Principles of Collaboration

Second Edition

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Preface

This book was created through a collaborative process over the span of one year, between two completely separate universities. This is an updated version that took on the form of a challenging semester project. The former version was created in the fall semester of 2009 between the University of Nebraska at Omaha and DePaul University in Chicago. This current version was a collaborative effort between the two universities in the spring semester of 2010. The former version was extensively reviewed and expanded upon, which led to this 2nd Edition. The intention of this book is to make the initial strides toward understanding and explaining the new concept of Principles of Collaboration Science. The University of Nebraska at Omaha team was guided by Professor Robert Briggs. The DePaul University team in Chicago was guided by Professor Daniel Mittleman. This book is a living document and will continue to be revised and elaborated upon in the future.

Purpose of this Book

This book is all about collaboration. In fact, it explains collaboration in aspects that may never have been put in words before. Potential readers will benefit from this book because they will learn how to develop collaboration skills, understand nuances of workspace design, and understand types of people they work with best. Additionally they will develop more creative problem solving skills that can be used at school, in the workplace, and in everyday life. The book will help enrich the reader's mind if they are someone who is intrigued by working with others to develop useful ideas.

We were assigned to write this book by our professors in the collaboration community. At first we had a vague understanding of collaboration science and what it entailed. Now we have gained a working knowledge of collaboration and its applications. We are pleased to share what we have learned over this course with others that might find it as helpful as we did.

Target Audience

Principles of Collaboration is aimed at a wide variety of students and instructors in all fields of study. This book can be used for both undergraduate and graduate level courses.

Key Features

- Easy to understand Graphics
- Simple, real-world examples
- Chapter Summaries
- Glossary of Key Terms
- Thought Exercises for each chapter
- Exam Questions for each chapter

These key features help aid in learning of the concepts of collaboration science.

Organization of the Book

Principles of Collaboration, 2nd Edition, is organized as an introductory collaboration textbook. Much of the book is based upon the Seven Layer Model of Collaboration and other key concepts of collaboration.

The book is organized as follows:

- Chapter 1: An Introduction to Collaboration Science
- Chapter 2: The Seven Layer Model of Collaboration
- Chapter 3: Useful Theories of Collaboration
- Chapter 4: Collaboration Technology
- Chapter 5: Facilitation
- Chapter 6: Creative Problem Solving
- Chapter 7: Personal Collaboration Skills
- Chapter 8: Negotiation
- Chapter 9: Collaboration Engineering
- Chapter 10: Thinklets
- Chapter 11: Designing Collaboration Workspaces
- Chapter 12: Collaboration and Knowledge Management
- Chapter 13: Convergence and Decision Making Techniques
- Chapter 14: Virtual Project Management Tools and Techniques
- Chapter 15: Adoption and Diffusion of Groupware
- Chapter 16: Ideation & Brainstorming Techniques

The end of chapter thought exercises and exam questions are designed to assist the student in understanding the concepts covered in each chapter. These sections are included to give the student a better opportunity to get a firm grasp on collaboration.

Acknowledgements

This book has taken two semesters to write thus far. It has taken many hours of research and group communication to get this book to a point that it can be published. We are very proud of our work and have learned a great deal along the way. We sincerely hope you enjoy reading what we have to offer. We would like to issue a special thank you to our professors Robert Briggs and Daniel Mittleman for their amazing ability to get people involved and for showing us how simple communication can go a long way.

Past Authors and Contributors

This textbook began as a production of the University of Nebraska in Omaha's College of Business. Considering the lack of current collaboration textbooks available today, the Principles of Collaboration class in 2009 collaborated together to form the chapters in the book. By the use of the Seven Layer Model as illustrated in this book, their contributions started a project that used collaboration techniques to teach others how to work in groups, as well as connected various parts of the country to finish it. The goal was to combine group efforts to provide a textbook for other students around the world to learn about collaboration techniques. By using the joint efforts of technology and teamwork, this goal, currently in process, is being attained.. Students had to use various patterns of collaboration including generating, reducing, clarifying, organizing, evaluating, and building commitment with people to ensure that the activities were useful in reaching the collective goal. The tools and scripts were very useful in the authors' efforts in writing this book. Several international audiences are awaiting the completion of the 2nd Edition which could not have been done without the outstanding work, dedication, and collaboration of these authors of the 1st Edition. The authors and editors of the first edition are as follows:

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2nd Edition

- Students from DePaul University and the University of Nebraska at Omaha are proud to present Principles of Collaboration, 2nd Edition, the first textbook exclusively focused on collaboration. Through in-depth chapters, exercises, and review questions, the text imparts the knowledge necessary to become effective and efficient collaborators.
- The text spans the full range of the Seven Layer Model of Collaboration with chapters on Collaboration Theory, Engineering, Technology, and Workspaces; as well as Creative Problem Solving, Negotiation, Knowledge Management, Cloud Computing, and Enterprise Collaboration.
- Principles of Collaboration, 2nd Edition offers comprehensive techniques for students and educators with the desire to achieve group goals through career-relevant application of time-tested collaborative principles.

Authors and Editors, Principles of Collaboration, 2nd Edition, University of Nebraska at Omaha

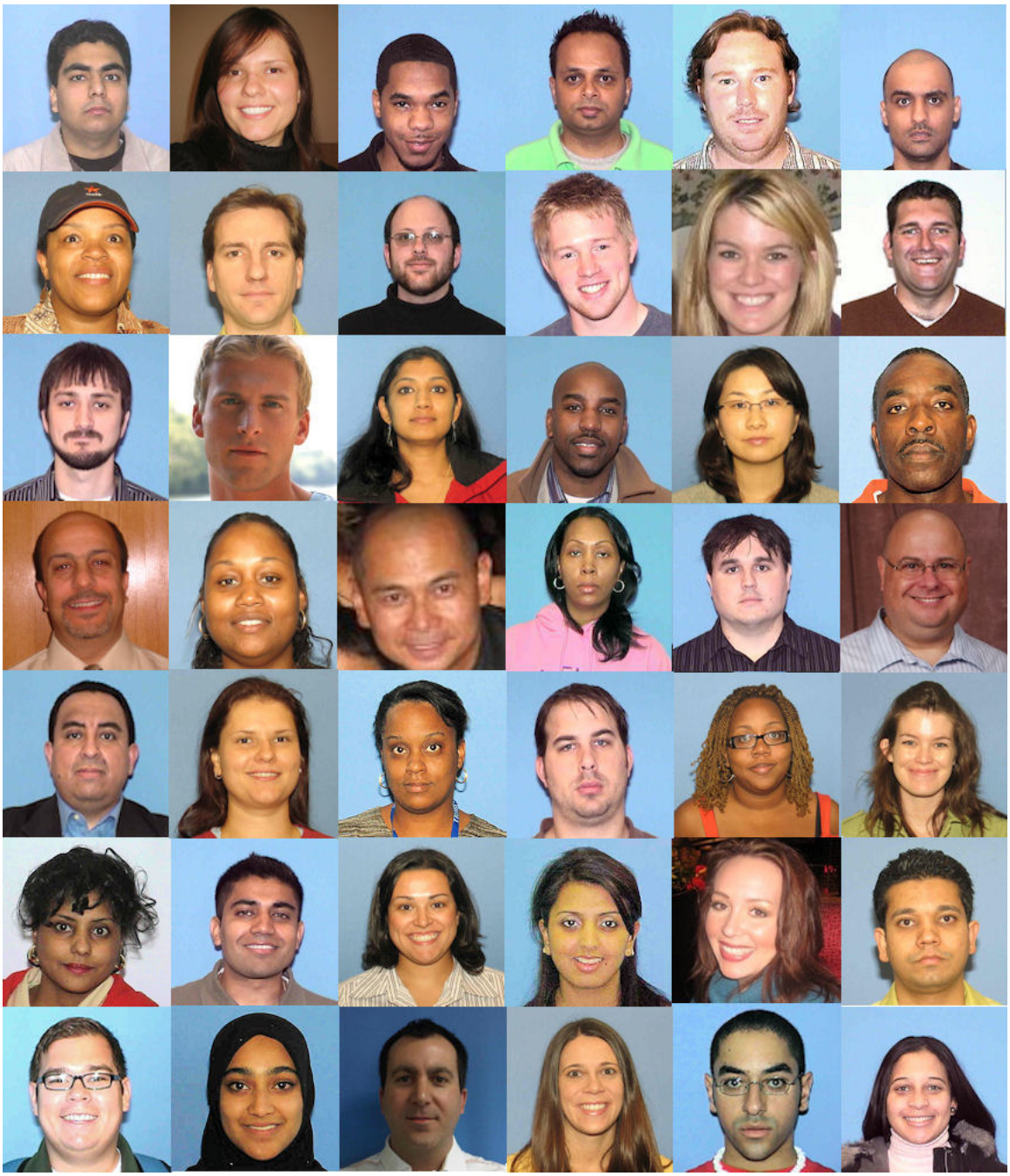

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Table of Contents

Chapter 1

An Introduction to Collaboration Science

What is Collaboration Science?

Establishing and clarifying common goals as well as determining differences of opinions should be accomplished during the beginning stages of collaboration so that both sides can benefit from the result by collaborating together properly.

Every day people and businesses use collaboration techniques to find better ways of understanding solutions, find better meanings, create new products, as well as improving current processes. We continuously learn how to use these skills throughout our lives which begins in the classroom, at home, with friends, and at work. As collaboration becomes more important in our world, it is imperative that students obtain enhanced techniques and experiences by collaborating with others. In this book we define collaboration as a joint effort toward a common goal. Throughout this book we will discover how collaboration works and what it takes to become successful collaborators with others.

How Do We Use It?

There are many reasons why collaboration is so important. The main reason is because we use it to learn from one another. Collaborative learning is commonly taught through schools as a means of educating others through a larger educational agenda. This means that students are pushed to learn and work with one another. It requires students to learn valuable skills such as involvement, cooperation, teamwork, and civic responsibility.

Involvement calls for students to actively be more involved in their learning experience. It requires social and intellectual communication, which are the fundamentals of building stronger learning experiences. For example, if a student did not want to work with other students and would rather work alone, then that student would be restricted from learning and understanding new ways of doing things they might not have thought of themselves. Students with closer connections to other students, faculty,

and others can build a better learning foundation not only for themselves, but for everyone else. Involvement is a critical piece of the puzzle when collaborating, in finding out different perspectives, and learning abstract approaches to new ways of doing things.

Cooperation and teamwork are also valuable skills to possess. In collaborative efforts, **cooperation and teamwork** means listening to one another's differences in an attempt to absorb both sides of a conflict while finding an even faced solution so that all voices are heard and taken into consideration. For teamwork and cooperation to be successful, there must also be care for what others have to say in a group or team. "The skills of teamwork, community building, and leadership are legitimate and valuable classroom goals, not just extracurricular ones (Smith 1992*)."* For a team to be successful it is important to cooperate. Cooperation shares the duty of listening and paying attention while also contributing information to help achieve the goal at hand.

Not only is civic responsibility important for the future of our communities, but for our nation as well. Though collaborative learning enables students to obtain an active voice in expressing their thoughts and ideas, it also encourages civic responsibility. This could shape the way student's thoughts and ideas occur.

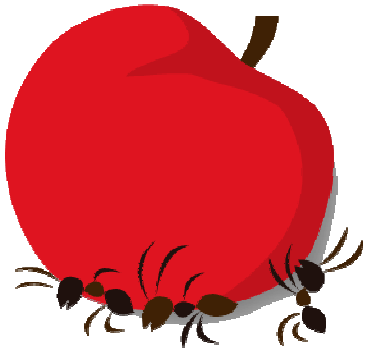
Why is it Important to Collaborate?

To fully understand why collaboration is important it is necessary to consider what would happen if we did not use collaboration. What if people could not effectively communicate with one other? More thoughts and ideas can be generated as a group leading to better solutions to problems. When you collaborate you are able to generate ideas that may not have become apparent otherwise. You are able to get feedback from the group to ensure ideas meet the group's needs. Collaboration helps you to build bonds with other people and sort through problems more efficiently. Collaboration enables networking with others, which may potentially help collaborators in the future. Collaboration can lead to work being accomplished more effectively and efficiently which has proved to be valuable for many companies. The primary goal of collaboration is to create value that stakeholders cannot

Collaboration is especially important among students. For example, in your collaboration class you have a test coming up. Instead of studying alone, you may choose to study in groups of three. You then have the opportunity for the other two students to share their knowledge of concepts that you did not fully understand and you will do the same for them. You are working together to obtain a good grade on the test. Accomplish this by sharing knowledge that you alone did not have.

accomplish as individuals. People collaborate when problems or goals are so complex that no one person has the expertise, insight, or resources to accomplish the goals.

Who Benefits From Collaborating?



The answer to this question is everyone and almost everything. If we think about collaboration as a whole, meaning, "the act of working together to reach a desired outcome", then we can talk about anything, from things found in nature to a group of business professionals in a board of directors meeting. Let us take for example a colony of ants. Each member of the colony has a specific task to perform in order for the colony as a whole to survive, therefore, each and every ant benefits from the combined effort of the colony. The same thing happens with business professionals. In a board of directors meeting, depending on the agenda, they are all working toward a common goal that they have a vested interest in.

When people collaborate they can benefit from the knowledge and experience of each individual in the group. Take for instance a group of ten people from various departments of a retail company. These departments consist of marketing, shipping, IT, sales, finance, human resources, customer service, purchasing, accounting, and maintenance. Now let us put them in a room and tell them that they have to work together to figure out a better way to steam line their departments so the busy holiday season goes smoothly. This task in itself will be hard for them to undertake because they each know what needs to be done in their own departments, but have no idea what goes on in the other departments during the holiday rush. Now get them brainstorming about how their job could possibly effect the other departments. Now the tables have turned and they need to think outside of their box or comfort zone. By sitting down and talking with each other about what goes on in the other departments they are able to work more efficiently and coordinate their efforts to make things not only easier for individually, but easier for their co-workers as well.

Why is This Book so Different or Special?

Markus Zusak once stated: "Sometimes you read a book so special that you want to carry it around with you for months after you've finished, just to stay near it." (Goodreads 2009) We hope this book will leave a similar effect on you. In this book there will be many interesting topics and discussions about how

an individual can better one's self by becoming better at communicating with others.

Textbooks are usually written by authors or professors, for students to read and learn. This textbook was created by students, for students, to understand what we have learned about working with others through a combined research effort using a collaborative approach. Using information and data from various reliable sources and our own points of view, we collaborated to complete this piece. This book encompasses many students' views and interpretations you may find yourself relating to. This book is special and unique to the students who worked on it and we hope the students who read it. We all share different perspectives on how to deal with everyday problems and situations, therefore figuring out how to deal with these problems is one of the goals of this book. We hope that what is discussed in this book will not shy students away from thinking differently, but rather encourage working together with others to resolve problems more effectively. This book is helpful to understanding the idea of collaboration and we hope you enjoy reading it.

Why Should We Care?

We should care about Collaboration because the world depends on the ability of people to work well with each other. Companies are hiring individuals who have a proven track record of being able to work well with others across all kinds of channels, cultures, and environments. Collaboration is a useful and powerful tool. By learning how to collaborate efficiently and effectively, you will be more equipped for the future. Another reason that we should care about collaboration is groups who work together can achieve their goals with less strain and effort. The group's conjoined effort helps to produce more ideas that spark creativity and action. Do you have goals that you wish to achieve, but they seem unattainable because you can't come up with a solution? Collaboration could be the answer to your problem. Collaboration can give you the ability to go beyond conventional ideas to create new and useful ones to help you succeed in achieving your ultimate goals or desires.

Brief Overview of Contents

The Seven-Layer Model of Collaboration

The Seven Layer Model of Collaboration can be looked at as the food pyramid of Collaboration Science. The Seven-Layers consist of; goals, deliverables, activities, patterns of collaboration, techniques, tools, and scripts. In this chapter each of these layers of the model will be broken down and explained.

Figure 1.1: The Seven Layer Model of Collaboration

Why	**1. Goals**
	2. Products (Deliverables)
What	**3. Activities**
How	**4. Patterns of Collaboration**
(Logical Design)	**5. Techniques (ThinkLets)**
How	**6. Tools**
(Physical Design)	**7. Scripts**

The seven layer model of collaboration addresses the seven areas of concern that groups must address when working together

The first layer of the Seven-Layer Model is determining why the group is collaborating. This is when the group determines what the goal is and what product or deliverable needs to be created. The next section in the seven layer model is selecting what activities to use. Activities are what need to be done to produce the deliverables that will accomplish the goal. Now the model will address how the activities will be navigated. Patterns of collaboration are observable regularities of behavior and outcome that emerge over time in teamwork (Vreede 2006). The six patterns of collaboration are: generate, reduce, clarify, organize, evaluate, and build commitment. Techniques make up the fifth layer. Techniques address how the group will move through the patterns of collaboration. Tools and scripts are at the bottom of the seven layer model. Tools are needed to utilize the techniques. Scripts are everything team members say and do with tools to move the group toward its goal.

Each layer of the model is reliant on the preceding layers. For example, if you change the techniques layer then you will have to make adjustments to the tools and scripts layers as well. You may need different tools and in turn different scripts to accommodate for the new technique being utilized. The seven layer model of collaboration addresses the seven areas of concern that groups must address when working together as their guide to success.

Useful Theories of Collaboration

This chapter will attempt to describe some useful theories of collaboration. We will also discuss why they matter according to relations with group productivity, satisfaction of group members, and consensus. This material will help you clearly understand the purposes and advantages of collaborating.

Useful Theories for Collaboration

1. Group Productivity
2. Satisfaction
3. Consensus

Collaboration Technology

In this book, we will discuss collaboration technology and its three types. The basic idea of collaboration technology is to make collaboration easier, which provides some obvious potential benefits. We will delve into the three types of collaboration technology: Jointly Authored Pages, Streaming Tools and Information Access Tools. First, the Jointly Authorized Pages allow multiple users to work on a single document using instant messaging. Its tools help users develop fitting solutions, as well as direct teams to an ultimate result with better productivity. Second, the Streaming Tools provide a complete solution for streaming video over IP networks. Using them, users have the capability to multicast, record, store and rebroadcast video and audio over the Internet or Corporate Intranets. Last, but not least, the Information Access Tools provide ways to store, share, classify, and find data and information objects. All of them are useful tools provided to help you collaborate better, and achieve a concise and ultimate result.

Facilitation

A big part of being able to collaborate effectively has to do with the facilitation of the group. A **facilitator** leads a group on the right path toward a common goal of the organization. Organizations today can depend greatly upon group productivity in order to accomplish group goals and assignments. Organizations that have facilitators on staff tend to be more productive and have better outcomes. Throughout this section we will learn how the facilitator will enable groups to work efficiently, effectively, and cooperatively toward a common goal.

Creative Problem Solving

How creative are you? Do you think you have what it takes to be a good problem solver? Can you think outside the box? When working in a team it is a good idea to try to be more flexible and try to put on multiple sets of shoes. In this chapter you will find an outline and a number of tools that you can use to become a good problem solver. This chapter helps you identify the four components of the creative-problem-solving model, increase creativity through information searches, master some techniques to generate more creative ideas, evaluate the generated ideas to make an appropriate selection, and then successfully complete an implementation plan. So let's get creative!

Personal Communication Skills

This chapter introduces six key personal communication skills; helps give a better understanding of what each skill is and why each skill is essential for successful collaboration to exist. The six personal collaboration skills to be covered in this section include; Listening, Respect, Communication, Conflict solving skills, Leading, and Sharing. Each skill will be identified and we will look further in detail at what constitutes each.

Negotiation

Negotiation is far more than maximizing short term benefits. This chapter will describe techniques and ways of thinking to take a more global approach to negotiation. Collaboration engineering places emphasis on the cultivation and maintenance of relationships to maximize returns over the long term. This chapter will show the pitfalls of emotionally charged negotiations and give advice to minimize competitive arousal. There are different types of negotiations and the attributes of each will be described to assist identification. Once the negotiation is identified specific techniques are tailored to achieve the greatest degree of goal interdependence. Concepts borrowed from game theory will provide a framework to understand the natural equilibrium of various negotiation outcomes.

Collaboration Engineering

Collaboration Engineering is an approach to designing and deploying recurring collaborative work practices for high-value recurring tasks and transferring them to practitioners to execute themselves without the ongoing intervention of a professional facilitator (Briggs 2009). This chapter will describe the concept of collaboration engineering, differentiate it from facilitation, define its participants, and outline a generic problem solving process. Particular attention will be focused on the goal of creating sustainable collaboration processes.

Thinklets

This chapter will explain what a thinklet is, how a thinklet enables collaboration, how thinklets interface technology, when to use thinklets, and how to choose the best one. Thinklets are the bridge enabling collaborators to work effectively without ongoing facilitation. Thinklets can save organizations time and money when applied appropriately. They range from simple manual techniques like brainstorming with scraps of paper, to techniques relying on complex technological platforms.

Designing Collaborative Workspaces

An often underestimating factor in employee performance is workplace design. A great environment can foster high collaborative performance while a poor design can completely prevent effective collaboration. This chapter will examine collaboration space planning in several different contexts to best meet the needs of a variety of users. The common steps of the programming process used to design collaboration spaces will be explained; goals, needs analysis, requirements, space configuration, and design validation make up this process. The process of needs analysis will be outlined to help designers prompt end users to clarify the most important design requirements.

Collaboration and Knowledge Management

Knowledge management is the management of organizational knowledge for creating business value and generating a competitive advantage. The use of knowledge management has many benefits and challenges. This chapter will explain how to use collaboration, technology, and the knowledge management process to achieve goals.

Convergence and Decision Making Techniques

Convergence is the process of analyzing, identifying, summarizing, and evaluating several ideas generated by team members into a refined agreed upon idea that supports decision making. Most decision making models include convergence which is similar to the Briggs' Pattern of Collaboration model. The model consists of six steps: generate, clarify, organize, reduce, evaluate and commit. Another model that is associated with convergence is the thinklet pattern of collaboration, which consists of divergence, convergence, organizing, evaluating and building consensus.

Virtual Project Management Tools and Techniques

Virtual project management brings teams, product engineering, and processes into the 21st century using e-collaboration technologies. It utilizes methods and a blend of conceptual, theoretical, and applied knowledge that will prove valuable for academics and practitioners. Virtual Project Management is how professionals and business associates can convene online and have private discussions, organize project details share and collaborate without having to be in the same physical location.

Adoption and Diffusion of Groupware

"Like an electronic sinew that binds teams together, the new groupware aims to place the computer squarely in the middle of communications among managers, technicians, and anyone else who interacts in groups, revolutionizing the way they work." (Richman and Slovak 1987)

This chapter will outline the history of groupware, describe the benefits of using it, predict implementation challenges and clarify the issue of matching system attributes to an organization's needs.

Ideation & Brainstorming Techniques

Ideation is the process of generating new ideas. This chapter will focus on idea generation and environmental factors that can impede it. A variety of Thinklets will be discussed to better understand techniques to facilitate ideation. Contrary to popular belief there are effective techniques that can make anyone generate novel and useful ideas.

Glossary

Collaboration: the act of working together to reach a desired outcome

Involvement: calls for students to actively be more involved in their learning experience.

Cooperation and teamwork: means listening to one another's differences in an attempt to absorb both sides of a conflict while finding an even faced solution so that all voices are heard and taken into consideration.

Facilitator: leads a group on the right path toward a common goal of the organization.

Thought Exercises

1. Gather in groups of four to five students and within your group create a goal. Once your group goal has been established, use the remaining six layers of the seven layer model to establish the deliverable, activities, and patterns of collaboration, techniques, tools, and scripts for your goal.
2. Brainstorm three activities in which collaboration does not take place. Take those activities and state how collaboration could make these activities more effective.
3. Look through the chapter to find an example of collaboration. Take the chosen example and state three collaboration techniques that could have been useful when working toward the group goal of the example.

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Chapter 2

The Seven Layer Model of Collaboration

Chapter Content

- Introduction of the Seven Layer Model
- Learn what each layer of the 7 layer model represents to Collaboration
- How to apply each step

Introduction

The Seven Layer Model of Collaboration (SLMC) abstracts the why, what, and how of effective team collaboration into seven categories for designers of collaborative systems and facilitators of collaborative processes. *"This separation of concerns may reduce cognitive load for designers and may help to improve completeness and consistency of their designs, yielding higher productivity for collaborating groups."* (Briggs, et. al 2003)

Figure 2-1: The Seven Layer Model of Collaboration

Why	**Goals**	Group goals, private goals, motivation, group formation, commitment, productivity, satisfaction, and other goal-related phenomena
	Deliverables	Output: tangible or intangible artifacts and outcomes produced by the group's labor
What	**Activities**	Sequences of steps and sub-tasks that will yield the deliverables
How (logical design)	**Patterns of Collaboration**	Six emergent patterns of collaboration: Generate, Reduce, Clarify, Organize, Evaluate, and Build Commitment
	Techniques	ThinkLets: Reusable procedures for predictably invoking useful outcomes
How (physical design)	**Tools**	Designing, developing, deploying, and using technologies in support of group efforts
	Scripts	Everything team members say and do; tacit and explicit procedural guidance

Scripts guide what to say and do with the *tools*, which instantiate the *techniques*, which invoke the *patterns*, to move through the *activities*, to create the *products*, to achieve the *goals*. (Briggs, et Al., 2009)

"Changes at one layer may not necessitate changes to layers above it, but may require changes to layers below it." (Briggs, et. al 2003)

The Layers

Goals

"If you don't know where you are going, how can you expect to get there?" – Basil S. Walsh

Teams without goals are purposeless. Given that collaboration is "a joint effort towards a group goal" (e.g. Briggs, et Al., 2003), goals are the reasons collaborative teams exist. Effective collaboration starts with group goals that reflect the primary interests of the group. Goals are defined in many different ways, but the two most prominent ones are "the end toward which effort is directed" (Merriam-Webster Online Dictionary, 2009) and "the final purpose or aim; […] which a person aims to reach or attain" (Encyclopedia of the Self).

Groups choose to work together to add value that cannot otherwise be gained by working alone. Group success depends upon strong congruence between group goals and the private goals of individual actors that comprise the group. Goal congruence is "the degree to which individuals perceive that working toward group goals will be instrumental to attaining private goals" (Briggs, et Al., 2009). Whether basic, instrumental, esoteric, selfish, or altruistic, private goals are the underlying cause for individual motivation. Groups must focus their attention on what the desired outcome is going to be and if they can possibly obtain the desired outcome.

Even though team members may be working toward the same group goal, their private goals will be different and have varying levels of productivity and satisfaction. Group productivity is the degree to which the group achieves its goal. High productivity can lead to a high satisfaction response. Satisfaction response is an emotion with respect to goal attainment. According to the theory, if you reach the goal you had worked for, and are happy with the outcome, your satisfaction response should be positive. The same goal can produce different levels of satisfaction in different people.

People ascribe different levels of utility to different goals. Some goals are going to be more

valuable to a person than other goals. The greater importance a goal has to an individual, the greater the associated utility. If a goal has no utility, it is no longer a goal. The brain will tell us which goals have the highest utility and thus which ones to chase after. You can influence levels of satisfaction by changing utility, likelihood perception, goals, or the time frame of comparison.

Deliverables

Also known products and artifacts, Deliverables are defined as "tangible or intangible work product, the existence of which signifies that a group goal has been attained". In order to achieve the goals of the team, groups must produce an outcome. One way of thinking of it would be: What products/deliverables can the team create together to get us to our goals?

In many situations it is easier to think about the deliverables wanted versus deeply defining the goal, which in turn will be served by the deliverables. Once having a full understanding of what deliverables are, one may work backwards to goals by asking a variety of questions. A few examples of these questions are:

- What benefit would the deliverable bring?
- Why do you want to create this deliverable?
- What value would the group get from using it?
- Who would use it?

As one is thinking about the answers to these questions, many times they will see a gap between the deliverables and the goals the group plans on achieving.

Now, one can see how the group must create deliverables which assist us in reaching our group goal. Activities are the breakdown of deliverables. What are the series of activities we have to do to get us to the product to help us achieve our goal? This leads us to the next step in the *Seven Layer Model of Collaboration*.

Activities

According to the Webster Student Dictionary (2009), an activity is the "state or quality of being active; action". The activities layer of the Seven Layer Model of Collaboration is the layer that helps develop the deliverables into patterns of collaboration. The activities are dependent on the deliverables. Therefore, we cannot establish the types of activities we need until we have decided the products, or

deliverables we need to reach our goal.

For instance, let's say that our goal is to get an A in "Principles of Collaboration" class. Now that we have established our goal we can establish our deliverables. The deliverable could be high scores on all the tests. The activities that we need to reach our product could be spending more time studying, going to review sessions, taking notes, or any other activity that could lead us to our goal. The Activities is the "What" part of the Seven Layer Model. This section highlights what will be done to reach our goals. After we have established our activities we can then move on to the next layer of the Seven Layer Model of Collaboration, *patterns of collaboration*.

Patterns of Collaboration

Patterns of collaboration are observable regularities of behavior and outcome that emerge over time in teamwork (Vreede, et Al., 2006). There are six patterns of collaboration and you will see that just about every one of these patterns occurs regularly throughout the teamwork process. Teams begin by generating ideas, and then they move to reducing them, followed by clarification of the ideas, then organization of those ideas, then the evaluation, and finally building commitment toward the proposal. What this means is that a team comes up with ideas through whatever process they choose. Then the team reduces the number of ideas that they have so they can focus on the best ideas. Then the ideas need to be clarified so that everyone on the team understands each of the ideas. The ideas are organized into groups so the team can better analyze the ideas later. The team will then evaluate the remaining ideas so they can find the most promising idea. Lastly, the team as a whole needs to build their commitment towards the idea(s) they have come up with. These six patterns of collaboration may occur separately or simultaneously during the teamwork process, a team can also go back and forth between these patterns.

Generate

When teams meet to solve a problem, do a group project, or organize an event they usually begin the process by generating ideas. Generate is the first pattern of collaboration. Teams generate when they "move from having fewer concepts to having more concepts in the set of ideas shared by the group" (Briggs, et Al., 2009). Some groups use a facilitator to give verbal cues throughout the generate process.

One way to generate ideas is the process of brainstorming. The Dictionary of Human Resource Management contains a great definition and explanation: "brainstorming is a problem-solving technique for generating ideas. In small groups, people shout out ideas which are written onto a board or flipchart. The idea does not have to be justified and no one is allowed to comment or otherwise pass judgment, no

matter how bizarre or impractical the idea might seem. The process continues until the supply of ideas runs out within the time limit set, and then the group begins discussing and evaluating the ideas." (Dictionary of Human Resource Management 2001) There are many other ways to generate ideas. This book will discuss a variety of "thinklets", collaboration techniques which are often geared toward efficient idea generation. Sometimes groups can generate individually by coming up with ideas and then presenting them to each other.

Another generation method is for each group member to write down one idea on a piece of paper and then pass it to another member and that member writes down a new idea of theirs. This process continues until all of the group members' ideas are exhausted. This is called the popcorn sort.

Not all ideas will be useful. Depending on their goals, teams may possess varying needs for originality, relevance, quality, effectiveness, feasibility, and thoroughness (Dean et al. 2006). Which of these factors is important to the team is based on what the team's goals are. Originality means that no one else has come up with the idea. Relevance is looking at whether or not the idea applies to the goals. Quality is how good the idea is at accomplishing the group's goals. Effectiveness is how well the idea helps the team reach the goal. Feasibility is the probability of success should the idea be carried out. Thoroughness focuses on whether or not the idea encompasses all aspects of the goal including how to achieve it, problems that may arise, and ways to deal with those problems

Reduce

The second pattern of collaboration is to reduce the number of ideas that the team has come up with. To reduce is to "move from having many concepts to a focus on fewer ideas deemed worthy of further attention" (Briggs, et Al., 2009). The ideas a group generates can be combined if they are related, some may be discarded, and then a selection of the most relevant ideas are made. A group does this by looking at the factors that were previously stated determining if any idea is useful in working towards their goal(s).This process can be difficult for teams whose members have different goals because some consensus has to be reached. It can also be time-consuming because group members may have strong feelings about certain ideas. However, it is imperative to reduce the set of ideas to a manageable number, so progress can be made and the goals can be accomplished.

Clarify

The third pattern of collaboration is to clarify the reduced set of ideas. To clarify is to "move from less to more shared understanding of the concepts in the set of ideas shared by the group" (Briggs, et Al.,

2009). Clarifying consists of reducing vagueness or ambiguity of ideas, reducing the number of words required to convey meaning, and establishing mutual assumptions (Mulder, et Al., 2002). In other words, to clarify is to make sure that the entire group is on the same page by ensuring the meaning of issues is clear to all members. This pattern is exceptionally important because conflict may occur within a group simply because members may not understand the ideas or concepts in the same way. There are many ways a team can go about clarifying the ideas to the rest of the group. An easy way is to have someone who understands the idea explain it to the others, if there is still confusion questions can be asked.

Organize

The fourth pattern is to organize the ideas. To organize is to "move from less to more understanding of the relationships among concepts in the set of ideas shared by the group" (Briggs, et Al., 2009). Organizing is an attempt to reduce the cognitive load of the group members. Organizing can be accomplished in many ways. One way is to cluster like ideas together, once this is done a team can go back and rework the cluster to come up with an idea that encompasses all the ideas in that cluster.

Evaluate

The fifth pattern of collaboration is to evaluate the ideas that remain. To evaluate is to "move from less to more understanding of the instrumentality of the concepts in the idea set shared by the group toward attaining group and private goals" (Briggs, et Al., 2009). How does each concept accomplish the goal or goals? Do any of the concepts accomplish more than one of the goals? Which concept appears to be the most relevant or successful in the accomplishment of the goals? What are the consequences from each of the concepts with respect to accomplishing the goals? These are factors that should be addressed during the evaluate pattern. Each concept or idea needs to be addressed to obtain the best possible outcome.

Build Commitment and Consensus

In summary, we have generated ideas, reduced the amount of ideas, clarified each of the ideas, organized them to reduce cognitive load, and evaluated them to select the best possible choice. The final pattern of collaboration is building commitment and consensus. Building commitment is when a group "moves from fewer to more group members who are willing to commit to a proposal for moving the group toward attaining is goal or goals" (Briggs, et Al., 2009). A group builds consensus when they come to a shared decision on the outcome. The proposal has to accomplish both group and private goals to gain the commitment needed to be successful. Creating goal congruence between group members is an

essential part of this layer.

Techniques

"A collaboration technique is a reusable procedure for invoking useful interactions among people working toward a group goal" (Briggs, et Al., 2009). Some examples of techniques are brainstorming (Osborne, 1963), nominal group technique (Diehl & Stroebe, 1987), or electronic brainstorming (Connolly, et Al., 1990). Researchers are trying to identify which techniques will result in more creativity and by group members. Once the group has determined what techniques will satisfy group goals then they can select the tools required to perform the techniques.

Tools

"Collaboration tools are instruments or apparatus used in performing an operation for moving a group toward its goals" (Briggs, et Al., 2009). Collaboration tools can be as high-tech as a state-of-the-art collaboration technology platform, or as classic as pen and paper or marker and whiteboard. Collaboration technology can be divided into three categories: jointly authored pages, streaming tools and information access tools. [See: Collaboration Technology Chapter].

Tools improve group communication by connecting individuals to one another. Tools can make research easier by supporting the group with relevant knowledge. Tools should add value to the collaborative process by increasing group productivity. It is hard to move on to the scripts layer without knowing the tools you are going to use. Tools provide the group with the necessary instruments to instantiate the techniques.

When choosing which tools to use, you must first focus on the purpose of them. Next you might want to look at what system capabilities you're up against. The tool may have the potential to be useful, but if supporting technology isn't available, the choice to use the tool must be reevaluated. Another question the group needs to consider is whether or not a tool is interoperable. Interoperability is "the ability of two or more systems or components to exchange information and to use the information that has been exchanged." (Institute of Electrical and Electronics Engineers 1990) The group needs to not only make sure their tools are compatible with each other, but also with those outside the group. Having appropriate tools can greatly enhance the process of reaching the group goals.

Scripts

The last layer of the model is Scripts. Scripts are the communication process of collaboration. For example while conducting a brainstorming session a facilitator may rely on scripts to remember what prompts best stimulate creativity. Some groups may require a higher level of formality in collaboration interactions than others. Meetings between students may be informal, but if you were to meet with a community organization working toward a goal of high importance you would need to be more professional in your speech and actions. "A script is everything team members say to each other and do with their tools to move toward the group goal" (Briggs, et Al., 2009). A script for collaboration also implies or describes how you are going to utilize your tools throughout the process. The content of scripts must be flexible to meet the needs of different groups. The script content will depend on the group goal, level of importance, who the group members are, what tools are they using, and even where the collaboration will take place.

"When it is obvious that the goals cannot be reached, don't adjust the goals, adjust the action steps." – Confucius

"I can't change the direction of the wind, but I can adjust my sails to always reach my destination." – Jimmy Dean

Conclusion

The Seven Layer Model of Collaboration is a useful tool to use during the process of working toward a group goal to ensure thoroughness, effectiveness, and most importantly success. The layers are dependent on one another moving down the model and independent moving up. This means that a significant change that may occur during the collaboration process requires you to readdress and make necessary adjustments to all layers below the one you made changes to. Once again, *scripts* guide what to say and do with the *tools*, to instantiate the *techniques*, to invoke the *patterns*, to move a group through *activities* that produce *deliverables*, to achieve the *goals*.

Glossary

Build Commitment: to move from fewer to more group members who are willing to commit to a proposal for moving the group toward attaining its goal

Clarify: To move from less to more shared understanding of the concepts in the set of ideas shared by the group

Collaboration: A joint effort towards a group goal

Deliverable Efficacy: a judgment of the degree to which its existence constitutes having attained a group goal

Deliverables: tangible or intangible work product, the existence of which signifies that a group goal has been attained

Evaluate: to move from less to more understanding of the instrumentality of the concept in the idea set shared by the group toward attaining group and private goals

Generate: to move from having fewer concepts to having more concepts in the set of ideas shared by the group

Goal Congruence: the degree to which individuals perceive that working toward group goals will be instrumental to attaining private goals

Goals: the end toward which effort is directed, the final purpose or aim

Group Productivity: the degree to which the group achieves its goal

Organize: To move from less to more understanding of the relationships among concepts in the set of ideas shared by the group

Patterns of Collaboration: observable regularities of behavior and outcome that emerge over time in teamwork

Reduce: to move from having many concepts to a focus on fewer ideas deemed worthy of further attention

Satisfaction Response: an emotion with respect to goal attainment

Scripts: everything team members say to each other and do with their tools to move toward the group goal

Seven Layer Model of Collaboration: abstracts the why, what, and how of effective team

collaboration into seven categories for designers of collaborative systems and facilitators of collaborative processes.

Techniques: a reusable procedure for invoking useful interactions among people working toward a group goal

Tools: instruments or apparatus used in performing an operation for moving a group toward its goals

Thought Exercises

1. Name three tools that you have used when collaborating in a group.
    a. Which of these tools worked the best? Why?
    b. Which of these tools was least helpful? Why?
2. Name a time when you experienced each of the patterns of collaboration, giving examples for each pattern.
    a. Identify what technique you used to get through each of the patterns.
3. Which of the 7 layers would you personally find most difficult and what can you do to overcome this?
    a. What are the reasons you aren't comfortable?
    b. What are some of the techniques that can help you overcome this?

Exam Questions

1. What type of goal is the underlying cause for motivation?
    a. Group Goals
    b. Private Goals
    c. Individual Goals
    d. Life Goals

2. The degree to which individuals perceive that working toward group goals will be instrumental to attaining private goals is:
    a. Collaboration
    b. Group Productivity
    c. Goal Congruence
    d. Goal

3. If a group completes their goal with minimal road blocks they will have had:
    a. High productivity, high satisfaction response
    b. Low productivity, high satisfaction response
    c. Low productivity, low satisfaction response
    d. High productivity, low satisfaction response
4. The process of collaboration must begin with defining goals.
    a. True
    b. False
5. "Tangible or intangible work product, the existence of which signifies that a group goal has been attained" is the definition of:
    a. Goals
    b. Deliverables
    c. Collaboration
    d. Group Productivity
6. Once having a full understanding on what deliverables are, one may work backwards to goals by asking a variety or questions, an example of these questions would be:
    a. What benefit would it bring?
    b. Why do you want to create this deliverable?
    c. What value would they get from using it?
    d. All of the above

7. “A judgment of the degree to which its existence constitutes having attained a group goal” is the definition of a group deliverable.
    a. True
    b. False
8. An activity is:
    a. Observable regularities of behavior and outcome that emerge over time in teamwork
    b. A state or quality of being active; action
    c. An emotion with respect to goal attainment.
    d. A joint effort towards a group goal
9. The layer of the Seven Layer Model of Collaboration that helps develop the deliverables into patterns of collaboration is the _____ layer:
    a. Activities
    b. Patterns
    c. Deliverables
    d. Goals
10. Attending a review session or studying an extra hour is an activity that one may do in order to complete the goal of receiving an A in a class.
    a. True
    b. False
11. Which of the following is NOT one of the six patterns of collaboration:
    a. Generate
    b. Reduce
    c. Clarify
    d. Achieve
12. The initial pattern of collaboration is:
    a. Reduce
    b. Evaluate

c. Build Commitment

d. Generate

13. Which of the following situations would be found in the *reduce* pattern of collaboration?

    a. Brainstorming ideas

    b. Combining, discarding and selection relevant ideas

    c. Accomplishing both group and private goals to gain the commitment needed to be successful

    d. Making sure the entire group is on the same page

14. To *evaluate* is to move from less to more understanding of the instrumentality of the concepts in the idea set shared by the group toward attaining group and private goals.

    a. True

    b. False

15. "Instruments which are used in performing an operation for moving a group toward its goals" are also known as:

    a. Activities

    b. Techniques

    c. Tools

    d. Scripts

16. Technology is one of the most commonly used tools in collaboration.

    a. True

    b. False

17. Interoperability is a property referring to the ability of diverse systems and organizations to work together.

    a. True

    b. False

18. Which of the seven layers entails how you are going to utilize your tools throughout the process?

    a. Deliverables

b. Techniques

c. Patterns of Collaboration

d. Scripts

19. The script content will depend on which of the following?

a. Group Goal

b. Level of Importance

c. What tools you are using

d. All above statements are true

Solutions for Exam Questions

1. b: Group goals and private goals are the only two types of goals in collaboration science. Of the two, private goals motivate effort towards the group goal.
2. c: Goal congruence describes to which degree private goals of all team members and group goals can be achieved without interference.
3. a: The group was very productive, because they achieved their goals with few problems, and the members probably have a high satisfaction response because they anticipated problems like they would appear normally in group work.
4. a: Goals are the top layer of the Seven Layer Model of Collaboration and are thus to be determined first.
5. b: Deliverables are the second layer of the SLMC and they are the product or outcome of group work.
6. d: An understanding of the required deliverables often helps defining the goals more clearly. When reiterating and adjusting the goals, these questions can help.
7. b: This is a definition of effectiveness.
8. b: Activities represent the link between deliverables and patterns of collaboration.
9. a: They are used to break the deliverables down into manageable activities, which – in turn – consist of patterns of collaboration.
10. a: These suggestions contribute to the goal and are therefore activities.

