thorough application of the tools and techniques of project management, but at the point these projects require more than one person they also depend on team work. This paper will provide a vision of a high performance team and provide guidelines every project leader can follow to improve their team's performance.

Introduction

The discipline of project management offers a well developed tool set for initiating, planning, monitoring, and controlling a project. Every PMI Congress is filled with fascinating descriptions of techniques to assess risk, determine requirements, and more accurately estimate project costs or schedules. Throughout all these tools and techniques there is a common unspoken assumption: That the people on the project team will work together in harmony to build plans, manage risks, perform tasks, and commit themselves to achieving the clearly stated goals of the project. But that is not always the case.

How big a difference does teamwork make? Listen to the opening lines from one of the classic books written on IT management, *Peopleware: Productive Projects and Teams,* by Tom DeMarco and Timothy Lister. (DeMarco, 1999)

Chapter One, entitled "Somewhere today, a project is failing" says it all:

> *Since the days when computers first came into common use, there must have been tens of thousands of accounts receivable programs written. There are probably a dozen or more accounts receivable projects underway as you read these words. And somewhere today, one of them is failing.*
>
> *Imagine that! A project requiring no real technical innovation is going down the tubes. Accounts receivable is a wheel that's been reinvented so often that many veteran developers could stumble through such projects with their eyes closed. Yet these efforts sometimes still manage to fail.*

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First released in 1987 and updated again in 1999, DeMarco and Lister invented the term 'peopleware' to analyze an oft-ignored dimension of Information Technology management: the human beings who develop and maintain our IT infrastructure. Routinely referred to as "our most important asset" and at other times merely "resources," we humans who make up project teams in every industry are more often than not the primary factor determining project success or failure.

"All projects are a series of problems to be solved."

Use your own experience to test this hypothesis. Think of the projects that stumbled groggily along; the interminable meetings that mercilessly beat the same immobile horse; the paralysis associated with consensus; designs where every ounce of innovation was sacrificed to the lowest common denominator among the stakeholders. The accounts receivable nightmare of Lister and DeMarco lives on in every industry where seemingly routine projects slowly decompose into a bog of inactivity and conflict. Over and over again it becomes clear that our biggest obstacle often isn't our knowledge or expertise – it is the way in which we work together.

High Performing Teams

A high performing project team – a team that accomplishes much and enjoys the process – has specific attributes every project manager can work to instill. In this paper we will focus on the capabilities that enable a team to quickly, confidently, and consistently produce high quality solutions to complex problems. I refer to such a team as a "Problem Solving Machine" and will reveal the three components you can develop to unleash the productivity of your own PSM.

Why focus on problem solving? Aren't we talking about high performance project teams? How does a Problem Solving Machine relate to project management? All projects are essentially a series of problems to be solved. At least, that is the difficult part of projects – solving the problems – and that is the part that can slow our progress to an imperceptible crawl. What problems? Start with the business need for the project. That's usually a problem or an opportunity that we need to understand before we can even speculate on a solution. Then comes the problem of determining requirements, the problem of selecting a solution, the problems associated with detailed design, etc. One long series of problems. To make matters worse, most of these are problems that require group solutions. The more abstract the problem and the larger the group of people that influence the decision, the less likely any progress will be made. That is why we need the Problem Solving Machine (PSM). The PSM is the kind of team that can take on problem after problem, working through each one in a steady, predictable manner, producing realistic decisions in a timely manner and, most amazingly of all, emerging from each problem stronger, more energized, and excited to take on the next challenge.

Too good to be true, right? Except that you've probably seen the PSM at work. Most of us have been part of these teams and we'd love to repeat the experience. If you are a project manager, creating a PSM is the greatest gift you can give your team members and yourself. In this paper, we'll understand the three primary characteristics of the PSM. We'll finish with specific steps you can take to build one yourself.

Characteristic 1: A Positive Environment

Project work can be hard work. Hey – the very definition of 'project' says that we'll produce a unique outcome. That means we'll probably be plowing some new ground somewhere along the way. These unique problems can be difficult, and the process of solving them can be draining. It's no wonder workers on long projects continue to report a high degree of "burn-out." That's why a positive team environment is so important, because it is the source of energy for the team.

There are at least four components that are necessary to a positive environment:

- **Trust among the team members.** Trust is the foundation of productive team relationships. Team work is interdependent work. When you can trust that I will keep my commitments and my words can be taken at face value then you can begin to rely on me.

- **Open communication characterized by effective listening.** Effective communication is necessary to discuss and analyze problems and solutions. More than any other communication skill, our ability to listen well – to truly understand the meaning and intent of another person – will enable our group to work together to understand and solve problems. An oft-cited listening skill is to be able to paraphrase and summarize what another person has said to prove we understand their point. Equally important is the ability to suspend our own judgments and abandon our own argument while we try to understand the ideas of our team mates. As our team exhibits this skill it increases our ability to explore complex ideas and, consequently, strengthens our ability to disagree on a subject without threatening our on-going relationships.