11. d: The six patterns of collaboration are “generate”, “reduce”, “clarify”, “organize”, “evaluate”, and “build consensus”.
12. d: The first pattern of collaboration is “generate”. In it, the group moves from fewer to more concepts related to the group goal.
13. b: These are all activities which help the group move from many concepts to a focus on a few worth more attention.
14. a: This is the final step needed before one can start building consensus.
15. c: The main purpose of tools is to move the group through the chosen techniques. This can happen with or without the help of computer technology.
16. a: The three types of collaboration technology are jointly authored pages, streaming tools and information access tools.
17. a: This is important to insure that the outputs can be used in the next step in the collaboration process.
18. d: Scripts define what team members say to each other and what they do with their tools to move toward the group goal.
19. d: Since scripts are the very bottom layer of the SLMC, they depend on all layers above.

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Chapter 3

Useful Theories of Collaboration

Introduction

Chapter Two introduced the Seven Layer Model of Collaboration. We learned the names of each layer, its meanings and the benefits of applying it to collaboration. Chapter Three will draw on information explained in Chapter Two and elaborate on developing useful theories from the Seven Layer Model of Collaboration. In order to fully understand the meaning of collaboration and its useful theories, we must first clarify the meaning of theory.

What is a Theory?

A theory is a plausible explanation to define a set of general repeated behaviors or actions with no objective cause (2009, Merriam-Webster). A good theory must be able to express complicated issues in a clear, concise and explicit manner. In addition, all arguments made by a theory must be logical and rise to a consistent framework without fallacies. It could be said that theories are an explanation for things or events that make you say, "Gee, that's funny, I wonder why that happens?"

According to Suppes (1967), scientific theories consist of two parts. First, there is the "logical calculus". It introduces the vocabulary used and states the axioms and postulates of the theory, the basic rules of how the phenomenon "works". The second part of scientific theories defines the empirical interpretations of the rules from the first part. It gives guidelines on how the theory should be interpreted and how it applies to the real world. In order to understand how groups work and what needs to be done to achieve these goals, theories are needed to explain the relevant mechanisms.

Importance of Useful Theories

According to Robert Briggs, the first level of the Seven Layer Model of Collaboration is Goals. **Goals** are a desired state of outcome. There are three useful relevant mechanisms identified as having a strong impact to achieving a successful collaboration:

- Group productivity
- Satisfaction of group members
- Consensus

Group Productivity

Communication, deliberation and information access are three concurrent tasks that must be demonstrated to be productive. The amount of thinking and processing a brain does at one time is limited. Additionally, the amount of brain power is used for one task is not available for other tasks. The primary theory that explains how productivity of groups is affected by cognitive capacity is the Focus Theory of Group Productivity.

The next component that influences group productivity is Goal Congruence. This is the degree to which group goals are compatible with each other and with each group members' individual goals. In order for a group to be productive, its members' cognitive load has to be distributed efficiently and their goals must be congruent.

Satisfaction of Group Members

The Yield Shift Theory of Satisfaction examines the salient set of goals that individuals possess and changes that occur to these goals. Each goal that is currently on their mind has a utility, a measure of how useful that goal is, and a likelihood, a measure of how likely it is to attain the goal. Utility and likelihood of the goals in the salient set together are the goal yield.

If there is a shift in the utility, likelihood or the goals an individual is currently thinking about, a satisfaction response is evoked and either increases or decreases, dependent on the type of yield shift (positive or negative).

Consensus

Consensus can be defined as a state in which all success-critical stakeholders are willing to commit to a proposal. To commit means to assume an obligation to expend time, effort, and resources to fulfilling the terms of the proposal (2009, Merriam-Webster).

The fact that all success-critical stakeholders are willing to commit does not necessarily mean that there is unanimity of purpose, desire, meaning, or satisfaction. There can be varying reasons and different goals for why they are willing to commit, a different understanding of the proposal, and/or varying degrees of satisfaction in doing so.

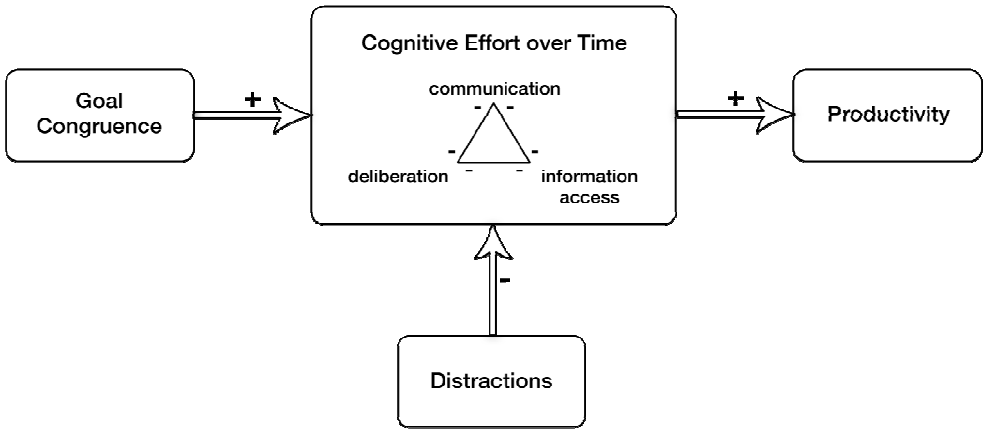
The definition of commitment given above demonstrates the importance of consensus for collaboration. If the stakeholders are not willing to expend time, effort, and resources to achieve the goals of the group, its chances of being successful and actually achieving the goals will be minimal.

In order to understand how groups operate and the course of action to achieve group goals, we look to different theories to explain the relevant mechanisms.

Focus Theory of Group Productivity

The most widely accepted theory to explain how the productivity of a group works is the Focus Theory of Group Productivity. Focus Theory states that goal congruence plus cognitive effort over time will equal the productivity; the obtainment of a goal. According to this theory, groups must handle several tasks concurrently to be successful. These tasks include: communication, deliberation and information access. As previously stated, because the cognitive capacities of humans are limited, the amount of mental effort that is occupied by one task is not available for the others. Additional components that effect group productivity are goal congruence and distractions, which will be defined in the following sections.

Figure 3-1: Focus Theory of Group Productivity



Concepts

To fully understand *Focus Theory* one must first understand goal congruence. To review from the previous chapters, a goal is defined as the end towards which effort is directed. **Goal congruence** is the degree to which group goals are compatible with, and how they advance, the group's private goals. According to the *Focus Theory of Group Productivity* by Robert Briggs, people will not work against their perceived self-interest over the long term. A team will only be productive to the degree that the intentions of the team are congruent with the private goals of the individual team members.

One method to combat this problem is to consistently reinforce how the goals of the team align with the goals of the individual. In these scenarios, it is the job of the project or group leader to develop

creative mechanisms that instill salient goals. These salient goals need to align with both the individual's private interests as well as the group's collective goal(s). A common tactic is career development incentives. Career development incentives convince a group member or members that achieving a successful group outcome to a project is a measurable metric and an addition to their private career success. Goal congruence fuels the focus of individual cognitive effort over time, which in turns leads to group productivity.

Another factor that influences productivity is distractions. A **distraction** is that which distracts, divides the attention, or prevents concentration (2010, Dictionary.com). Group leaders, as well as the entire group, must make efforts to keep focus on the problems and goals in order to avoid distractions that lessen productivity.

Cognitive Effort Over Time

The team will accomplish its goals through **cognitive effort**, which consists of communication, deliberation and access to information (Briggs, 2008). Each team member must be able to engage each different process in order to be productive. These factors will be individually described more thoroughly to ensure proper understanding.

In order for team members to be productive, they must first be willing to communicate. **Communication** is defined as "a process by which information is exchanged between individuals through a common system of symbols, signs, or behavior" (2009, Merriam-Webster). The process of communication in a group setting starts out with an idea about what the solution to a problem is perceived to be. The idea that the person starts out with is then put into an environment as a communication stimulus (Weaver, 1964). The communication stimulus is then received by the other members of the group through their senses, and then assigned a meaning to what they perceive (Draft & Weick, 1984). For example, if a person receives a wedding invitation in a nice envelope with fancy script they are likely to take it very seriously, while if they got the same invitation on a piece of construction paper drawn out in crayon and slid under their door, they would associate it with a joke or prank. People tend to assign social significance to all aspects of the stimulus: the choice of words, the tone of the speakers voice, the medium, and the level of effort the initiator is making.

Deliberation is defined as careful consideration before decision (2010, Dictionary.com). These actions do not need to be organized and are very useful when there is an open exchange of thoughts or opinions on the designated topic without fear of reprimand. Open discussion can lead to distractions; therefore the group must make an effort to focus on relevant information and opinions. Team members

may not fully understand the problem they are trying to solve (or goal they must attain), which creates alternate solutions that do not fit.

It may be necessary to look at the question from a different point of view. For example, the question “How can I cross the river?” could yield very different results than if the question were looked at from the point of view of “Why do I want to cross the river in the first place?” Perhaps the main problem is that my food source is on the other side, not necessarily that I must cross the river. So if the problem were looked at from this different viewpoint, different solutions such as moving the food source, hiring others to deliver the food, etc. could be generated.

Another problem that may arise could be that members may also be sidetracked when they gather the needed information for their goal because they each perceive a different goal from one another. In order for deliberation to be successful, a clear problem and a clear goal must be stated so each member perceives it the same way. After collecting information, clearly communicating and going through the deliberation process, certain conditions are identified that do not meet standards to obtain goals and are therefore discarded. This process continues until an acceptable amount of options remain.

Information is defined as “knowledge obtained from investigation, study, or instruction” (2009, Merriam-Webster). Information is the key component of which communication and deliberations are composed. Incorrect or missing information can lead a group down the wrong path, which could in turn lead to the wrong solution. Proper and correct information should be able to be cited just as in scholarly papers to avoid questionable results. For example, if one group member states that a new study was released from a well-respected university on the subject of time travel and that relates directly to their paper, the group is not likely to believe this group member unless he/she can properly cite the information and prove that it is indeed valid.

Yield Shift Theory of Satisfaction

Yield Shift Theory of Satisfaction states that people are aware of a "salient set" of goals and changes that occur to them. Each goal that is currently in the group’s repertoire has a utility and likelihood. The utility of the goals measures how useful that goal is to the group. The likelihood of attaining the goal acts as a nozzle controlling the flow of utility to yield. Utility and likelihood of the goals in the salient set together are compose Goal Yield.

If there is a shift in the utility or likelihood, a satisfaction response is evoked. This means that satisfaction of individual group members increases or decreases, causing a Goal Yield Shift. The satisfaction response can be positive or negative, thus shifting the Goal Yield in either direction.

Individuals may hold many goals; these goals may range from fundamental goals like breathing or eating to elaborate goals such as becoming president of the United States or self-actualization. The human cognitive resources are limited, and therefore cannot assess all of an individual's goals simultaneously. The set of goals currently being processed by the subconscious is called the active goal set (Briggs, Reinig, and Vreede, 2008).

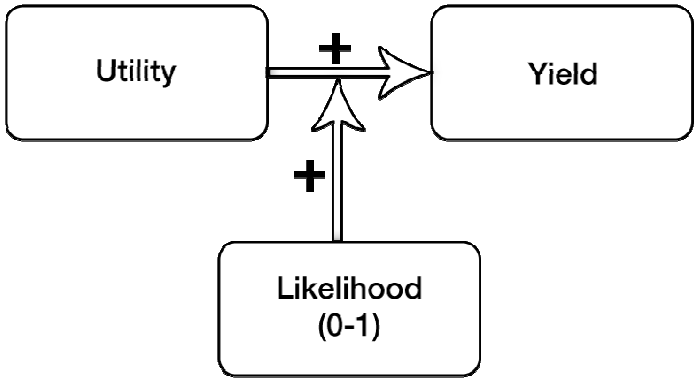


Figure 3-2: Goal Yield Theory

- Goal Utility – Some goals are better than others
- Goal Yield – How good would that goal be?
- Goal Likelihood – How attainable is that goal? Works like a nozzel controlling the flow of utility to yield

The Satisfaction Response

The phenomenon that the Yield Shift Theory explores is emotion. The satisfaction response is a cognitive arousal that is caused by the noticeable change of an object or event. For example, when an individual has been in the hot sun all day and then walks into an air-conditioned room, this change in air temperature is noticed and a positive shift would occur.

The satisfaction response encompasses more than one emotion. Positive feelings, commonly called satisfaction, negative feelings, commonly called dissatisfaction, and neutral feelings all fall within the umbrella of the Satisfaction Response. Under this definition, satisfaction and dissatisfaction are not two ends of a continuum with a neutral point in the middle. The intrinsic value is demonstrated by the arousal as either being positive or negative, but does not define its magnitude of how important it is to the individual. This concept is important because an individual may experience a switch of intrinsic value from negative to positive or vice versa and may do so completely subconsciously (Briggs, Reinig, and Vreede, 2008).

Satisfaction is a fulfillment of a need or want; it is contentment (2009, Merriam-Webster). In collaboration, there is a group goal that people are working to achieve. In order for individuals to want to work towards this goal, they have to feel satisfied by completing it. The group goal may remain in

congruence with the individual's private goal or goals for motivation to persist. Satisfaction is a matter of survival: Dissatisfied team members quit and dissatisfied customers switch to another company. In order to create satisfaction amongst group members, it is necessary to invoke a satisfaction response. This might mean discovering individual's private goals. It is important to understand that all members of groups have private goals that fuel the group's goals.

The Satisfaction Response: Caused by Yield Shift

- Positive shift = You feel satisfied
- Negative shift = You feel dissatisfied
- No shift = You feel nothing

There are ten phenomena that the Yield Shift Theory provides explanations for:

1. **Goal Attainment Effect:** Individuals feel satisfied on attainment of a desired state or outcome. They feel dissatisfied when the desired state or outcome is thwarted.
2. **Confirmation Effect:** Individuals feel satisfied when outcomes match expectations or desires, and feel dissatisfied when outcomes are less than expectations or desires.
3. **Disconfirmation Effect:** Individuals feel neutral when outcomes match expectations or desires. They feel satisfied when outcomes exceed expectations or desires; they feel dissatisfied when outcomes are lower than expectations or desires.
4. **Anticipation Effect:** Individuals feel satisfied or dissatisfied when thinking of future goal attainment, even though goals have not yet been attained or thwarted.
5. **Nostalgia Effect:** Individuals feel satisfied or dissatisfied when thinking about past goal attainment or past failure to attain goals.
6. **Differential Effect:** Multiple individuals manifest differing levels of satisfaction upon the attainment of goals to which they ascribe similar utility.
7. **Hygiene Effect:** Individuals feel only neutral or negative about an object or event, but never positive.
8. **Mentor Effect:** Individuals feel more satisfied or dissatisfied after discussions with a trusted advisor, even though current conditions have not changed.
9. **Mixed Feelings:** Individuals experience both satisfaction and dissatisfaction with the same IS/IT artifact.

10. **Attenuation Effect:** Individuals' satisfaction responses diminish over time.

    (Briggs, Reinig, and Vreede, 2008)

Goal Attainment

The Yield Shift Theory predicts that when goal attainment occurs, either a positive, neutral or negative satisfaction response is possible, depending on conditions. There are two conditions where a positive satisfaction response will occur. The first occurs if attainment of a goal produces higher utility than the individual had ascribed to a goal. For example you see money on the ground, initially you think it is only a dollar, and you decide to pick it up, you then realize that it is actually a hundred dollars. This would create a positive response. The second condition happens when the individual has ascribed less than full likelihood to attaining then goal. If the goal were actually completed there would be a large positive shift in satisfaction response (Briggs, Reinig, and Vreede, 2008).

Salient Goals

To understand satisfaction responses, it is best to initially understand three key terms: First is *goal utility*. Goal utility is defined as how useful a goal is if it is achieved. Next is goal *likelihood*; goal likelihood is how attainable the goal is to achieve. Last is the term *goal yield*; goal yield is how useful a goal is, reduced by how likely it is to be achieved. Because individuals analyze goals based on their value and likelihood, the higher the goal yield is, the more likely it is going to become a salient goal (Briggs, Vreede and Reinig, 2003).

To relate this to satisfaction, the change in yield shift creates satisfaction responses. The greater the yield shift, the greater the satisfaction response. If the yield shift happens to be negative, dissatisfaction occurs. If the goal yield shift is zero; there is no feeling of either satisfaction or dissatisfaction. It is important to remember, that this satisfaction response can only occur if the goal is a salient goal. Meaning, if the goal is not something a person is paying attention to at the time, they are not going to be satisfied or dissatisfied if it is accomplished or not.

Applying the Yield Shift Theory of Satisfaction

The logic of Yield Shift Theory suggests there are four strategies for evoking a satisfaction. Understanding these applications could help and individual motivate group members into becoming more productive.

1. You can change the utility of the goal. To do this, the goal must become more useful to the individual working to complete it. Thus, the more useful the goal is perceived to be, the more satisfied the group members are going to be when it is completed.

2. You can change the likelihood that the goal can be accomplished. In order for the likelihood to change, you have to change the perception of how easily the goal can be completed. This can work in one of two ways. If the goal was at first said to be something easy to complete, one may not feel as satisfied when they do complete it. For example, are you going to be more satisfied getting a good grade on a test if the teacher says everyone gets a good grade on it? Or are you going to be more satisfied if the teacher says that it is a hard test and good grades are rare? Most often, more satisfaction will occur if the second is true. Sometimes, goals must be made to seem more likely to increase satisfaction as well.

3. Change the goals that in the salient set. Human cognitive resources are limited and if the active goal set is maximized then a new goal could not enter without one displacing another. Changing the goals in the active set may rearrange the degree of importance an individual applies to a certain goal, thus increasing the yield of another goal.

4. Change the time frame of comparisons. For example, a person may be upset that they did not get a raise at their job, but if you tell them to think about last year when they did not even have a job, they will often feel better about not getting the raise. They might not be satisfied about not getting the raise, but they are at least less dissatisfied.

Instrumentality Theory of Consensus

The Instrumentality Theory of Consensus is a way of framing a group's agenda based on the utility of the end goal to the individual group member's personal interests. There are different components making up the Instrumentality Theory of Consensus, but first the definitions of "instrumentality" and "consensus" must be understood to fully grasp the larger concept.

Consensus is "a state in which all stakeholders are willing to commit to a proposal" (Kolfschoten, Briggs, de Vreede, Jacobs, & Appelman, 2006). Willingness to commit is a prescient factor that constitutes the degree to which an individual feels obligated to expend time, effort, and outside resources to fulfill the terms of a group proposal; therefore commitment is also a mitigating factor in the productivity of any group. The individuals composing the group must have strong dedication to the end collective goal to generate maximum productivity in the shortest span of time. With collaboration the end goal is for group success and with it the individual members move closer to completing their personal goals, which is perceived as individual success. To build a strong consensus the individuals composing

the group must feel that their own goals are being executed as well as the group goal(s).

There are many different variables that can affect the group's level of consensus. The most prevalent factors that hinder a group's unanimity are: difference of meaning, mental models, conflicting information, difference of individual goals among group members and difference of taste.

Differences of meaning throughout a group are common interruptions to consensus. Differences in meaning could occur on a micro level in the ways language is interpreted, all the way up to a macro level in the way the entire group process or goal is interpreted by a member. In order to move past this roadblock, group members must be able to identify the differences, define specific meanings, and be able to test the meanings through deductive reasoning.

Mental models can also impede the success of group consensus by resolving an individual's thought process to a single mental framework they may have previously encountered. Group members can combat the challenge mental models present with several techniques. The group leader can challenge the underlying assumptions of the mental model holder. This can open the group members' thought processes to other ways of examining a problem. Additionally, the leader can challenge the mechanisms of the mental model holder by probing how the model works. If, in fact, the specific mental model is faulty the member who is holding onto it will see why it is ineffective through the probing and move on with the group to more productive ideas. Additionally, if the mental model seems to weather the challenges above then it is a possibility to change the group proposal or the group goals in order to be free of the connotations of the mental model.

Typically many, if not all, group members join a group with an idea of what is to be accomplished and a rough framework of why and/or how. Sometimes the information the individuals receive is correct and sometimes it may be lost in translation along the way, and individuals will be a party to wrong or conflicting information. While, objectively, this seems like an easy problem to fix, group members may feel compelled to defend the information they have and align others with it, though it may be wrong. Group members can filter out the incorrect data by exchanging and comparing information among members, assessing the credibility of the information, and testing for incomplete, incorrect, or possibly deceitful information. If the three methods of distilling information are used, often the inaccurate information falls to the wayside while the correct and useful information keeps the group on track.

Differences among group members' individual goals can be the most difficult challenge to overcome when building consensus. As each group has a collective goal, each member of the group has individual goals that need to align with the collective goal. It is of utmost importance that individual goals are similarly aligned in a group; they are the force that keeps group momentum driving forward and

productivity high. To overcome differences of individual goals in a group there are six techniques that may be exercised (2010, Briggs, *Useful Theoretical Perspectives for Collaboration*).

The first method that is essential to aligning group goals with individual ones is to identify the differences of individual goals among members. Once this step is complete the group leader or member aligning the group's individual goals can frame the goals that are not aligned in a way that will lead them to group territory. They can change the ascribed utility or the likelihood of the outside goal. By making it seem less useful or probable the individual may change the goal or disregard it.

The group leader can focus members' attentions on higher yield goals they can attain to conform outlying goals to the group. If the payoff is greater, this may be enough incentive for the individual goals to kowtow to the collective one(s). The leader may change the time frame for goal attainment or alter the perceived chains of instrumentality. If the time frame is changed then the individual may find that they have a different perspective on their individual goals and are more willing to aid the collective effort for group goal attainment.

Instrumentality is the most important factor in reaching group consensus. It is the degree to which one believes that committing to a proposal will advance their private goals. Instrumentality has two factors: group instrumentality and individual instrumentality. Group instrumentality, also known as Outcome, measures the final result of group efforts and how positive or negative that result is on the collective. Individual Instrumentality takes group instrumentality into account and its effects on an individual basis and each person's salient goals.

Perceived Instrumentality is the degree to which stakeholders perceive that outcomes of the proposal would increase likelihood or utility of private goals. If the leader chooses to change the perceived chains of instrumentality, this means the leader will show the individual how the larger group goal is aligned with their individual one. The leader will change the individual's perceived instrumentality of the group goal to the individual's favor so they are more willing to expend their mental and physical efforts to the group.

For differences in individual tastes the group leader has to pull in individual members and promote compromise throughout the group. Typically, you cannot change individuals' singular tastes or opinions, but rather introduce a level for compromise that will satisfy all parties. If 40% of group members want their group logo to be blue, and 60% want it to be red, the leader could introduce the idea of a purple logo to appease all members. In this way most parties will finish a project satisfied that they have had input. Substitute goals can also be brought in as a way for the group to change their taste paradigm. If the level of discontent among group members is high, one option is to completely change the goal set to placate

and satisfy all individual tastes. Adding goals to the group can also be helpful. In this way the primary task the group has set out can be achieved but may have some elements that were initially thought of.

Summary

This chapter has presented several theories that are useful when collaborating with others. First described was the basic nature of theories.

- A theory is a plausible explanation to define a set of general repeated behaviors or actions with no objective cause. (2009, Merriam-Webster)
- A good theory must be able to express complicated issues in a clear, concise and explicit manner.
- All arguments made by a theory must be logical and rise to a consistent framework without fallacies.
- According to Suppes (1967), scientific theories consist of two parts. First, there is the "logical calculus". It introduces the vocabulary used and states the axioms and postulates of the theory, the basic rules of how the phenomenon "works".
- In the second part, the researchers define the empirical interpretations of the rules from the first part. It gives guidelines on how the theory should be interpreted and how it applies to the real world.
- The Focus Theory of Group Productivity is used to understand the basic functions within a group to obtain goals. This theory states that goal congruence plus cognitive effort over time will equal the product obtainment of goal. Cognitive effort is broken down into three elements: Information Access, Communication, and Deliberation. Distractions often negatively affect group productivity and must be identified and addressed to improve group productivity.
- The Yield Shift Theory of Satisfaction describes the phenomena that people hold many goals. Each goal had utility and a yield. The likelihood of attaining the goal acts as a nozzle controlling the flow of utility to yield. The satisfaction is caused by the yield shift. This change determines weather there will be a positive shift, negative shift, or no shift.
- Invoking a Satisfaction Response can be done in four ways:
    - Change the goal utility

- Change in goal likelihood
- Change the goals in salient set
- Change in timeframe of comparison

- The Instrumentality Theory of Consensus is a way of framing a group's agenda based on the utility of the end goal to the individual group member's personal interests.
- Instrumentality is the degree to which an individual believes that private goals will be advanced through their commitment to a proposal.
- Individuals also make judgments based on their perceptions of how important committing to a proposal will advance their own private goals.
- Difference of meaning, mental models, conflicting information, mutually exclusive individual goals and difference of taste can hinder achievement of goals.
- Group leaders can cope with the individual group challenges through the following methods:
  - Challenge: Differences in Meaning
    - Identify the differences
    - Define specific meanings
    - Test the meanings through deductive reasoning.
  - Challenge: Differences in Mental Models
    - Challenge the underlying assumptions of the mental model holder.
    - Challenge the mechanisms of the mental model holder by probing how the model works.
    - Change the group proposal or the group goals in order to be free of the connotations of the mental model.
  - Challenge: Differences in Information
    - Filter out the incorrect data by exchanging and comparing information among members, assessing the credibility of the information, and testing for incomplete, incorrect, or possibly deceitful information.
  - Challenge: Differences in Individual Goals
    - Identify the differences of individual goals among members.

- Change the ascribed utility or the likelihood of the outside goal.
- Focus members' attentions on higher yield goals they can attain to conform outlying goals to the group.
- Change the time frame for goal attainment.
- Alter the perceived chains of instrumentality.

- Challenge: Differences in Taste
  - Promote compromise throughout the group.
  - Substitute goals can also be brought in as a way for the group to change their taste paradigm.
  - Add goals to the group's task queue.

Glossary

Active Goal Set: The subset of goals currently being assessed by subconscious cognitive mechanisms for changes in yield.

Cognitive effort: Consists of three sections: communication, deliberation, and information access. Attention is a key component and is limited, distractions also interfere member focus.

Commit: To assume an obligation to expend time, effort and resources to fulfilling the terms of a proposal.

Communication: A process by which information is exchanged between individuals through a common system of symbols, signs, or behavior.

Consensus: A state in which all stakeholders are willing to commit to a proposal

Deliberation: Careful consideration before decision

Distraction: That which distracts, divides the attention, or prevents concentration

Goal congruence: The degree to which group goals are compatible with, and how they advance the group's private goals.

Goal likelihood: How attainable the goal is to achieve.

Goal utility: How useful a goal is if it is achieved.

Goal yield: How useful a goal is reduced by how likely it is to be achieved.

Goals: Desired state or outcome.

Information: Knowledge obtained from investigation, study, or instruction.

Instrumentality: The degree to which one believes that committing to a proposal will advance one's private goals.

Perceived Instrumentality: The degree to which stakeholders judge that outcomes of the proposal would increase likelihood or utility of private goals.

Perceived Shift in Yield: A subconscious perception that the overall yield for the active goal set has changed.

Likelihood: The degree to which an individual subconsciously believes a goal to be attainable

Satisfaction: A fulfillment of a need or want; Contentment.

Satisfaction Response: A valenced affective arousal with respect to some object that has reference to an individual's private goals

Yield: A multiplicative function of the utility and likelihood an individual ascribes to attaining a goal or a set of goals

Thought Exercises

1. Think a theory on the topic of your choice, scientific, political or mathematical. Go through the two part of a scientific theory according to Suppes.
2. Think of a time when you made plans for yourself and some friends. Identify the situation and identify the individual parts of Focus Theory and which parts were most difficult to do (e.g. was it most difficult to communicate with so many individuals or was there a problem with goal congruence?).
3. Name a salient goal you currently have. Explain through goal utility, likelihood, and satisfaction how it became a salient goal.
4. Using the Yield Shift Theory of Satisfaction think of a way to make your team makes more satisfied with a current project.
5. According to the Instrumentality Theory of Consensus what are three possible obstacles a group leader may encounter? Please explain possible ways to resolve the three obstacles chosen on individual and/or group levels.

6. How is Group Instrumentality different than Individual Instrumentality?

Exam Questions

1. In general, theories are developed for events that rarely occur.

   a. True

   b. False

2. What theory states that goal congruence plus cognitive effort over time will equal the product obtainment of goal?

   a. Focus Theory

   b. Consensus Theory

   c. Yield Shift Theory

   d. None of the above

3. In the Yield Shift Theory of Satisfaction, people hold multiple goals and can only focus on a certain subset of goals due to the lack of mental resources.

   a. True

   b. False

4. Goal likelihood is how attainable the goal is to achieve.

   a. True

   b. False

5. According to the Yield Shift Theory of Satisfaction, what technique would invoke in an individual having a positive response?

   a. Change the utility of the goal

b. Change the goal

c. Change the temperature

d. Change the time of day

6. Making a group dissatisfied can be beneficial, because it can spark efforts to make change.

a. True

b. False

7. To assume an obligation to expend time, effort and resources to fulfilling the terms of a proposal is to:

a. Confirm

b. Consent

c. Commit

d. Confer

8. Cognitive Effort over Time is a result of Communication, Deliberation, and:

a. Competition

b. Agreement

c. Information Access

d. Argumentative Statements

Solutions for Exam Questions

1. b)
2. a)
3. a)
4. a)
5. a)
6. a)
7. c)
8. c)

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Chapter 4

Collaboration Technology

Who Cares?

According to the Bureau of Labor Statistics, there are at least 69.2 million mobile workers in the United States. That figure is evidence of the need for technological tools that can facilitate productivity through collaboration. Without collaborative technologies, mobile workers may be left isolated, and the benefits of collaboration unrealized.

The market for collaboration technologies is filled with hundreds of players bringing new technologies to market all the time. These technologies fit into three broad categories of technological functions: jointly-authored pages, streaming tools, and information access tools. A challenge for firms is to create single tools that can integrate two or more functions at once. Adobe's Connect software is an example of a tool that aggregates multiple technological functions by combining streaming and application sharing.

What is Collaboration Technology?

Several definitions exist for collaboration technology. A general definition is "Software and hardware optimized to improve the productivity of people making joint effort toward a group goal" (Mittleman et al. 2008) Collaboration technology may be defined more specifically as: **"**Software, platforms, or services that enable people at different locations to communicate and work with each other in a secure, self-contained environment. Collaboration technology may include capabilities for document management, application sharing, presentation development and delivery, white-boarding, chat, and more." (Lexicon. 2008) Many types and combinations of technology fit under these definitions. They all share the attribute of providing value that facilitates collaboration.

Why Collaboration Technology?

The basic idea is to use technology to make collaboration efficient and effective, enabling groups to:

- Involve more people in less time
- View the contributions made by others in real time
- Continuously back up work
- Conduct meetings without physical proximity
- Access more relevant information

Collaboration Technology: Classification Scheme

Collaboration technologies are categorized into three types:

- Jointly Authored Pages
- Streaming Tools and
- Information Access Tools

Combinations of the technologies fitting into the categories above are known as aggregated systems.

Jointly-Authored Pages

Jointly Authored Pages enable multiple participants from different parts of the world to collaborate collectively, enabling them to contribute, view and edit information simultaneously. Many variations of Jointly Authored Pages are available. Some of these software programs are free, while others are not. Wikis and Group Support Systems are examples of the types of technologies designed to support instant messaging, threaded discussions, blogs and joint creation of documents. (Jay F. Nunamaker and Briggs 2005) Technologies falling under the umbrella of Jointly-Authored Pages may be further classified into the subcategories: Conversation Tools, Shared Editors, Group Dynamics Tools and Polling Tools. (Mittleman et al. 2008)

Conversation Tools

Conversation tools support dialogue among group members to aid in the creation of Conversation knowledge. **Conversation Knowledge** is the knowledge built in the process of conversation between individuals through the process of questions and answers (Wagner 2004).

E.g. the conversation tool Skype which enables VoIP can overcome many constraints that affect the productivity of teams. When teams must be in constant communication, but carry out individual activities in separate locations, a conversation tool such as Skype can provide the benefits of meetings without the constraints.

Two of the most widely used conversation tools are email and instant messaging. Instant messaging has appeared in many different iterations, cellular based text messaging being the most widely used example. Instant messaging is included in email services such as Gmail and often utilized in customer support. Other examples of conversation tools include: chat rooms, blogs, and threaded

discussion forums. When using an instant messaging service a window pops up when a person sends you a message, allowing the user to work on other processes simultaneously while being alerted to incoming messages in real time. Instant messaging is more synchronous in nature than blogs and discussion threads. Also, the information in blogs and discussion threads exists until it is changed or deleted. In the case of instant messaging or chat rooms the messages entered in the process of communication are often set to be ephemeral; this means if the session between the conversing parties is ended the messages entered are lost. (Mittleman et al. 2008) However, many instant messaging platforms allow chat logs to be saved. Threaded conversations are offered by many vendors in this communication medium.

Shared Editor Tools

Shared Editors enable the creation of jointly authored pages by multiple contributors working in different parts of the world. There are several shared editors available; some examples are Wiki's, SharePoint 360, and Google Docs & Spreadsheets. (Mittleman et al. 2008)

A wiki is a website that enables the creation of user generated content by granting editing access to any user. E.g. a person with interest in widgets could create a page providing a detailed description of a widget including their attributes, history, influence on society, and so on. Other users could edit the widget entry to add content or ensure information accuracy by adding more authoritative sources. While individual user editing privileges are limited when a user attempts to "damage" a wiki by adding inaccurate or biased information, the greatest force keeping the content intact is quick restoration by users. Often a damaged wiki is restored within hours or minutes of the vandalism.

Google Docs is a free, Web-based word processor, spreadsheet, presentation, and form application. Google Docs functions as a shared editor which facilitates collaboration between multiply people by allowing them to see what others have contributed and edit the project at the same time. The variety of mediums supported is a real strength of the platform. Google docs works by maintaining a copy of the project which may be edited in real time by any authorized team member. Groups may edit the project collaboratively by saving all changes made by all members or use a revision function where user's revisions may be compared. Using Google Docs an executive on a trip to Japan could collaborate with colleagues anywhere in the world in real time in a rich medium.

Group Dynamics Tools

Group Dynamics Tools are a set of tools which facilitate jointly authored pages creating, sustaining, or changing patterns of collaboration among individuals making a joint effort towards a goal.

These tools support generating ideas, establishing shared understanding of them, converging on those worth more attention, organizing and evaluating ideas, and building consensus. (Briggs et al., 2006)

One example of a group dynamics tool is a computer network designed to enable anonymous brainstorming. A computer network can handle far more data than traditional methods that require a facilitator to organize ideas written on slips of paper. An attribute of effective group dynamics tools is a high level of customization providing the agility to facilitate unpredictable problem solving processes.

Companies are creating networks though which implicit knowledge in the organization can be documented, cataloged, and accessed by employees. (Frauenheim 2007) Given strong adoption by employees these networks offer great potential to save resources since many inter-organizational questions that previously required direct communication between two or more employees can now be answered with a simple search by one employee. Organizational knowledge can be permanently recorded, preserving competitive advantage even when key knowledge workers leave.

Polling Tools

The polling tools are optimized for gathering, aggregating, and understanding judgments or opinions from multiple people. At a minimum, the shared pages of a polling tool must offer a structure of one or more ballot items, a way for users to record votes, and a way to display results. Polling tools may offer rating, ranking, allocating, or categorizing evaluation methods and may also support the gathering of text based responses to ballot items. (Mittleman et al. 2008) A good polling tool gives users options to customize the structure of questions and analysis. It is important the poll can be tailored to meet the needs of the researcher and enable them to minimize bias whenever possible.

E.g. the free polling tool "Survey Monkey" enables users to create questions and a URL or link is generated which takes anyone to the survey over the World Wide Web. The link is then distributed though some communication means to the desired survey base. Once a sufficient number of responses are captured "Survey Monkey" offers many statistical tools to analyze the data.

Polls are often incorporated into threaded discussions. Most forum software enables users to create a poll which can be incorporated into a thread. Good software allows the user to set parameters such as anonymity so users can voice their true opinions in a quantifiable way. Users may post additional

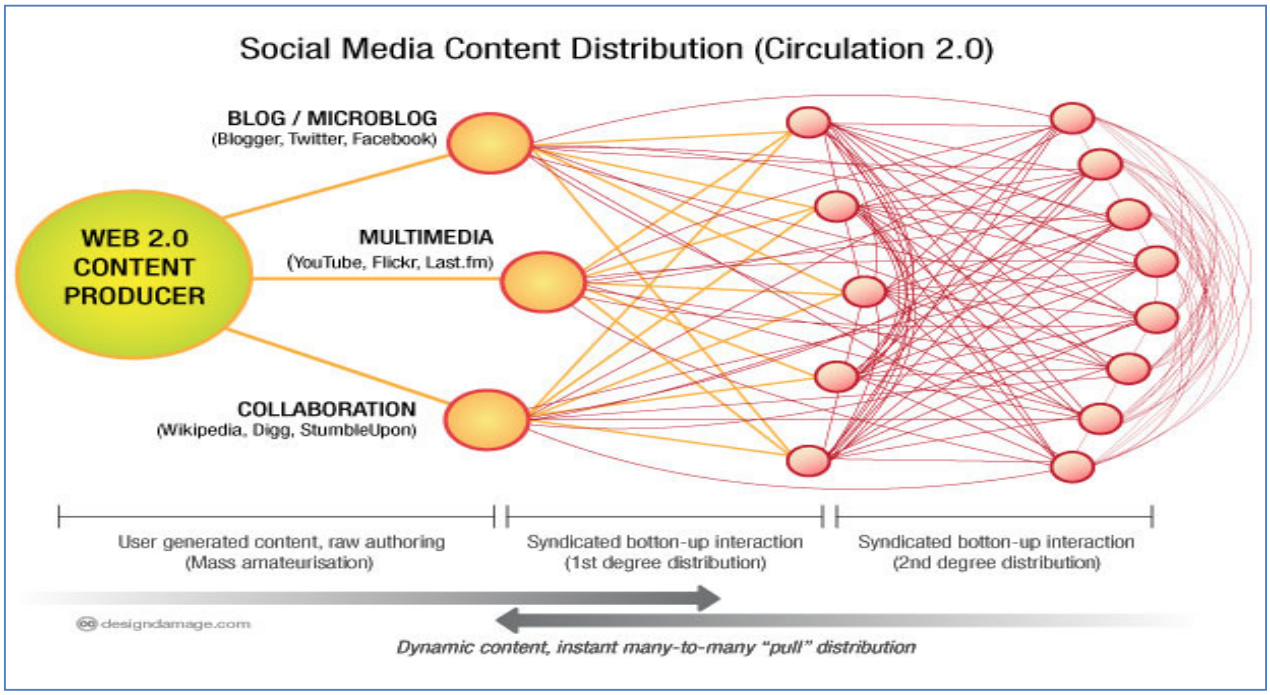
information to help frame the context of the poll and discuss the results.

Streaming Tools

With the tremendous amounts of workers having access to desktop computers or laptop computers, organizations may benefit from taking advantage of programs that enable Desktop Sharing, Video/Audio conferences via streaming, and other forms of internet based communication. Once the platform is in place a user need only internet access to use these technologies.

Streaming Server Technology provides a complete solution for streaming video over IP networks. Streaming Servers provide the capability to multicast, record, store and rebroadcast video and audio over the Internet or Corporate Intranets. Some examples of streaming server technologies are: one-to-many distributions of content, live video streaming, pre-recorded content, live broadcast (camera, VCR), on-demand streaming, and recording (instant and for later distribution).

An example of One-to-Many Distribution:



(http://designdamage.com/blog/index.php/200907/the-evolution-of-media-content-distribution-circulation-1-0-to-2-0/)

In this section we will introduce streaming media tools, and identify key components including audio and video conferencing, desktop, file and application sharing, and remote presentation (Briggs 2009). We will discuss specific examples of how streaming tools can add value to an organization.

Streaming Media is any form of multimedia that is constantly received by, and presented to, an end user while being delivered by a streaming provider. The term “presented” means audio and video playback. The word streaming signifies the uninterrupted delivery of audio and video.

Streaming media applications can be both a blessing and a curse. Firms can quickly and cost-effectively distribute corporate communication across enterprises no matter the distance. On the other hand, YouTube, viral videos and other recreational apps can distract employees, consume tremendous amounts of bandwidth, require powerful CPUs to properly run the programs, and compete with business applications for resources. To maximize the benefits of streaming media, and minimize the cost and risk of recreational use, networks must be carefully monitored. To optimize On-Demand video streaming for business value, there must be differentiation between business and recreation content. Bandwidth-hungry, recreational applications must be controlled, and live video broadcasts over your existing network supported with adequate bandwidth by enforcing corporate policies for network access. In short, you need to identify, optimize and secure all your critical applications.

Streaming tools give organizations the capability to hold conferences or meetings through remote access, the ability to choose how the meeting will be observed by participants, and the ability to share documents or files electronically between participants. Desktop sharing, application sharing, and audio/video conferencing are common examples of streaming technologies which all feature the same core capability, a continuous feed of dynamic data.

Video conferencing is gaining increasing acceptance as a collaboration tool. Its main advantages can be summarized as eliminating the need for expensive travel; making the best use of limited time; and allowing genuine dialogue between participants, along with full two-way communication of content (verbal, pictorial objects, etc.) (Carr et al. 2008) For video conferencing to be effective it must mitigate several barriers such as: limited picture quality, small screen image, and connection problems. (Carr et al. 2008)

As bandwidth increases have been achieved, and businesspersons increasingly carry powerful laptops and smartphones, more firms are promoting new video conferencing solutions. Cisco is heavily promoting its TelePresence technology, even using a self-mocking placement on NBC’s corporate satire “30 Rock”. (Burrows 2009) Prices are dropping. Cisco is rumored to be releasing a video conferencing solution priced at $5,000. LifeSize offers a technology called “Room 200” that can record and transmit full HD 1080p resolution at 30 frames per second. Room 200 costs $17,000. (Garcia 2009)

Desktop and Application Sharing Tools

These tools allow participants to view content on their computer that is being displayed on a remote host computer. Some application sharing tools allow the ability to control the remotely viewed computer through the use of their own keyboard or mouse. (Mittleman et al. 2008) Most applications will give the host the option to share an entire screen or only a portion, in order to keep meeting participants focused on key information (Rodcay 2009). Desktop and Application sharing tools are great for conducting meetings based on interactive software demonstrations, but place a high demand on users PC's so it may not be feasible for all users (Rodcay 2009). Desktop Sharing plays a critical role in Web seminars and conferences.

How can Desktop and Application sharing tools be applied?

- Several programs allow Remote Login which allows users to access their computers from any Internet-enabled device
- By being able to share presentations, teleconferences are more engaging instead of being dry and boring
- Servers may be partitioned into virtual computers having the same capabilities as desktops, but accessed remotely via the internet by multiply users at once.

Remote login is desktop sharing software that allows user to gain access to files located on the host computer via the Internet. All that is required is have the needed software downloaded and installed, have an active internet connection, and make sure the sharing network is secured so that others will not have access to potentially private information. A minor setback with remote login is that both computers must be on at the same time. This effect may be mitigated by choosing operating systems like openbsd that have a reputation for stability and rarely if ever require restarts. Desktop sharing has been traditionally used in technical support applications. As the price comes down desktop sharing will be used in more interesting ways. Web Dialogues is a web conferencing solutions company that offers a free plug-in enabling desktop sharing via programs like Skype or Yahoo! Messenger. (Aronauer 2007)

Application sharing is very similar to desktop sharing, except you are using software to view what is on the other computer or run programs. At no point is the software being ran from the accessing computer. This provides a great benefit to companies of all size as they can now test out software they are interested in without having to commit to spending hundreds if not thousands of dollars to implement it. Another benefit is the ability to run proprietary software from remote locations keeping the underlying code secure.

Audio and Video Tools

These tools offer continuous streaming of content that can either be heard (audio), or seen (video). Audio Conferencing Tools provide a continuous channel for multiple users to send and receive sounds. Video Conferencing Tools allow users to send and receive both sound and moving images (Mittleman et al. 2008). There are currently over a dozen streaming audio formats available on the web. Widely used formats today include Real Network's Real Audio, Streaming MP3, Macro Media's Flash and Shockwave, Microsoft's Windows Media, and Apple's QuickTime and iTunes. Newer formats are available, which synchronize sounds with events on a web page. These formats are RealMedia G2 with SMIL and Beatnik's Rich Music Format (RMF) (Streaming Media Formats). Also available are downloadable formats including Liquid Audio, MP3, Midi, WAV, and AU. The most common video streaming formats include Window's Media Player, RealMedia, QuickTime, MPEG-4, and Flash.

Updates for Windows Media are easy to install and most people using Windows based operating systems have the correct player. Overall, Windows Media performs well, as files are high in quality and low in size. MPEG-4 has been losing popularity in recent years because it is somewhat complicated and confusing to use. Along with that, big players, such as Microsoft, have abandon support for MPEG-4 on their players.

Flash is at a slight disadvantage due to its high price tag (roughly $700 USD (Amazon.com)) and the significant amount of features you will have to invest time in learning so that you can operate the software effectively. Flash is also one of the most widely-supported cross-platform players available and almost everyone has the plug-in that enables them to view Flash made formats on their personal computers.

The types of audio and video formats used will depend on the specific needs of an organization. Before you get started, you need to ensure a few things are in place:

1. **Get management to buy in to the idea of delivering video on the Web.** Web site traffic tends to go up considerably when you add video to your site. Audio and video are richer formats for delivering information. You can use streaming media inside your organization to deliver training material so employees don't need to leave their desks. They can view material as time permits instead of scheduling a training room, an instructor, and time on their calendars.
2. **Determine how the video or audio will be produced.** If there is space and financial commitment an organization can dedicate a room to shoot videos, otherwise high quality webcams may be installed for each participant.

3. **Make sure you will be able to update your content regularly.** If your content doesn't change regularly, people will get bored with your site and won't come back. Some content may not be useful for some users after being on the web page for a long period of time.
4. **Pick a technology and go with it**. For example some use RealNetwork's streaming technology because of the incredible worldwide market penetration of their RealPlayer software. There are other viable alternatives available such as Windows Media Player and Encoder.
5. **Determine how your videos will be hosted.** Some choose to host them on their own because they might have adequate Internet connection to do so and trained staff managing Web servers already. Most organizations have their websites hosted by their ISP and this generally the best option. A growing number of ISPs are providing hosting services. Even if you choose a different ISP than the one that hosts your Web site, you can still have links on your regular Web pages to the videos that are hosted elsewhere.
6. **Determine how your videos will be encoded.** Encoding tools have come a long way in recent years. Any competent IT person can handle encoding.

The use of the Web for streaming tools has exploded over the past years, driven the ongoing competition between RealNetworks, Microsoft, Adobe, Cisco and Apple. Each has developed successive generations of Web media players, and hosted portal sites for streaming media. Streaming Media is more than just listening to music, watching a movie trailer or animation, streaming media is also an underlying set of technologies that can help firms and their employees communicate more effectively by connecting employees, partners, resellers, friends, and customers.

Remote Communication: Web Conferencing Solutions

In a perfect world, members of an organization have the ability and resources to meet face to face in the same location where they can present information and correspond easily through the use of traditional in-house conferencing. However, in today's global landscape, organizations may have great distances between their home office and dispersed branches. With the budget crunch more than ever upon us, organizations must find a way to break down barriers to easily and inexpensively communicate with others. One way organizations can achieve this goal is through the use of Web-Conferencing Solutions. Web-Conferencing Solutions are collaboration software equipped with voice and video sharing capabilities, desktop/application sharing, instant messaging (IM), shared whiteboard, and basic security features (Skeen). Organizations must be able to recognize their specific needs for collaboration when deciding on what type of web-conferencing solution to utilize. This leads an organization to answer a

critical question, whether to implement service, or software (Rodcay 2007).

Service or Software: Which is the Better Fit?

There are two types of Web-Conferencing Solutions available, a hosted service known as **Software as a Service (SaaS)**, or as a Purchased Technology that is installed in house. To decide between which software to use, organizations need to consider how many employees will be using the solution, the number of seat licenses needed, and how much time is spent in conferences. (Rodcay 2007) Once a solution is decided upon, an organization will have plenty of products to choose from. Typically organizations will choose a certain product based on their current technology provider (e.g. use Microsoft software, use LiveMeeting), but should also consider three key criterions when making a decision, 1) Ease of use, 2) Cost, and 3) Experience quality (Skeen 2007).

So where do you start? The first step in the process is deciding which type of web conferencing solution best fits your organization. To illustrate this further we will look deeper at both SaaS and Purchased Technology, and identify what type of businesses would benefit from each.

Software as a Service (SAAS)

(Saas) consists of online hosted services which offer collaboration technologies available for firms, or for individual use. Typically, small to mid-sized businesses with low usage levels or companies that are evaluating different solutions are better off using a hosted service. Smaller businesses or those in transition are better suited for this type of solution because there are usually low or non-existent upfront costs, free upgrades and features when available are included, and the ability exists to adapt to changes because no long term commitment is required. SaaS solutions typically charge a per-user, per-minute fee or a flat-rate, unlimited-use for a specified amount of time. (Rodcay 2007)

Purchased Technology

Usually purchased technology benefits larger organizations that have a greater need for, and higher usage of remote collaboration. In-house solutions have higher upfront costs because of the equipment and software required, but over time companies avoid escalating usage costs. Purchased technology solutions offer organizations greater control over application performance, availability, and firewall security because the application is installed in-house. (Rodcay 2007) Recent research currently shows that 70-80% of organizations using web conferencing solutions use SaaS technologies, but this percentage is expected to drop in favor of in-house solutions because of cost, reliability, and security concerns. (Rodcay 2007)

Organizations may feel that neither solution is sufficient by itself, and may desire both types of solutions in case of contingency events. Many vendors offer web-conferencing tools as both a hosted service or as standalone software. Microsoft is an example of a vendor who offers their product LiveMeeting 2007 as both types of Web-Conferencing Solutions. Cisco's WebEx Meeting Center is another example of software offered in both forms. This may become costly to an organization because in both examples given, each solution must be purchased separately. To avoid the costs associated with purchasing both types of solutions, an organization may consider a product which integrates the two. Interwise is a solution provider who not only offers SaaS and stand alone solutions, but also offers a solution with redundancies which allows the user to seamlessly transit between the two solutions in the event that one should fail. (Rodcay 2007)

Value Creation Using Streaming Tools

So far we have identified what streaming media tools are, how they are integrated into software, the types of software available, and what size organization would benefit from each type of software. We now will discuss how streaming media tools add value to consumers.

The overall purpose of using streaming tools is value creation. Value creation is defined in this context as the way streaming media tools offer a benefit to a consumer by enriching the collaboration process. Streaming tools can add value to processes in a number of ways including offering audio and video sharing capabilities, sharing documents through file transfers and desktop sharing, and cost savings through remote presentation. There are a number of ways people utilize streaming tools depending on what type of software being used, and based on their specific collaborating needs. For example, a teacher may use a media distribution system that allows access to On-Demand video, distance learning, or virtual classrooms in order to enrich discussion content, and maximize classroom time. (Savic 2009)

Web-hosted products are also available for use in online communication. They allow users to communicate over a great distance, including overseas. An example of such product would be Skype. Skype is a web-hosted product that offers communication solutions online. Some features come free such as Skype-to-Skype calls, video calls, instant messaging between users and group IM's, conference calls, and the ability to transfer and forward calls to Skype.

Along with these free basic services, some advanced features which are offered with a subscription fee include: outgoing and incoming calls (to and from land line and mobile phones), ability to send and receive phone mail, a Skype "To-Go" number, ability to forward Skype calls to your phone of choice, sending SMS messages, and the ability to transfer calls from Skype to land lines and mobile phones (Skype). The experience can be further enriched through video calls when both users have web cameras.

Web cameras offer the consumers the ability to “meet” face to face without traveling any distance, which eliminates geographic barriers and saves the users the costs associated with travel.

These are just a few ways streaming tools add value for a consumer through the use of Purchased Technologies.

Information Access Tools

Most, if not all, students have had to work on a group project. Have you ever looked at a photo on a social networking site and found it difficult to recognize an old friend in a photo? During research projects, do you find yourself having difficulty finding information related to your topic? When you are away from your computer, do you find yourself wishing you had access to the most recent status updates of your friends on social networks? If you find yourself in any of these situations then you have a need for information access technologies.

"Information access technologies provide ways to store, share, classify, and find data and information objects." (Mittleman et al. 2008)Examples of products that enable users to access information range from Microsoft Groove to Facebook. These products can be categorized under four categories: shared file repositories, social tagging, search engines, and syndication. These categories don’t necessarily have to be operated independently. For example, Facebook has the ability to tag items, such as pictures within the program; Facebook also notifies the user when an update on their account occurs while allowing the user to search the database as well. To further explain these capabilities, the four categories are explained as follows.

Shared File Repositories

This category of tools enables a team to work on the same file separately, meanwhile updating it simultaneously. Google Docs is emerging as a popular software tool for this purpose. People can create and maintain a document in one location, rather than on multiple computers which must be synced to maintain one congruent file.

Social Tagging

Social Tagging gives users the ability to tag digital objects with keywords within a shared repository. Data in a social tagging repository is not organized by experts; instead data is organized organically by the users’ contributions through tagging. One of the best current examples of social tagging can be found in Facebook, a social networking site. Facebook allows users to tag a photo with

the names of the people in the photo.

Search Engines

Search engines allow users to find digital objects from within a vast database using keywords. Google has played a dominant role in the search engine market. Over the years Google, and other companies, continue to make advancements in search technology. For example, as you input a keyword the search engine will automatically begin to display common searches relating to your keyword.

Another form of search engines students may be introduced to, are those offered by education programs, and referred to as databases. One example is EBSCO. Databases are search engines that help in the research of material by offering results of articles related to the keyword search. Databases may be searched using any attribute of data such as authors, keywords, time frames and subjects.

Syndication

Content syndication for the Internet refers to the controlled placement of the same content on multiple sites or the process of pushing your content to your customers, prospects and other opt-in subscribers. (Belicove 2009) RSS feeds are one example of syndication. RSS feeds enable users to opt-in to a data stream an entity controls. Company announcements and new product descriptions, are two examples of content appropriate for RSS feeds. "The updates, delivered by an RSS feed; show up on subscribers' desktops or web-based feed-reading applications, also known as "news aggregators," where snippets of new content from your site are on display along with a link to the source." (Belicove 2009)

Syndication tools are becoming more common. These tools allow for notifications to be sent when new contributions to pages and repositories are added. Twitter makes great use of syndication technology. Twitter is a website that allows users to send "Tweets", also known as status updates, to multiple people at once. Syndication tools can be helpful especially when immediate information is needed at a minute to minute or hour to hour basis.

Aggregated Technologies

Aggregated systems are a combination of the previously described technologies, configured to interoperate in order to fulfill collaboration needs. Aggregated systems exist because one technology alone may not be sufficient to fully support and execute a task. There are many examples of aggregated technologies including:

- Virtual Workspaces
- Group Support Systems
- Social Networking Systems

Virtual Workspaces make it easier for groups to execute shared efforts toward a common goal by combining tools such as document repositories, team calendars, conversation tools, streaming audio and video, and remote presentation and web conferencing tools. **Group Support Systems** are collections of group dynamic tools which allow for a smooth transition between activities which lead a group toward the completion of a goal. This can be done by generating an idea in one tool, organizing it in another, and putting your final thoughts together in new tool. **Social Networking Systems** are social tagging systems in which the user has access to blog features, streaming tools, search capabilities, and communication abilities through mail or instant messaging (IM). (Mittleman et al. 2008)

Comparing Technology

We have now introduced you to the four types of collaboration technologies including Jointly Authorized Pages, Streaming Tools, Information Access Tools, and Aggregated Technologies. The Technology Comparison Scheme is used to differentiate between the four technologies based on nine key attributes shown in the table below.

Figure 4-1: Technology Comparison Scheme

Core Functionality	Jointly authored page, stream, info access, etc.
Access Controls	Ways to control what users can see and do
Awareness	Ways to inform users their attention is required
Content	Kinds of objects users may contribute
Actions	Things users can do with and to contributions
Synchronicity	Delay between my action and your response
Identifiability	Degree of anonymity for actions
Relationships	Kinds of relationships among contributions and contributors
Persistence	Permanence of content, actions across sessions

The table below is an example of how this scheme is used when comparing technologies. The example illustrates the attributes within Instant Messaging, and Desktop Sharing Tools.

Figure 4-2: Comparing Technologies

	Instant Messaging	Desktop Sharing
Core Functionality	Jointly Authored Page	Data Stream
Access Controls	Permission, Invitation	URL, session key
Alerts / Interrupts	Popup Dialog, Sound	None
Content	Chronologically Ordered text	Moving picture of desktop
Actions	Add, View	View, (Sometimes Add, Edit, Move, Delete)
Synchronicity	Immediate	Seconds
Identifiability	Psuedonym	Identified
Relationships	Chronological Order	N/A
Persistence	Ephemeral, optional, manual	Ephemeral

Summary

- The four types of collaboration technology are jointly authored pages, streaming tools, information access tool, and aggregated technologies.
- Jointly authored pages allow multiple users to contribute, edit and view information simultaneously in a forum.
- Types of jointly authored pages are conversation tools, shared editor tools, group dynamic tools, and polling tools.
- Streaming tools provide the capability to multicast, record, store and rebroadcast video and audio over the Internet or Corporate Intranets.
- Information access technologies provide ways to store, share, classify, and find data and

information objects.

- Types of information access technology include: shared file repositories, social tagging, search engines, and syndication.
- Aggregated technologies are a combination of collaboration tools, to help enrich a process through the use of multiple technologies.

Glossary

Aggregate Technology: Integrated technologies used to optimize a task that cannot be done using one technology alone.

Audio Tools: A continuous channel for multiple users to send and receive sounds.

Conversation Knowledge: The knowledge built in the process of conversation between individuals through the process of questions and answers.

Conversation Tools: Optimized to support dialog among group members.

Desktop/Application Sharing: Allow participants to view content on their computer that is being displayed on a remote host computer.

Group-Dynamics Tools: Optimized for creating, sustaining, or changing patterns of collaboration among people making joint effort toward a goal. (e.g. idea generation, idea clarification, idea evaluation, idea organization, consensus-building).

Jointly-Authored Pages: Technologies that provide one or more windows that multiple users may view, and to which multiple users may contribute, usually simultaneously.

Polling Tools: Optimized for gathering, aggregating, and understanding judgments, opinions, and information from multiple people.

RSS Feed: A web-conferencing tool that is purchased from a vendor and installed in-house to the hard drive.

RSS (Rich Site Summary): A format for delivering regularly changing web content to users subscribed to specific feeds.

Shared Editors: Optimized for the joint production of deliverables like documents, spreadsheets, or graphics.

Streaming Media: Multimedia that are constantly received by, and normally presented to, an end user

while being delivered by a streaming provider.

Software as A Service (SaaS): A web-conferencing tool which allows for online collaboration and utilize streaming tools.

Search Engines: Allow a user to search within a search space a keyword.

Shared-File Repositories: A tool that allows users to store digital objects that can be simultaneously updated from multiple locations.

Social Tagging: Allow a user to tag digital objects with keywords.

Technology: Solution for streaming video over IP networks.

Streaming Tools: Tools which allow organizations the capability to hold conferences or meetings on site or through remote access, the ability to choose how the meeting will be observed by participants, and offers the ability to share documents or files electronically between participants.

Syndication Tools: Provide notifications when new contributions are made to a digital object.

Video Tools: Allow users to send and receive both streaming sound and moving images.

Web-conferencing Solutions: Collaboration software equipped with voice and video sharing capabilities, desktop/application sharing, instant messaging (IM), shared whiteboard, and basic security features.

Thought Exercises

1. What purpose does collaboration technology serve and what are the benefits it can provide to collaboration practices?
2. Identify the four Collaboration Schemes.
3. Provide examples of jointly authored pages, streaming tools, information access tools and aggregate systems.
4. Describe the four categories of information access technologies.
5. Discuss how all types of streaming media support “value creation”.
6. Recognize and compare technologies using the nine key attributes.

Exam Questions

1. All are potential benefits of Collaboration Technology, except;

    a. Involve more people

    b. View the contributions made by others

    c. Spend more time on actual work rather than wasting time on e-mails and in meetings

    d. Access to antiquated information

    e. Have backups of previous versions of documents

2. All of these are types of Collaboration Technologies, except;

    a. Jointly Authored Pages

    b. Streaming Tools and

    c. Information Access Tools

    d. Postal Communication Tools

3. Conversation Knowledge is…

    a. the knowledge built in the process of conversation between individuals through the process of questions and answers

    b. the knowledge you use to converse with peers online.

    c. not a term associate with collaboration technology.

    d. information coming from a study of conversation

4. Which is of these is a criterion used when deciding between software or service solutions?

    a. Functionality

    b. Scalability

    c. Ease of Use

    d. Product Brand

5. Which of the following is an example of an Information access technology?

    a. Google Messenger

b. Video Conferencing

c. Wikipedia

d. Facebook

6. _____ are technologies that provide one or more windows that multiple users may view, and to which multiple users may contribute, usually simultaneously.

7. _____ are optimized for the joint production of deliverables like documents, spreadsheets, or graphics.

8. Multimedia that are constantly received by, and normally presented to, an end user while being delivered by a streaming provider are _____.

9. A tool that allows users to store digital objects that can be simultaneously updated from multiple locations is _____.

10. This jointly authored, tool known as_____ allows for gathering, aggregating, and understanding judgments, or opinions from multiple people.

Solutions for Exam Questions

1. d
2. c
3. a
4. c
5. d
6. Jointly Authored Pages
7. Shared Editor
8. Streaming Tools
9. Shared File Repository
10. Polling Tools

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Chapter 5

Facilitation

Goals

This chapter will provide a better understanding of:

- What is facilitation?
- Why should you care about facilitation?
- Why there is a need for facilitation in group meetings
- What is a facilitator?
- What does a facilitator do?
- What makes a good facilitator?
- What are ThinkLets?
- How facilitation relates to the Seven Layer Model
- Things to remember

Introduction

When an organization has an issue or a goal they are striving toward there may be roadblocks. There will probably be controversy with how to complete the task at hand or how they will obtain the goal. An organization may find itself with so many ideas that it finds itself wondering what it will do with all the ideas and how it will choose the best way to reach its goal. Bringing in an outside source - an outside view on the task - is sometimes the best option an organization has to get the job done in the best possible way. This is where a facilitator and facilitation come into action. **Facilitation** is the process of enabling groups to work efficiently, effectively and cooperatively toward a common goal. A **facilitator** is a person who leads the facilitation process; he leads the group in the right path toward the common goal of the organization (Gaffney, 2000).

Facilitation

It is a proven fact that most managers spend a majority of their time in meetings. In the United States alone, approximately twenty million meetings take place daily (Vreede, 2002). Unfortunately, the time spent on these meetings is generally seen as wasted time by over half of the participants. What does

this mean? Basically companies are throwing away billions of dollars on ineffective and inefficient meeting practices. Luckily for these companies, the dilemma can be resolved if they are willing to take the time and energy to research the facilitation process. Knowing what facilitation is and how facilitators can improve their companies, can help in making company meetings more both effective and efficient.

So what is facilitation? Simply put, to facilitate means to make things easier (dictionary.com, 2009). However, just because it makes things easier does not mean it is easy. **Facilitation** is a dynamic process that involves managing relationships between people, tasks, and technology, as well as structuring tasks and contributing to effective accomplishment of the meeting's outcome (Vreede, 2002).

This process can be implemented before, during, or after a meeting to help the group achieve its own outcomes (Vreede, 2002). Doing the following before a meeting can help in facilitation: identifying hopeful outcomes, identifying who should be present at the meeting, determining the appropriate time and place, and creating an agenda (Halverson, 2008). Keep in mind that preparing for a meeting is not limited to these few items. During a meeting the following could help but are also not limited to: clarifying the purpose of the meeting, defining the expected outcomes, agreeing on the given agenda, assigning roles for each member, maintaining a balance between the content and process of the meeting, and evaluating the meeting. Lastly, communicating the happenings and acting on the decisions made in the meeting help facilitate after the meeting (Halverson, 2008).

Facilitation is made up of two different tasks, **task interventions** and **interaction interventions**. Task interventions focus the participants' attention on the group task while interaction interventions enable, assist, or simplify the communication between meeting participants.

Task Interventions include (Vreede, 2002)**:**

1. Planning and designing the meeting – steps taken before meeting is held. Activities and agendas are made based on the desired outcomes of the group.
2. Keeping group outcome focused – Clearly stating what is expected of the group; displaying intermediary results to the group; letting the group visually see progress as it works toward the outcome.
3. Selecting and preparing appropriate technology – selecting proper technological tools that will aid in accomplishing desired outcomes.
4. Directing and managing the meetings – facilitator gives a brief overview of what the meeting will consist of and how they will go about achieving desired goals.

5. Developing and asking the right questions – asking questions that will encourage participation.
6. Promoting ownership and encouraging group responsibility – facilitator encourages the group to be responsible for accomplishing meeting content.
7. Understanding technology and its capabilities – facilitator needs to be comfortable solving simple technical problems and understand different tools function.
8. Creating comfort with and promoting understanding of the technology and technology outputs – facilitator should be able to educate the group on how to use the technological tools available which aid them in their group work.
9. Presenting information to group – giving clear and explicit assignments; offering group written information if needed.

Interaction Interventions include (Vreede, 2002)**:**

1. Listening to, clarifying, and integrating information – listening to group and understanding them; clearly stating goals, agenda, and definitions
2. Creating and reinforcing an open, positive and participative environment – Stimulating participation and controlling dominant behavior to promote equal participation.
3. Actively building rapport and relationships – developing a good relationship among and with participants.
4. Managing conflict and negative emotions constructively – asking for opinions and working to gain consensus when opinions differ.
5. Encouraging and supporting multiple perspectives – offering ways to open up different frames of reference and other ways to see things.

Facilitator

A **facilitator** is someone who uses some level of intuitive or explicit knowledge of group process to formulate and deliver some form of formal or informal process interventions at a shallow or deep level to help a group achieve what they want or need to do, or get where they want, or need to go. They are also an impartial moderator of a group process and are responsible for the preparation, structuring, and simplification of group interaction and collaboration in order to make a group achieve its goals (Vreede, 2002).

Now that we know what a facilitator is, let us examine the four functions of a facilitator. These four functions help to explain what is exactly to be expected of a facilitator and the description as to why meetings should be led by a facilitator. The four functions of a facilitator are: the facilitator as a process guide, the facilitator as tool giver, the facilitator as neutral third-party, and the facilitator as a process educator (Straus, 2002).

The Facilitator as Process Guide

There are always two parts of a conversation; the process, how people are interacting and the content, what they are talking about. It's almost impossible for a single person to lead, and manage both of these aspects of a discussion at the same time. This is where the role of a facilitator comes into action. If a manager, or leader of an organization tries to lead a meeting where a discussion is at hand, or a goal is trying to be reached, the meeting could be biased as to what the manager believes. The role of the facilitator is to be guidance of the meeting. By bringing in a facilitator the manager does not have to worry about leading the group in discussion, they can partake in the discussion without manipulating the final discussion points (Straus, 2002). In simple text, the process guide, the facilitator, does not contribute to the discussion or input their own ideas; they simply listen, and keep the group on track. The facilitator is not the leader, they keep the group on track by; offering process suggestions, enforcing rules, keeping the discussions on track, and ensuring that everyone participates (Straus, 2002).

The Facilitator as Tool Giver

In being a facilitator you should pose the skills of decision-making methods and problem-solving ideas. The facilitator should be able to get the group through any rough spots, at any given time, using the skills they have incurred. This is explained by being a tool giver, providing the necessary actions and methods, to get the group through the meeting (Straus, 2002). In keeping the group focused and on the right track, the facilitator has avoided multi-headed animal syndrome-everyone heading off in different directions, while using multiple processes (Straus, 2002).

The Facilitator as Neutral Third-Party

The third function of a facilitator is easily defined within the title: **neutral third-party**. The facilitator has to come into the meeting with no biased information (Straus, 2002). It's not that the facilitator won't have their own input about the subject at hand, or their own opinion. However, it is not the facilitator's job to input their opinions; it's the facilitator's job to be the neutral, unbiased third party

that guides the discussion to be as productive as possible. A facilitator does not have to be an outside source to the company that needs a facilitator, they can be a person who is not involved in that specific group or that specific topic at hand; however, to completely ensure the unbiased affect of a facilitator an outside source may be beneficial (Straus, 2002).

The Facilitator as Process Educator

The final function of a facilitator is, once again, easily interpreted by the title. The process educator role in simple terms; the facilitator must not only guide the group to success through the methods learned, but help to inform and educate the group about what steps the group is taking to achieve their goal, throughout the meeting. The facilitator can help the group learn the steps and actions they are taking, so they can in turn apply it to situations in the future. Perhaps one day the need for a professional facilitator can be eliminated due to the company's employees learning the methods, and applying the methods (Straus, 2002). How does a facilitator educate without taking time away from the groups' objectives? All that needs to be done is, as the facilitator guides the group through a fluid meeting; simply say, for example, "OK, we have just finished brainstorming a list of ideas. We are at a strategic moment. We have several choices as to how to proceed. There are several ways we could organize and order this list. One of them might be to review the list and clarify those that you don't understand. Or, we could begin by eliminating those that are obvious duplicates. I would recommend that you begin by clarifying first so that you are certain of understanding what each item intended before you merge or combine it with another.

Why Should You Care About Facilitation?

Think about a meeting that you have gone to in the past. How was it? Did you feel it was a successful, productive and well-organized meeting? Or was it poorly organized and deemed a failure in your eyes? In both cases, the beauty of facilitation is upon you. In poorly organized, failed meetings, facilitation is either non-existent or the facilitator has not prepared him/herself fully to take on the task at hand. Because of this, you deem the meeting a waste of time and feel that nothing has been accomplished. Frustrated employees, wasted money, and wasted time are all that are gained from the failed meeting. Now think about how this meeting could have been improved. Was there a facilitator leading the discussions or was it more of a free-for-all? Was an agenda prepared and given out in advance, or were topics covered at random? Making subtle changes to how meetings are held can have dramatic effects. Think now to a meeting that you felt was well- prepared and executed properly. What made it run so smoothly? Chances are that there was a facilitator in charge of keeping the group meeting

on track and making sure the group accomplished the goals asked of them. From a participant's point of view, facilitation is typically the most critical factor for successful meetings. So why should you care about facilitation? Facilitation improves meetings by making them more effective, efficient, and cooperative.

Facilitation in Group Meetings

Let's be realistic, meetings fail. There can be dozens of reasons why meetings don't end up the way the participants want to. One of the most common reasons is the process design, there has to be consensus over the meeting's rules and how it will advance. This requires time, if not given sufficient time, no consensus is possible and failure is eminent. Another critical factor is goals; these have to be clear and attainable. Further more, you want these goals to be set before the meeting starts. That's what an agenda is for! As the third example: the participants themselves, the way they act and react in meetings defines the atmosphere. For instance, if one is too dominant, he will be most likely to keep the more introvert people from ever saying anything. Thereby eliminating any advantage a meeting could ever have. The technology being used is another common factor that can make or break a meeting. If the wrong technology is called upon for a certain type of meeting this can have the absolute opposite effect of what it is meant for. The facilitator, however, is the most critical factor; which is exactly why you are reading this chapter. The facilitator is responsible to come up with solutions for all of the problems mentioned above, and he or she is perfectly equipped for the task.

By no means are we implying that by implementing proper facilitation techniques a company will magically turn around and be successful. It takes time and dedication to make sure that facilitation is welcomed and given a chance to flourish. In order for group meetings to be successful, the facilitator must be well prepared. If the facilitator fails, the group meeting will fail. Prior to the meeting, the facilitator must have the meeting planned out, and the agenda set. He or she will continuously evaluate how the group is operating, notice dangers to the process and then administer techniques to adjust the group operations in order to achieve the greatest efficiency. He or she is also responsible for selecting, implementing and utilizing the correct technology. As you hopefully see by now, the facilitator really is the key to better meetings.

Six Tensions of Group Activity (Workshops, 1999)

Next we will talk about six tensions of group activity, as laid forth by Sivasailam Thiagarajan. These six tensions are critical factors that can enhance or destroy group activities. They are all factors that

the facilitator will have to deal with. Yet there is no configuration set for these tensions that guarantees success. It's the exact opposite. Before and during a meeting, a facilitator will have to be constantly aware of any changes in these tensions, and either decides to go along with it if it improves flow or tries and steers away from it if he feels it endangers the process. The six tensions are as follows:

Structure

First the facilitator should evaluate the group **structure**. This is a measurement of the rigidness or flexibility within the group activity process. Structure exists from very loose to very tight. At its *loosest* level, a group makes up the rules of the meeting as it goes along, or "on the fly", and uses these rules arbitrarily. Moving up the spectrum, a *loose* structure explains the rules only when needed, applying them loosely. A *neutral* structure simply gives an overview of rules and enforces them flexibly. When using a *tight* structure, the rules are announced in the beginning and they are enforced fairly strict. Finally, the *tightest* group structure: here the rules are explained in details at the beginning of the meeting, and they are rigidly enforced throughout the meeting.

Pace

Next the facilitator evaluates the groups **pace**. The pace reflects how rapidly or leisurely the group activity moves. Pace is measured from slow to fast. At its *slowest* level, the activity is constantly slowed down; a *slow* pace keeps the activity proceeding, however there's no slowing down. A *neutral* pace moves at a comfortable pace; there's no slowing down nor are there incentives to speed things up. At a *fast* pace the process moves fairly fast, while at the *fastest* pace, participants are constantly rushed and tight time limits are imposed.

Interaction

How group members relate to each other is known as **interaction**. These interactions can either be competitive or cooperative. When the group's interactions are at its *most competitive* level, "cut-throat" competition is encouraged by constantly viewing winning as the only goal, with a reward that is usually given to the winner. *Competitive* interaction keeps score and encourages participants to outperform their opponents. A *neutral* interaction maintains a balance between cooperation and competition. When having a *cooperative* level, the group stress lies on encouraging participants to help each other and it de-emphasizes scores. Finally, at the *most cooperative* level focus lies on external threats and obstacles through maintaining a high level of cooperation.

Focus

The **focus** of a group determines how the meeting will move to its deliverables, either they will focus on maximum efficiency or they want it to be an enjoyable process for all the participants. Thus, focus ranges from *most results-focused* to *most process-focused*. The *most results-focused* has a constant emphasis on goals, results, and outcomes of the activity. Regular r*esults-focused* de-emphasizes the idea of enjoyment during the activity and focuses mainly on getting the job done. A *neutral* focus balances enjoyable procedure and efficient results. *Process-focused* groups attempt to keep the activities enjoyable, and the *most-focused* groups keep all activities interesting, playful and creative.

Concern

Concern constitutes whether a group will focus more on individual or on the group needs during the meeting process. This ranges again from *greatest individual concern* to greatest *group individual concern.*

Control

Control describes the facilitator's role as group members look for directions and validation. At the *most external* level of control, the facilitator takes a leadership role by providing authoritative advice and evaluation. On the *External* level the facilitator takes a consultant role, in which he gives suggestions and feedback without being asked to do so. *Neutral* maintains a balance between participating and withdrawing from group activities. An *internal* level of control is taking a background role by the avoidance of giving suggestions and feedback. The *most internal* facilitator will be unobtrusive and let the group decide what is valuable to them. This is in fact most of the times a cultural decision. Some cultures feel that the facilitator should not be dealing with the content, and keep his opinions or advice to himself. If others want the facilitator to speak his mind, they pay him for it, don't they? It's the facilitator's task to find out how the group he's working with feels about this.

A facilitator, in most cases, should avoid the extremes of the tensions; but beyond that, he or she may use a variety of exercises to increase or decrease the elements in each tension. Though a facilitator may use many creative ways to adjust tensions, here are some basic examples of these methods:

	↓	
Structure	Explain the rules and stress their importance. Have them visible at all times.	Introduce rules only when it is really required. Otherwise go with the flow.
Pace	Announce and implement minimum time requirements	Insist on review and revision
Interaction	(Competitive) Use scoring system and rewards.	(Collaborative) Use multiple criteria for determining effectiveness.
Focus	(Effectiveness) Have everyone commit to getting the job done.	(Process) Introduce game elements.
Concern	(Group) Identify dominant characters and offer them multiple responsibilities.	(Individual) Divide teams in groups of equal skill.
Control	Ensure external command and control. Make sure everyone agrees with that.	Refer questions back to the group.

(Workshops, 1999)

Groupthink

Groupthink can be defined as a situation where all members jump onboard with one idea and go along with it. No one may speak up and point out flaws in logic for fear of being outnumbered by the group. There are multiple reasons for this to happen, for instance, there are many known cases where powerful social pressure is laid upon people who voice objections to a group consensus.(Lanis, 1971) Therefore whenever someone feels the group has pretty much reached consensus, he or she will no longer fight that idea. Groupthink can become so strong that realism and alternative courses of action simply seem to disappear. This especially happens if people are motivated to avoid being harsh and extremely critical in their judgments. Groupthink is more likely to happen in an amiable atmosphere.

There are a couple of symptoms that point towards the possibility of groupthink occurrence

(Lanis, 1971):

- Invulnerability: Most or all of the members within a group have a shared feeling of vulnerability. This makes an eventual outcome that can have serious repercussions suddenly seem less dangerous.
- Rationale: Groups ignore warnings; they rationalize that their actions will bear results.
- Morality: When caught by groupthink, the entire group believes in the inherent morality within the group. This makes them ignore ethical or moral consequences of their actions.
- Pressure: Members who attempt to question the reasoning being made are immediately pressured to fall back in line with the rest of the group.
- Self-censorship: People, who feel doubts, will start to minimize the importance of their reflections.
- Unanimity: A feeling of unanimity engulfs the entire group. Although everyone may disagree inside, they think everyone else agrees and thus decides to keep their feelings and ideas to themselves. Thus, a group can come to a conclusion that is supported by none of its members.
- Mind guards: Some people might keep information away from leaders, because they feel the extra information will shake the foundation the leader is making his decisions on. And they think the decision is the right one.

By having a facilitator present, groups are less likely to engage in groupthink because the facilitator has several ways to counter it:

- Have someone play the role of devil's advocate. This person will always be questioning reasoning and pointing out potential problems with the idea.
- Do not mistake silence for consent. Ask for silent members opinions. Welcome discussion.
- Break group down into subgroups and have each discuss newly proposed ideas.
- Don't state opinions too early
- Allow enough time for participants to make good decisions.
- Reward critical thinking, and appoint everyone the role of critical evaluator.
- When assigning a mission, do not state requirements or wishes.
- Before agreeing to an idea, force everyone to say at least 1 critical idea.

What Does a Facilitator do?

A facilitator should first decide on which position they should take while helping with group work (Vreede, 2002). Should they focus more on the content, the process, or a mixture of both? Content-based facilitators have knowledge of the content and process simultaneously. In some cultures, this is accepted, while in others they feel the facilitator is there to aid them along the process, not to offer any advice that may address content of the company. Process based is focused solely on how to move the group along the meeting process and the facilitator must not have any input on meeting content. A mixture of both, process and content, would allow the facilitator to have enough knowledge of the meeting content to understand what is going on, but not enough to have a strong opinion that may have an effect on the group members. This would help the facilitator get through the process easier and without as many questions.

No matter how hard a facilitator may try, content interference is bound to happen. It cannot be avoided. The interference happens due to the facilitator asking questions, formulating problems, or summarizing intermediary results.

Like most other jobs out there, facilitators have a list of activities that are useful for them.

Some useful activities for facilitators are:

- Create situations that stimulate learning
- Set a code of conduct for behavior
- Monitor information coming in and out of the group
- Participate as an expert
- Prevent stress and attacks from distracting team
- Monitor and confront members on group progress

What Makes up a Good Facilitator?

Good facilitators should be able to influence others without being influential. They have understanding that inevitably they will gain knowledge of the content that may interfere with the group if allowed to be influential. Good facilitators will do what they can to minimize the amount of influence they have over the group members.

Facilitators should have the following characteristics: (Vreede, 2002)

- Good communication skills
- Be flexible – able to modify their group activities before and during use
- Be understanding of the group and the group's goals
- Be able to focus on the task at hand
- Have strong leadership skills
- Lack ego-centricity
- Be self conscious
- Proactive – before using a group activity, facilitator will modify it on the basis of the characteristics of the participants and the purpose of the activity
- Responsive – being able to make modifications during the group activity to keep the different tensions within acceptable ranges
- Resilient – being able to accept whatever happens during the group activity as valuable data and smoothly continue with the activity
- Be adaptive – being able to modify their group activities along six critical tensions

(Workshops, 1999)

ThinkLet

A **ThinkLet** is an intervention to achieve a certain pattern of collaboration (Vreede, 2002). ThinkLets are composed of three parts: a tool, a configuration, and a script. Tools can be anything from notes to whiteboards or anything in between. Configuration is how the process is designed. Numerous factors can be changed with the configuration that will have an impact on the results. Scripts are instructions on how to use the tool and configuration to accomplish the task. Even though the same tool and configuration may be used, results can vary significantly depending upon the script (Vreede, 2002).

Facilitation & Seven Layer Model of Collaboration

The seven- layer model has been broken down into piece-by-piece and described in the previous chapters. This section will cover the relationship between the facilitator and the seven- layer model. The seven- layer model of collaboration is the basic foundation of collaboration. It is important to know that the facilitator should come into action throughout each of the seven layers. In each of the seven layers, the facilitator guides the group to complete that layer, which in turn gets the group to their desired goal.

As far as the goal layer is concerned, we can state that the facilitator is brought in to help the group formulate, understand and obtain the group goal. First, it is important that the facilitator knows, understands and maybe influences the private goals of each team member. For example, he or she has to make sure that mutually exclusive goals are avoided. Second, the facilitator has to formulate the group goal. Hereby, the facilitator has to make sure that the perceived instrumentality is positive for all the members. **Perceived instrumentality** is the degree to which a stakeholder judges that outcomes of a proposal would increase likelihood or utility of private goal attainment. If team members perceive that they will attain their private goals by putting effort into the group goal, the collaboration process is more likely to succeed.