- **Value individuals for their individuality.** Each team member brings a unique set of skill, style and experience – make use of it. This is easy to say, but in practice many of us would rather surround ourselves with team members whose skills or style of problem-solving resemble our own. However, mature teams recognize that diversity strengthens the team in the way that bio-diversity strengthens a forest. These teams seek out members whose participation will broaden the skills and perspectives of the group, and accept the reality that some will see the forest, some the trees, and others the leaves. Valuing the individual also means actively drawing out all team members, and asking each of them to play to his or her strengths.

- **Acknowledge the need to make mistakes.** A PSM knows that the journey will contain many twists and turns. Tough problems require tenacity and creativity. If we are afraid of making mistakes we are likely to miss all opportunities as well. A healthy PSM does not avoid admitting a mistake – just avoids repeating it.

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One other component that exists on many PSM's is a sense of humor. These teams can poke fun at themselves and often laugh together. This is exactly the type of attitude that coined the term Problem Solving Machine – a playful, upbeat, confident conversation about why a team was working so well.

Here is the benefit of a positive environment: To innovate, to be creative, we must take risks. If I am afraid to suggest a novel approach or to take a contrary stand then the team loses the one unique advantage humans will always have over computers and machines: our imagination. Our positive team environment makes it safe to challenge ideas and each other.

Characteristic 2: A Conscious Collaborative Process

When a group of people tries to understand and solve a complex problem, one of the challenges they face is that individually we each have our own method and speed of working through the facts and testing ideas. Our detail-oriented team member may want to check some facts while the big-picture thinker is already choosing a solution. At the same time, a conflict can emerge over what, exactly, is the problem we are trying to solve? A PSM avoids this frustration by having known methods of working together through these decisions. There are essentially three categories within the collaborative process for which the PSM has explicit practices:

- **Decisions.** Teams make decisions in several ways, including by voting, through consensus, in a subgroup or autocratically. Each approach has its advantages and drawbacks. For example, consensus decisions offer the greatest participation to the group and therefore tend to be both thorough and well supported. But consensus decision making is time consuming and laborious and not always warranted. The PSM understands that there are different methods of making a decision and will shift among them, according to the importance, complexity, and speed required to make the decision.

- **Conflict.** Disagreements arise among the closest of friends, so it is also natural to find them on a project team that is faced with many decisions. Choosing a vendor, an accounting package, a risk mitigation strategy, etc., can all generate conflict between team members as each strives for what they believe is the best solution. This kind of conflict, while natural, is an obvious threat to the relationships of the team members. Immature teams often respond to conflict with unproductive behaviors: one member may focus on his or her solution more and more forcefully, trying to cow the other members, while another may have a pattern of acquiescing at the first sign of disagreement to avoid any damage to relationships. The PSM, because it knows conflict is inherent – even healthy – also knows how to acknowledge conflict and respect relationships while working through problems. They can't afford to sacrifice relationships or results.

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- **Problem solving.** It is relatively easy to state the steps of problem solving, but it is a rare team that follows them. Though there have been many books and seminars devoted to this important process, they all have in common these general steps:

  1. Clearly understand the problem.

  2. Clearly describe the criteria for the solution, i.e., "What will the situation look like when the problem is solved?"

  3. Gather many possible solutions.

  4. Compare the benefits, costs, and limitations of the possible solutions.

  5. Choose the best one given the cost, schedule and environmental constraints.

  The reason so many books and seminars have been devoted to these steps is that they each require skill. A PSM has an understood problem solving method – so well understood that team members use the same terms to describe it, even going so far as to have it documented with specific steps and outcomes. The structure of the process gives focus to each activity and clarity to the group about where they are in the decision. It also prevents them from making the simple but commonplace errors humans seem so prone to, such as jumping to solutions and making decisions based on unacknowledged assumptions.

What is the specific benefit of a conscious collaborative process? Awareness of how we do anything enables us to analyze our effectiveness and improve; the more complex the activity, the greater the value of this consciousness. This is true whether we are managing an automobile assembly line or hitting a baseball. It is this awareness that enables the PSM to avoid bogging down during their meetings or chasing their tail from week to week. In addition, it provides a framework for analyzing the effectiveness of the team's behaviors, giving them language to express frustration or dissatisfaction with some aspect of their process. When a team has developed strong collaboration skills they move through both simple and complex problems with more speed and with superior results.