In order to attain the group goal, the facilitator establishes the deliverables. Since the facilitator has identified the desired outcomes to the group, he or she knows what the team has to achieve in order to fulfill the personal and group needs. The facilitator has to keep the group focused on the deliverables all the time and avoid distractions.

In consultation with the organization's management, the facilitator will guide the group through the other layers. He or she will establish activities that support the deliverables. If we know what the group has to do and why, the facilitator helps designing how they can achieve the group goal. The facilitator prepares, selects and understands technology. This gives him or her the ability to fit the technology to the patterns of collaboration and the ThinkLets. After the appropriate tools are selected, he or she explains the scripts and educates the group.

The Seven Layer Model of Facilitation

Along with the seven layer model of collaboration, there is another seven layer model that is devoted to the facilitation topic. The facilitator's layer model was formulated to describe the facilitator's point of view or what is to be expected when in the role of a facilitator (Macaulay, 86). The seven layers in order are as follows: Environment, Technology, Activities, Method, Personal, Social and Political.

Each layer is described through the functions a facilitator will perform. The descriptions of the seven layers are stated in a way that describes what they must do in each layer.

First, the facilitator must create an environment that is conductive to learning and participation. He or she has to oversee the meeting and control dominant behavior. Second, the facilitator must select an appropriate technology that supports goal attainment. He or she must have an understanding of its functions and possibilities of the various tools. Third, the facilitator takes control of the agenda of the meeting, and makes summaries at appropriate points. It is important that the activities can be done and led to the deliverables. Fourth, the facilitator has to understand and explain the methods that are needed to be used in the meeting. Fifth, facilitators must be aware of their own feelings, body language, behaviors, and be able to think on their feet. Sixth, a facilitator has to be able to deal with cultural differences, be sensitive to verbal and non-verbal cues, identify individual differences, and build the team spirit. Finally, he or she has to be sensitive to organizational differences, deal with internal power struggles, and be clear about the objectives of the sponsor (Macaulay, 87).

The table below displays a summary of the Seven Layer Model of Facilitation:

Layers Model	The tasks completed in each Layer
Environment	Planning, preparing, and handling logistics
Technology	Selecting, preparing and operating appropriate technology
Activities	Selecting, preparing and instructing appropriate group activities
Methods	Selecting, preparing and following appropriate methods
Personal	Preparing the facilitation role and being self-aware
Social	Getting to know the group or as much info about them as possible and dealing with group dynamics and conflict
Political	Understanding different stakes and perspectives and dealing with politics

Things to remember

- Facilitation does not guarantee success
- Various collaboration techniques offer great potential in the workplace as well as other areas of life
- Conscious efforts on behalf of companies can make collaboration skills available to larger proportion of the workforce
- Conscious design efforts on behalf of companies can help workforce adopt productive, repeatable collaborative work practices

Key Terms

- Concern
- Control
- Facilitation
- Facilitators
- Focus
- Groupthink
- Interaction
- Interaction intervention
- Task intervention
- ThinkLet
- Pace
- Perceived instrumentality
- Structure

Exam Questions

1) Name and describe the two tasks that make up facilitation:

   Facilitation is made up of two different tasks, task interventions and interaction interventions. Task interventions focus the participants' attention on the group task while interaction interventions enable, assist, or simplify the communication between meeting participants.

2) Give five characteristics of a good facilitator:

   a. Good communication skills
   b. Flexible – able to modify their group activities before and during use
   c. Understanding of the group and the group's goals
   d. Able to focus on the task at hand
   e. Strong leadership skills
   f. Non ego-centricity
   g. Self conscious
   h. Proactive
   i. Responsive
   j. Resilient
   k. Adaptive

3) Which parts of the Seven Layer Model relate to facilitation?

   All layers play a part in good facilitation

4) What is the purpose of facilitation?

   a. To increase productivity in groups
   b. Make life easier

Glossary

Control: The facilitator's role as group members look for directions and validation.

Facilitation: The process of enabling groups to work efficiently, effectively and cooperatively toward a common goal.

Facilitator: A person who leads the facilitation process, they lead the group in the right path toward the common goal of the organization.

Focus: The importance of positive procedure verses efficient results.

Groupthink: A situation where all members jump onboard with one idea and go along with it.

Impartial Outsider: A person that can lead the a meeting without influencing the decisions being made.

Interaction: How group members relate to each other.

Interaction Interventions: Enables, assists, or simplifies the communication between meeting participants.

Pace: How rapidly or leisurely the group activity moves.

Perceived instrumentality: The degree to which a stakeholder judges outcomes of a proposal.

Structure: Describes how rigidly or flexibly the group activity.

Task Intervention: Focus' on the participants' attention on the group task .

ThinkLets: An intervention to achieve a certain pattern of collaboration.

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Chapter 6

The Creative Problem-Solving Process

Introduction

This chapter will teach you how creativity is encouraged and used in everyday life. **Creativity** is a mental characteristic that allows a person to think outside the box, which results in innovative or different approaches to a particular task (Business Dictionary 2009). It only arises when ideas are new and useful to an individual or an organization (Amabile 1989; Mumford et. al 1996). For example, you will not get credit for making another ordinary pen. NASA, however, had a great invention when they created the space pen that writes without the use of gravity. It took creativity to make a new product that was useful to the space organization (About.com 2001).

Who should care about creativity and innovation? Individuals that drive prosperity are of the utmost importance. From the people who first used a sharp rock as a knife to the continuous search for alternative energy, humans are always making attempts to be creative. The ability to encourage and employ creativity in the workforce and within oneself will prove to be a very useful tool in life.

Research has come up with multiple ways to boost creativity. This chapter will provide you with an overview of these methods by elaborating on the general problem-solving framework. It will also explain how creativity ties into each step. When you are finished with this chapter, you should be able to:

- Define a specific problem to encourage a creative answer
- Increase creativity through information search
- Master some techniques to generate more creative ideas
- Evaluate generated ideas and make an appropriate selection
- Successfully complete an implementation plan

Problem Identification & Construction

Problem Identification involves a clear and precise understanding of the issue at hand. It is crucial that the problem is identified, understood, and defined in its entire capacity, as it affects all the subsequent activities involved in the problem-solving process. It is also useful to use creativity to first define the parameters and problems associated with the primary goal(s). This can be done on an individual and/or group level. First, we explore the idea of individual creativity, which is the most critical element in team creativity (Illies and Reiter-Palmon 2004). Factors like personality, motivation, and cognitive processes all have an effect on individual creativity. A **cognitive process** is a “psychological process involved in

acquisition and understanding of knowledge, formation of beliefs and attitudes, decision-making and creative problem solving (Business Dictionary 2009)." This model is based on three elements: expertise, creative-thinking skills, and intrinsic task motivation (Robbins and Judge 2009). First, **expertise** enhances creativity because one comes equipped with the knowledge and past experiences of their particular field. The more proficient an individual already is at any given task, the more likely they will be to generate new and novel ideas for that task. The second part of this model is creative-thinking skills. **Creative-thinking skills** take into account personalities, the ability to use analogies, and the talent to see the familiar in a different light (Robbins and Judge 2009). The ability to use analogies relies on the idea of being able to apply an old experience to a new one. Seeing an old problem in a new way can often lead to a creative solution. The final key to this model is intrinsic motivation. **Intrinsic motivation** is the desire to work on something because it is interesting, involving, exciting, satisfying or personally challenging (Robbins and Judge 2009). Motivation is the key to actuality, and intrinsic motivation allows an individual to stay involved because it is something they genuinely like to spend time doing. Applying these three concepts on an individual level will help foster creativity.

Focusing on how the problem is defined will help to remove barriers that could lead to an erroneous route in the problem construction phase.

When constructing a problem, it's important to take into consideration how the individual will view the problem and how they will apply their skills to it. Constructing the best solution requires asking the right questions. As Albert Einstein once said: "The formulation of a problem is often more essential than its solution, which may be merely a matter of skill". Any given problem can be worded multiple ways leading to a multitude of different causes, proposed solutions and responses. Depending on how a problem is presented will determine which direction an individual or team will take to come up with a solution. Say there are mice in the basement of a home. There are multiple ways of presenting this problem but all will lead to different solutions.

- How do I get rid of the mice in the basement?
- How did the mice get in the basement?
- How do I get the mice to leave the basement on their own?
- How do I learn to peacefully coexist with the mice?

For example, take one of the questions above, how did the mice get in the basement? This problem statement will steer an individual or team towards a solution that prevents mice from entering the basement. On the other hand what if we were to ask how do we get rid of the mice in the basement? The individual or team will move towards a solution that might involve traps. In conclusion, there are many

possible solutions to any given problem it is just a matter of how the problem is constructed that will determine the direction taken to obtain the solution.

Information Search

This section will discuss the types of information that can be used to increase creativity. To understand why the information search stage is important in the creative problem solving process, we use the following example. Suppose there is a team of aircraft designers that have been working on a project for two years and they know every specific detail inside and out. One day, this group finds out that the wings they were planning on using do not fit the body of the plane. This is a problem that they have not encountered before. In order to find a solution the team has to search outside the company, the team, or even the problem itself. This section will show the best approach to searching for information in order to solve problems creatively and efficiently.

Information Types

There are two types of information that are helpful in increasing creativity: internal and external. **Internal information** comes from within an individual. This information could be prior or general knowledge and includes information that the individual possesses before starting the research process. Internal information is different for each individual because it is based on their past experiences and personal background. **External information** would be the information an individual finds when he or she is doing research. This would be information that is not commonly known by the average person. External information could be found through the internet, books, journals, other individuals, etc. A good way to access external information is to use a knowledge base source. This is a searchable database or software that contains information on a particular topic. It contains frequently asked questions about the topic, information on known issues, how the topic works and what can be done with it. Knowledge base sources can provide that extra bit of information that helps an individual come up with their problem construction and alternative solutions.

Creativity Increase or Decrease During Info Search

If the goal is to be creative, there are strategies that can increase creativity while searching for information. There are, however, actions or behaviors that need to be avoided because they could decrease creativity.

Increasing Creativity

One of the more effective ways to increase creativity is to put time and effort into searching for information (Illies and Reiter-Palmon 2004). In order to retrieve diverse information, different strategies are used depending on whether it is retrieved by an individual or a team. Forming a team, doing an experiment, or conducting interviews expands and creates diverse internal information. However, in a team, internal information is not completely shared among all members.

A factor that would increase the diversity in a team, which would also inadvertently increase the creativity, is the frame of reference. **A frame of reference** is a set of norms, values, or ideas that affect the way somebody interacts with others, either in everyday life or in a particular situation (Encarta 2009). A barrier mentioned above for a team is retrieving the internal information from other team members. Members could be shy or think that their information is irrelevant. However, what is not relevant to one member could be relevant to another. Better yet, one piece of irrelevant information from one member could trigger relevant information from another member. The following are ways to bring out internal information:

- **Brainstorming** – is the "process for generating creative ideas and solutions through intensive and freewheeling group discussion. Every participant is encouraged to think aloud and suggest as many ideas as possible, no matter seemingly how outlandish or bizarre. Analysis, discussion, or criticism of the aired ideas is allowed only when the brainstorming session is over and evaluation session begins. See also lateral thinking and nominal group technique (Business Dictionary 2009)."
- **Discussion Group** – is an "informal and voluntary gathering of individuals (in person, through a conference call, or website) to exchange ideas, information, and suggestions on needs, problems, subjects, etc., of mutual interest. Discussion groups are one of the mainstays of the popularity of internet" (Business Dictionary 2009).
- **Speak/write method** – is the process of allowing group members to simultaneously state their ideas. This can be done on a piece of paper that is passed around the group or by computer software that allows users to post and view other members' ideas.

To gather diverse external information implies searching through different types of sources that could increase ones creativity. Using Internet and book sources can help in research, but there are many other things that can be done to expand on information about a topic. Going out and observing the environment can lead to additional data. Giving surveys to people who interact with the topic can also

provide unique insights that may have not been noticed otherwise. Setting up an experiment to reenact the problem can also help individuals collect information by giving them experience with handling it. If the information found contradicts a theory or hypothesis, it does not mean it is useless. Looking at all angles of the problem could help build a better understanding of the topic, which could spark more creativity.

Decreasing Creativity

People who spend more time searching for relevant information tend to generate more creative solutions (Mumford et. al 1996). Searching and encoding faulty information leads to deficient problem solving and decreases creativity (Smith 1989). Sometimes in order to get the right information, someone has to think outside the box and seek alternative sources. Group think is also something that is important to avoid because it decreases creativity. This is when a group does not consider all the alternatives because they are more concerned with a cohesive solution. Instead of thinking outside the box, they tend to choose the first resolution that they all agree upon. This will give a solution that is not creative and may not solve the problem in the best way. In order to avoid this, a "Devil's advocate" can be appointed in the group. This person will push for further ideas and creativity by questioning every idea the group has. Splitting up into subgroups can also accomplish this by allowing multiple ideas to be brought to the table (Borchers 1999).

It is important to remember that creativity requires a lot of brainpower and thought. Information overload will take away from someone's ability to be creative.

Increasing Creativity Through Leadership

There are several methods for leaders to increase creativity. In this section we will briefly identify some of the most common methods leaders can use to increase team creativity. One method is to simply encourage the team members to be creative. When team members are encouraged to be creative they tend to produce more creative ideas (Gillman 2010). Next, leaders could sponsor team-building events outside of the normal work environment to boost morale which could foster or inspire creativity (eHow.com 1999). Another method that sparks creativity among team members is to offer an incentive as a motivation device for members to come up with the best creative idea.

The influence of leaders in the creative problem-solving process can be substantial; they should provide structure and guidance to the team. Furthermore, they are uniquely fit to assess the usefulness of the gathered information. They can also draw on the authority they have to direct their team's searching methods. They have to balance their team members between free search and encoding processes while

providing the structure and direction necessary for obtaining a quality product in a timely manner.

Information Sharing Within a Team

Teams as a whole have access to more information than individuals do. Not only do teams have multiple people that can be searching at the same time, they also have more diversity among its members (academic, demographic, cultural, societal, etc.). Diversity by itself can increase the information available, which could lead to increased creativity.

A successful diverse team has to have good communication and be able to share information with one another. A barrier that a team may encounter is confirmation bias. **Confirmation bias** is when an individual has a tendency to filter information to retain only what conforms to one's preferences, and to reject what does not (Business Dictionary 2009). If someone is constantly twisting and disregarding the information to promote their own views, it will make communication and creativity extremely difficult.

Idea Generation

There are hundreds of techniques to improve creativity during idea generation. In this chapter we consider three. The first technique is called **decomposition**, which is breaking a problem into a set of subcategories (Dictionay.com 2010). This encourages individuals to devote their attention to the entire set of subcategories more evenly thereby improving performance. The main idea behind decomposition is problem structuring, which includes identifying the relevant variables in a problem situation and the important relationships among these variables. An individual's ability to structure a problem is largely dependent on and limited by their cognitive abilities.

The second technique involves giving people instructions to be creative. Researchers have found that increasing the creativity does not necessarily mean that an organization has to implement difficult techniques or expensive investments. People can become more creative simply by being told to be more creative. The development of creativity does not depend on culture or ethnicity but on the domain people specialize in (Chen et. al 2005).

A facilitator can help creativity by guiding the group. A facilitator draws out answers and helps the team build a vision or plan that goes along with their goals. This person may push the group to expand on their alternatives or drive them to find new ones. When a group is not allowed to settle for their first option, they are forced to think further outside the box and have to get creative to come up with one-of-a-kind solution. A facilitator takes in all the ideas and urges every person to speak up and have their voice

heard, which can spur additional ideas from others. The more the facilitator collects and guides the group, the more creative they can be (Spencer 1989).

Third, we can use analogies to improve creativity. **Analogy** is a process whereby structured knowledge from a well-known source domain (in the form of objects, simple relations, and higher-order relations) is mapped on to a less-well-known target domain (Markman and Wood 2009). If used, the leader must clearly explain the link between the analogy and the problem at hand (Mumford et. al 1996). Furthermore, leaders should instruct their team to focus more on information that is less similar (think outside the box) and to think more broadly about the subject (Mumford et. al 1996). Once again, the use of analogies refers to problem structuring, which, in turn, will lead to improved problem understanding.

Teams & Creativity

As far as teams are concerned, there are several interesting ideas to consider which improve creativity or solve team related problems. If the group is diversified, the likelihood of creative ideas increases. The interaction with people who have different ideas can be an incentive to stimulate ones cognitive idea generation.

The main element in an effective idea-generating process is to pay attention to all the participants' ideas and to rely on different thinking styles. Mixing the divergent perceiving and convergent judging proved to be the most effective tools (Segal 2001). **Convergent thinking** can be described as bringing relevant information together and coming to a firm conclusion based on that information (Runco 1999). **Divergent thinking** can be described as a thought, which leads to different directions, regardless of how conventional and original they may be (Runco 1999).

Step 1: Divergent Thinking

Here are some examples of divergent thinking triggers (Segal 2001):

- List all the uses you can think of for a shoe.
- Generate meanings for a nutshell.
- List all the resources available for your next project.
- Make as many sentences as you can using all of the following words: candle, hope, tissue, egg.

Each of these is an open-ended exercise. There is no evaluation required and there are no criteria that the questions ask you to meet. Even if the answers are outside of the parameters perceived in the

question, they are free from any restrictions. This constitutes an important point.

Step 2: Convergent Thinking

Here are some examples to demonstrate convergent thinking (Segal 2001):

- Which shoe idea is the most novel?
- Rank your meanings of the nutshell from the most personally meaningful to the least.
- Select the resources that are most challenging to maintain.
- Of all the sentences you made, which is the most intriguing?

Each of these questions induces "narrow-down" thinking. During the convergent stage, critical thinking is applied; i.e. criteria to evaluate, select, and analyze the output from the divergent phase is used.

Table 1 on the next page shows how each cognitive process voice may contribute to diverging and converging activities. You can use it as a guide to expand your approach to encourage creative thinking. An advantage of teams is that they can capitalize on the multiple ideas suggested by team members. There are several characteristics that improve creativity and solve team related problems. If the group is diversified, the likelihood of creative ideas increases because the individuals' ideas are inspired by different backgrounds. The interaction with people who have different ideas can be an incentive to stimulate your cognitive idea generation.

Changing team members will contribute to group diversity but it is only effective if the new members enter the team in an early phase of the process. If the team has already made some major decisions, membership change could lead to frustration or decreasing motivation among existing team members.

Brainstorming is a popular technique to generate ideas. For the best results it is important that every team member is given the opportunity to suggest their ideas. An example on how to brainstorm effectively is when every member writes down solutions to the problem or situation they are discussing. After some time, a facilitator collects all the papers and each idea is given the same importance. This technique has several advantages. First, everyone is able to generate ideas, since introvert team members could restrain from sharing their ideas with the group. Second, conflicts among team members are eliminated because the idea and the person who generated it are separated. Conflict could facilitate creative thinking if we provide constructive feedback and do not criticize the person.

Table 1 – Divergent and Convergent Thinking in the Eight Cognitive Process Voices

DIVERGE CONVERGE

PERCEPTION	JUDGMENT
Creative ideas— where they come from. Consider using each of these:	**Creative ideas— how they are evaluated. How well do ideas meet these criteria?**
Extraverted Sensing (Se) Change what is. • Give new uses and tactics for what is contextually happening now, what's right in front of you.	**Extraverted Thinking (Te)** Improve efficiencies, structures, measurements, and organizing principles. • Demonstrate excellence using provable and profitable standards.
Introverted Sensing (Si) Change what was. • Recombine past elements.	**Introverted Thinking (Ti)** Improve understanding of how something works. • Provide clear categorical shifts.
Extraverted iNtuiting (Ne) Change what might be. • Infer new patterns, potentials, and spin-offs from the current situation.	**Extraverted Feeling (Fe)** Improve harmony among people. • Facilitate cooperation and interpersonal harmony in the outcome.
Introverted iNtuiting (Ni) Change the representation of the future. • Integrate insights to form new concepts.	**Introverted Feeling (Fi)** Align with values, personal and corporate. • Demonstrate commitment to what is truly important to those impacted and involved.

Adapted from Marci Segal, Creativity and Personality Type: Tools for Understanding and Inspiring The Many Voices of Creativity (Telos Publications, 2001)

It is also important to not to be too critical of ideas because a small solution may help you think about a great one. Including diversity, membership change, and brainstorming techniques can help a team create truly creative and unique solutions to a problem.

Idea Evaluation & Selection

Once a team has generated ideas, the next step in the creative problem-solving process is to evaluate them and select the best idea to be implemented. It may seem simple; just look at the options and choose the best one. That is not usually the case. There is not always a standout solution that is better than the others. Evaluation is important in breaking down each option individually and determining its

feasibility. Some ideas will be rejected immediately, while others will be revised until some of them are excluded. The remaining ideas will be revised until they lead to the selection of the idea that is implemented. For example, a group is given 7,000 bricks and has to decide what to build with them. The ideas are generated and the options of the group are to build a house, a church, or a hospital. We see the convergent thought; each option is to build something. The first step is **rejection**. Let us assume the group rejects the ideas of building the church and the hospital and decides to build a house. However, the design for the house is not feasible given the number of bricks, which leads to the next step, revision. **Revision** means re-evaluating and changing the options for them to be implemented. In this case, the group may decide to build a smaller house. The third step is to implement their design, which will be discussed further later.

The brick example can help explain several important aspects of the idea evaluation and selection stage, i.e. convergent and divergent thinking are recursive. In the above example, divergent thought would be executed by determining different uses for a brick other than for a building, like holding a door open. Convergent thought is executed when using a brick to build more than one thing, like a house, a church or a hospital. Generally, more convergent thought is used in evaluation as the already generated ideas are judged and chosen (Brophy 1998). However, it does not mean that the divergent thought process is absent. Convergent thinking occurs by narrowing down the revised ideas and choosing the best one, while divergent thinking happens when a choice is made and ideas are generated for the best way to implement. The cycle of convergent/divergent thought continues until one idea has been selected, evaluated, and is ready for implementation.

At this stage of the creative problem-solving process, it is more beneficial if the team members share the same mental model. A **mental model** is an explanation of someone's "beliefs, ideas, images, and verbal descriptions that we consciously or unconsciously form from our experiences which guide our thoughts and actions. Although mental models provide internal stability in a world of continuous change, they also blind us to facts and ideas that challenge or defy our deeply held beliefs (Business Dictionary 2009). It is a representation of the surrounding world, the relationships between its various parts and a person's intuitive perception about their own acts and their consequences. Our mental models help shape our behavior and define our approach to solving problems and carrying out tasks. Sharing the same mental model will insure more accuracy in evaluating and selecting the ideas.

Leadership in the Evaluation & Selection Phase

(Adapted from Illies and Reiter-Palmon 2004)

First, a leader should articulate to the team the criteria on which the solutions will be evaluated. Second, leaders should encourage both positive and negative consequences of the implementation in the assessment process. It is important to think about both short-term and long-term consequences. One of the most important roles for leaders in this phase is the establishment of an open and trusted culture where information and ideas can be vocalized risk-free among group members and between the group and the leader (Amabile and Gryskiewicz 1989; Isaksen et al. 2001).

Implementation

When the individual or team effort in the Idea Evaluation & Selection phase offers a top solution, the next step is implementation. Having a thoroughly selected idea is one thing, implementing it might still pose problems. The implementation phase must be immaculately planned, leaving virtually nothing to chance.

Implementation Planning

The **implementation plan** is a detailed listing of activities, costs, expected difficulties, and schedules that are required to achieve the objective of strategic plans (Business Dictionary 2009). There are three main steps that need to be completed in order to present an implementation plan: develop an action plan, identify any possible obstacles and develop possible solutions to all problems.

Develop an Action Plan

To initiate an action plan think about what steps or activities are necessary to meet your goal. This requires making a list of all the goals and ranking them in order of their importance. Next, attach due dates to the activities, develop a realistic time line and assign responsibilities to group members. Then consider the costs that are attached to the activities. These costs can include marketing efforts, salary costs, working expenses, etc.

Identify Possible Obstacles

Once your action plan is complete, some things may still be unclear. Some constraints and obstacles may occur, since most of the activities are interdependent. One missed due date could ruin your entire plan. It's necessary that you analyze everything that may negatively affect your plans. Are there any unknown factors? Are there risks to be taken? What dangers may lie ahead? Try to be as extensive as

possible. The better prepared the task at hand, the easier the implementation will be.

Develop Possible Solutions

After generating a good understanding of what the possible obstacles to your success might be, you must go through the creative problem-solving process again to clear any barriers.

Make decisions using data or well-estimated guesses and then use a stress test for maximum security. A **stress test** is a "what if" scenario that takes the world as given but assumes a major change in one or more variables in order to see what effect this would have on various indicators (IMF 2003).

At this stage you need to be flexible and redo any step that requires modification. The goal is to implement the idea that solves the problem. Do not hesitate to revise the entire action plan if there are too many uncertain or unreliable facts.

Implementation Intentions

(Gollwitzer & Schaal 1998)

Implementation intentions specify when, where and how goal-directed behavior is to be initiated. It builds on the concept of **goal intention**, which is an intention to realize a specific wish.

Implementation intentions help you focus on what you want to attain. For example, the implementation intention "if Y happens you will do X", results in a higher success rate for your goal. In a test about Breast Self-Examinations (BSE) (Orbell et. al 1997) there was a surprising result. Of all the people who reported a strong intention to perform BSE during the next month, 100% did when they were induced to form additional implementation intentions. However, when no additional implementation intentions were induced, the goal alone produced only 53% of completion.

As you can see, having the intention of implementing makes a bigger difference than just planning your implementation.

Being Creative in a Team vs. Alone

Most of the time, teams have an easier time with the creative problem-solving process. However, it is not because team members easily agree with each other. It is actually the opposite; by arguing about certain key tasks they obtain a broader view of the problem. This allows teams to identify more obstacles and barriers, which help develop a better action plan. Therefore, if you are working alone, try to talk to as

many people as possible to enrich your experience with their insights. Pay attention to constructive criticism since it will prove to be very useful.

A team, however, needs close coordination. Discussion and brainstorming are good techniques to enhance creativity but the members also need to build consensus. A facilitator could supervise and drive the team onwards. Planning is an advantage for teams, since they get a better and shared understanding of the problem and its solution. Nonetheless, the danger of getting off track is always present. It is the facilitator's task to keep the team focused and steer them in the right direction.

Glossary

Analogy: Process whereby structured knowledge from a well-known source domain (in the form of objects, simple relations, and higher-order relations) is mapped on to a less-well-known target domain.

Brainstorming: process for generating creative ideas and solutions through intensive and freewheeling group discussion.

Cognitive Process: A psychological process involved in acquisition and understanding of knowledge, formation of beliefs and attitudes, decision-making and creative problem solving.

Confirmation Bias: When an individual has a tendency to filter information to retain only what conforms to one's preferences, and to reject what does not.

Convergent Thinking: bringing relevant information together and coming to a firm conclusion based on the information.

Creativity: A mental characteristic that allows a person to think outside the box, which results in innovative or different approaches to a particular task.

Decomposition: Breaking a problem into a set of subcategories.

Discussion Group: informal and voluntary gathering of individuals (in person, through a conference call, or website) to exchange ideas, information, and suggestions on needs, problems, subjects, etc, of mutual interest.

Divergent Thinking: a thought, which leads to different directions, regardless of how conventional and original they may be.

Frame of Reference: Set of norms, values, or ideas that affect the way somebody interacts with others, either in everyday life or in a particular situation.

Goal Intention: An intention to realize a specific wish.

Implementation Intentions: Where and how goal-directed behavior is to be initiated.

Implementation Plan: A detailed listing of activities, costs, expected difficulties, and schedules that are required to achieve the objective of strategic plans

Intrinsic Motivation: The desire to work on something because it is interesting, involving, exciting, satisfying or personally challenging.

Mental Model: An explanation of someone's "beliefs, ideas, images, and verbal descriptions that we consciously or unconsciously form from our experiences which guide our thoughts and actions.

Speak/Write Method: Process of allowing group members to simultaneously state their ideas. This can be done on a piece of paper that is passed around the group or by computer software that allows users to post and view other member's ideas.

Stress Test: A "what if" scenario that takes the world as given but assumes a major change in one or more variables in order to see what effect this would have on various indicators.

Thought Exercises

1. Think about what skills are required in the creative problem-solving process. Write down five creative-thinking skills and analyze their usefulness in every stage of the creative problem-solving process.
2. Suppose you have identified the following problem: There is a tear on my shirt. Write multiple questions that address this problem from different perspectives.
3. Think about techniques that could be used to bring out internal information from team members. Search and name a fifth technique that is not mentioned in the chapter.
4. Identify a problem and find the best solution to it. Go through the three steps of the implementation plan, stating your implementation intentions, in order to solve the problem.

Problem-Solving Initiative Games

Here are a few suggestions. Begin by clearly explaining the game. Make sure the rules are understood, including that everyone must complete the activity for the group to be successful. Don't offer ideas for solving the problem. Stand back and let the group work and play with it even if the group has a difficult time. Don't interfere unless something is unsafe or the group has fallen apart. Reflect on the activity. Spend a few minutes afterward talking about what the participants learned. Talk about how effectively and efficiently they accomplished the task and how well they got along with each other. Ask open-ended questions to help the group talk about the issues. Don't be judgmental. In asking questions,

first help the participants focus on what happened, then ask them to decide if what happened was good or bad. Finally, ask them to set some goals for the future (learningforlife.org 2010).

I. RADIOACTIVE FIELD. Materials: three boards (pieces of plywood work fine) about a foot square

The goal is to transfer the entire group across an open, flat area using three protective shields without touching the ground with any body part. Boards must not be thrown across the open area.

II. BLIND SQUARE. Materials: one length of rope 50–100 feet long; blindfolds

The group begins by forming a circle and putting the blindfolds on. Then each person picks up the rope, which has been tied into a circle. Everyone should be standing on the outside of the rope. The object is for the blindfolded group to form a square, triangle, pentagon, or any shape the players want to try.

III. REVERSING PYRAMID. Have 10 people form a 4-3-2-1 horizontal pyramid (arranged like bowling pins). Tell them to reverse the apex and the base of the pyramid by moving only three people.

IV. GIMME A LEG TO STAND ON. The goal of this activity is to get your group to have a minimum of contact points with the ground. In other words, you want to find out how few legs and arms you must use to maintain a balance point for, say, five seconds.

Exam Questions

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1. What is the fourth step in the creative problem-solving model?

    a. Implementation
    b. Problem Identification & Construction
    c. Idea Evaluation & Selection
    d. Idea Generation

2. According to the chapter, what are the three components that help with an individual's creativity?

    a. Analogy, cognitive process, expertise
    b. Expertise, creative-thinking skills, intrinsic motivation
    c. Creative-thinking skills, stress test, creative-thinking skills

3. Prior or general knowledge that includes information that the individual possesses, is:

    a. Internal information

b. External information

4. Which of the following is not a way to bring out internal information:

a. Brainstorming

b. Discussions

c. Searching the internet

d. Speak/Write method

5. What is a way in which creativity can be decreased

a. Put time and effort into searching for information

b. Diversify the team

c. Searching for information that is not necessarily relevant

d. Use a brainstorming technique

6. Is giving people instructions to be creative considered an idea generation technique?

a. Yes

b. No

7. What model is useful for team members to share at the Idea Evaluation and Selection Stage?

a. Implementation model

b. Convergent thinking model

c. Decomposition model

d. Mental model

8. Which of the following are required to achieve the objectives of strategic plans?

a. Activities

b. Costs

c. Expected difficulties

d. Schedules

e. All of the above

9. How can close coordination be insured in a team?

10. Name the three main steps that need to be completed in order to present an implementation plan.

Solutions for Exam Questions

1. c

2. b

3. a

4. c

5. c

6. a

7. d

8. e

9. A facilitator could supervise and drive the team onwards. Planning is an advantage for teams, since they get a better and shared understanding of the problem and its solution. Nonetheless, the danger of getting off track is always present. It is the facilitator's task to keep the team focused and steer them in the right direction.

10. Develop an action plan, identify possible obstacles, and develop possible solutions.

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Chapter 7

Personal Skills of Collaboration

Learning Objectives

After reading this chapter, you should be able to:

- Identify your personal skills for collaboration and enhance them with the tips and tricks given in this chapter.
- Understand the four levels of respect and provide examples for each of them.
- Know the five conflict-handling modes and be able to act in an appropriate way in each mode.
- Identify the three directions a leader can use to lead.
- Understand the importance of Human Capital in today's environment.

Introduction

A successful collaborative work practice not only depends on the application of the techniques from previous chapters, but as the definition states, involves people. An individual can have, improve, or learn certain skills that contribute to the success of the collaboration practice. This chapter will provide an overview of major personal collaboration skills, such as listening, respecting, communicating, conflict solving, leading, and sharing. We are aware of the fact that this list of skills can be elaborated, but we have chosen some of the major skills that everyone can use in daily situations, especially in collaborative work practices.

Listening

Listening is a personal skill that we have been taught since birth. It is the first personal skill a human being is exposed to from the first moment they enter their new world. It involves paying attention to what you can hear or see. Sometimes people are born with a hearing disability. These special people rely on their sight and if they are gifted, may read lips as a way of listening and understanding. Listening involves paying close attention, making eye contact, showing personal interest, and may require engaging in the conversation when appropriate. In the work field, one of the essential skills of successful collaboration is listening to your team members. This skill sounds very basic and most people think they incorporate "listening" during every meeting. Unfortunately, very few people succeed in listening the right way. Some people don't listen attentively to their team members, others interrupt their peers whenever possible and others are distracted by their own thoughts. Listening to your team members and

asking for other people's ideas before offering your own are very important for several reasons.

First, it gives you the opportunity to be aware of the existing issues among team members. As an example, consider a meeting, where the goal is to increase the productivity of ten employees who make wooden tables. By listening to employees' comments, you may learn that the company's technique to sand the wood is too painful for some and mounting different pieces of the wooden table takes too much time.

Second, people feel ownership about ideas they generate themselves. Consider our wood factory again. Suppose one of the employees came up with the idea to sand the wooden pieces with the newest state of the art sanding machine. That employee will be much more likely to learn about this machine and teach others how to use it. People will put more effort into an idea which they feel comfortable with or take ownership of.

Third, listening to others' ideas increases the likelihood that other will listen to your ideas. It is unlikely that someone will not listen to your ideas, if you have listened to his or her ideas and supported them.

Finally, when you listen to the ideas others have shared, you can use their ideas to expand or formulate your own ideas. Other people's ideas can bring a new perspective to your own ideas. It gives you the opportunity to improve your ideas even before you shared them with the team members.

Respecting

Respect is a vital tool of the collaboration process that can work for you, or against you. Respect is associated with personality, and personality is associated with behavior, whether with your family, with co-workers, or with the general public. It is very important to respect the opinions of others when collaborating. **Respect** is defined as treating something or somebody with consideration or showing esteem for it. A painless way to increase teamwork is to respect those you work with, whether they are your co-worker, staff or supervisor. Respect is a value that is not only important in collaboration work practices, but also recognized by the whole of society. You must respect everyone regardless of their color, faith, gender, or any other differences. Marlene Chism identifies four levels of respect that one can observe in everyday circumstances: behavior, respect for authority, liking someone, and leadership (Chism 2007).

Level One: Behavior

Level one is the behavior of respect: treating others with consideration, being polite, and using manners. Some people do not understand that you do not have to like, know, or even have a high regard for someone to behave respectfully toward them. There will be others who do not perform at your capacity, but you still have to behave respectfully towards them. Feeling justified in laughing at or ignoring the employee of the wood factory who brought up the issue that mounting the different parts is time consuming, because you mount the parts faster is disrespectful. Likewise, eye rolling, shouting or acting impatient are other ways of treating a team member disrespectfully.

Level Two: Respect for Authority

The second level of respect is a respect for authority or position. You may not like your boss, but you should respect the position or the level of authority they hold. It may happen that you view your boss as incompetent, therefore you do not respect his or her work, but you have to respect the position they hold and behave respectfully in the work place.

It is difficult to continue to show respect for someone who does not show respect for you. If the boss of the wood factory has poor interpersonal skills and makes comments such as "If sanding the wood is too painful, find yourself another job," you have two choices. You can act disrespectfully or you can continue to act respectfully because doing so represents you. When you continue to show respect to those who are in a higher level position or authority, you are making choices based on who you are, and not on how others behave.

Level Three: Liking Someone

At level three, respect comes from an emotional attachment to the person. Regardless of the person's position or lack thereof, you simply enjoy the company of this person and like to be around them. In addition, you would not get him or her, a job application at your place of business because it would ruin your reputation. So, while you respect him or her and have high esteem for him or her as a person, you simply cannot disrespect yourself by referring this person to your professional contacts.

Lever Four: Leadership

At level four, respect comes from leadership. ***If*** you are holding a higher leadership position, you may admire a person's accomplishments at the workplace and you may hold a person in high esteem. Your liking and admiring this person might influence you to refer him or her to your professional inner circle. In fact, you might even be willing to follow in this person's footsteps because you have seen his or her work accomplishments. You respect this person's great interpersonal skills, integrity and discipline.

In meetings, you can also show respect towards your peers by clearly acknowledging their contributions. That way, they know that you know they have spoken. It makes them feel comfortable. This can also be applied to the wood factory example. When the employee states that the sanding technique is too painful, one could say the following: "That is an interesting point" or "I see your point, let's talk about ways we may be able to help make it less painful."

The most important thing to remember is this: no matter how you feel towards someone else, and no matter how they treat you, you always have the choice to behave respectfully to all people. You do not define other people by what you think of them. You do define yourself by how you behave. When you choose to treat others with respect, you are on your way to earning respect from others at the highest level.

Communicating

Another essential skill of collaboration is the ability to communicate well. **Communication** is the process of transferring information from one entity to another. Bad communication can cause multiple problems, while good communication can help to avoid them. In our wood factory example, shared understanding about the sanding process or jargon that is used can prevent needless disagreement about the implementation of a new machine that has nothing to do with the painful sanding process.

Figure 7.1: Communication Skills

One can identify three major categories of communication skills that are interconnected and interdependent: oral, non-verbal, and written communication skills.

Oral Communication

Oral communication is the ability to explain and present your ideas in clear language, to diverse audiences. This includes the ability to tailor your delivery to a given audience using appropriate styles and approaches.

First, you need to understand the needs, experience and level of understanding of the audience. Going back to the wood factory meeting example, it is important to acknowledge the level of experience the employees have. If an employee had been working for the wood factory for ten years or more and he or she points out the painful process, you would be more likely to believe him or her.

Second, you should be sensitive to the audience in organizing, presenting ideas, and responding to feedback. One way to do this is to present your ideas clearly and concisely by changing the tone and volume of your voice to convey emotion and feeling. Speaking vaguely, digressing, and talking too low should be avoided. Paraphrase when appropriate to make sure that everyone understands what you are saying. **Paraphrasing** is defined as the restatement of a text or passage, using other words (Merriam-Webster Dictionary 2010).

Third, referring to group members by their name makes them feel personally involved in the meeting. Some people have to be called on by name, otherwise they will not contribute. Not only could you potentially lose the opportunity to have their input, but they could also feel railroaded to comply with ideas that they were not a part of generating. If you are not good at remembering people's names, you could use name tags or make a seat map that displays the names and seats of every team member.

Finally, another characteristic of a good communicator is the use of smooth transitions between being a speaker and a listener. You may choose to ask for comments or ask the listeners questions such as "How do you think we can build on that?" or "Can we take that a step further? Suggestions?". In addition, when you ask a question, do not start to answer it because people want to have a chance to answer the question themselves.

Non-Verbal Communication

Non-verbal communication is the ability to enhance the expression of ideas and concepts without the use of coherent labels, through the use of body language, gestures, facial expression and tone of voice, and also the use of pictures, icons and symbols (www.businessdictionary.com). In collaborative work practice, it is important to acknowledge the importance of these cues in communication. When one of the employees in the wood factory example comes up with a solution for the problem of mounting the parts

unproductively, it is not appropriate to roll your eyes. By doing so, you express that you do not believe that person or that you are not interested in hearing what they have to say. Also, be aware of your body language, consider if your stance presents confidence, exhibits a controlling posture, or shows nervous gestures.

Written Communication

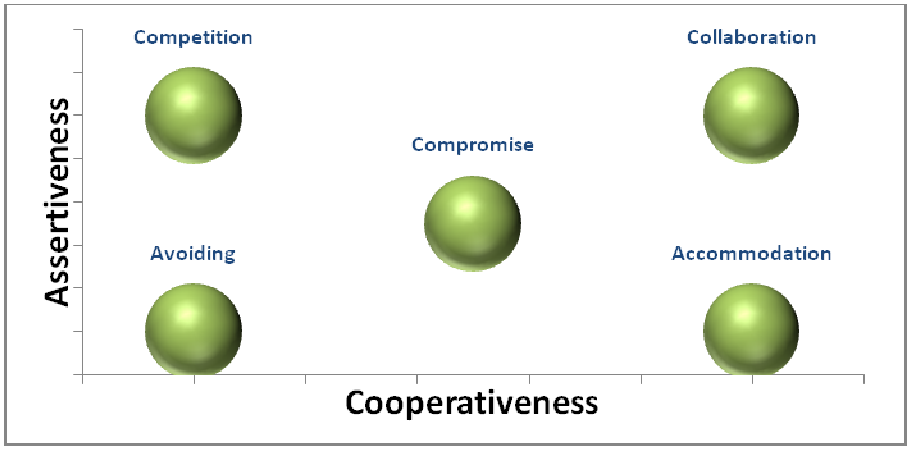
Written communication is the ability to write effectively in a range of contexts and for a variety of different audiences and purposes. This includes the ability to tailor your writing to a given audience and use appropriate styles and approaches, in a structured fashion. Good revising and editing skills contribute to a successfully written document. Improving technology and the increasing use of the Internet may require written communication skills that encompass electronic communication such as Short Messaging Service (SMS), email, discussion boards, chat rooms and texting. Written communication skills are especially important for the secretary of the meeting. A secretary's contributions are not always highly regarded by peer members. One way to counter this is to physically elevate the written messages in a meeting. Instead of sitting at the table and writing with your head down, you could stand up and use a whiteboard to explain. This approach can help put the focus on the secretary and the written word during a meeting. The same effect could be achieved by using a projector screen to display the secretary's desktop. An advantage to using this approach is that the notes are visible to everyone and they can be revised and elaborated on jointly during the meeting.

Conflict Solving Skills

As soon as you build a relationship with a person, there is a risk to have a conflict with the other party. A **relationship**, in the context of collaboration, is defined as a logical or natural association between two or more persons. This can take on forms like supervisor and subordinate, parent and child, brother and sister, between colleagues, etc. Conflicts are inevitable in any of these relationships, especially in a collaboration work practice environment. Learning to deal with them is crucial.

Kenneth W. Thomas defines a conflict as the process which begins when one party perceives that another has frustrated, is about to frustrate, or has some concern of his'. In addition, Thomas provided a taxonomy, in which five conflict-handling modes are classified by the two underlying dimensions of assertiveness and cooperativeness. Assertiveness is attempting to satisfy one's own concerns, whereas cooperativeness is attempting to satisfy others' concerns. When a conflict occurs, there are five conflict-handling modes to consider: competition, collaboration, compromise, avoiding and accommodation.

Figure 7.2: Conflict - Handling modes



Competition will occur when both parties are only focused on satisfying their private goals without taking their relationship partner's goals into account. When we go back to the example of the wood factory we could encounter a situation where two employees bring up two different ways to solve the unproductive mounting process. Each of those employees defends his or her idea, because he or she will benefit from the implementation of the idea. No matter what implications their solution may have for the other person, they will stick to their idea. As a result, both parties will end up in competition with each other.

Accommodation is the opposite of competition. It is a situation where people try to satisfy other's concerns and take an unassertive approach while doing so.

It is possible to have a situation where conflict will be avoided when both parties are not focused on satisfying their own goals, or on satisfying other's goals. A skill related to avoiding is that knowing when to let something go. Agreeing to disagree is also an accommodation. If a conflict is going nowhere, you can choose to disengage and move on. A typical example to illustrate this point is in political conversations. It is very unlikely that a Democrat and a Republican come to an agreement in a discussion concerning health care or taxes.

The final way to handle a conflict is by compromising. Each party will give into demands from the other and vice versa.

As we have learned in previous chapters, collaboration takes place when all parties can achieve their private goals. After having analyzed the different modes of conflict solving, we would like to share some important ways to resolve conflicts that one could encounter during collaborative work practices or any other daily situation. Of course, all the other skills listed in this chapter contribute to the resolution of conflict, e.g. listening or open communication, but consider the following:

First, it is important not to become defensive when others disagree with your ideas. Taking a defensive stance is a common cause of conflict. As stated above, individuals feel ownership of their ideas, so it is natural that each person wants to defend what he or she believes. When this occurs he conflict starts to escalate. A way to deal with this is to explore every idea first by giving pros and cons, before you disagree with somebody. Another possibility is to generate ideas anonymously. Every person could write his or her idea on a piece of paper at the beginning of the meeting and each idea can be considered afterwards. Another advantage of generating ideas anonymously is that you break the link between the person and his or her idea. By doing so, personal conflicts between team members are eliminated. It could happen that two employees in our wood factory example have a personal conflict. In order to solve the painful sanding process, no matter how good the idea is, the other one will disagree. Not because he or she thinks the solution is not suitable, but because of the personal conflict between these persons. When all ideas are considered anonymously, the situation described above is avoided.

Second, relieving stress quickly is a vital aspect of conflict resolution. The capacity to remain relaxed and focused in tense situations helps you to minimize stress. If you don't know how to stay centered and in control of yourself, you may become emotionally overwhelmed in challenging situations (J. Segal, M. Smith, and J. Jaffe2009). Try to remain calm in every situation, even when others are not. If you are not capable of relieving stress quickly, you give an incentive to your peers to adopt your behavior and start to become emotional. This has to be avoided at all times.

Third, pick your battles. This is actually more of a conflict avoiding skill than a conflict solving skill. Conflicts can be draining, so it is important to consider whether the issue is really worthy of your time and energy (J. Segal, M. Smith, and J. Jaffe2009). Arguing with your wife about what to eat for dinner or fighting over a parking space when there are ten others available is not worth a conflict. The message that we want to give is that one needs to be realistic when making the cognitive decision whether to argue or not to argue.

Fourth, in a collaborative work practice, you should help others resolve conflicts if necessary. A whole team of employees can suffer and productivity can decrease due to workplace conflict between two members. An important skill is the capability to help others resolve their conflicts. A way to do this can be by saying the following: "I hear you saying 'A', and you are saying 'B', is there a way to bring those two ideas together?" This gives other team members the opportunity to share their ideas and help resolve the conflict.

Finally, here are some tips to keep in mind when confronted with a conflict (J. Segal, M. Smith, and J. Jaffe, 2009):

- Express feelings through words, not actions. If you think you are losing control, take a time-out.
- Be specific as you explain what is bothering you. This incorporates the communication skill requiring that ideas have to be presented clearly and concisely.
- Deal with one issue at a time. Do not introduce other topics until each is fully discussed, otherwise you could end up in a situation where nothing has been resolved.
- Do not generalize. Using the wood factory example, one should not say that mounting the parts takes too much time because an employee always works too slowly and never does something right the first time.

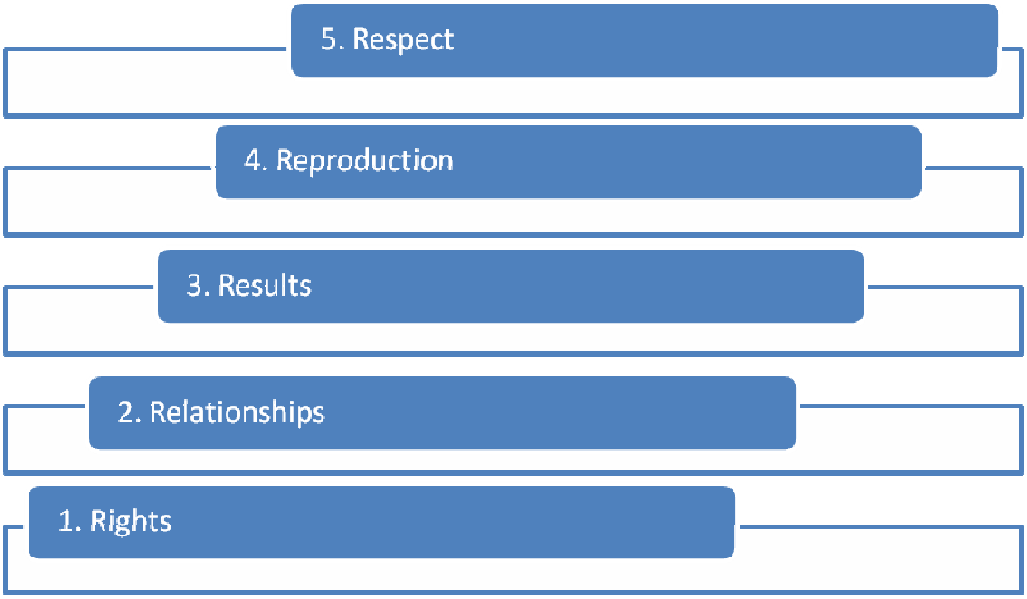
Leading

At some point in everyone's life, they have been subjected to leadership; whether it be the leading in some capacity, or following the direction of another. **Leading** in essence, is an organizational role which includes the activities of (1) establishing a clear vision, (2) communicating the vision to allow subordinates to willingly commit, (3) offering information, knowledge, and methods to understand the vision, and (4) being able to please all stakeholders through handling conflicting interests (www.businessdictionary.com).This definition of leadership implies that leadership has a downward flow, starting from the top of an organization with the CEO and senior management group to the lower level employees of the organization, when in reality leaders can emerge at any level of the hierarchy. According to John Maxwell in his book "*The 360° Leader*", 99% of leadership takes place from the middle of an organization, rather than from the top. Although an organization usually has one person who is *the* leader because of his or her position, anyone can lead no matter where they fall in the organization. In the book "*Essentials of Organizational Behavior*", Behavioral Theories explains that since behaviors can be learned, we could train people to be leaders. It i all based on one key principle: Influence.

According to "*Essentials of Organizational Behavior*", Leadership is defined as the ability to influence a group toward the achievement of a vision or set of goals. Influence in this context means "the ability to produce effects on other's actions, behaviors, and opinions (Business Dictionary)." No matter how low someone sits in the organization, their ability to influence others is not hindered. This is true because leadership is derived from the core personality of the individual. A person can learn techniques to enhance their capability to lead, but initially, this ability is an intrinsic trait. Being influential allows people to lead in all directions within the organization. According to Maxwell, people who have the

ability to lead up (those you work for), across (those on the same level as you), and down (those who work beneath you) within the organization are said to be 360° leaders (Maxwell 2005) Maxwell's model of 360° leaders helps one understand the importance of influence at all levels, and that leading from the middle is not only possible, but that it is essential to an organization's success. Consider the example of the group trying to increase productivity while producing wooden tables. In this meeting, there may be individuals from various departments or divisions, all looking to accomplish the same goal of increasing productivity. When they reach a solution, there may be a number of reasons as to why people agree on the outcome. It may be that the person who suggested the solution ranks high in authority, they are well respected, or that possibly it was the best overall solution suggested at the given time. It is important to note that leading happens at a personal level, and varies between each and every individual's goal, status and purpose. To further help illustrate this point, Maxwell offers the Five Levels of Leadership model illustrated in Figure 7.3.

Figure 7.3: Five Levels of Leadership



The first level starts at the bottom of the model with Rights. This level states that the sole reason why people are influential is based on job titles. The only reason someone has any influence over another is because they sit higher on the organizational chart, and others must follow them because this person is their superior.

The second level is Relationships. In this level of influence, people follow you because they choose to do so. The influencer has a friendship or kinship with the individuals in which they are influencing, and this stage goes beyond simple job titles and reporting relationships.

The third level is Results. In this level, people recognize what you have accomplished for the organization, as well as having an established relationship with you. People will allow you to influence them because they respect your contributions to the organization's success, and they have taken a liking to you.

The fourth level is Reproduction. In this level people follow because of what you have done for them. This is the level where the influencer starts to mentor others, and help groom them to follow a similar path. The reproduction stage is also known as the people-development stage because your personal agenda is to help others develop their skills, and leadership ability.

The fifth and final level is Respect. This level is impossible to reach on your own because it is the perception of others that allows you to become the fifth level leader. People continue to follow you not just because of your organizational success, but also because of who you are as a person. Very few people within an organization make it to this level because it takes years of grooming success for both those you mentor, and the organization (Maxwell 2005).

When looking through history it is easy to identify inspirational figures who exhibited the characteristics that it takes to be a great leader. Martin Luther King Jr., Winston Churchill, and Robert and John Kennedy are examples of individuals who have demonstrated what it takes to be true leaders, and they didn't start once they were already on top. Purpose coupled with charisma and natural ability, set the foundation upon which these individuals built their successful campaigns of leadership.

Sharing

From an early age, children are taught to understand the importance of sharing. During early stages of development we usually define what is shared as a tangible object such as a toy, or something intangible such as their thoughts and ideas evoked by the teacher in an attempt to generate discussion. **Sharing** is "the joint use of a resource or space, and can refer to the alternating of a finite good" (www.wikipedia.com).This section will focus on the aspect of resources and its importance to sharing, as well as identifying the three major types of resources.

Resources

People are involved in activities everyday where they partake in sharing with one another whether they consciously know it, or not. Think back to our example of the employees who manufacture wooden tables. Through the duration of the meeting, they meet at a designated time and pay their attention to other

members in attendance. In doing so, they are sharing their time with these individuals, and vice versa. They also must occupy a designated area; therefore they are sharing a common space. During the meeting, information exchange is taking place and people are sharing their knowledge, and ideas between one another. Finally after the group comes to some type of solution, there are tasks which must be completed in order to launch the plan. Workloads are shared between members, and the shared efforts of those involved will help lead to goal attainment. This example helps illustrate the numerous ways sharing affects our lives through our everyday actions.

Three Types of Resources

We previously defined sharing, and identified that resources compose what people share. The three most basic types of **resources** are (1) Land, (2) Labor, and (3) Capital (Business Dictionary). These three types, in essence, are categories that constitute the actual tangible and intangible resources.

Land

The first resource shared is **Land**. We refer to land in this context as an asset on the ground, such as a building, stalls in the parking lot, a conference room, and any other shared space within the physical building (Business Dictionary). Generally, there may be many departments, and many people within an organization which share a common space. The interior space of any building is a limited resource, which is why one must have the ability to share it effectively.

Labor

The second resource shared is **Labor**. We define labor here as the people doing the work, as well as the tasks and work load defined by the individual's job description (Wikipedia). Sharing tasks can be beneficial because it allows the burden of one, to be delegated to a few. This may relieve some of the stress or pressure one may feel, creating the opportunity for better focus and production. Also, in some circumstances it may be convenient to share people across or within departments. In such scenarios, there may be an individual who could offer their expertise in a particular area to a group in order to help them achieve their end goal.

Capital

The third and final resource shared is **Capital**. According to the Five Capitals Model of Sustainability, there are five capital assets in which people try to maintain and increase in order to

develop, and financially flourish. The five capitals are (1) natural, (2) human, (3) social, (4) manufactured, and (5) financial (www.lboro.ac.uk). Our focus will pertain solely to the element of human capital. **Human capital** in an organizational context refers to the knowledge, skills, and abilities (KSA's) of the collective workforce (Business Dictionary). **KSA's** are developed over time, through education and work experience. One value human capital offers an organization is that every person brings their own KSA's into the organization which can help diversify the organization's intellectual capital.

The resources introduced in this section help one understand what can be shared, and the value they offer to an organization. There is some sort of human element present in each type of resource because the joint effort of individuals toward a shared goal is required to achieve a desired outcome.

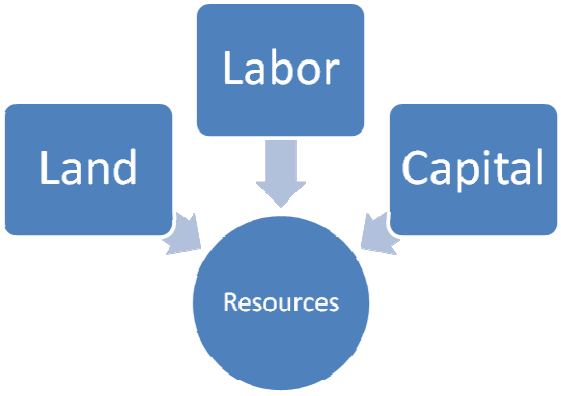


Figure 7.4: Resources

Summary

This section introduced and summarized six important personal communication skills. These skills include Listening, Respecting, Communication, Conflict solving, Leading, and Sharing. Each skill has been identified and elaborated on by providing examples, and benefits of each.

Listening

- It gives you the opportunity of being aware of the existing issues among team members.
- People feel ownership about ideas they generated themselves.
- Listening to other's ideas involves that those people will listen to your ideas.
- One could use the information other people gave by sharing their ideas to formulate your own ideas.

Respecting

Respect is a value that is not only important in collaboration work practices, but it is recognized by the whole society.

There are four levels of respect :

- Behavior – Treat others with consideration, be polite, and use manners.
- Respect for Authority – Respecting someone's authority based on position.
- Liking Someone – Respecting someone because of an emotional attachment; a friendship.
- Leadership - You admire someone's accomplishments, you're willing to follow.

Communication

- Poor communication can cause problems, while effective communication avoids many.
- There are three major types of communication; 1. Oral, 2. Non-verbal and 3. Written.

Conflict Solving Skills

- Relationships create the opportunity for conflict.
- Relationships involve the association of two or more parties.
- Kenneth W.Thomas defines a **conflict** as the process which begins when one party perceives that another has frustrated, is about to frustrate, or has some concern of his'.
- Thomas provides taxonomy of five conflict-handling modes, and two underlying dimensions of assertiveness, and cooperativeness.

Leading

- Leadership can happen at any level of the organization.
- Influence is the one key principle which underlies leadership.
- Maxwell's 360° leader model states that effect leaders must lead in three directions:
    - Lead up – Lead those who you work for.

  - Lead across – Lead those on the same level as you.
  - Lead down – Lead those who work for you.
- Maxwell also shows us his five level model of leadership. These identify the flow of leadership from the bottom of the spectrum to the top.
  - Rights, Relationships, Results, Reproduction, and Respect.

Sharing

- People share resources. Resources are tangible objects, or intangible traits.
- There are three types of resources: Land, Labor, and Capital
- Land refers to the physical space in which people work, and collaborate.
- Labor refers to the workers themselves, and their tasks and job responsibilities.
- Capital refers to Human capital. Human capital consists of the knowledge, skills, and abilities of the individuals who populate an organization.

Thought Exercise

Make two groups. One group sits in a circle and will generate ideas and come to a consensus on the following topic: how to make students more involved with the community within the next two months and a budget of $1000.00? Each person of the other group will observe a person of the first group during the discussion. After the discussion, the second group will provide feedback in front of the entire group to the person he or she observed. Try to incorporate as many tips and tricks, covered in this chapter, as possible. In addition, provide a minimum of one constructive comment to the person you are observing.

Exam Questions

1. List three reasons why listening is important in a collaborative work practice?
2. List and define Chism's four levels of respect.
3. Why is non-verbal communication so important?
4. List the five conflict-handling modes and their characteristics.
5. List the five types of capital.

6. What are KSA's?
7. Identify and explain the five levels of leadership.
8. What are the three types of resources? How do they benefit the organization?
9. Where does leadership occur in the hierarchy?
10. What is the most important aspect of leadership?

Glossary

Assertiveness: Attempting to satisfy one's own concerns.

Capital: Assets people try to maintain and increase in order to develop, and financially flourish. The five capitals are (1) natural, (2) human, (3) social, (4) manufactured, and (5) financial.

Communication: The process of transferring information from one entity to another.

Conflict: The process which begins when one party perceives that another has frustrated, is about to frustrate, or has some concern of his'.

Cooperativeness: Attempting to satisfy other's concerns.

Human Capital: The Knowledge, Skills, and Abilities of individuals, which make up an organization's intellectual capital.

Influence: The ability to produce effects on other's actions, behaviors, and opinions.

Ksa's: An individual's Knowledge, Skills, and Abilities.

Labor: The people doing the work, as well as the tasks and work load defined by the individual's job description.

Land: An asset on the ground, such as a building, stalls in the parking lot, a conference room, and any other shared space within the physical building.

Leadership: The ability to influence a group toward the achievement of a vision or set of goals.

Leading: An organizational role which includes the activities of (1) establishing a clear vision, (2) communicating the vision to allow subordinates to willingly commit, (3) offering information, knowledge, and methods to understand the vision, and (4) being able to please all stakeholders through handling conflicting interests.

Non-verbal communication: The ability to enhance the expression of ideas and concepts without the use of coherent labels, through the use of body language, gestures, facial expression and tone of voice, and

also the use of pictures, icons and symbols.

Non-verbal cues: Signs accompanying the words used in speech. Such cues include body language, tone, inflexion, and other elements of voice, dress, etc.

Oral communication: The ability to explain and present your ideas in a clear language, to diverse audiences.

Paraphrasing: The restatement of a text or passage, using other words.

Relationship: A logical or natural association between two or more persons.

Respect: Treating something or somebody with consideration or showing esteem for it.

Resources: What people share including Land, Labor, and Capital.

Sharing: The joint use of a resource or space, and can refer to the alternating of a finite good

Written communication: The ability to write effectively in a range of contexts and for a variety of different audiences and purposes.

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Chapter 8

Negotiation

Learning Objectives

- Understand the difference between position-based and interest-based negotiation
- Learn key concepts about negotiation
- Understand why goal interdependence is important
- Learn the Easy WinWin project methodology

Introduction

One of the key parts of Collaboration Science is the ability to communicate effectively to achieve a goal. Negotiating is very important in the study of Collaboration Science and will be analyzed throughout this chapter. Negotiation occurs in our communities almost every hour and every day. Car salesmen bring out the best and worst negotiators. The moment you step foot on the lot or you call the dealer, the negotiation process begins. Each party has objectives and negotiating strategies. That was a light example of negotiation. Now imagine you are the Secretary of State, visiting a foreign country to work on a nuclear arms treaty. Can you see the importance of understanding negotiation and how to apply its understanding?

Why Negotiate?

Negotiating is not an easy process; we are sure that if you are reading this book you will find that out by yourself. So, why do people negotiate? Even if you have the authority to simply demand something, negotiating about it could prove useful. Negotiating is the perfect tool to help plant a seed for future joint effort. In joining a negotiation process you understand and validate the other person and his or her motives. This automatically makes it easier to cooperate in future processes since the other person(s) will always remember that sign of respect.

Another reason why negotiating is important should be that the other person is success-critical to your goal. If you do not negotiate with this person and leave him or her out of the whole process, chances are slim that the individual will agree to expend resources to advance your goal. There is no commitment to any goal. The only way to resolve this is by joining negotiation with this person.

A third potential reason why you want to negotiate is because you want to create something you cannot do on your own. This requires cooperation, and that starts off with negotiating.

Finally, you can negotiate to resolve a dispute or problem. Especially Interest-Based Negotiating, which we will get into later, gives you the ability to understand why people act the way they do and utilize this to address problems that might exist. This is a very powerful strategy; and we hope that this chapter will convince you of this fact.

Key Concepts

Before jumping into the hands on part, we would like to share some key concepts of negotiation and attempt to explain them to you. You will find many different definitions around, but we decided to define **Negotiation** as a discussion intended to produce an agreement (Collins English Dictionary, 2003). Notice the definition includes an **Agreement**, which in turn can be defined as a mutually acceptable commitment. **Commitment**, lastly, is the act of assuming an obligation to expend resources to fulfill the terms of said agreement.

What this means in basic English is that negotiating is not just a process of winning or losing. Negotiation occurs when the desired outcome is mutually acceptable. Better yet, it's the process in which both you and the other individual reach agreements about committing to fulfilling certain action, and this will only happen if both you and the other person find the outcome to be acceptable. This means that there is no real win or loss. Because if you think you have lost, the deal is off and no agreement will occur. This is helpful to remember when you negotiate.

Competitive Arousal

Emotional negotiators are subject to competitive arousal. They care more about winning than their own best interests. Their strategy is hostile and confrontational and focuses very little on creating value. This attitude can cause emotional negotiators to walk away from a mutually beneficial deal. There are many effects of competitive arousal on emotional negotiators. They include:

- Restrict Attention Capacity
- Less Deliberation
- Less Information Processing
- Increased Risk Taking

Competitive arousal can restrict a negotiators attention capacity. Without full attention, the negotiator will not be able to make complete and accurate decisions. Something could have been

overlooked and that thing could break the negotiation in process. The negotiators with heightened competitive arousal are likely to jump on negotiations and cause the process to be shortened to the detriment of the outcome. Along with less attention capacity comes less processing of information. If certain information is not processed during a negotiation, errors can be made and the outcome may not turn out in the best interest of the critical stakeholders. In the state of competitive arousal, there can be an increase in riskier methods of negotiation. This increase in risk taking may well lead to larger gains for a negotiator; however, an increase in greater losses comes along with it.

The causes of arousal are even more intriguing. These causes can be rivalry, social facilitation, pressure of time, and the chance of being acknowledged as the winner. Obviously, rivalry between others can cause emotional negotiators to begin to take on a more arousal state of competition. The feeling to have beaten others and have won can dramatically affect the strategy of a negotiator. The presence of an audience watching or third parties waiting on an outcome can, obviously, affect a negotiation strategy. Time constraints can certainly put strain on a vulnerable negotiator and cause him or her to show effects of competitive arousal. An emotional negotiator likes to be considered special or one-of-a-kind. To attain this status, they might seek out to win even with the likelihood of increased risks and less efficient deliberation and information processing, resulting in less desirable results.

Goal Interdependence

Goal interdependence was first mentioned by Deutsch (1949, 1973, & 1980) as a very influential factor for interaction. He identified three types of mutual dependence: cooperation, competition, and independence. In the **Cooperation form**, people feel that their goals and interests are much alike, or positively linked, in that way that attaining one person's goal either attains the other person's goal as well or helps him in the process. In the **Competition type** the opposite is true: the individuals feel their goals are negatively linked. Whenever one of them reaches his goal, the other faces increased difficulty to accomplish his goals. The last type, **Independence**, occurs when people believe their goals are non-related. Whatever the other person does, in no way affects our goal.

It should be clear that in a situation of positive or cooperative goal interdependence, the people involved would seek to work together. Whenever the other person is effective, he or she also gains. Therefore, in this form, everyone is motivated to work together and achieve their goals. On the other hand, in the negative or competitive goal interdependence case, people will not be eager to help others, or may even be motivated to impede them from realizing their goal.

These different interaction styles set the stage for entirely different outcomes. When incurring

positive goal interdependence, the chances of every side and everyone attaining their goals are very high. People assist each other, share resources and try to learn from each other's ideas. This does not mean that negative arguments cannot come up, but it encourages fair and open negotiation forms. Everyone gains, a win-win situation is almost ascertained, and therefore the participants should attempt to go as far as they can when given the chance. This leads to three specific characteristics of positive interdependence that prove its effectiveness.

First, it brings high interpersonal communication, more ideas are verbalized, and people are more influenced by the other's ideas. Second, there is a lot more helpfulness, friendliness, and a true desire to aid the other person. Third, there is more coordination of effort, and overall a higher productivity.

Deutsch defines two different ways a person can act; he can either bungle which may damage his own chances of attaining his goal, or he can be effective which aids in reaching the goal. Combining the two types of interdependence and the two ways to act creates this matrix:

Figure 8.1: Cross-matrix Goal Interdependence

	Competitive Interdependence	Cooperative Interdependence
Other person bungles	Good for you! Bad for him.	Doesn't hurt you. Bad for him.
Other person is effective	Bad for you. Good for him	Good for you! Good for him.

If this was a game theory concept, it is clear that the bottom-right quadrant is the dominant strategy. Therefore, everyone should attempt to get into a cooperative interdependence situation, and give it their all to be effective.

There has been a great deal of research on the subject, and all of this seems to support Deutsch's theory. (Deutsch, 1973; 1980; Johnson, Johnson, & Maruyama, 1983; Johnson, Maruyama, Johnson, Nelson & Skon, 1981; Tjosvold, 1984, 1986).

The previous paragraphs made it very clear: negative goal interdependence makes it very hard to attain your goals. You will not receive any help, and might even have to deal with people who attempt to work against you. Therefore, whenever it is possible, try moving from a situation with competitive interdependence to a situation with cooperative interdependence. There are multiple ways to accomplish this. First of all, you can make minor adaptations to your goal in such a way that they no longer contrast other's goals. A different solution is to give a more thorough explanation of your goal. This works when people perceive the goals differently. With the exact same goal set, it can look as if the goals support each

other or completely deny each other, depending on how they are perceived. Clarifying your intentions and how you see everything can positively enhance any negotiation process.

Types of Negotiation

There are two types of negotiation: one that is based on a fixed position, which leads to a static concept: the Positional Negotiation; and one that is based on interests and goals, which allows for different strategies to be applied, the Interest-Based Negotiation. We will elaborate on the difference between these two and the possible strategies in the following parts.

Positional Negotiation

The first negotiation type we will elaborate on is the **position-based negotiation**. In this kind of negotiation, you strive to achieve a fixed state or outcome - the position - and keep arguing for it alone. You do not, at any time, think about why you want that specific outcome, nor does it cross your mind that other outcomes might just turn out to be of equal or greater value.

It should be clear to everyone that in these conditions, there is only one situation for a win-win negotiation. This position is when one individual immediately grants the other individual his favored position. If this is not the case - and it rarely is – then at least one person will fail in his desire to get what he was after.

Positional Negotiation fails to meet the basic criteria of producing a wise agreement, efficiently and amicably [1]. This type of negotiation is characterized by strong adversity between the negotiating parties. Since no one seems to be willing to drop their claims, they will start feeling annoyed and irritated. They might think, “Why is this person giving me such a hard time? I only want X, is it that hard to simply give it to me?”

Of course this isn’t the issue: the fact is that both subjects have conflicting positions, so, whoever caves in first “loses” the negotiation process. Most people do not want to cave, leading to a simple loss-loss situation. Neither person gets what he came for; the deal is off, or better yet, never started often leaving them dissatisfied, worn out, or alienated- and frequently all three.

Research has shown that Positional Negotiation tends to cause advancing commitment towards the position, but not the interest. When negotiators bargain over position they tend to lock themselves into those positions. This means that the person grows fonder of his position. However, this does not aid him in getting what he wants. Instead, the contrary is true, as it tends to distract individuals from what they

were initially looking for. They are only defending their position, slowly forgetting why they had assumed the position in the first place.

A situation like this is likely to create less value for both sides as opposed to getting into the Interest-Based Negotiation. It eventually leads to a compromise situation, where no one arrives at what he/she really wanted. This would be considered a sort of semi-win condition attained by both parties. This leaves them both unhappy.

Arguing over positions leads to inefficient agreements, endangers an ongoing relationship, and is worse when there are multiple parties involved.

When to Use

As the above explanation should have made it clear, the results of positional negotiation are usually sub-optimal at best. However, some situations allow for this kind of negotiation.
For instance, if you know you're going to end up in a win-loss situation regardless, you might as well try to be on the winning side.

Secondly, it could happen that trying to suggest other interests would create pejorative feelings, thus deteriorating the relationship. As an example, it would most likely not enhance the relationship between two people if one were to say: "Ok, so you don't want to vote for my abortion law, how about it if I give you the green on that new bridge you're trying to build?" In this case, the person did not understand why the other person got into a position, namely because of his principles, and only made it worse for himself through suggesting that he could be bought by giving him the go on building a bridge.

The third situation is when conflicting interests supersede all others. As an example, when two countries are at war, chances are slim they will agree to prosecute speeding offenders in the other country.

The last situation is when you don't expect there to be any value in the future for this specific relationship. It's a one-shot situation, and you will never ever see this person again; except for ethical reasons, why wouldn't you try your best to get all you wanted out of it? Remember though, it's a small world and it keeps getting smaller, chances that you see each other again are realistic.

Hardballing

One possible strategy is the **Hardball strategy** this is the case when you refuse to give in. You give the other person very little in every step, yet demand a lot in return for it.

For example:

A wants $200k, B counters with $150k

A offers $180k, B thinks about it, and proposes $151k

A counters with $ 160k, B says $152k

This is classic hardballing. There are however constraints to this technique. You can't poke the bear forever, he will snap at one point. What would be a likely settling point? What would the minimum he would be willing to get out of the situation be? If you drop beneath the minimum, chances are great the other party simply walks away. Be sure that everything is included in the negotiating terms. If not, you risk whatever was not included in the deal.

Interest-Based Negotiation

As we hope you understand by now, focusing on positions usually doesn't get you anywhere. You are stuck in a back-and-forth game where no one feels the need to change his own position. Therefore you end up in a stalemate, which, in the non-chess world, results in a loss-loss situation. Knowing that, what else could you do?

This part of the chapter will use interests and ideas to negotiate. The people involved in the process do not start from a fixed position. They want something; the interest, and they have a certain idea about how to get it. This is what puts them in a certain position. However, as long as the interest gets fulfilled, they don't care about their position. As such, this sets the stage for win-win situations.

It has been widely argued that behind a person's position, there are other concepts, namely: interests, beliefs, sub goals and private goals. This next part will elaborate on all three and try and give you a basic understanding of the interconnection between them all.

Interests

The **Negotiation interests** are those which drive you to attempt a negotiation process. This is the set of motivational attitudes that make you decide which position to take, i.e., it advances your private goal set, and thus they are specific to each individual.

Interests can be very basic, but can also be very extensive. The negotiator's job is to find out what he is dealing with and what the other party's interests are.

Interest Adoption

The justification of an interest for an individual has three spheres: a subjective, objective and normative sphere (Habermas, 1984).

The **subjective sphere** is the result of an individual believing that the interest advances his private goal. The **objective sphere** comes from general beliefs the individual has that justify the existence of the interest to him. Finally, the **normative sphere** arrives from the social position and relations the agent has. All of these influence the set of interests a person has.

Beliefs

Beliefs are what determine how you look at the world and your position in it. One could say that your beliefs form the core of your behavior. As such, they also form the context in which the interest holds. The beliefs justify the goal through the objective sphere of justification.

For instance, two people can think differently about how world peace can be attained, they might both agree on the private goal of world peace, yet one could attempt to reach it through war and conquest and the other through diplomacy. Different beliefs lead to different interests. However they do not imply different private goals.

Sub Goals

The interests people have are not automatically attained; it takes a certain amount of steps before an interest becomes reality. We will define these steps as **Sub goals** the set of resources and actions necessary to achieve the interest or main goal. It is clear that a goal can be made up out of multiple sub goals or just one. Again, using the world peace example, we find that the diplomacy route to world peace contains sub goals such as writing up a charter, getting everyone to sign it, enforce it, etc.

It should also be clear that whenever one sub goal in a set of sub goals is defeated, or suddenly unattainable, the entire goal becomes automatically unattainable as well. However, the same goal can be the result of different sets of sub goals. All roads lead to Rome; but if you face a roadblock on yours, you better turn around and look for a different one.

Private Goals

Private goals have been explained enough throughout this book. And it should thus be clear that interests only exist because the individual feels that his interests are instrumental to his private goals. He will also be able to make a list and state exactly which interests are most instrumental towards his private goal. This will then enable him to select which interests he wants to explore first, taking into account how hard it will be to attain each and every one of them.

Differentiating Between People and Problem

Negotiators are people. People have emotions and different backgrounds with deeply held values and viewpoints. They are unpredictable. Dealing with human aspects in negotiation can be either helpful or disastrous.

A working relationship where trust, understanding, respect and friendship are built up over the time can make each new negotiation smoother and more efficient. On the other hand, people get angry, depressed, fearful, frustrated and hostile. They have egos which can be easily offended. Routinely they fail to interpret what you say in the way you wanted to understand them, the problem. Hence, understanding human behavior plays a major role while negotiating.

Every negotiator has two kinds of interests: in the substance and in the relationship. But, with many long-term clients, family members, business associates, or foreign nations, the ongoing relationship plays a far more important role than the outcome of a particular negotiation. Generally, relationships tend to entangle with the problem and positional bargaining puts it into conflict. (Fisher, 1991)

Hence, it is very crucial for a negotiator to separate people from the problem (Fisher, 1991). An effective negotiator needs to understand the other side's thinking. Putting oneself in others shoes is one of the most important skill negotiators can possess. But understanding their point of view does not mean agreeing with it. It allows you to reduce area of conflict and generate new and better self- interest.

Without communication there is no negotiation. Effective communication is required to reach a joint agreement. There are three big problems in communication. First, negotiators might not be talking to each other or at least not in such a way to be understood. Second, even if they are talking, they may not be hearing each other. Third is misunderstanding, what one says is misinterpreted by the other. (Fisher, 1991) To overcome these problems, a negotiator should always listen actively and acknowledge what is being said. He should be able to speak in a manner which makes the other person understand him the way he wants him to. Sometimes the problem is too much communication rather than too little. The negotiator

should develop the ability of talking precisely and clearly.

Roles

The final thing that typifies an individual's goals is the role he or she plays in our society. Some interests are intrinsic to a certain role, and therefore performing the role itself is a justification for adopting the interest. For instance, the role of a nurse requires the person to aid people in the hospital, even though the person might not feel like it. Roles also come into play when interaction between roles makes the agent react differently, and affects his interests. This could happen when a professional stuntman in his role as a father does not allow his son to pursue the same career.

Dealing with Interests

Now that you know what influences the adoption of an interest it is necessary to know how to use this knowledge. First you must have an idea about the role, private goal, sub goals and beliefs your negotiating partner. Once you have this information you leverage it to your advantage. The information is crucial to interest based negotiation, if you have no knowledge of this information, you will never be able to negotiate, because the only thing you can base your arguments on is the adversary's position. Sharing the knowledge of the information during the negotiation will help the other person understand your motivations, and will help in working towards an optimal solution.

The interests in a negotiation play a significant role. Finding out the other person's interests is a task that needs to be completed in order to effectively negotiate. In the book "Getting to Yes" by Roger Fisher and William URY, it is suggested that you put yourself in the position of your negotiating partner to see where they are coming from. Then you need to ask "'Why?'" they may be having certain interests (Fisher, 1991). If you are not looking at the problem from all aspects then successful negotiation cannot take place.

Also when addressing interests it is important to take into account basic human needs such as economic well-being and security. Interests that affect human needs will be the ones that people feel very strongly about (Fisher, 1991).

Interests are also one of the factors of negotiating with which you can be very firm about when conversing with your partner (Fisher 1991). When you are discussing your interests in the negotiation process what you say will not be attacking your negotiating partner because you are not addressing any of their thoughts or beliefs. This is why being firm when discussing interests is ok. However, when

discussing other topics within the negotiation it may not be suitable to be firm. It is important to make sure that your negotiating partner does not feel attacked during the process because it will hamper the completion of a successful negotiation. It needs to be clear that both negotiating partners are working together to solve the problem and not working to prove the other wrong (Fisher 1991).

If the other person does not supply the necessary information including interests, you must attempt to obtain this information by questioning him or her about it.

An example of why information such as beliefs and interests are useful can be seen through the scenario of a person who takes hostages and the negotiator for the police force. Think about any hostage movie you have ever seen, and you will understand why they keep talking to the hostage taker. They want to understand why he is doing what he is doing, what could be the private goal behind it, why did he decide to use this specific sub goal to attain his goal, what are his beliefs that support this, etc.

Different Negotiation Strategies

There are different ways to approach a situation in which negotiation will be necessary. Here are some of the strategies that can be used in negotiation. Three main categories for negotiating include: attacking beliefs, attacking sub goals and attacking interest.

Attack Justifying Beliefs

Attack the Beliefs

One possible strategy is to attack the context the other person lives in. Doing so is a very hard to do, as it is a purely subjective discussion about both parties' beliefs. Of course, if you succeed, the goal no longer fits the beliefs, and thus the interest can be changed. Then the negotiation process can move on as new opportunities are created.

Attack the Relation between the Interest and the Beliefs

A different strategy is to try and erase the existing relationship between the belief and the interest in the subject's mind. If you can successfully argue that you believe A, you cannot possibly have B as an interest, and then the structure falls apart. You can then continue to argue that considering this belief in A, interest C is a much better idea. By doing so you can again move the negotiation process forward, as the former positions have been abandoned.

Acknowledge Another Interest, that could conflict with the Former One

For this strategy you will attempt to argue that the current set of beliefs also justifies a different interest; better yet, an interest that conflicts with the earlier interest. When this technique works, you make the other party decide between the two interests, or at least get them to think about the importance of the achievement of the current interest. In this strategy you want the alternative to benefit your cause, so that the new interest makes a possible win-win situation.

This strategy may be somewhat difficult because it requires you to have an idea about which other interests are justified by the set of beliefs.

Attack the Sub Goals

Attach the Achievability

One way to attack the achievability is to argue that a certain sub goal necessary to attain the interest is not likely to be achievable. In doing so, you force the other person to rethink his or her plan of action, and possibly convince them to attempt to go after a different set of sub goals. By affecting him or her in this stage it is possible to move the negotiation process in the direction that suits you best.

Attack the Relation Between the Interest and the Sub Goals

The title says it all: argue that the sub goal does not help in getting towards the interest. If this is a fact, then a different set of sub goals is necessary, or the goal has to be redefined. One way or the other, new options arise.

Argue that Completion of Sub Goal will Negate a Different Sub Goal

It can very well be that by completing a certain sub goal, all other interests are no longer available to the individual. If the other interest(s) is more valuable than the one he or she is trying to attain now, the logical reaction would be to switch interests.

Attack the Interest

Attack the Instrumentality between Interest and Sub Goal

In this case you can make it clear that fulfilling the interest does not, in any way, move the individual closer to the private goals he or she wants to obtain. This will then allow you to elaborate on which interest does help the individual towards attaining his private goals. This is a very powerful position to be in, and is the advised route to take whenever possible.

Argue the Importance Rating of Interest

Here, you argue that whatever interest the individual tries to complete now provides him with less utility then going after a different interest. Of course, if successful, this leads to the acceptance of the other, proposed, interest.

CRACK Criteria

The CRACK Criteria lists characteristics that stakeholder representatives should have in order to negotiate effectively:

Collaborative

The representatives must be able to work with others to attain an outcome that can benefit everyone.

Representative

These representatives must remember the stakeholders they are negotiating for. If that focus is diverted to other interests than a win for the stakeholders is unlikely to occur.

Authorized

Authorization is important because the right people must be present at negotiations; information can be analyzed and decisions can be made by those that are authorized to do so. If an unauthorized person is sent to a negotiation, nothing can be achieved because that person cannot take any action or make any decisions.

Committed

Committed representatives are needed at negotiations to ensure that an efficient and effective process can occur. Without a committed representative, stakeholders risk the attention, information processing, and deliberation needed to make the best decisions.

Knowledgeable

Without having a knowledgeable representative at the table, other negotiators at the table have the opportunity to take advantage of negotiation process itself.

EasyWinWin Method

The EasyWinWin method is a negotiation methodology that has been widely used in multiple project negotiation processes. It is used the most to build a project-outline, including requirements. It has been successfully used in the software development stage, which is also where it originates. Nonetheless, with minor adaptations it is easily converted to aid in different processes as well. The big advantage of the process is the step-by-step advancement, which makes conflicts easier to handle. The end goal for every stakeholder is to attain a "win condition". Win conditions are achieved when the stakeholder comes out of the project/process as a winner.