Characteristic 3: Goal Clarity

Why is the project worthwhile? What are we really trying to accomplish? The answer to these simple, fundamental questions will influence nearly every decision the team makes and can even influence how the team makes decisions. Again, this is pretty obvious: effective teams have clear goals. The difference between most teams and a PSM is that the PSM has *over-learned* the goal. Many teams take the time to clarify their goal and write it down, usually in a charter or statement of work. But they also *forget* the goal soon afterward. Think of it as crossing a desert and using your compass only once, to start the journey, then carefully packing the compass away. You are likely to lose direction, perhaps heading north for a time then slowly circling until you are heading

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south. The PSM, usually thanks to the efforts of the project manager, uses the compass constantly. As meetings begin, they remind themselves of the project's purpose. When a problem is identified, part of the problem statement describes how the problem relates to the project goal. Whether it is risk management, allocating people to the team, technical decisions or communicating with customers, the team is conscious of the overall project goal.

The benefit of goal clarity is that the Problem Solving Machine keeps their energy focused on the primary goal. Every action is a step toward that goal. The team is energized through their unity of purpose.

Build Your Own Problem Solving Machine

When you belong to a PSM you have a sense of unity, effectiveness, and accomplishment. For knowledge workers whose job it is to create or implement new technology and or business processes, the power of the PSM can change your experience of work 180 degrees – from frustration to achievement. For the project manager, the PSM can feel like a gift from the heavens. But it is neither a gift nor a happy accident. Now that you know the characteristics of a PSM, you can build one for yourself by following these guidelines.

1. Focus on team building activities early in the project. Project teams, like their projects, have a beginning. The often cited team cycle of form, storm, norm, perform (Tuckman, 1965) describes the evolution of a team from a disparate group of individuals to a cohesive, functioning unit. The project leader can assist the team to move through these phases. Build time into the project plan specifically for team building activities such as those described below. Be aware of the characteristics you are trying to foster and look for opportunities to build or model these characteristics during every team meeting.

2. Use a kick-off meeting to model the characteristics of your ideal team. Find a way to begin introducing team members to each other, helping them understand the skills and experience of the group. Whether you make the introductions based on your own pre-meeting investigations or you allow them to introduce themselves, realize that this is an important component of your first meeting and give it due time. The kick-off is also the time to begin goal immersion. Give them the background to thoroughly understand the purpose of the project. Finally, show them the right way to run a meeting. Have an agenda, use it, and follow other good meeting management tactics. At your first meeting people will be on their best behavior, so with proper planning this meeting will set a positive precedent, a momentum you can leverage in future meetings.

3. Set "Ground Rules" early in the project. These set expectations for behaviors that build the positive environment. It may go without saying that team members should show up to meetings on time, prepared, and ready to cooperate with the group. But when we specifically list those expectations it is more likely to happen. What other behaviors would the team like? Let them tell you and each other. Devote twenty minutes of one of your early meetings to creating this list, then bring it to the next few meetings and post it in a visible place until you no longer need to reference it during a meeting.

4. Focus on communication skills. We've already discussed the importance of listening skills. Learn them yourself and find a way to teach the team. Personality and behavior style inventories are another way many teams develop their communication skills. In my company's team leadership course, we use a simple, easy to administer tool that helps people recognize various styles of problem solving and working in groups. As a result of these insights, team members

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have greater appreciation for other's strengths and develop tolerance and patience for alternate styles. There are many such tools. Invest in their use to show you take these skills seriously.

5. Make your collaborative process conscious. As the team goes to work you'll see what type of problem solving skills and habits each person brings. If necessary, use training to build their awareness of the options for decision making and conflict resolution. Like any skills, these improve through use but only if the team is aware of what they are doing. After initial training in these skills, use a "plus/delta" exercise to wrap up meetings by reviewing the effective behaviors – the plus – and listing what should be done differently in the future – the deltas (changes).

These guidelines aren't meant to over-simplify the challenge of building a PSM. It takes consistent effort as the team's leader to build the key characteristics. And while your team is developing, they also need to be making progress against the project schedule. The trick is to work these activities into routine project meetings. If you'll invest at least ten minutes at each project meeting for the team to address some aspect of its effectiveness, you'll make steady progress on the road to becoming a PSM.

Summary

Project teams solve problems. The toughest projects are a series of problems, with each phase in the lifecycle consisting of more decisions to make and problems to solve. Project teams who face this dynamic rely as much on their group problem solving skills as their technical expertise. This paper describes the three characteristics of the highest performing teams. These are the teams that function together like a fine tuned machine to smoothly and efficiently work through complex group decisions. The three characteristics of these Problem Solving Machines are a positive environment, a conscious collaborative process and goal clarity.

The primary ingredient for turning your team into a Problem Solving Machine is your leadership and focus on developing the key PSM characteristics. Both the team members and project leader must commit their energy and their attitude to achieving this goal. It requires extra attention to communication skills and team dynamics, but the payoff in productivity is worth the effort.

Sources:
1. Tom DeMarco and Tim Lister, *Peopleware: Productive Projects and Teams*, 2nd ed. (New York: Dorset House, 1999.

2. Tuckman, B. W.. (1965). "Developmental sequence in small groups." Group and Organizational Studies, 63(1), 384-399.

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