As mentioned before, the EasyWinWin methodology drives the team through a step-by-step process and by doing so it covers all the patterns of collaboration you have seen in the earlier chapters. To accomplish this it uses some collaboration techniques and ThinkLets. We will now elaborate on each activity in the EasyWinWin process:

Requirements Stage

In this stage, you start off with a basic outline that will form the basis of your process. It defines what you want to incorporate in the process and what the outcome should be. For example, in software development this stage will most likely discuss the following: features and functions of the software, system interfaces, performance, project and process specifications, and future evolution. We hope it's clear that pretty much everything you might want to touch on in a software development process can be identified in one of these categories. Usually, this is a standard process, and thus the outline already exists. If not, there are multiple ways to build it from scratch. (Try and think of the patterns that would be needed to do so, and maybe what Think lets you know that could be used to facilitate these patterns.)

That is not all that happen during this stage, people will also suggest additions, revisions, and general comments on the outline at this point. Every little thing in the outline could become a future win condition for one of the stakeholders. This almost guarantees that every stakeholder will "win" at least once during the process. By doing so, conflicts are largely avoided.

Brainstorm Stage

In this stage people use the taxonomy defined in the earlier step to talk about their interests. By using an anonymous brainstorm technique everyone is encouraged to give his or her opinion about the topics that were described in the earlier step. Anonymity is crucial, as this will allow people to talk about interests (and thus win conditions) they would otherwise be reluctant to share. The resulting collection of statements will be used in the next steps as a starting point for win conditions, as they identify important process terms.

Sorting Stage

In this stage, the team goes over all the statements in each category and identifies any redundant or ambiguous statements and either deletes them or clarifies them together. Making sure there is a joint understanding among the team about all statements is crucial. Misunderstandings may cause problems in future steps.

The resulting statements are put into a list and they are organized by the team in the pre-defined categories. As an example, “The system has to be able to connect to the customer database in the future” will be a statement or win-condition that will be organized in the Evolution category. It might happen during this step that some statements will not fit in any of the categories. No worries, this just asks for a new category to be developed!

Be aware that at this point in the process there will be no discussion or endorsements of the win conditions!

Polling Stage

In this stage, people are polled about their opinion on certain characteristics of the win conditions. For instance, what often happens is allowing them to vote on both “Importance” and “Ease of implementation”. The results are brought together and shown to the entire team. A clear distinction will be made between results that show an obvious consensus, or those that do not. Oral discussion (e.g. using the Crowbar technique) is then called upon to uncover any unshared information, unnoticed assumptions, hidden issues, constraints and any other factor that resulted in the lack of consensus. This is not anonymous, although that might be an option. In the Crowbar technique the facilitator will attempt to pry the reasons for the lack of consensus out of the team. This is done orally, and discussion is free. This drives the entire team to more shared understanding of the concepts and allows for consensus to exist

after another voting session.

Once everyone agrees on the scores given to each win condition, these win conditions are showed in a scaled matrix below.

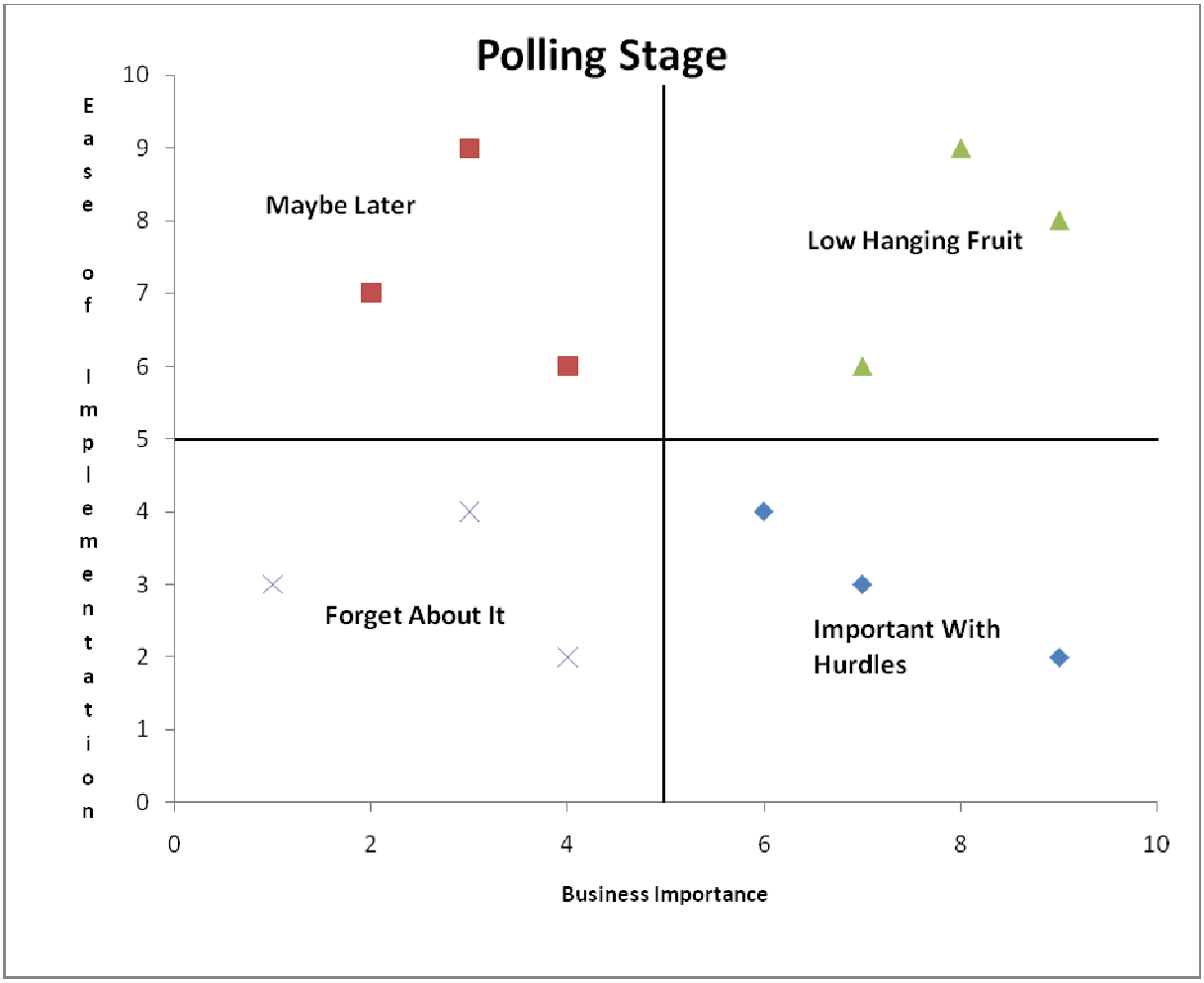

Figure 8.2: Polling Stage

The lower left quadrant is called “Forget them” for obvious reasons; these statements appear to be neither important nor easily attainable. Therefore they can be left out of the process.
The upper left “Maybe later” quadrant combines low importance with high ease of implementation. This means that while it is not the most important thing to accomplish, it might be worth looking into if there is still some time left.

Moving to the “Low hanging fruits” or upper right quadrant we have obviously discovered our prizewinners. These win conditions are both easy to implement and of big importance to us. These will be

the first to devote resources to.

The last quadrant, “Important with hurdles” proposes us with some difficulties. The team feels these statements are important, yet they are hard to implement. Once the low hanging fruits are harvested, devotion will be needed to these topics.

Identification Stage

In this step, the team will talk about how to advance in the listed categories. They will start with the low hanging fruit, moving over to the important with hurdles statements, and so on. This process starts with the team that once again reads the win condition. If anyone has an issue with this condition, he or she may say so and the issue will be noted. There is no immediate discussion about the issues raised as to not hamper cooperation. Once all issues for a condition have been listed the team will converge on the important issues that must remain. All others are deleted or rephrased into one. Once this is done, the team tries to think of “options” to resolve the issues. Again there is no immediate discussion about these options. They will all be listed –if any- and at the end the team will converge on them again.

This leads to the following decisions:

- Conditions with no issues, are immediately accepted, agreement has arrived.
- Conditions with issues and options can usually be resolved by using these listed options. After some discussion hopefully the team resolves the issues, with or without using the options.
- Conditions with issues but no options also have to be resolved. These have to be negotiated the old fashioned way. Hopefully, through the use of interest- based negotiations, as you know by now.

The secret behind EasyWinWin is that most stakeholders will already have acquired some wins during the earlier process. Therefore, they will be less reluctant to advance to a state of competitive arousal and will be more likely to agree to trade-offs or consensus.

Although all of this might seem very elaborate, and maybe even complicated, it is often used in the industry, not only by big companies such as IBM, Boeing or Xerox, but also by the government and smaller companies as well. It is a commonly used technique and we hope that you see the advantages that it provides.

Negotiation is very important to collaborative works. While there are many different strategies and methods the desired outcome is the same. People want to work to resolve problems with solutions that everyone in the group can be satisfied with. It is possible to come to an agreed upon solution if the

negotiation process goes well.

Glossary

Agreement: A mutually acceptable commitment.

Commitment: To assume an obligation, to expend resources to fulfill the terms of an agreement.

Hardball strategy: A strategy where you refuse to give in.

Interest: That which advances your private goals.

Interest-based negotiation: The negotiation process where you strive to attain an interest.

Negotiation: Discussion intended to produce an agreement.

Position-based negotiation: The negotiation process where you battle over a position.

Sub goal: resource or action necessary to achieve a main goal or interest.

Win conditions: achieved when the stakeholder comes out of the project/process as a winner.

Thought Exercises

1. List the difference between position-based and interest-based negotiation.
2. Explain the importance of negotiation and examples of situations in which it can be used.
3. Identify what goal interdependence is and the three types of mutual dependence.
4. Which types of interests will people tend to feel more strongly about? Think of specific examples

Exam Questions

1. Explain why position-based negotiation is usually ineffective.

2. Give 3 ways in which you can attempt to change the negation process; this can be based on beliefs, sub goals or private goals.

3. Why would one attempt to get involved in cooperative goal interdependence?

4. Effects of Competitive Arousal include everything but:
    a. Restricted Attention Capacity
    b. Reduced Time
    c. Less Deliberation
    d. Less Information Processing

5. Which criteria is not part of the CRACK Criteria?
    a. Collaborative
    b. Communicate
    c. Representative
    d. Authorized

6. What are the different stages in the EasyWinWin process? How do they advance the process?

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Chapter 9

Collaboration Engineering

Learning Objectives

The focus of this chapter is the practice of setting in place collaboration platforms that do not require the ongoing aid of a professional facilitator. The techniques enabling stand alone collaboration platforms are known as Collaboration Engineering. In this chapter you should learn the following objectives in regards to Collaboration Engineering:

- What Collaboration Engineering does
- Roles within Collaboration Engineering
- Collaboration Engineering approach and the model it represents

The objective of this chapter is to describe the concept of Collaboration Engineering, showing the advantages it provides in increasing the performance of teams. The following sections will help you to gather a basic understanding of Collaboration Engineering.

What is Collaboration Engineering?

There are ways to approach collaboration engineering. There are many different ways the collaboration engineering process can be taught to employees. First the basics of collaboration; **Collaboration Engineering** is an approach to designing and deploying recurring collaborative work practices for high-value recurring tasks and transferring them to practitioners to execute themselves without the ongoing intervention of a professional facilitator (Briggs 2009). Collaboration Engineers design collaboration processes comprised of combinations of the fundamental patterns of collaboration. Collaboration engineers spread the knowledge of recurring work practices to practitioners in order to maintain levels of collaboration previously only possible with the ongoing aid of facilitators. While facilitators may often achieve remarkable results, for a variety of reasons keeping persons employed as facilitators on a long term basis is difficult. Facilitators are often among the first employees let go during lean times. Facilitators are often promoted to higher level positions within the organization and the supply of facilitators is lower than demand making replacement a challenge. The cost of ongoing facilitation may be appropriate to solve unique problems not expected to reoccur. However, in situations where a problem is expected to happen regularly, collaboration engineering can put into place a collaboration platform tailored precisely to the issue at hand without the aid of professional facilitation. With the work practices in place, ordinary employees may take full advantage of advanced collaboration techniques using collaboration engineering.

In order for collaboration engineering to take place group support systems (GSS) may need to be used. "A **GSS** is a collection of collaborative software tools used to structure meeting activities. Typically, a GSS is run within a face-to-face meeting room. All participants have their own console and each can contribute simultaneously and anonymously to the discussions" (Harder et al. 2005). A GSS helps in the facilitation process as well, but can be used when the practitioners learn what they need to have knowledge about in order to play the role of a facilitator. "The key in achieving sustainable success with GSS is to design primary collaborative processes and to train practitioners and groups to be self-sustaining in these processes with GSS" (Harder et al. 2005).

We have talked about facilitation in a previous chapter. To reiterate the topic, Facilitation is the process of enabling groups to work efficiently, effectively and cooperatively toward a common goal. Collaboration has the same goal, but achieves it without ongoing facilitation.

Roles within Collaboration Engineering

There are different roles within collaboration engineering. The four major roles that will be covered are: the facilitator, collaboration engineer, practitioner and participant.

Facilitator

Facilitation is the process of enabling groups to work efficiently, effectively and cooperatively toward a common goal. A **facilitator** is a person who leads the facilitation process; they lead the group in the right path toward the common goal of the organization (Gaffney 2009). The facilitator in turn is the person who would ensure the company's chosen practitioners are well informed of the facilitation process, the recurring work practices though which a company to practices collaboration engineering.

Collaboration Engineer

The collaboration engineering process starts with the collaboration engineer. The **Collaboration Engineers** job is to design collaboration processes that are combinations of the fundamental patterns of collaboration. This role initiates the setup of the overall goal of conducting collaboration engineering. A collaboration engineer designs collaborative work practices used to solve reoccurring problems.

Practitioner

A **practitioner** executes a repeatable collaboration process in his or her own domain. This is the person, an internal source, who is taught the collaborative work processes traditionally managed by professional facilitators. A practitioner is anyone in an organization managing collaborative work practices to push a group towards a goal.

Participant

The final role is also in congruence with the final stage of the collaboration engineering process. The **participant** is the individual who takes part in the collaboration process. After the practitioner is taught techniques to lead ongoing collaboration work practices, the practitioner leads the participants, or other members of the group, though those work practices.

Collaboration Engineering Approach

Collaboration engineering addresses problems and purposes requiring particular ways of thinking, working, modeling, controlling and supporting. These processes can be divided up into four layers within which the group interacts. These are the Process, Pattern, ThinkLets and Phenomenon layers.

The Process Layer

The **Process layer** focuses on what a group must do or the steps a group must take to attain goals and solve problems. The goal attainment model shows us that when a group works towards a goal, they go through multiple phases as explained in "Collaboration Engineering: Designing Repeatable Processes for High-Value Collaborative Tasks." (Briggs and Vreede 2005) These tasks are:

- Understand the Problem
- Develop Alternative Solutions
- Evaluate Alternatives
- Chose Alternatives
- Make a Plan
- Take Action

- Monitor Results

When group members work, they are most likely working in one or more of these phases. A process designer can start with this model to figure out what tasks a group must complete to reach it's a goal. According to Briggs and Vreede, "Each phase has its own set of deliverables, a problem statement, set of alternatives, an evaluated set, a decision, a plan, an implementation, and metrics" (Briggs and Vreede 2005). The designer can use this model as a way to decide what a group must do and what deliverables must be produced in order to attain its goal. This top most layer of a process design is the framework that maps the phases in the model which produce deliverables. A visual representation of this map is shown below.

Figure 9.1: Designing Repeatable Processes for High-Value Collaborative Tasks

Step	**Phase(s)**	**Deliverable(s)**
Identify Risks	Understand the Problem	List of risks by impact area
Assess Risks	Understand the problem	Prioritized list or risks List of controls for each risk List of mitigated risks
Mitigate Risks	Develop alternative solutions Evaluate alternatives Choose alternatives Make a plan Take action Monitor results	List of new controls List of prioritized new controls Plans to implement new controls Plans to measure new controls' effectiveness

The Pattern Layer

Although a group may know what steps a group must take to attain goal and knows the deliverables for each step, but they may not know how to complete each step. The **Pattern Layer** is a way of thinking about how people move through each phase of goal attainment. There are five patterns of collaboration that characterize activities while moving through each phase. Each pattern is based upon moving a member from a starting point to an end result. These five patterns according to Robert Briggs and Gert-Jan de Vreede (Briggs and Vreede 2005) are:

- **Diverge**: Move from having fewer to having more concepts
- **Converge**: Move from having many concepts to a focus on and understanding of a few deemed worthy of further attention

- **Organize**: Move from less to more understanding of the relationship among concepts
- **Evaluate**: Move from less to more understanding of the benefit of concepts toward attaining a goal relative to one or more criteria.
- **Build Consensus**: Move from less to more agreement among stakeholders so that they can arrive at mutually acceptable commitments.

A team can start **divergence** activity from many different points; one may start at the beginning and identify concepts that have not been considered. Another team may start from a well developed concept and form new ideas based on the original concept. It is important in **convergence** to judge existing concepts to decide which ones should be developed further. Along with judging concepts, the ideas being judged must be filtered to reduce the number of concepts to a manageable amount. Another important aspect of convergence is creating shared meaning; often, many people use the same words for different meanings. A group must decide on the connotation of a set of words for the assignment. **Organization** is the next task. Organization consists of rearranging concepts into general categories that show relationships. **Evaluation** refers to the estimating the likely risks of various consequences which leads to **building consensus** where individual team members align goals with the group as a whole.

The ThinkLets Layer

ThinkLets are the named, scripted activities that produce known patterns of collaboration among people who work together. Following the Process Layer and Pattern Layer, the ThinkLets Layer is simply the building blocks needed when creating repeatable processes. This is the basic information one must know in order to reproduce the patterns of collaboration without the implementation of a facilitator. These patterns are typically used to construct new group processes. The building blocks are usually easily learned, remembered and assembled into a process design. We will talk more about ThinkLets later in the chapter.

The Phenomenon Layer

This layer is the foundation layer for the layers mentioned above. The **Phenomenon Layer** consists of "theoretical underpinnings for the outcome that collaboration engineers seek to affect with their collaboration process design." (Briggs and Vreede 2005) The purpose for an engineered process is to increase the productivity of the people who use it which leads to the theoretical understandings of activity. Some examples are shown in the following table:

Figure 9.2: The Phenomenon Layer

Phenomenon Layer	**Theoretical Foundation**
Group Productivity	Focus Theory
Creativity	Cognitive Network Model
Satisfaction	Satisfaction Attainment Theory
Value Creation	Value Attainment Model
Transition of Work Practices	Technology Transition Model

Ways of Working

The Collaboration Engineering method of working describes the steps needed to design collaboration processes (Briggs and Vreede 2005). The steps in this process start by identifying the best practices for a given task. Next, using the information from the best practices, the collaboration engineer uses knowledge to create a prototype collaborations process. Finally the process is executed and evaluated. The design activities according to "Collaboration Engineering: Designing Repeatable Processes for High-Value Collaborative Tasks" (Briggs and Vreee 2005) are:

- Define the goals of the people for whom the process is to be implemented
- Negotiate the content, structure, and packaging of deliverables
- Define data and data transformations required to achieve deliverables.
- Design process in terms of steps.
- Design process in terms of patters.
- Design process in terms of ThinkLets.
- Implement ThinkLet and transition capabilities and script.
- Pilot the collaboration process.
- Refine the collaboration process.

- Train practitioners
- Monitor and update collaboration process designs.

It also states that this design is depicted in linear fashion but most commonly implemented in w parallel fashion. These are a set of building blocks they can help build processes depending on the task at hand. You are able to alter or even remove steps to better fit the group's needs to attain its goals.

Collaboration Engineering Methodology

Collaboration is gaining great recognition throughout the business world. Because of such attention, it is important for the collaboration engineering process to create organizational value for the users time and time again. This can be accomplished by using Collaboration Engineering Methodology to help walk through collaboration engineering models and keep on task. This model will help systematize the manner in which collaboration engineers assess and improve the collaboration engineering process (Kolfschoten, 2006). The model has two dimensions to it: the first represents the various steps of the collaboration engineering approach, the second indicates the capability and a description of generic levels of process maturity that help to assess and optimize individual phases.

The sequence that is to be followed in order to gain success has several key phases in the Collaboration Engineering Methodology. Should these phases be skipped or done improperly, the process may be deployed ineffectively within an organization and it may not successfully support collaboration practices. The phases in the Collaboration Engineering Approach are:

- Field Interview
- Design
- Transition
- Practitioner Implementation
- Sustained Organizational Use

An illustration of what the process looks like is inserted below. Next, we will gain a better understanding of what occurs in each phase.

Figure 9.3: The Collaboration Engineering Approach (Kolfschoten et al. 2006)

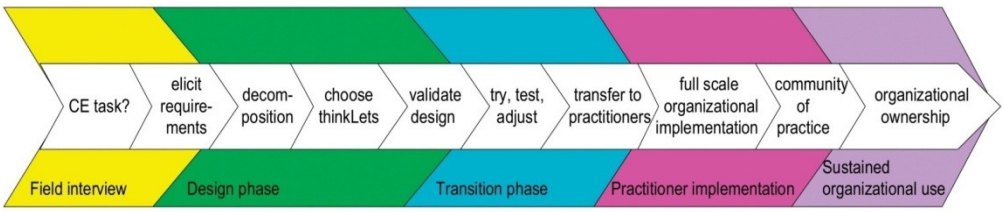

Figure 1: The collaboration engineering approach.

Field Interview

This is the first phase within the Collaboration Engineering Methodology. Within this phase, the collaboration engineer gets together with the stakeholders to figure out what is needed for the situation at hand and to gather as much relevant information as possible (Kolfschoten et al. 2006). This phase usually consists of a series of interviews with various organizational units. In collaboration with the organizational actors, the collaboration engineer needs to determine the following parameters:

- Define the problem or task that is in need of attention
- Define the context for the problem or task
- Define the key players in respect to the problem
- Define what outcomes and goals are to be obtained
- Determine the frequency of the collaboration practice and the need for a collaborative approach (Kolfschoten et al. 2006)
- Identify individuals who will be trained to conduct the process for the organization
- List and define any potential resources that may be needed to complete the task

After conducting this phase of the Collaboration Engineering Methodology, it becomes the responsibility of the collaboration engineer to determine the suitability of the collaboration engineering approach to the task at hand (Kolfschoten et al. 2006). Should the problem not be well suited for collaboration engineering, now is the time for the collaboration engineer to make that recognition.

Design Phase

This is the second phase within the Collaboration Engineering Methodology. Within this phase, a set of activities from which the collaboration engineer designs the recurring collaboration process for the specific task, organization, and practitioners will be found (Kolfschoten et al. 2006). In order to best design the entire process, it is important for the collaboration engineer to dissect the task down into single collaboration activities. From here, the engineer can decide which ThinkLet would be best for each individual activity. Then, using criteria set forth in the Field Interview phase, the design can then be validated as a whole to determine if all requirements have been met.

Transition Phase

This is the third phase within the Collaboration Engineering Methodology. Within this phase, the organizational practitioners are taught to execute the collaboration process (Kolfschoten et al. 2006). This process must first be designed and tried by the engineer through a set of different approaches that may be used prior to formally training practitioners on how to use the process. By doing so, the chance of an error and any unforeseen issues that may arise are eliminated. After formally training the practitioners, the collaboration engineer observes them as they implement the process themselves in a group setting for the first time, making note of any problems that may exist. The collaboration engineer is also there to offer support and feedback on complex processes, as well as make the new practitioner feel comfortable performing the process plan (Kolfschoten et. al 2006).

Practitioner Implementation

This is the fourth phase within the Collaboration Engineering Methodology. Now that we have trained and tested the designed collaboration process, it is time for the practitioners to assume the role of the facilitator and begin running the collaboration processes they were trained on by themselves (Kolfschoten et al. 2006). With time, the organization in which the processes are being implemented will spread throughout the organization, assuming management helps in stimulating the execution of the process throughout various departments.

Sustained Organizational Use

This is the fifth and final phase within the Collaboration Engineering Methodology. With the previous four steps being completed successfully, the organization can now assume full responsibility for and ownership of the process created by the collaboration engineer (Kolfschoten et al. 2006). Those practitioners who have been trained by the collaboration engineer are to be considered resident experts and will be expected to take control of the process from this point on. Any changes that are to be made will be done by the organizational process owners, although input from the original collaboration engineer is likely available and should be considered valuable. Within this phase, the practitioners begin training others to be practitioners and facilitators.

By following this model, organizations and practitioners can gain a better understanding of how the methodology of collaboration engineering takes place. First a facilitator is brought in to hold Field Interviews with the organization. Second, a Design Phase breaks down the process into smaller, more

manageable pieces that will each have a ThinkLet assigned to them. Third, the Transition Phase will allow practitioners to become comfortable in executing the process in a controlled environment. Fourth, the process will go through Practitioner Implementation as the practitioner becomes the facilitator. Finally, the process is at Sustained Organizational Use where the organization becomes fully responsible for the use and the designed changes of the collaboration engineering process. Next we will discuss the different ways of modeling used in collaboration engineering.

Ways of Modeling

Ways of Modeling describe a process in which the design activities used within Collaboration Engineering work together to produce a number of modeling deliverables. While several different modeling conventions have been developed to support these deliverables, one of the most relevant and most used foundation models is that created by Kolfschoten et al. (Kolfshoten et al. 2006). Kolfschoten et al. takes elements from within the collaboration process and based off of the elements relevant to the design process, different aspect models can be defined (Briggs and Vreede 2005). The differing models each highlight different parts of the collaboration process design. From the differing highlights, one can gain a multi-perspective view on how the collaboration process works as a whole. Thus far, only the following aspect models have been defined: the ThinkLet Description Document, the ThinkLets Notation Model, and the Facilitation Process Model. Each will now be discussed in further detail below, starting with the ThinkLet Description Document.

The ThinkLet Description Document

ThinkLet Description Document is just what one would gather from the name - a description of a document that is a ThinkLet. To date, roughly sixty ThinkLets have been formally documented in ThinkLet Description Documents (Briggs and Vreede 2005). In order to be eligible to be formally documented as a ThinkLet Description Document, the text-based template model should present the following content:

- **A ThinkLet Name:** Name given to the ThinkLet that is either descriptive or metaphoric to the pattern the ThinkLet creates. Example: in the ThinkLet known as “Leafhopper,” participants start with one page for each of several discussion topics and then “hop” from page to page at will, making contributions as needed (Briggs and Vreede 2005). The name should be an expressive word or phrase as this will help in remembering what the ThinkLet is and how it is used.

- **Choose This ThinkLet:** Criteria for deciding which ThinkLet to use; should provide enough information to convey the pattern(s) the ThinkLet produces and to distinguish itself from others that may create the same pattern. Example: the ThinkLet known as "FreeBrainstorm," has selection criteria, "Choose this ThinkLet when it is important to create a shared understanding of the problem among people with different perspectives, expertise, or background (Briggs 2005)."
- **Do Not Choose This ThinkLet:** Criteria for deciding against using the ThinkLet. Example: "Do not choose this ThinkLet to maximize the number of creative ideas a group produces (Briggs 2005)."
- **Overview:** Paints a picture of what the ThinkLet will do and what outcomes it will produce.
- **Inputs:** Variables that must be applied at the time the ThinkLet is to be used. Some ThinkLets may require a whiteboard, polling methods, ballot items, post-it notes, and other items necessary to carry out the ThinkLet objective.
- **Outputs:** Lists and gives characteristics of the deliverables that will be created by using a certain kind of ThinkLet.
- **Setup:** Describes what is needed to setup and effectively use a certain kind of ThinkLet. Some technological capabilities may be required by individuals contributing to the ThinkLet; these kinds of requirements will also be listed under the setup content.
- **Steps:** Much like a recipe, the Steps part will give a clear, concise order of operations. A list of what participants must say, do, decide, and remember during the execution of the ThinkLet will be given to help produce the desired pattern of collaboration (Briggs and Vreede 2005).
- **Insights:** Here, a list of helpful tips and tricks to use during the use of the ThinkLet that will make its use easier or more effective will be given, along with general observations about the nature of the ThinkLet.
- **Success Stories:** Real life stories of the ThinkLet in action and the results it produced to aid a process designer in understanding the utility the ThinkLet can offer.
- **What's In A Name:** A simple explanation that explains why the ThinkLet is named as it is.

The ThinkLets Notation Model

Next, we will discuss the ThinkLets Notation Model. The **ThinkLets Notation Model** is a formal textual method for documenting and communicating group process designs (Briggs and Vreede 2005). Instead of having a long and extensive list like the ThinkLet Description Model, the ThinkLets Notation Model has a list of criteria that best resembles an agenda. For every step in the process, a ThinkLet Notation Model includes:

- **Step Name:** Some descriptive phase will be listed that describes what the team will accomplish in the step.
- **ThinkLet Name:** Lists what ThinkLet is to be used. There could potentially be several ThinkLets listed for any given step.
- **Parameters:** Similar to the Inputs of the ThinkLet Description Model, the parameters specify what criteria must be used at the time the ThinkLet is being used to assure consistent results.
- **Duration:** The amount of time that will be devoted to the execution of the ThinkLet.

While the ThinkLet Notation Model is very effective and useful, it does have a slight problem with its design. It is only useful for individuals who are familiar with the ThinkLets that are referenced within the design, therefore if one does not know which ThinkLet is being referred to, they will first have to train themselves on how to effectively use the ThinkLet prior to using it in a group setting. Below is an example of how a process design can be laid out using the ThinkLets Notation Model. As you can see, it is very similar to what an agenda looks like.

Figure 9.4: A process design in ThinkLets Notation (Briggs and Vreede 2005)

1.	Welcome and introductions
2.	Identify impediments
	40 Minutes – *(FreeBrainstorm)* Brainstorming question: "What are the impediments that prevent IT managers from becoming business leaders?" 30 Minutes – Converge on a list of about 8 impediments to IT managers becoming business leaders using two ThinkLets simultaneously: *(ThemeSeeker)* to elicit new contributions: "Please browse through your brainstorming comments and tell me what are the key themes that have emerged in your brainstorming?" (*RichRelations)* to reduce the size of the list: "Please look at this list of impediments that keep IT managers from becoming business leaders. See if you can find two items on this list that are related and tell me how they are related."
3.	15 Minute break
4.	Propose Solutions
	40 Minutes – (*LeafHopper)* "Here is the list of impediments that prevent IT managers from becoming business leaders.

	What strategies could be used to mitigate and overcome these impediments?"
5.	Wrap-up review
	15 Minutes – (*LeafHopper)* "What did you like about the things we did today?"
	"What would you change in the future?"

The Facilitation Process Model

The Facilitation Process Model uses three symbols to illustrate the flow from ThinkLet to ThinkLet. The symbols are: Activity, Decision, and Flow Direction.

Summary

In summary, this chapter was focused on a technique developed to help remove a professional facilitator in a situation referred to as Collaboration Engineering. Collaboration Engineering involves several models that help illustrate the processes used by facilitators and practitioners to maximize success through the use of various ThinkLets. We also touched bases on the methodology of Collaboration Engineering, explaining how a facilitator is brought into a difficult situation, and helps the organization implement a ThinkLet process designed specifically for their needs. The overall goal of the methodology is to train practitioners to be facilitators and not to rely on support from the original Collaboration Engineer who initially designed and implemented the process. After reading this chapter, you should be able to explain:

- What is Collaboration Engineering?
- What are the roles within Collaboration Engineering?
- Explain the Collaboration Engineering approach and the model it represents.

Glossary

Collaboration Engineering: is an approach to designing and deploying recurring collaborative work practices for high-value recurring tasks and transferring them to practitioners to execute themselves without the ongoing intervention of a professional facilitator.

Collaboration Engineering Methodology: this model will help systematize the manner in which collaboration engineers assess and improve the collaboration engineering process.

Collaboration Engineers design collaboration processes that are combinations of fundamental patterns

of collaboration.

Facilitator: is a person who leads the facilitation process; they lead the group in the right path toward the common goal of the organization.

Facilitation Process Model: uses three symbols to illustrate the flow from ThinkLet to ThinkLet.

GSS: is a collection of collaborative software tools used to structure meeting activities.

Participant: is the individual who takes part in the collaboration process.

Pattern Layer: is a way of thinking about how people move through each phase of goal attainment.

Phenomenon Layer: consists of theoretical underpinnings for the outcome that collaboration engineers seek to affect with their collaboration process design.

Practitioner: executes a repeatable collaboration process in his or her own domain.

Process layer: focuses on what a group must do or the steps a group must take to attain goals and solve problems.

ThinkLets: are the named, scripted activities that produce known patterns of collaboration among people who work together.

ThinkLet Description Document: provides a brief, yet detailed description of the ThinkLet.

ThinkLets Notation Model: is a formal textual method for documenting and communicating group process designs.

Thought Exercises

1. Explain what collaboration engineering is and why group support systems may be used.
2. Briefly explain the four major roles identified in collaboration engineering and how they can effectively be incorporated.
3. Identify three situations in which the collaboration engineering approach may be integrated.

Exam Questions

1. What are three different ways of modeling currently used in Collaboration Engineering?

2. The ThinkLet Notation Model best resembles:
   a. A blueprint
   b. An agenda
   c. Bulleted list

3. List the five phases used in the Collaboration Engineering Approach/Methodology:

4. Collaboration is the process of educating practitioners on ways of recurring collaborative practices, in order to remove the use of professional facilitators.
   a. True
   b. False

5. List the four layers of the Collaboration Engineering Approach.

Solutions for Exam Questions

1. ThinkLet Description Document, ThinkLets Notation Model, Facilitation Process Model.
2. b
3. Field Interview, Design, Transition, Practitioner Implementation, Sustained Organizational Use.
4. b
5. Process, Pattern, ThinkLets, Phenomenon.

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Chapter 10

ThinkLets

Learning Objectives

In this chapter, you will learn:

- What a ThinkLet is
- Why it is beneficial in Collaboration
- How technology enhances ThinkLet implementation
- When to implement a ThinkLet activity
- Differences between several ThinkLets
- How to choose the best ThinkLet
- How ThinkLets relate to other major concepts in this book

Introduction

As previously discussed in chapter 2, detailing the Seven Layer Model of Collaboration, there are 6 main patterns of collaboration: generate, reduce, clarify, organize, evaluate, and build consensus. The patterns of collaboration are beneficial for groups to utilize along with facilitation techniques in order to get the most value out of collaboration. Groups that use activities as a facilitation technique are able to efficiently move through the patterns of collaboration quicker and more thoroughly. By using activities as facilitation techniques, groups gain the ability to increase productivity and strengthen the group's focus to achieve their goal.

It is important for groups to collaborate in order to reach a shared goal or complete a task. Collaboration provides group members the opportunity to contribute mutual knowledge and skill sharing in order to achieve a common goal. Group contributions produce different results than if the same task was completed individually. In order to expedite some of the important group processes that must happen while working towards a shared goal, groups have begun using ThinkLet activities in order to access this information quickly and easily.

ThinkLets are facilitation techniques that constitute the smallest unit of intellectual capital required to create one repeatable, predictable pattern of collaboration among people working toward a goal (Santanen and Vreede 2004). They are simple devices that elicit responses from the participants in order to move the group through the project requirements. ThinkLets are comprised of 3 main parts that aid in

high-value, recurring collaborative tasks: tools, configurations, and scripts (Harder and Highley, 2004). It is important to recognize these 3 areas, so that the selected practitioner can best modify the activities to fit the needs of the group. A **practitioner** is a person, either a member of the group or not, that initiates ThinkLet activities and selects the most appropriate ThinkLet combination to use.

ThinkLets are question oriented cognitive tools that give the mind the best chance to find the right ideas, solutions, or answers. They can be as simple as one question, a thinking process, questions embedded into a template, or even a short lecture. There are more than 125 types of ThinkLets to choose from when moving the group through the patterns of collaboration (yourmindatwork.com 2009). This chapter discusses 5 ThinkLets that each relate to a pattern of collaboration. Examples of these ThinkLets are shown in Table 10.1.

Name	**Purpose**
Free Brainstorm	To generate a variety of ideas.
Fast Harvest	To identify and categorize useful ideas.
Theme Seeker	To summarize ideas.
Leafhopper	To have a group brainstorm ideas on multiple topics simultaneously.
MoodRing	To continuously track the level of consensus within the group.

Table 10.1: Examples of ThinkLets

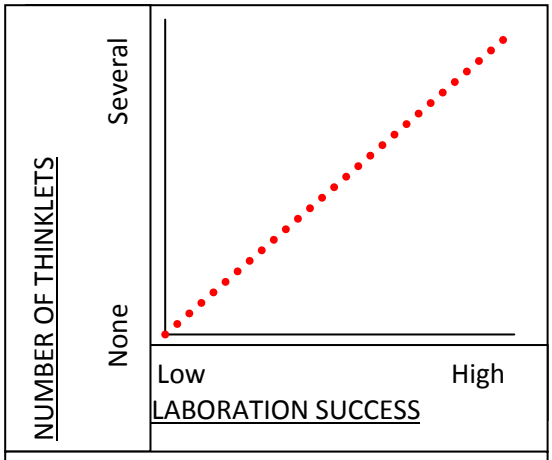
Each ThinkLet is designed with a different purpose as part of some group process to help a group move through the patterns of collaboration and toward achieving the group goal. "Field experiences suggest that these ThinkLets fill in perhaps 80% of a given collaboration process design; the other 20% of actions a group must perform needs to be customized for the task at hand. In this sense, ThinkLets have become a powerful pattern language for collaboration engineers, who use ThinkLet names to describe and communicate sophisticated, complex process designs in a compact form" (Kolfschoten et al 2004).

Why Should We Use ThinkLets to Collaborate?

ThinkLets are beneficial to collaborators because "they encapsulate a facilitator's best practice regarding establishing a certain pattern of collaboration among a team of participants" (Santanen and Vreede, 2004). With the implementation of ThinkLets, a group may now easily accomplish a task in the most appropriate manner without the assistance of a skilled facilitator. This eliminates the need for a

company to hire an individual solely to direct these meetings or to train an employee to do it. It places the facilitation responsibility onto the members of the group.

"Because ThinkLets produce a predictable pattern of interactions among people working together toward a goal, they can be used as snap-together building blocks for team process designs" (Kolfschoten et al 2006). These activities make it easier for a group to communicate. This, in turn, means that they will reach conclusions faster and be able to move on to the next step (see Table10.2).



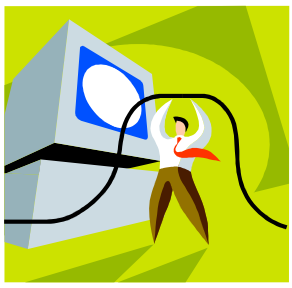
As groups use ThinkLet activities during collaboration, the likelihood of successfully completing the 7 Layer Model Increases.

Table 10.2

Design Patterns are vehicles for communication that enable the users of the pattern language to name and share complex concepts without having to explain them in much detail (de Vreede et al 2006). Communication is very important among teams and pattern language allows practitioners of the same ThinkLets-based collaboration process to easily share insights and experiences among themselves (de Vreede et al 2006). It provides a convenient language for communication as long as the ThinkLets not only benefit the designers, but the group as a whole.

Electronic vs. Manual ThinkLet Applications

ThinkLet applications are composed of various combinations of tools, configurations and scripts. The **tool** in a ThinkLet activity refers to the technology that is implemented in order to create the desired pattern of thinking. The tool components of a ThinkLet application are simply the processes that are used during the brainstorming activity. These processes can include using manual tools such as paper and pencil implementation like flip over charts, whiteboards, or brown papers, or electronic tools such as collaboration technology (Jointly Authored Pages, Streaming Tools, and Information Access Tools, previously discussed in chapter 4) or Group Support Systems (GSS).



GSS programs are electronic tools that aid in implementing the patterns of collaboration. GSS tools aid a group in structuring activities, generating ideas and solutions, and improving group communication (DeSanctis 1987). Electronic tools, such as GSS and collaboration technology, have given groups new tools to collaborate with and an advanced ability to transfer

information among group members. Choosing the right tool for a brainstorming activity is important as each tool results in different group interactions. For example, choosing a manual tool, such as paper and pencil implementation, for a group collaboration activity may require more effort by the facilitator to include everyone in the group while holding their attention and interest through the lengthy activity. Whereas utilizing a GSS program, the facilitator could involve a larger group much easier then with a manual ThinkLet application, and could direct the electronic program to move the group through the activity in a more efficient process.

Manual ThinkLet applications are best used with smaller groups completing a fairly simple brainstorming activity, or used when technology is not available. Manual ThinkLet applications, such as a whiteboard, can be used quickly and efficiently to complete simple brainstorming activities. The downside of manual applications is that they take longer to generate responses and are more difficult to allow users to be anonymous. Electronic ThinkLet applications are best used when involving a larger group. Electronic ThinkLet applications, such as GSS, allow group members to see instantaneous responses and are easily set up as anonymous. The downside to electronic ThinkLet applications are the need for network setup and technology, such as computers and GSS programs, which would require an investment by the company involved. It is important to consider the pros and cons of each electronic and manual ThinkLet application before choosing which to use for a brainstorming activity (see Table 10.3).

PROS	CONS
• involve a larger group • instantaneous responses • easy anonymous application	• requires network development • requires computer use abilities • may interfere with one's thinking pattern

Table 10.3: Pros and Cons of Using Technology in ThinkLets

The **configuration** of a ThinkLet activity refers to how the hardware and software are designed which includes the specified settings of the tool. The configuration component of a ThinkLet application will also have a varying impact on group dynamics. For example, consider the outcome of a group activity that is completed anonymously vs. identified. The results for that activity will most likely vary depending on if the selection of votes contain the individual's identity or remain anonymous.

The script of a ThinkLet application ties the tools and configuration components together. **Scripts,** in a ThinkLet, are the instructions and sequence of events used by the facilitator in order to invoke a specific pattern of thinking in the group. Utilizing the same tool in the same configuration can produce varying results depending on how the group interprets the script of the activity. For example, if a group is to use an electronic ThinkLet tool such as GSS and the activity is to be completed anonymously, then the outcome of that activity will vary depending on how the group interprets the script, or instructions

provided.

Before choosing which ThinkLet activity to use, as described in the following section, the facilitator should choose the ThinkLet application, whether manual or electronic, that best fits the brainstorming activity. Choosing the right ThinkLet application depends on what the group goals are, what the products are, and what the activities are. The ThinkLet application should use a combination of tools, configuration, and script that will best complement the ThinkLet activity.

Choosing the Right ThinkLet

There are numerous types of thinking processes that occur in collaboration. Understanding which one your team is using helps to focus the groups thinking and aids the facilitator in choosing which ThinkLet to use (yourmindatwork.com 2009). Below are examples of thinking processes.

Reactive: Quickly resolve urgent problems, situations or conditions.

Systems: Resolve the whole complex problem, issue or challenge.

Corrective: Restore something to an original, past or standard condition.

Creative: Develop something novel, useful, and of value that has never existed.

Improvement: Make current levels of performance better.

Planning: Anticipate and prepare for future opportunities or problems

By understanding your groups thinking process, the facilitator can more effectively select the right ThinkLet by determining which pattern of collaboration the group needs to invoke through the thinking process (yourmindatwork.com 2009). As you will see later in this chapter, selecting the right activity is crucial in invoking the correct thinking pattern or pattern of collaboration.

The two main types of ThinkLets are convergence and divergence. Convergence activities label the information into categories and divergence spreads the information out into a broader range of categories. **Convergence** ThinkLets move the group from more ideas to fewer ideas. The opposite, **divergence**, moves the group from fewer ideas to more ideas.Divergence ThinkLets can be further classified as either directed or non-directed (Santanen and Vreede 2004). In directed divergence ThinkLets, some type of moderator is responsible for providing stimuli that help to guide and direct the group. **Stimuli** are questions or limitations that are placed on the group's thinking process so that the best type of information is collected from the group. **Task focus** refers to the moderator's ability to produce stimuli that effectively move the group to use the most appropriate pattern of collaboration. In the non-directed

type of ThinkLet, the group receives no external stimuli and is required to work among themselves for the time period allotted.

Implementing ThinkLet Activities

In order for collaboration engineering intervention to be most successful, it is most important to choose the right task (Dudezert et al 2007). Since companies use group collaboration on some projects, it is important to notice that implementing ThinkLet activities reduces time and money every time these processes are performed. The chosen tasks that the group will partake in must meet some minimum requirements. Firstly, the goals of the group must be established. Next, you must consider the size of the group and the type of information to be collected. Finally, knowing how to introduce stimuli to limit the type of information that is produced is the final step of implementing these activities. It is important for the facilitator to introduce stimuli during collaboration. Stimuli aids in directing the group by defining limitations and restrictions on ideas that can be given. Ultimately, stimuli help the group to reach the end product sooner. Some questions that may limit the group are: Will it work? Is it timely? Is it costly? Is it easy? Will it be accepted? It becomes easy to systematically manipulate the diversity of stimuli and conditions to which problem solvers are exposed as they work. (Santanen and Vreede 2004).

"Each combination of tool, configuration and technique will produce different group behaviors" (de Vreede et al 2006). It is important for a facilitator to understand what action they are trying to invoke out of the group in order to select the best ThinkLet application and collaboration process. A facilitator uses ThinkLets to define their actions and to develop a script, or prompts, to invoke an action from the group as they go through the collaboration activity. Santanen and Vreede in 2004 have organized various prompts that are given to collaboration teams in the following manner:

- **Quartet**- prompts can be arranged in blocks of four; four different prompts derived from one criterion, then four different prompts from another criterion, and so on. (AAAA-BBBB-CCCC-DDDD-EEEE)
- **Duet-** prompts can be arranged in pairs; two prompts derived from one criterion followed by two prompts from another criterion, and so on. (AA-BB-CC-DD-EE-AA-BB-CC-DD-EE)
- **Solo-** prompts can be organized such that each prompt derives from a different criterion than the one that preceded it. (ABCDE-ABCDE-ABCDE-ABCDE-ABCDE)
- **Free-** involve no prompting at all, rather the group members interact with one another by expanding upon the solutions of others, arguing with previous solutions, or generating entirely

new solutions.

Prompts also describe the types of responses that can be given to the facilitator by the group participants. It is helpful to classify the information retrieved from prompts so that it can be easily reviewed and discussed by other group members or teams. By understanding the terms and outlines that are used in prompt activities, it is easier to talk about and understand group processes.

Examples of ThinkLet Activities

As we discussed earlier in the chapter, there are more than 125 types of ThinkLet activities to use that correspond with the six the patterns of collaboration. Each ThinkLet activity is designed with a different purpose to relate to the patterns of collaboration to help a group move toward achieving the group goal. This section discusses ThinkLet activities that relate to the patterns of collaboration: generate, reduce, clarify, organize, evaluate, and build consensus.

Activity 1: Free Brainstorm [Generate]

When to Use:

- To generate a variety of ideas
- To eliminate the confusion that occurs with large groups
- To get breadth of topics and to push the group in an anonymous way to provide new topics

When Not to Use:

- When the activity is expected to yield fewer than 50 total responses
- When the team doesn't need a wide range of topics but rather a concentration of thought on a limited amount of topics

What to do:

1. Ask the group to list all of the things that come to mind when you ask them a question
2. You can have everyone write down on a piece of paper their idea and then when they are finished they must switch with another piece of paper

3. Allow about 30-40 minutes for all of the responses to be recorded and let the contributors remain anonymous

Activity 2: Fast Harvest [Reduce & Clarify]

When to Use:

- To quickly identify useful ideas from a large set and thenputs those ideas in a category
- When you need the information as fast as possible so speed is very important

When Not to Use:

- When you need to guarantee that all concepts from the original exercise will appear on the final outcomes
- If participants can't clearly express the ideas that they are trying to get out because there needs to be some kind of structure

What to do:

1. Divide larger group into teams
2. Divide the categories among the groups and have the groups debate the main ideas of that category
3. Decide if the main ideas are relevant to advance

Activity 3: Theme Seeker [Organize]

When to Use:

- To summarize ideas after a brainstorming activity
- After any brainstorming activity and before any popcorn sort

When Not to Use:

- If brainstorming activities have not yet been identified
- If categories for organizing information have already been identified

What to do:

1. Allow participants to view the outputs of the brainstorming activity and let them identify the relationships between two or more topics
2. Produce set categories after a brainstorming activity
3. Discover themes throughout the brainstorming activity

Activity 4: Leafhopper [Evaluate]

When to Use:

- When you know in advance that the team must brainstorm on several topics at once
- When different participants will have different levels of interest or expertise in the different topics,
- When it is not important to assure that every participant contributes to every topic
- When you know in advance that the team must

When Not to Use:

- If you want the participants to address topics in a specific order
- If you want all participants to address all issues.

What to do:

1. 1.Create a list of topics for discussion
2. Explain the topics to the group and verify their understanding
3. Explain the kinds of ideas that the group must contribute

4. Have participants "hop" from topic to topic contributing as they are inspired, then move on.

Activity 5: Mood Ring [Build Consensus]

When to Use:

- To track patterns of consensus on a single issue in real time
- To know when it is time to stop the talking and take a decision

When Not to Use:

- If you need to address several issue at the same time

What to do:

1. Post a statement about an issue
2. Have participants register their opinion on the issue and begin an oral discussion
3. As they talk, they may hear something that changes their opinion.
4. Produces an ever-changing pattern of group consensus

Summary

ThinkLets are activities that direct a group to exhibit a certain pattern of thinking. They have the ability to include a larger number of participants, acquire varying ideas faster, and more easily aid a group in one of the patterns of collaboration. ThinkLets are not dependent on specific technology and may be used as manual applications, such as paper and pencil implementation, or electronic applications, such as GSS technology. Both manual and electronic applications aid group members in completing a brainstorming activity and move through the patterns of collaboration. The moderator has a direct influence on the outputs of the group by administering stimuli and by putting restrictions on group focus. The group may analyze one topic at a time or several topics at once. ThinkLets are easy to use and they influence groups in a very positive way. With that in mind, you must understand the purpose of the group in order to select the right ThinkLet, as the outcome of the meeting depends on how the ThinkLet activity is introduced and implemented. Activities within a Thinklet or collaboration meeting like Theme Seeker Free Brainstorm, Fast Harvest, Leafhopper, or Mood Ring will help a group arrive at their end goal.

Glossary

Configuration: how the hardware or software of a ThinkLet is designed including the specified settings of the activity.

Convergence ThinkLet: an activity that moves the group from more ideas to fewer ideas.

Corrective Thinking: to make something standard or back to the original state.

Creative Thinking: developing something both novel and useful that has never existed.

Design Pattern: vehicles for communication that enable the users of the pattern language toname and share complex concepts without having to explain them in much detail.

Divergence ThinkLet: activities that move the group from fewer ideas to more ideas

Duet: prompts arranged in pairs (AA-BB-CC-DD-EE)

Fast Harvest: a type of ThinkLet activity used to quickly get the most ideas about a specific category.

Free Brainstorming: a type of ThinkLet activity used to add breadth to ideas.

Free: involves no prompting at all, rather the group members interact with one another by expanding upon the solutions of others, arguing with previous solutions, or generating entirely new solutions.

Group Support Systems (GSS): electronic tools that aid in implementing the patterns of collaboration.

Improvement Thinking: making current conditions or performance better.

Planning Thinking: anticipate and prepare for future circumstances or events.

Practitioner: a person, either a member of the group or not, that initiates ThinkLet activities and selects the most appropriate ThinkLet combination to use.

Quartet: prompts arranged in blocks of four (AAAA-BBBB-CCCC-DDDD)

Reactive Thinking: making decisions quickly in order to solve an urgent problem, situation, or condition.

Script: the instructions and sequence of events used by the facilitator in order to invoke a specific pattern of thinking in the group.

Solo: prompts organized such that each prompt derives from a different criterion than the onethat preceded it (ABCD-ABCD-ABCD-ABCD)

Stimuli: questions or a limitation that are placed on the group's thinking process so that the best type of

information is collected from the group.

Systems Thinking: solve large problems that are generally broad.

Task Focus: the moderator's ability to produce stimuli that effectively move the group to use the most appropriate pattern of collaboration.

Theme Seeker: a type of ThinkLet activity used to find common ideas among contributions.

ThinkLet: facilitation techniques that constitute the smallest unit of intellectual capital required to create one repeatable, predictable pattern of collaboration among people working toward a goal.

Tool: the part of a ThinkLet that deals with the technology that is used to invoke a specific pattern of thinking.

Thought Exercises

1. Explain why a ThinkLet is beneficial to collaboration.
2. Explain the differences between ThinkLets and how to decide which is the best to be implemented.
3. Explain how ThinkLets relate to other major concepts in this book.
4. Choose a pattern of collaboration, select one of the associated ThinkLets, and explain how the ThinkLet will benefit the collaboration process.

Exam Questions

1. ThinkLets are:
   a. not helpful in large collaboration efforts
   b. facilitation techniques that constitute the smallest unit of intellectual capital required to create one pattern of collaboration
   c. best used with more than one activity at a time
   d. concrete in the terms that are outlined in the activity

2. The Brainstorming ThinkLet is best used when:
   a. there are only a few participants
   b. you need to add categories to the topics that are being discussed

c. you have completed the other ThinkLets

d. the team is almost done with their project

3. The two types of divergence ThinkLets are:

a. facilitated and moderated

b. simple and complex

c. Theme Seeker and Fast Harvest

d. directed and non-directed

4. True or False. ThinkLets have been used for several years and because of that, they are well established and rarely altered.

5. True or False. Diversity in stimuli when conducting ThinkLet activities will contaminate the activity and should be avoided.

6. The main types of prompts used in ThinkLet activities include:

a. quartet, duet, solo, free

b. quad, bi, single, free

c. quartet, duet, single, free

d. 1, 2, 3, many

7. Design patterns:

a. is a language that only moderators can use

b. are how the ThinkLet activities are set up

c. make it easier for collaborators to share experiences and outcomes of meetings

d. refer to the way the network is set up during a digital ThinkLet activity

8. True or False. Technology has helped strengthen the qualities of ThinkLet activities.

9. True or False. Understanding which ThinkLet to use depends on the personalities of the group members.

10. True or False. Most ThinkLets can only be implemented digitally.

Solutions for Exam Questions

1. B
2. B
3. D
4. False
5. False
6. A
7. C
8. True
9. False
10. False

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Chapter 11

Designing Collaborative Workspaces

Introduction

One of the more important issues regarding collaboration is that of the spaces in which collaboration takes place. A collaboration space brings together all the topics and ideas expressed throughout this text, and it is the space where each of the goals and ideas can be realized. One may think that a team can collaborate in any reasonable space – that it is more about the team than the space. In addition to the team being an important aspect of collaboration, the space in which that team collaborates is also crucial to success. Imagine collaborating in a warm, cluttered room with little airflow, poor lighting, and computers which only face the walls with no ability to change any of these factors. Now imagine being able to control the lighting, air, and temperature, computer configuration.. Which of these rooms will a team more likely be successful in collaborating in? It quickly becomes apparent that a good design for a collaboration space may be just as important as any other facet of collaboration.

In this chapter the different research categories of collaboration space planning will be examined: white collar environment, classroom planning, and collaboration spaces. Additionally the methodology, guidelines, and principals for planning collaboration spaces will be introduced. Finally, the common steps of the programming process used during the design of collaboration spaces will be explained: goals, needs analysis, requirements, space configuration, and design validation. After reading this chapter, the reader should be able to describe and explain what type of design makes a collaboration space successful, as well as discuss the steps and guiding principles which lead to that design.

Research on Collaboration Space Planning

The research on collaboration space planning generally falls into three main categories: white collar work environments, classroom design, and collaboration spaces. Each category offers tools or techniques that help create a successful collaboration space. Understanding each category of collaboration space planning will help the team plan for and build a more successful collaboration space.

White Collar Work Environments

White collar work environments are the first area of research on collaboration space planning. A common white collar work environment is the environment of a typical salaried professional who's work does not involve manual labor. The research of white collar work environments is associated with the fields of environmental psychology, interior design, and ergonomics (Mittleman 2009). Two general

categories of work environment research will be discussed: spatial organization and ambient properties.

Spatial Organization

Spatial organization, the physical layout of an area, is the most researched aspect of the work environment. Spatial organization can either facilitate or inhibit the collaboration process (McCoy 2002). The International Workplace Studies Program (ISWP) has done work to create understanding of how the physical work environment can support and encourage high performance (McCoy 2002). ISWP developed five key criteria for the physical environment.

First, the environment must reflect a team's sense of identity. Identifying a team's sense of identity will include style, location, allocation of space, signs, color codes, and artwork. Second, the features of the environment have to facilitate communication. Features of the environment can include but are not limited to: lounges, main corridors, snack areas, communication technologies, and commons areas (McCoy 2002). Successful features of the environment facilitate communication by having places in the work environment that provide opportunities for communication. Third, the features have to lead to the facilitation of task accomplishment. Leading features to facilitating task accomplishment can be done by ensuring proper size and quality of the workspace and other spaces, information and communication technologies, and by providing proper distance between people as they interact. Fourth, adaptability to both the team and the organization are important for the environment. Adapting to changes must happen quickly and without interrupting work. Lastly, the policies of the environment must support the previous four criteria; any conflict can reduce productivity (McCoy 2002).

Ambient Properties

The **ambient properties** in the environment are characteristics like light, noise, air quality, and temperature (Mittleman 2009). Characteristics of ambient properties can greatly affect the quality of work that is performed in a collaboration space. The ability for workers to control the aspects of ambient properties can lead to higher performance. Inadequate ambient properties that cannot be controlled can severely reduce performance (McCoy 2002). Poor lighting or temperature can irritate employees, which effects their morale and productivity. Loud noises could distract employees and also affect their productivity.

Classroom Design

The main purpose of research in the area of classroom design is to use the educational goals, perspectives, and philosophies to provide an environment that will support learning (Lackney 1994). The push for more open and flexible learning space is not a recent one. High ceilings constructed to minimize echo are preferred over low ceilings by providing a more open space. One way to ensure flexibility is to allow space for present and future technology. By remaining flexible, the classroom could be protected against invasive and expensive re-cabling common to technological upgrades (ACNielsen 2004). Teachers as early as the 1960's were expressing needs for a classroom that was more open and flexible. The teachers' push for a more open and flexible classroom helped architects associate classrooms with learning spaces that are flexible and include the ability for movable furniture to facilitate the learning process (Lackney 1994).

Collaboration Spaces

No field of academia focuses specifically on the study of collaboration spaces, however, much research has been conducted (Mittleman 2009). There have been extensive studies done by the Buffalo Organization for Social and Technological Innovation (BOSTI). The studies of BOSTI have shown that the success of collaboration relate to four criteria. The first criterion for successful collaboration is that shared spaces act as a team's "conceptual and technical playground." The second criterion is having and using multiple forms of representation and communication such as conversation, physical models, whiteboards, computer screens, and drawings (Brill 1997). The third criterion is having a wide spectrum of formal and informal environments for random encountering, spontaneous meetings, and scheduled sessions. The last of the four criteria is easy access to a team's spaces by coworkers: "casually dropping-in or passing-by" (Brill 1997). These criteria should be seen as crucial to supporting collaborative efforts.

The BOSTI studies provide a link between the organization of collaboration space and job performance of both individuals and teams (McCoy 2002). A team can be more successful if given facilities that will enhance their performance. Studying how collaboration space affects team performance is important because a team can be more successful if given facilities that will enhance their performance.

Methodology

The methodology for collaboration research is derived mainly from design science methodology. Design science is a problem solving process that can be done most effectively by using seven guidelines. These guidelines help researchers among others understand what is required for effective design science research (Hevner 2004). These seven guidelines (Hevner 2004) are:

1. Design-science research requires the creation of an innovative, purposeful artifact.
2. The artifact is for a specified problem domain.
3. Thorough evaluation of the artifact is crucial.
4. Novelty is similarly crucial since the artifact must be "innovative," solving a heretofore unsolved problem or solving a known problem in a more effective or efficient manner.
5. The artifact itself must be rigorously defined, formally represented, coherent, and internally consistent.
6. The process by which it is created incorporates or enables a search process whereby a problem space is constructed and a mechanism posed or enacted to find an effective solution.
7. The results of the design-science research must be communicated effectively.

Researchers need to know these guidelines and when, where, and how best to use them. Not all guidelines need to be done in order, but all should be used at some point in order for complete research (Hevner 2004). Research through use of these seven guidelines gives a better understanding of the cycle to design, build, and evaluate (Mittleman 2009) collaboration activities. Knowing when best to employ the guidelines throughout this cycle can lead to more successful and productive research.

The main theory which guides this research is the Focus Theory of Collaboration. This theory is a causal model for group productivity – the degree to which people making a joint cognitive effort achieve their common goals (Briggs 1994). To achieve the group goals, attention is divided between three “distractions”: communication, information access, and deliberation. Each of the three distractions interferes with the other two (Mittleman 2009). Focus Theory states that group productivity is a function of goal congruence – the degree to which the goals of the group align with the goals of the individual members of that group (Mittleman 2009). This theory is also presented in the chapter on Useful Theories of Collaboration.

Space Planning Process

Architectural programming is the process of design planning in architecture. There are many programming processes that are accepted and established in the field of architecture (Mittleman, 2009). The majority of these processes follow a common model of goal definition, needs analysis, requirements definition, and documentation. There are many other stages including: information gathering, generation and testing of programmatic alternatives, and program decision making.

The programming of collaboration spaces can be integrated into the collaboration engineering approach for designing collaboration processes (Kolfschoten and de Vreede, 2007). In this chapter a Collaboration Engineering Physical Environment Programming Process will be laid out. This is an architectural programming process that has been slightly modified with the collaboration engineering approach for designing collaboration processes (Mittleman 2009).

The five stages of the process bear a resemblance to the five standard programming stages. Each stage produces familiar output that can be used later in the process to validate the design. Next, each of the stages is described, along with many questions that should be addressed by the client and communicated to the planner at that stage.

Goals

The first step in establishing an architectural program for a collaboration environment or meeting facility is to clearly establish the goals and scope of the project. It is important to keep in mind that collaboration teams are working in a joint effort toward a common goal. Originally, when the idea of having technology structured meeting environments built to encourage Group Support Systems, the rooms consisted of a few computers sitting in a semi circle. The rooms were known to be noisy, due to legacy 10 or 20 ton air conditioners residing in the room. The rooms also tended to be extremely bright caused by the fluorescent lighting and highly reflective walls. These meeting rooms were said to have bad acoustics and were known for having poor audio and visual support. The designers of these meeting spaces envisioned them as computer rooms where people happened to meet, rather than meeting environments utilizing computers as tools to support collaboration (Mittleman 2009).

Although many of the design errors can be traced to a lack of articulation of goals such as objectives and scope of the project, the budget seems to be the biggest constraint when considering using existing space.

The key of this stage is that the goal definition document must set the objectives, ownership, and

scoped use of the collaboration space, as well as establish a time line. This document serves as a frame and outline for the programming process. It is important to have the opinion of the project owner, while also possibly getting input from key stakeholders. One method of retrieving necessary information would be to interview the project owner and key stakeholders for preparation of the document.

Questions for Consideration

Some questions that might be asked to surface project and objectives include (Mittleman 2009):

- What is the driving objective for the creation for this space? Why is this space being built? What is the desired outcome of having this space?
- What is the scope of this design project?
- How will the success of this project be measured? Do quantifiable objectives exist? How will you know if this project is a success?
- What image should the space convey? Is the space meant to be a showcase? Is it to be a training room or classroom? Is it to be a conference room or a board room? How are similar facilities in the organization appointed?
- What is the time line for the space? One year? Five year? Ten years?
- Will the space remain built for the entire planning horizon, or must it be designed to support future growth or changes?

Needs Analysis

The second programming step is to conduct a thorough needs analysis. While this may be a stage that seems obvious and basic, it is one that is often over looked or cut short. Shortchanging this step can lead to the design of an environment which does not fit the needs of the organization as well as it could. This could result in a design solution that does not address the real problems as well as contribute to the oversight of less obvious needs from the final design.

Questions for Consideration

There are two key questions to surface during a needs analysis (Mittleman 2009):

- What are the characteristics of the group who will be using the meeting space?
- What are the tasks they will be utilizing the space for?
- There are many key dimensions that differentiate group composition that should be considered.

These dimensions include (Mittleman 2009):

- Will the groups only be meeting locally, or will there be a virtual component to the groups?
- Are the groups all at the same hierarchy level in the organization, or is the hierarchy mixed?
- Are the groups meeting regularly on projects, or is each meeting an independent project or task?
- Will the participants likely be familiar with one another, or will they likely be strangers?
- Are the groups likely to be small or large in size?

One of the key determining factors in designing a meeting space is group size. Smaller groups are able to communicate within a social distance, meaning that individuals are able to speak in a conversational voice and are able to send and receive subtle non-verbal cues (Mittleman 2009). It is much easier to give and receive feedback in a smaller setting, and trust is much greater within a small group as well. Mid-size and large groups communicate at a public distance. At a public distance, individuals have a harder time sharing what they are thinking, and it is much more complicated to receive feedback (Mittleman 2009). Many times participants will not have a chance to share their thoughts if there is a large amount of people. Also, conversation is more taxing, air time is limited, and subtle non-verbal cues are more difficult to pick up on (Mittleman 2009).

There are many ways to differentiate the use of meeting space. One should consider the flow of information in the space. There are two common ways information can flow; the first is one way flow. One way flow is similar to a teacher or presenter lecturing an audience. While some people may have questions or comments, the majority of information is passed in a single direction from one to many. Other groups experience an n-way flow of communication where many individuals will take turns speaking, or many times attempt at speaking at the same time. This flow of communication is a very complex many to many communication pattern.

Questions for Consideration

In addition to the questions asked about goal definition, there are many more that need to be answered to do a proper needs analysis, including (Mittleman 2009):

- Who is going to use the meeting space? How large will the group be? Will they be ad hoc or an established group?
- Do the users have any physical needs or limitations that will impact their use of the space?
- What are the inputs from the collaboration engineering design process? What kinds of work processes or ThinkLets will collaborators use the space for?
- How long will meeting last? Will food or drink be served? Will they take breaks in or adjacent to the space?
- How will the group use the space during their meeting?
- Will there be virtual participants?
- Will information processing or communication equipment be required?
- What is the organizational culture like?
- Will the space be used for electronic technology-supported activities? If so, what needs must be met to support these other activities?

Requirements Definition

After a needs analysis has been completed it becomes clear what the primary design requirements need to accomplish. There are several categories that need to be addressed at the requirements definition stage. These categories are space configuration, workstations, lighting, room appointments, atmosphere, public display and support for tele-presence, electrical, HVAC, acoustics, security, breakout, and social space.

Space configuration addresses the seating layout of the room. The primary factor in determining the layout is to decide how individuals are going to need to communicate in the space. The way in which members will interact determines the seating configuration. According to Daniel Mittleman (2009), there are three areas that will help to determine what type of space is needed. These include the size of the group, the types of tasks that will be occurring, and the form of physical or virtual presence the group will

be participating in.

Three types of tasks that typically would be taking place in meeting rooms are execution, briefings and problem solving. Banquet halls and horseshoe type rooms support execution meetings well. Classroom rows and tiered cases are ideal for briefings. Many meeting spaces need to accommodate many different types of meetings. Reconfiguration of the room is an important factor to consider. How often the room will need to be rearranged and how it will need to be rearranged is a necessary element in this planning process.

How often does a student choose a seat in class at the beginning of the semester and make that their permanent seat for the entire semester? The same is true for businesspeople in meeting rooms. They generally choose a workstation and that becomes their unofficial spot in the room. Meetings sometimes take several hours and a workstation needs to be able to keep the individual comfortable and have the ability to provide computer access and space for the materials needed during meetings. The workstation also must support the communication that takes place during the meetings. For example, workstations that did not face each other would be unproductive in a problem solving environment because the members would need to be able to face and communicate with each other. In today's work environment many people work from their laptops so laptop connectivity needs to be addressed when designing workstations. In respect to workstation comfort, adjustable chairs and armrests would be beneficial for meeting spaces that are used for extended periods of time.

Location is an extremely important part of designing a workspace. It is ideal to have a place that is as close to the participants as possible. Starting with an area that is close to a common school, church, or social hall would be a great place to begin.

Lighting affects employee performance and satisfaction so, it is imperative that proper lighting is provided in the space (Sundstrom 1987). Some questions that should be asked at this stage are: if the group will be video-conferencing, how much reading will be taking place, and if the group will be using a projection monitor (Mittleman 2009).Other lighting considerations include glare on computer screens, heat emitted, room perimeter, zone lighting controls and dimmers, and fixture locations.

The next element of the requirements definition is public display and support for tele-presence. Some meeting rooms may need to be designed with the ability to see more than one screen at the same time. Some screens may even be used for participants in the room to simultaneously make contributions for the rest of the group to see. Screens will often be utilized for video conferencing so determining if this is going to be taking place is necessary. Certain spaces may only need to be designed for one presenter but many will need to be flexible in the way they are set up for a variety of purposes. Location

of the camera and microphone is important if video conferencing is going to take place and multiple locations might also be essential.

When designing rooms utilized for meeting purposes more care may be necessary than normal when determining electrical and HVAC (heating, ventilation, and air conditioning) requirements. It is essential to discuss what equipment will be used with an electrical engineer. Plenty of electrical jacks must be present at each workstation. It is important to have slightly more than necessary to ensure preparedness. Even if wireless internet is provided, hard-wired ethernet cables should be stored in case they are needed. Each workstation and audio visual device should be equipped with their own circuit breaker. Proper air conditioning is necessary for equipment to function and the heat generated by individuals in the room needs to be considered. During this step it may be appropriate to determine who will be controlling the thermostat in the room.

Acoustics is a factor that needs to be considered when planning the design of the room. Noise from outside the room needs to be addressed as well as how much sound will be coming out of the room itself. Sound within the room is also an important factor. This entails how sound will flow throughout. Will each participant be able to hear one another? When it is necessary, groups may need to be working separately in the room and the room needs to provide zoned privacy for them.

Security issues should be addressed when planning the design of the space. The value of technology in the room will most likely be very high and should be protected from theft and individuals who do not need to be in the environment. .

The final factor in the requirements definition is to make the design of the room capable of becoming a social space. When long meetings are conducted breaks are necessary and the room should hold a comfortable feeling for those times. This is also when placement of conveniently located restrooms and possible food and drink stations should be discussed.

Space Configuration

The product of these decisions is the document called the requirements definition. Each of the preceding factors should be addressed in the document and will provide the design planner with the necessary information to successfully create design solutions for the room. The design solutions will be created by the planner in the form of drawings or models. When the space configuration is taking place and a change needs to be made in the requirements, it is necessary to make changes to the requirements document and not just by word of mouth.

Design Validation

Design Validation is one that does not violate the constraints of the program problem (Mittleman 2009). In other words, the final design chosen for the space should be evaluated against the original requirements set previously that were put forth to ensure that no mistakes have been made and the room is going to satisfy the goals and objectives.

Summary

By now the reader should have a strong foundation for understanding the importance of collaboration spaces and several of the issues that need to be taken into consideration when designing collaboration spaces. In order to understand the basis for these design concepts, the three main areas of research that apply to the design of collaboration workspaces were discussed: white collar environments, classroom design, and collaborations spaces. Using the research from these various fields it was clear that there are five general steps to the process of designing collaboration spaces. These five areas, as discussed, are: Goals, Needs Analysis, Requirements Definition, Space Configuration, and Design Validation. An understanding of the concepts presented in this chapter allows the reader to properly identify and plan for the importance of the collaboration workspace.

Glossary

Ambient Properties: are characteristics like light, noise, air quality, and temperature.

Architectural Programming: is the process of design planning in architecture.

Classroom Design: use the educational goals, perspectives, and philosophies to provide an environment that will support learning.

Design Science: is a problem solving process.

Design Validation: a valid design is one that does not violate the constraints of the program problem.

Focus Theory of Collaboration: is a causal model for group productivity – the degree to which people making a joint cognitive effort achieve their common goals.

Goal Definition: must set the objectives, ownership, and scoped use of the collaboration space, as well as establishing a time line.

N- Way Flow: where many individuals will trade off speaking, or many times attempt at speaking at the same time. This is a very complex many to many communication pattern.

One Way flow: majority of information is passed in a single direction from one to many.

Space Configuration: addresses the seating layout of the room.

Spatial Organization: is the most researched aspect of work. It can either facilitate or inhibit the collaboration process.

White Collar Work Environments: this research is associated with the fields of environmental psychology, interior design, and ergonomics.

Thought Exercises

1. Identify and explain each of the stages of the architectural programming process.
2. Identify and explain each of the categories included in the requirements definition document.
3. Join a group of five students and assume that you were chosen to plan for a new room in your school specifically for conference courses. A conference course is one that may include students from several different sites and the professor will only be at one site at a time. This means that video conferencing is necessary. Create a requirements definition document and then create a model that validates your document. What was the most challenging part of this process? How did your group overcome that challenge?
4. Where have your best and worst collaboration experiences taken place? Why were these experiences good or bad? Could the environment have helped those experiences turn out better?
5. What would your ideal workspace look like? What components would it consist of?

Exam Questions

1. What are the two ways information can flow and give an example of each?
2. What are the communication differences between small and large groups?
3. What are the two key questions that need to be addressed in a needs analysis?
4. What four factors must be determined in the goal definition?
5. Identify four of the categories included in the requirements definition.
6. What is space configuration?
7. Why is lighting important in space design?
8. What are some problems that may occur related to acoustics in a meeting space?
9. What is meant by a valid design?
10. Is it always necessary to create a high end atmosphere in a collaborative workspace?

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Chapter 12

Collaboration in Knowledge Management

Learning Objectives

By the end of this Chapter you should be able to:

- Provide a definition of knowledge management and an overview of the history of knowledge management
- Give a working example of collaboration and its organizational value
- Discuss the role collaboration plays in knowledge management
- Define the key processes that help organizations manage knowledge
- Recognize the disciplines which have contributed to the development of knowledge management
- Identify the benefits and challenges knowledge management can bring to an organization
- Provide a description of various tools and technologies involved with knowledge management
- Understand the role technology plays within the knowledge management process
- Differentiate between technologies that capture and codify knowledge and how knowledge is distributed
- Understand the process of the knowledge management life cycle as iterative rather than a single event
- Understand of the importance of each phase of developing a knowledge management system
- Define return on investment as it pertains to knowledge management

Introduction

In 2008 we experienced the greatest economic fallout since the great depression. Some of largest and most respected organizations in the history of the world collapsed. The reasons why this occurred varied across industry from the sub-prime lending tactics of the banks to lackluster sales and performance of the American automakers. Many companies were blind-sided by the economic unrest and as a result jobs were lost and billions of dollars of government bailout dollars were handed out to these organizations. Many economists and financial experts say the warning signs were there for years and that the information to diagnose this economic pandemic was there the entire time. The problem was that

many of the companies' failures resided in the fact that they did not know how to properly manage the information at their very fingertips. The internal resources that have been developed and strategic processes that have now come from the fallout were often suggested and presented to company leadership. The ability to prevent, predict or prepare for challenges exists if organizations effectively managed the knowledge they acquire or develop.

Knowledge management (KM) is a new business discipline that deals with how organizations utilize all types of knowledge and how that knowledge promotes learning and innovation. "To compete effectively firms must leverage their existing knowledge and create new knowledge that favorably positions them in their respective markets"(Gold 2001). Knowledge Management uses both technology and business process together to be the most effective. For years many companies have collected and stored data. Massive campaigns for information management, storage, and security have been in place for decades. It is a more recent trend that organizations have looked to truly understand, develop, store and secure the knowledge of its most valuable asset; its people.

In this chapter you will learn what the knowledge management process is and its features. You will also examine how collaboration plays a vital role in knowledge management. Finally you will learn about the knowledge management life cycle and be given some tools that will help you overcome some of the challenges you may face as you begin to utilize knowledge management inside of your organization. Let's begin!

Collaboration and Knowledge Management

Knowledge is defined in Merriam-Webster's dictionary as the fact or condition of knowing something with familiarity gained through experience or association. As a member of a group or organization the knowledge that you possess and gain as a member of that body has become a recognized resource. Collaboration and knowledge management are the respective terms used to describe systems that channel and harness those experiences and associations for the ultimate goal of organizational growth and establishing a competitive advantage in the global marketplace. Knowledge management systems and collaborative information systems both attempt to organize and handle the massive amounts of information, data, and knowledge our hyper connected business environment has created (Nunamaker 2001). Organizations have implemented information technology tools that have grown business networks and the amount of people we work with on a regular basis. As more experience and association (knowledge) come from this, knowledge management in a basic essence can be described as the way an organization or individual organizes and stores learning from past success and failures. By the end of this

chapter you should understand Knowledge management and how to utilize it in your organization to generate a competitive advantage in your marketplace. Let's examine the two concepts before looking at how they work together.

Collaboration

Collaboration is working together to achieve a goal. The goal could be a common goal of the parties involved, or separate yet jointly intersecting goals requiring the effort and resources of the groups collaborating. Organizational collaboration is vital for success. It exists in all aspects of organizational structure and most groups could not function without it. Even if the individual tasks are completed separately inside an organization, some form of collaboration is required to merge the tasks to achieve the common goals of the organization.

Let's look at a physician for example. Think about a physician and how they treat patients. Physicians use what's called empiric theory or evidence based medicine when they treat people. They ask questions of their patients and come up with a diagnosis and plan based on the subjective and objective information they collect during the patient interview and follow up tests. At times a patient may require lab work or an x-ray for the physician to properly diagnose and treat their ailment. The goal of the physician is to properly heal the patient, but that goal relies on the skill of the radiologist or lab technician seeing the patient as well. Without the collaborative effort of the lab technician and radiologist, the physician could not properly complete the empirical investigation. The goal of all the parties may or may not have been to treat this patient. The goal of the radiologist could have been to capture good x-ray images and the goal of the lab technician could have been to get a good sample for the lab to run tests. In this case their individual goals intersected. The success of the lab technician and radiologist directly impacted the physician and his or her ability to treat this patient. A great deal of collaboration is needed to have the best outcome.

The example above is just one of many that could be described to show the levels of collaboration required for organizational success. Later on we will discuss how collaboration plays a vital role in knowledge management.

Knowledge Management

Knowledge management is the "management of organizational knowledge for creating business value and generating a competitive advantage (Gamble 2001). More simply it's gathering the knowledge

of internal and external resources to generate solutions to an identified need. Years ago companies began to understand that knowledge was a valuable resource. Advances in information technology over the time have broaden the base of interaction and being able to track and store this knowledge share for later use is vital. Knowledge management or KM can assist individuals and groups share valuable organizational information, to reduce redundant work, to reduce training time for new employees, to retain internal knowledge as employees' turnover in an organization, and to adapt to changing, emerging, and dying markets (Thompson & Walsham 2004).

Knowledge management emerged as discipline in the early 1990's but seemingly existed under the guise of many titles prior to that. Job boards, discussion sessions, brainstorming, training, mentoring and formal apprenticeships were truly the foundations for knowledge management. Companies recognized the value in the experience and knowledge of their people so in the beginning it was more information management. As information technology improved so did the opportunity to provide tools to develop this information into solutions, products, and strategies. Information technology and software applications made the older information stores or organizations come to life.

Knowledge management exists today with many perspectives, but three that dominate. The techno-centric or technology perspective focuses on how technology is used in knowledge management today. There are many software applications that aid in knowledge management from the most complex standalone applications to mobile applications and free web based services. This perspective and organizational approach is growing rapidly as organizations seek to do things smarter, better and faster. The use of technology aids a business' ability to do things more efficiently. The organizational perspective is the more traditional process of looking at information flow within an organization and how knowledge flows through an organization. This could also be considered knowledge resource allocation. Many human resource and corporate communications departments handle this information flow. Finally, the ecological perspective looks at how people interact inside an organization and how knowledge is shared environmentally.

Knowledge Management Perspectives (McInerney)

Techno-Centric :	*knowledge sharing and creation that focuses on the use of technology*
Organizational :	*focuses on the facilitation of information throughout the organization*
Ecological:	*focuses on environmental factors of the organization as well as the interaction of the people inside the organization*

Knowledge management is creating value and harnessing the power of a business' most valuable asset, its people. The next section will explore how collaboration and KM work together.

Collaboration and Knowledge Management Together

Collaboration and Knowledge Management are inevitably tied together. Knowledge management requires the collaboration of many moving parts. Depending on your strategy the level of collaboration could increase greatly. If your KM strategy requires technology implementation, you are now relying on not just your own know how but quite possibly an entire department of people to assist in the KM process. Let's revisit our example with the physician. In that example, the physician's ability to make a proper diagnosis and treat the patient was entirely dependent on the information, or knowledge, provided by the radiologist and lab technician. If at any point one piece was off, the diagnosis the doctor provided could have been drastically incorrect. Situations that organizations deal with require the same level of accountability and follow through when it deals with collaboration. Mismanagement of knowledge could lead to lost opportunity. Lost opportunity could lead to lost earnings or development opportunities. Collaboration is vital to knowledge management.

Knowledge Management Features

Knowledge management is the "management of organizational knowledge for creating business value and generating a competitive advantage (Gamble 2001). More often than not, employees don't know where to locate knowledge within an organization, or they don't have access to it, and they lack understanding of who possesses the knowledge and its various forms. Incorporating knowledge management techniques into an organization means making sure that employees have access to the appropriate resources and skills that help them perform their daily job activities and contribute to the success of the organization. Regardless of the type of organization, knowledge is present in some fashion "and their success or failure will depend on the extent to which they can create, nurture, store, share and exchange knowledge" (Gamble 2001).

Knowledge is formed based on people's thoughts, experiences, and the data they have collected throughout their lives. The generic categories of knowledge include tacit knowledge and explicit knowledge. **Tacit knowledge** (sometimes known as embodied or informal knowledge) is inherently derived from a person based on their personal experience, perspectives, and natural insights. This knowledge is embodied in people and is what is relied upon when forming conclusions and making decisions. **Explicit knowledge** (represented knowledge) is documented information and data existing in databases which should be the foundation in the decision-making process. It can come in a variety of forms or artifacts such as case studies, research reports, analyses, and instructional guides. Knowledge

bases are common projects that enhance the accessibility of explicit knowledge and "technologies that provide an information infrastructure that enables ready access to these artifacts are essential" (Anklam 2002). Knowledge can also be **embedded knowledge**, which is present in products, processes, and procedures. Over time, these types of knowledge within an organization have become recognized as a key asset to the organization and when the knowledge is translated into actions that create a competitive advantage, they are more highly esteemed.

Research done by Gartner Consulting identifies the factors for why companies would want to be focused on knowledge management initiatives. They are divided into two different categories based on what they are responding to. The first three factors which include improving knowledge sharing across units, improving competitive response, and accelerating the rate of innovation belong to the knowledge push category**.** **Knowledge push** signifies the efforts that involved in quickly recognizing and responding to customer needs. **Knowledge pull** revolves around reacting to the competition.

Knowledge Management Processes

As a factor in establishing a culture of knowledge sharing and developing a knowledge management system, organizations should follow a key set of processes to help them in managing both internal and external knowledge. These processes can be placed into four categories of process methods based on their commonalities – acquisition, conversion, application, and protection. Despite the numerous synonyms utilized for the acquisition category, they all revolve around the topic of gathering knowledge. **Acquisition** includes innovation, benchmarking, and collaboration. **Innovation** comes in when new knowledge is produced after existing knowledge is applied. It's vital for an organization to take advantage of the knowledge it currently has and turn it into new opportunities. **Benchmarking** compares the best practices of other organizations to their own procedures and identify areas for improvement and expansion. Collaboration takes place in the acquisition process with the sharing and distribution of knowledge amid the organization's employees and external businesses. The **conversion** process involves taking the existing knowledge and turning it into useful procedures. This means that a firm must have the "processes that enable knowledge conversion [which are the] ability to organize, integrate, combine, structure, coordinate, or distribute knowledge" (Gold 2001). Integrating knowledge from a variety of areas is important in addition to eliminating redundancy and creating a framework of consistency in knowledge representation. The main reason knowledge is beneficial to an organization is that it can aid in creating a competitive advantage. It's often assumed that knowledge is applied throughout the application once it has been developed. The storage, retrieval, and dissemination of knowledge are key aspects of application as they help companies reduce expenses and improve overall

efficiency. The **protection** process signifies the steps taken to secure an organization's knowledge from potential illegal activity and improper use. Technology can be utilized to secure proprietary information and restrict access to critical knowledge that allows for a competitive advantage. Without taking these crucial security measures knowledge can become more prevalent, therefore reducing a knowledge rich organization's position over its competition.

Knowledge Management Disciplines

Knowledge management is derived from a wide variety of fundamental disciplines and technologies. Some of them include expert systems, groupware, decision support systems, and relational and object-oriented databases. Expert systems are a type of artificial intelligence that have a primary goal "to make expertise available to decision makers and technicians who need answers quickly" (Expert Systems). Knowledge bases are the foundation for expert systems. Groupware is software utilized for collaboration among groups and virtual teams working remotely towards a specific goal. Decision Support Systems are a specific type of information system that focuses on compiling useful data to help organizations with decision-making. Relational databases gather data based on common characteristics into rows and columns that form tables while object-oriented databases are tailored more specifically for inconsistent content and involve data being stored as objects.

In addition to these domains that knowledge management was developed from, there are a number of focus areas that help to illustrate knowledge management: knowledge strategy, knowledge culture developers, knowledge management applications, enterprise architecture, and technology and tools. Knowledge strategists are business leaders who assess whether or not existing practices are providing value to the organization and make changes to adapt in order to adapt to external forces. Knowledge culture developers analyze organizational knowledge, promote knowledge culture development, and "create training, learning, and sharing programs to enhance the socialization performance of the organization (Waltz 2003). The remaining focus areas are involved with building an environment for knowledge management to flourish at a company-wide level. Typically, knowledge management applications are software packages that have been customized by applying KM principles and processes to an organization's specific business functions. By purchasing a KM software from an external vendor, "this allows some enterprises to focus internal KM resources on organizational tacit knowledge while outsourcing architecture, infrastructure, tools, and technology"(Waltz 2003). Enterprise architecture looks at the organization as a whole from a variety of different perspectives including business, application, information, and technology. They make knowledge more easily manageable by designing structures that implement the knowledge management processes and techniques in addition to defining

how an organization can successfully meet its business objectives. KM technology and tools are the hardware and software elements which allow for knowledge capture, search, storage, and distribution in addition to content management, collaboration, and data analysis.

Benefits of Knowledge Management

Why is it important to manage knowledge? Knowledge involves the background information that a person acquires over the course of their life experiences. Their intuition or natural instincts are interspersed into their daily behavior. Often this is not well documented so that others can benefit from their experience. To be beneficial to an organization, knowledge must be nurtured, captured, and transferred to those people who will create a competitive advantage for an organization. It must be easily shared and accessible to those who are required to make critical decisions for the organization. It is this that will be a very valuable asset to an organization. Simply storing data in a database is not sufficient for a company's knowledge system; it must be transformed into actions to be effective. It's critical that a knowledge management strategy be developed because "to be successful, knowledge management has to be related to the business. It has to have context and it has to have business drivers. There has got to be value to it" (Gamble 2001).

Organizations are undergoing both external and internal knowledge management initiatives in order to make the most out of their knowledge resources. These frequently involve gaining knowledge from existing customers in addition to relaying additional knowledge to them. By capturing sales data and collecting customer complaints, organizations can examine actual customer behavior to enhance sales and also improve customer service. By analyzing customers' complaints and problems and subsequently designing solutions for call centers to relay to them during support calls, customers feel that their input is being recognized and that their problems are being actively addressed, thus increasing their overall satisfaction. Organizations also provide customers with detailed information that can assist them in the decision making process.

Some of the internal initiatives that companies have implemented to exploit their resources include creating a knowledge repository of instructional training documents and how-to guides that help to expand business opportunities and increase revenues. By establishing a knowledge sharing culture, management can indirectly encourage learning and idea generation amongst employees. With management's support, it is easier to acquire technologies that enable knowledge sharing. Technologies such as blogs, wikis, and portals aid in nurturing a knowledge sharing culture. Instead of focusing on the collection of raw data, companies are utilizing fundamental communication tools such as video-

conferencing and e-mail to assist in the transference of informal knowledge. The most successful knowledge management initiatives will have clearly defined goals as to how the initiative will provide value to the organization and get ahead of its competition.

There are multiple ways in which knowledge management can realize business value, thus benefiting the entire organization. By applying the customer sales and service techniques, product development and marketing approaches, and other strategic business decisions derived from knowledge management systems, organizations can realize gains in speed and productivity, enhanced levels of customer service, innovation, organizational learning, and employee skills retention, in addition to cost savings. It is also common that organizations create a business case that defines the reason for achieving business objectives. This is sometimes referred to as a value proposition and "an organization may have one or more propositions; there may be a primary focus, with multiple secondary foci – but all must explicitly couple value (qualitative benefits of significance to the organization's mission) to quantitative measures" (Waltz 2003). Three of the basic dimensions for establishing this business case include operational excellence, product-to-market excellence, and customer intimacy (Waltz 2003). Operational excellence aims at increasing revenue and reducing operational costs by enhancing operational efficiencies and productivity. Product-to-market excellence emphasizes reducing the time it takes to produce a product and deploy it to the marketplace. Customer intimacy involves increasing customer satisfaction and loyalty by creating a sense of trust and understanding. It is essential that quantifiable measures be taken in order to determine the overall value and benefits that knowledge management systems can provide.

Challenges of Knowledge Management

Amongst the numerous benefits that can be realized from knowledge management initiatives come challenges that organizations typically address when building knowledge management systems. One of the most immediate challenges is "that of creating the knowledge-based business that can capitalize on the opportunities afforded by the knowledge economy. This includes the challenge of gaining acceptability within the organization of the theory and practice of Knowledge Management" (Cortada 1999). Promoting an environment where existing knowledge can be shared and new knowledge can be created and fostered between communities of practice is also included in this. Gaining support and involvement from upper management and leaders in the organization can be difficult especially if the business value of implementing knowledge management initiatives is not immediately realized. In his Knowledge Management Handbook, Jay Liebowitz relays his four notions as to the challenges encountered when implementing knowledge management techniques. "First, knowledge is often hoarded,

rather than shared. Second, valuable knowledge developed by others is often ignored, rather than applied in daily work situations. Third, knowledge and expertise are often not valued by the corporate culture, by failing to measure intellectual assets. Fourth, employees who share knowledge and expertise are considered naïve, rather than being rewarded for their valuable organizational behavior" (Liebowitz 1999).

One of the most challenging factors involved in building a knowledge repository is determining how to extract and present this knowledge so that it can be shared between everyone in the organization. Moreover, simply defining who contains the knowledge and how they hold, manage, and display it can be cumbersome. Since knowledge can be created collectively and can be derived from a variety of perspectives and circumstances, it can be difficult to convert it into a form that is accessible and usable for the organization. It is crucial that knowledge be available to the relevant people at specific times in order to enhance business value and increase competitive advantage.

Knowledge Management Trends and Tools

Despite the challenges involved, establishing knowledge management initiatives has become critical within organizations as they recognize that organizational knowledge needs to be deployed and promoted to the fullest in order to maintain a competitive edge in today's marketplace. With the rapid development and innovation of technology and the Internet, organizations and its employees have a greater depth of information and increased access to it than they ever have had before. Additionally, the rate in which communications pass throughout the world today means that decisions and strategies need to be created and distributed at a much faster pace. Technological tools facilitate an organization's knowledge management efforts. Even though knowledge management is more about people and processes, technology enables companies to adopt knowledge management practices. "What is important about the technology is how it is used, what it is used for, and why it is used" (Gamble 2001). Technology and online tools aid management in analyzing data, solving problems, and making decisions.

Some common knowledge management tools that facilitate knowledge transfer and collaboration include blogs, wikis, enterprise portals, and FAQs. Blogs are websites which contain periodic commentary from users based on their perspectives and experiences, descriptions of events, and links to articles and other media. Blog is a shortened term for "web log" and can take form as an online journal with logs of recent events and personalized content such as photos and videos. Occasionally, blogs are focused on a specific topic and "virtually all blogs provide a vehicle for comments from readers, and the best ones-those that are most popular with readers, and therefore generate the most traffic- develop into a

kind of conversation" (Waters 2010). The blog postings are listed in chronological order from the date they were posted, and secured therefore, they remain unedited. Blogs are very simple to update and many organizations use them as a supplement to their regular website for distributing FAQs, tips, and suggested practices to customers and product users. In return, companies can indirectly gather demand, potential sales, and marketing data on their products based on their customers' feedback in the form of blog comments. Wikis are websites consisting solely of user generated, text-based content that can be edited by different users at any time. New content can be added and existing content can be revised by anyone who accesses the website. Wikis can provide companies with a centralized location for managing documents including meeting notes, agendas, training documentation, and company-wide calendars. Both blogs and wikis are an important corporate communication and knowledge management tools for disseminating messages internally to employees and for sharing resources externally to the public. Additionally, they help to build a sense of community within the organization and are continually being utilized as online collaborative spaces. **Enterprise portals** are web-based interfaces to applications, databases, and systems which provide a gateway for employees to access information kept both internally and externally to the organization. "Internal portals provide relevant information and links between personnel to support internal operations just as Internet-based portals provide information and links between people across organizations" (Tatnall 2005). Portals can help people become more informed and therefore, better decision-makers. In order to provide further value, specific types of portals such as knowledge portals were designed to distribute knowledge across the organization and foster an environment built on knowledge management best practices. *Knowledge portals* are more specialized and "focus on particular areas of business; they can be customized to meet the needs of users from all areas of the organization, ensuring that they receive only information appropriate to their needs" (Tatnall 2005). Today, they have a vital role in providing knowledge workers with access to information, thus making them more productive within their specialized areas.

Knowledge Management Tools and Technologies

Knowledge management (KM) tools and technologies aid in the process of solving problems. When implemented properly, problems are able to be solved by analyzing data to find patterns and relationships that can predict and clarify behavior. This section will provide an overview of the technologies and processes that foster the creation of knowledge and provide a system for information to be defused and shared.

Knowledge management (KM) encompasses several different components. It requires access to available information, and processes to refine, store, disseminate, and present knowledge. Combinations

of technologies – internet, intranet, extranet, browsers, data filters, data mining, client server, multimedia, groupware, and software – and knowledgeable people are used to facilitate support for knowledge management. For further understanding, the process of knowledge management can be subdivide in five distinct layers – Acquisition, Refinement, Storage/Retrieval, Distribution, and Presentation – Figure 1 summarizes this process. For each layer various tools and techniques play a role within the knowledge management process.

Figure 1

Furthermore KM tools and techniques can be grouped by how they capture and codify knowledge or how it's distributed and shared. There are various technologies available that are used to capture and codify knowledge – popular technologies include:

- **Database** – Database is an integrated structure of logically related of data. When queried, databases allow for effective and efficient retrieval of information.

- **Case-Based Reasoning (CBR)** – These applications use a knowledge based support philosophy with a simulation of human reason when past experience is used. When new problems arise they can be matched against historical cases to find solutions.
- **Expert Systems** – These systems query and guide users through a decision making process. Its purpose is to collaboratively lead users towards and decision or solution.
- **I-net-Agents** – I-net technology refers to internet/web technologies which allow the customization of information in an unstructured environment. When combined with software agents, theses technologies preset the building blocks for the creation of knowledge.
- **Data Mining** – this technology cultivates knowledge discovery by sifting through large amounts of data extracting patterns and establishing relationships.

Computer networks, communication and collaboration tools and technologies provide an effective medium to distribute and share the development of knowledge. These tools directly support technology that captures and codifies knowledge by enabling interaction and collaboration in knowledge based teams. Various technologies in this group include email, groupware, wikis, threads, EST.

Numerous products and solutions have been introduced into the market as KM technology. However, the key factor to receiving high returns from KM technology is choosing the right technologies within a given context and the effective utilization of knowledge when using those technologies. When choosing KM technologies, it is best to have a detailed understanding of each technology and where it fits within the team/organizational goals. Figure 2 will provide a brief layout of how technology infrastructures play a role the knowledge management process.

- **Knowledge Generation** is the process of obtaining tacit knowledge – difficult to articulate knowledge
- **Knowledge Access** provides a way to store, share, classify, and find knowledge.
- **Knowledge Transfer and Representation** is the change of tacit knowledge into explicit/codified knowledge – knowledge articulated in a formal language.
- **Embedding Knowledge** refers to the automation of a decision making process.

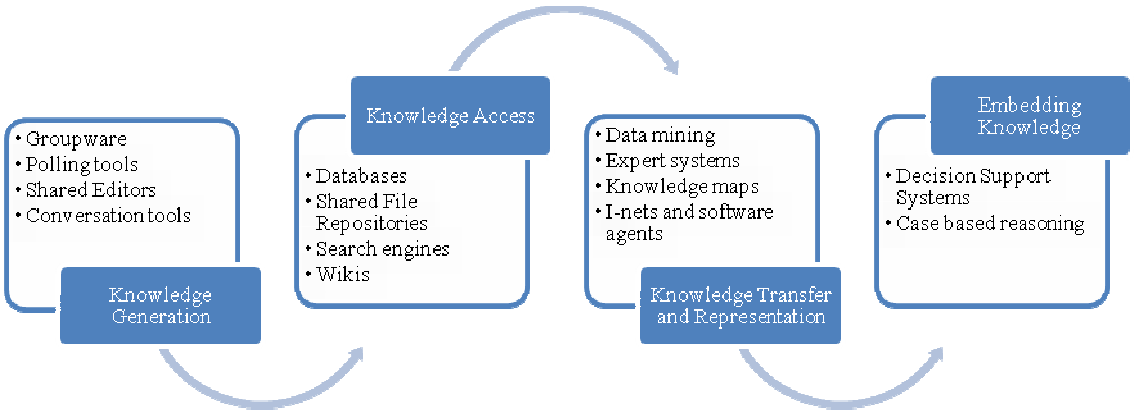

Figure 2

The KM architecture represents a variety of sophisticated tools that capture, codify and allow knowledge to be shared across networks. With a proper knowledge management infrastructure the full potential of each tool and technology can be reached. By adopting proper strategies and techniques, teams are able to enhance knowledge discovery and create effective solutions from knowledge assets already inherent to the team/organizations capital.

Knowledge Management Life Cycle

There are five main and distinct iterative components to the life cycle of KM that are similar to those of enterprise, product development, or software engineering life cycles. It is related to the development of a system that incorporates the tools and technology of KM. These steps (as represented in Figure 3) include but are not limited to planning, analyzing, designing and improving, implementing, and evaluating the system, and repeating the entire cycle or certain steps incrementally as needed and in an ongoing manner.

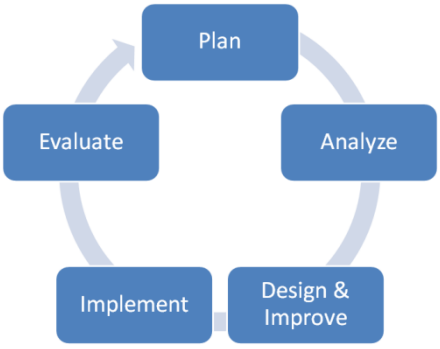

Figure 3

Plan

The first phase of KM development life cycle involves planning. This is where an organization develops a mission and outlines its vision and objectives for a project to take on a direction. Before any system can be implemented, the teams responsible for decision making, creating, and maintaining must develop a strategic plan of how the system should be executed, and how it will be used. This may include user research along with a survey of current structures and practices in place by the organization. This is the also phase of the project where the transition details are planned.

Analyze

The goals of the company and its resources are taken into account when deciding what is needed for the KM system to operate. A comprehensive analysis of the organization's needs and a risk assessment determine what elements of a KM system are suitable for and sustainable by the organization. The system's potential for ROI is analyzed and predictions are made.

Design and Improve

This is where the engineers collaborate with management and stakeholders to create the proper KM system. The creation of the infrastructure takes place, as does the software development and documentation. Identifying the techniques of handling data, including acquisition, storage, processing, and distribution, is also a vital aspect of this phase. Multiple iterations of this stage can be expected, as changes to the design and improvements are made to optimize the system before deployment and implementation can take place.

Implement

Implementing a system refers not only to the actual installation of a system, but also the process of integrating it with current systems in use by a company and the people who will use it. This sometimes involves changing a procedure that they may be used to, so a degree of learning is involved. Testing the system, training staff to use the system, and evaluating the security of the system are key points in successful implementation and company-wide adoption of the process.

Evaluate

To determine the efficiency and productivity of a KM system, it is crucial to evaluate the way it is structured and used. Checking system compliance is another important step. “KM system governance is essential, and proper focus on future system interoperability should be considered to sustain enterprise value over time.” (Bixler 2010).

This is also an opportunity for the business team to validate the cost-benefit analysis performed in the Analyze stage. Return on Investment can be determined by processes that are synchronized correctly. Testing and feedback are required to determine the quality of the system and allow for changes to be made. Improvements and suggestions at the evaluation phase may set the stage for the next round of the life cycle development process.

Return on Investment of Knowledge Management

ROI, or return on investment, is the rate of return on an investment in relation to the amount invested. "Business processes are any activity by which a company can generate incomes." (Bernard 2008). At the basic level, when it comes to determining ROI for a particular piece of software, the measurement of profit or loss can be as simple as a calculation that subtracts the starting cost and maintenance from the earnings created by the use of the software. Determining the ROI for a system that is potentially as multi-dimensional and complex as a KM system is not as simple. A broader range of metrics are involved and are less likely to be determined by any one method of measurement, but rather “by applying a combination of traditional methods and non-traditional methods.” (BEI Consulting). The evaluation stage of the Knowledge Management Life Cycle offers insight into whether or not the system yields the desired benefits.

When it comes to defining the value in KM returns, there are many tangible benefits to consider, which are easily tabulated and can be assigned a monetary value. They include performance measures, quantity of work, cost and time savings, and increased quality resulting in fewer errors.

There are also intangible assets that impact the value of an organization, such as productivity, increased customer and employee satisfaction, innovation, and intellectual capital. “It is often held that intellectual capital is the difference between the stock price of the company and the book value.” (BEI Consulting). While the knowledge held by members of an organization, including their expertise in any given subject, isn’t measured in precise monetary worth, it tends to raise the overall value of the shared asset of organizational knowledge. Having a proper formal KM system in place helps to leverage that

wealth of information and distribute it within the organization. It can mean the difference between meeting company goals and falling short due to lack of individual access to an existing and collaborative knowledge base.

Summary

This chapter takes the reader through an overview of several areas of Knowledge Management and certain aspects pertaining to Collaboration. Covered topics include KM features, processes, disciplines, benefits, challenges, trends, tools, technologies, life cycle, and ROI.

- Learning Objectives of the chapter are defined as a starting point to guide the reader through key points explored in the chapter.
- The introduction illustrates a modern day example of the importance of leveraging knowledge management.
- The Collaboration and Knowledge Management and subsequent sections provide detailed definitions of each and how they are interconnected within organizations.

- Knowledge Management Features, Processes and Disciplines introduces KM specific terminology such as tacit, explicit and embedded knowledge, as well as knowledge push and pull.
- The Benefits and Challenges of Knowledge Management delve further into specific reasons for implementation of KM and considerations that organizations often address.
- Knowledge Management Trends, Tools and Technologies provides an overview of methodologies and where they belong within a organizational structures.
- Knowledge Management Life Cycle details the specific steps involved in the iterative development process, and Return on Investment focuses on the benefits garnered from the evaluation stage of the cycle.

Glossary

Knowledge management: The "management of organizational knowledge for creating business value and generating a competitive advantage" (Gamble 2001).

Tacit knowledge (sometimes known as embodied or informal knowledge): Inherently derived from a person based on their personal experience and perspectives.

Explicit knowledge (represented knowledge): Documented information and data existing in databases which should be the foundation in the decision-making process.

Knowledge push: Signifies the efforts that involved in quickly recognizing and responding to customer needs.

Knowledge pull: Revolves around reacting to the competition.

Acquisition: KM process method that focuses on innovation, benchmarking, and collaboration.

Innovation: Occurs in the acquisition process when new knowledge is produced after existing knowledge is applied.

Benchmarking: Organizations use this in the acquisition process to compare the best practices of other organizations to their own procedures and identify areas for improvement and expansion.

Conversion: Process that involves taking the existing knowledge and turning it into useful procedures.

Protection: Process that signifies the steps taken to secure an organization's knowledge from potential illegal activity and improper use.

Enterprise portals: Web-based interfaces to applications, databases, and systems which provide a gateway for employees to access information kept both internally and externally to the organization.

Knowledge portals: More specialized and "focus on particular areas of business; they can be customized to meet the needs of users from all areas of the organization, ensuring that they receive only information appropriate to their needs" (Tatnall 2005).

Thought Exercises

1. Describe how knowledge management and collaboration have worked together in a prior experience.
2. In what ways can collaboration have a negative impact on knowledge management? Positive?
3. Define some ways in which organizations create, nurture, share, and exchange knowledge. How have they changed the culture of the organization?
4. Based on your experience in the companies you have worked for, how have they implemented technologies or tools in order to establish a knowledge management culture?
5. Imagine you are tasked with establishing ideas for knowledge management initiatives for an organization in the healthcare industry. Work in a team of 3-4 other students to plan and design ways in which knowledge can be transferred and exchanged to create a competitive advantage. How do you go about generating and documenting your ideas? Who are the key stakeholders of your organization that should be involved in establishing KM initiatives?
6. An aspect of the knowledge management acquisition process is benchmarking. Describe ways in which your organization has used benchmarking to compare its business processes to best practices in the industry or to another organization's capabilities.
7. Name 3 ways that knowledge can be accessed
8. What role does I-net agents play in the know management infrastructure?
9. What is the best way to create a knowledge management infrastructure? Why?
10. What kinds of tools are used in knowledge management?
11. Which steps of the knowledge management life cycle are most likely to be iterative? Why?
12. Which members of an organization are responsible for each step of the life cycle process?
13. Explain why measuring the return on investment of a knowledge management system can be a challenge.

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Chapter 13

Convergence and Decision Making Techniques

Learning Objectives

- Define and understand key concepts of Convergence
- Understand the importance of utilizing Decision Making techniques
- Learn key steps to effective Decision Making
- Convergence and Decision Making in relation to collaboration

Introduction

Convergence and Decision Making

Convergence is the coming together of different ideas, functions, or values into one cohesive unit. It is the combining of various resources from different areas and creating one core function or idea. In collaboration engineering, convergence is the process of organizing and summarizing a list of ideas into key concepts that are worthy of further review. During convergence, participants use structured approaches to move ideas to the point of evaluation as viable solutions. These refined ideas will be the input for the decision making process. Once a collaborative team has generated their ideas, the next steps are to analyze the ideas, identify and summarize key concepts, review each idea to gain shared meaning, evaluate the viability of each idea to determine which ideas have the potential to meet the need of the problem or opportunity, and finally, make a decision. Convergence involving both technology and decision making has been the most influential in the perpetuation of productive team collaboration.

Key Concepts

Digital Convergence

Digital convergence is defined as the union of audio, video, and data communication into a single source, which is then received on a single device, delivered by a single connection (Wallin 2006). A collaborative tool that is an example of this type of convergence is Skype. Skype combines audio with video and text chat options. Digital convergence has created a new way to access traditional information sources, such as books, catalogs, and consumer services. These sources can now be reached via televisions, hand-held devices, or computers. The wide availability of broadband internet and its

connectivity to these types of devices helps to make digital convergence possible. Since digital convergence and broadband Internet has become so accessible, more people around the world can connect with each other for multiple types of collaborative purposes (Wallin 2006).

Digital convergence has provided individuals with many more options for learning and entertainment. Most people have access to hundreds of television channels and countless internet pages. Digital convergence has established three fundamental conditions that provide a foundation for individual learning and communication to continue to be one of the main focuses for future societal development. These conditions are pervasive computing, extended enterprise, and virtual communities (Wallin 2006).

Pervasive Computing

Computers are everywhere. They are no longer found just under desks, but in cars, in pockets and everyday objects that people use every day. This wide spread use of computers is pervasive computing. Pervasive computing provides us with more functionality at reduced prices, making new technologies more widely available. One example of this is the digital camera phone. This type of digital convergence provides the user two functions in the same device and is a standard feature offered on many cellular phones. These innovative services are now being delivered to the global market quickly. Groups of companies are constantly and rapidly working to create and support new technologies. This rapid spread of technology has been useful in facilitating the collaboration of various groups around the world (Wallin 2006).

Extended Enterprise

The need to exploit global comparative advantages has made it necessary for a modern company to become an extended enterprise. In the global economy this means that less developed countries are now getting an increasing amount of work because of lower labor costs. One company will often commission labor from another company on a different continent. This can be called subcontracting or outsourcing. A company can also contract out to suppliers. This almost makes the suppliers a subsidiary, since their service is essential to customer satisfaction. Extended enterprise is effective and flexible. A system that is based on combining open, standards-based services is easily enhanced when needed. New technologies, such as on-demand IT services, allow these extended enterprises to provide required services for their customers anywhere in the world at little cost (Wallin 2006).

Virtual communities

Digital convergence has also provided a social component to technology. This social component

takes the form of different communities. An example of this is the open source movement. Open source software developers make their products open to the public so people can add to or enhance what the software developers have created. It is usually offered at no cost. These communities are often created by individuals pursuing personal projects. However, they are done in a social context. This is technology-supported socialization that stems from individual self interest (Wallin 2006).

Impact of Digital Convergence

Pervasive computing impacts the physical product's content. Products are more configurable to personal needs, and provide interaction flexibility. An example of this is the difference between analog and digital technologies. Analog represents a step-by-step, predesigned process. Digital offers more flexibility, and can be tailored to users with different expectations (Wallin 2006). Pervasive computing technology impacts the collaboration and decision-making processes used by teams every day.

Extended enterprise has promoted new service logic where services are flexibly combined when needed and then separated when the goal has been achieved (Wallin 2006). A company can partner with a distributor for the convenience of getting their product in a certain area at a certain time. This partnership can be dissolved once the one company no longer needs the distribution for that particular area. Digital convergence reaches beyond the collaboration of individuals and focuses on general business needs in a technology dominated world.

Virtual communities offer the role of giving individuals value as a co-creator. As an example, the company Amazon uses feedback given by customers to add value to their offerings. Different incentives are provided to encourage customer's participation. The customer is emotionally engaged in the buying experience. This type of collaboration gives a social context to digital convergence.

Symbolic Convergence Theory

Convergence does not only apply to technology, but can be discussed in terms of ideas, which also influence the decision-making process. Symbolic convergence is the creation of a climate and culture that allows people to communicate and identify with each other on an emotional level. "It is symbolic because it deals with the human tendency to interpret signs, signals, current experience, and human action and to invest these with meaning" (Hirokawa 1996). Symbolic convergence branches from the human need to try to understand events in terms of people. This means that individuals try to understand events involving certain people based on that person's personality traits and motivations to make decisions. Overlapping experiences in our separate lives helps to create a symbolic common ground. This common

ground allows individuals to communicate better with one another and share interpretations.

Symbolic convergence is how, during the communication process, two or more private symbolic worlds come together and begin to overlap. If a group develops an overlap of symbolic worlds from each member then a shared group consciousness starts to emerge. If all the members share enough of the same symbolic interpretations then they have a basis for communicating with one another to discuss their common concerns and experiences as group members, and to agree on how they can make decisions together. This explains how people can come together to take part in successful logical negotiations processes, problem-solving procedures, and decision-making. These symbolic attachments to ideas also serve to provide an emotional involvement and commitment to symbols. It is a shared vision of what must be achieved and what that achievement will ultimately look like. This convergence of ideas is a very important aspect of an effective decision-making process. If a group does not share the same vision then the best outcome will never be fully realized (Hirokawa 1996). Examining the symbolic convergence of ideas makes it easier to understand the mental processes underlying convergence in relation to collaborative practices.

Convergence as a Collaboration Pattern

Decision making as a model is the entire process from Ideation to Evaluation of ideas. It is an eventual selection of an agreed upon approach to a problem, idea, or opportunity by a group. As collaboration patterns there are two components:

1. First, the process of evaluating the merits and risks of ideas refined during Convergence as potential viable solutions. This is known as the Evaluate pattern.
2. Second, the process of building group consensus and commitment to one or more of the ideas that emerge from the evaluation process.

Every decision making model includes convergence as a part of the process. In an early Briggs' decision making model (Figure n), the Clarify and Reduce patterns make up the convergence process. In this model, to "Clarify" is to "Move from having less to having more shared understanding of concepts and the words and phrases used to express them.", while "Reduce" is to "Move from having many concepts to a focus on a few deemed worthy of further attention" (Briggs 2003).

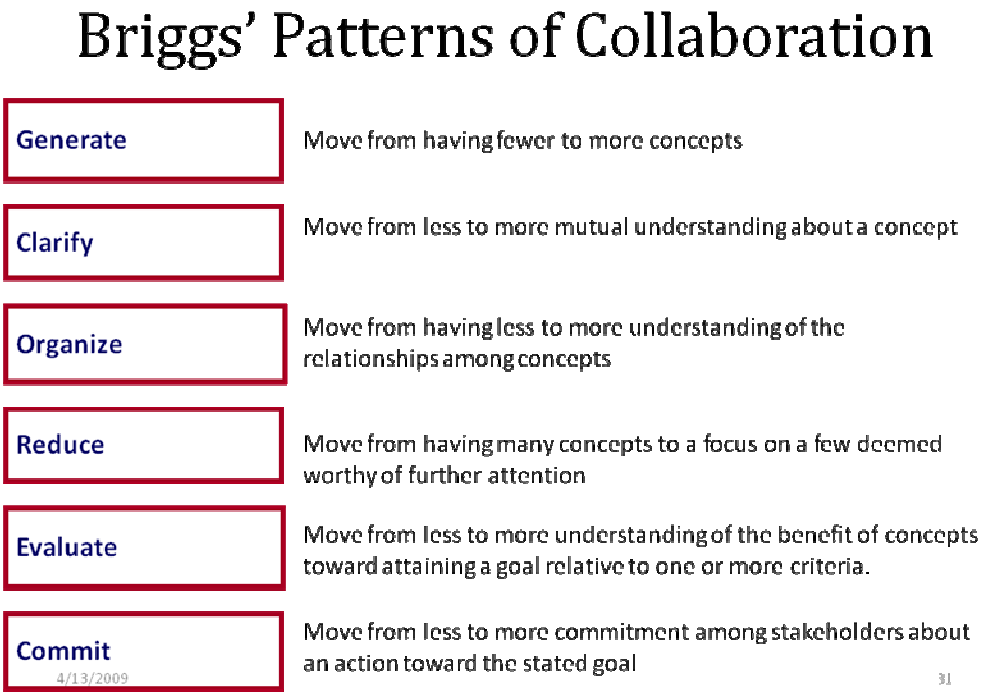


Figure N:

Prior to convergence, a team has generated numerous ideas in response to a question. Some of these ideas may be redundant, outside the scope of the question or problem, or may just be bad ideas. Convergence begins when the group reviews the ideas to address these issues. The group will work to reach a consensus on the meaning of each idea, achieving symbolic convergence.

For instance, a group may be asked for feedback for improvements to their masters' program experience. As a result, the following ideas may be generated:

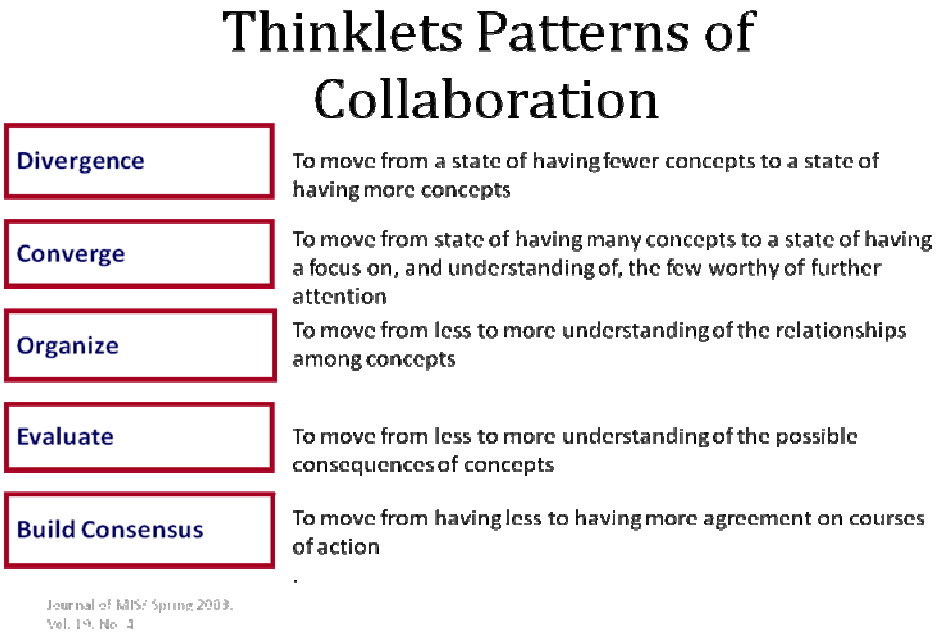
- Provide more guidance on how to use university research tools.
- Offer master program classes during the day.
- Eliminate tests.
- Add 10 week class sessions in the summer.
- Set up a lab so students can get assistance using university library resources.
- Offer more classes with an on-line session.
- Extend library hours during the summer.
- As an initial pass, these ideas might be filtered or reduced to the following concepts:
- Offer more options in class scheduling;

- Provide help for using library resources; and
- Eliminate tests.

Additional filtering might result in removing "Eliminate Tests" because it could be considered as outside the scope (i.e. not an improvement).

Now that the list has been reduced, the next task is to ensure that the group achieves shared meaning of each concept. In our example, the participants may conclude that everyone understands the meaning of the resultant items by reviewing the previous list to confirm that the statements represent examples of the feedback. In other instances, participants may have a different understanding of specific words and discussion is required to clarify.

To help participants properly focus, drive towards results and provide standard tools for facilitators, activities known as thinklets have been proposed for use by facilitators during group collaboration (Briggs, de Vreede, Nunamaker, 2003). As defined by Briggs, de Vreede, Nunamaker, "a **thinklet** is the smallest unit of intellectual capital required to create one repeatable, predictable pattern of thinking among people working toward a goal". In other words, thinklets assist in the facilitation of group collaboration.



Thinklet designers associate these activities with another set of collaboration patterns: Diverge, Converge, Organize, Evaluate, and Build Consensus. At a high level, these patterns align with the Briggs' earlier model. The **Converge** pattern corresponds to the combination of Briggs' **Clarify and Reduce** patterns. See Figure n for description of each pattern.

Beyond associating thinklets with a set of patterns, the additional power of thinklets is the incorporation of three components: **Tools**, **Configuration**, and **Scripts.**

Tools are the software technologies used to create a collaboration pattern. The technologies need to be specific enough to support execution of the thinklet. An example is a tool that allows

participants to review and idea and provide their understanding of a concept. Tools are covered more in depth later in this chapter (Briggs 2003).

The **configuration** of the features of the tool helps to drive the activity forward. For a convergence thinklet, the tool might have features that allow an exchange of comments about the meaning of specific terminology or words associated with an idea. As a part of tool configuration, a facilitator may ask participants for a list of criteria to be used to evaluate ideas.

Scripts are the series of steps used to guide participants through the activity. In conjunction with the tool, a facilitator asks questions and directs participant actions in the tool. The facilitator may ask participants to explain why an idea should be removed or how an idea relates to other ideas.

Because the thinklets are highly structured activities, they reduce the cognitive load on participants, thus streamlining the discussion. As a result, if all members have a vested interest in achieving the group's goals, thinklets can be used without a facilitator.

Currently, there the 10 thinklets associated with Convergence. They fall into one of three categories:

1. Shared Meaning and Filter

- **Fast Focus** – Quickly produces a list of key concepts from a broad list of ideas by addressing issues of redundancy, irrelevance, clarity, and inappropriate levels of abstraction.
- **OneUp** – Narrowing key concepts under time pressure by identifying and applying criteria to judge the quality of ideas.
- **BucketBriefing** – Cleaning up the language in ideas by addressing wordiness, redundancy, and ambiguity, eventually creating categories in which to place the ideas.
- **DimSum** – Incorporating group feedback into a single statement or refining definitions of terms that are acceptable to participants.

2. Filter

- **Pin The Tail on the Donkey** – Reducing a large list without discussing each idea in detail by

having participants identify a key concept of the items and reach a shared understanding based on key comments.

- **BroomWagon** – Reducing a large list quickly by using a voting method where participants are required to select a subset of ideas based on a fixed number (ex. Top 10 of 50).
- **Goldminer** – Identifying the gold nuggets or important ideas deemed so valuable that they are worthy of further attention. Participants are allowed to advance the ideas they think are important without having to consider input from others.
- **ExpertChoice** – Charging an 'expert' with the tasks of placing ideas into categories that are reviewed and potentially refined by the group's participants.
- **Garlic Squeezer** – Charging a 3rd party (a facilitator along with an expert) with reducing the number of reactions to a set of ideas to their fundamental properties.

3. Shared Meaning

- **ReviewReflect** – Review, confirm, and update the content of an outline.

Decision Making Techniques

Introducing Decision Making

Decision making is not easy. Every decision made results in a unique consequence. In collaboration with others, decisions are factored into a whole group, and the consequences of those decisions rest on a entire team, not an individual. As a result, many ideas will emerge which will complicate the process. However, utilizing specific thought processes and creative tools will prove useful in overcoming these challenges. It is important to remember that not every decision made will be a good one, people make bad decisions everyday. Michael J Maubossin, Chief Investment Strategist at Legg Mason Capital Management and Established Author, in the article, "Smart People, Dumb Decisions," addresses this notion about decision making. As Maubossin states, decision making has become complex and being prepared, self-aware and learning how to take a look at the decision making process in ourselves, and in our collaborative environments will help to ensure better decisions are made and better outcomes are achieved (Mausboussin 2010).

Importance of Decision Making

The importance of collaborative decision making is well explained by David Strauss, founder of Interaction Associates, which is a consulting organization focused on group process facilitation, training and development. In his book How to Make Collaboration Work, Straus says, "When the full range of differing interests and points of view is involved in solving a problem or making a decision, the solution is likely to be much more comprehensive and creative than if a small group of like-minded individuals acted on its own. (Straus 2002)." Straus is saying that collaborative decision making is important because it allows individuals to devise creative and comprehensive solutions. Decision making is about creating an answer, but when done collaboratively, a better solution can be achieved.

The Theory of Decision Making

Decision making theory must be examined in an effort to understand and enhance the decision making process. Current theory of decision making is based on the **decision making collaboration scale**—a measurement of collaborative traits in a person when they are making decisions. In a study entitled, "A Convergent Validity Study of the Decision-Making Collaboration Scale," two researchers, Katie Neary Dunleavry and Matthew Martin, examined the decision making collaboration scale. Their study breaks down the traits of decision making into two scales. These scales are the cognitive flexibility scale, and the communication competence scale.

Cognitive flexibility refers to a person's ability study situations, see alternatives, adapt, and handle those situations. The second scale, communication competence, focuses on someone's ability to communicate to others in a situation. By using these two definitions it is possible to see what makes a great collaborative team member. This theory can also help to enhance the collaborations skill of an individual by identifying who will need more coaching within a team (Dunleavey 2006).

Decision Making Techniques

Decision making processes and techniques are used everyday to help people make choices. The more detailed the problems are, the more complex the techniques will be. A few issues that create barriers in reaching decisions include uncertainty, interrelated factors, missing information, consequences, personal connection to the issue and/or outcome, etc. Decision making becomes even more complicated when collaborating with others in an attempt to reach a mutually acceptable outcome. Therefore, using decision making techniques effectively is very important. As an example, the Convergence pattern can address many of the issues listed above, while The Evaluate and Commit/Build Consensus patterns would

be the vehicles to an acceptable outcome.

There are logical steps you can employ to increase the chances of a desired outcome. By addressing critical outcomes whether the decision is on an individual basis or within the parameters of collaboration (Plous, 1993). Taking these systematic steps help to ensure that all factors are considered and details will be over looked less often. These steps include the following:

- Construct a positive environment and generate options to consider; the Generate and Divergence patterns
- Explore realistic alternatives as a group and choose the best alternative; the Organize, Converge, Evaluate, and Commit/Build Consensus patterns
- Double-check your decision against desirable outcomes; Commit/Build Consensus
- Communicate and actualize the final decision

It is important to understand that even within these steps, effective tools exist. Some of these tools will be discussed in the respective sections.

Constructing a Positive Environment and Generate Options to Consider

Creating a constructive environment is a critical foundation to ensuring successful decision making. There are many factors to consider when setting up a positive environment. Who are the key stakeholders? How do we facilitate the right questions? How can we encourage open dialogue? Which processes and tools will best fit our needs? In an environmental set-up of key stakeholders Strauss advises that: "The power of collaboration comes from inclusion, not exclusion." (39) Strauss advises that the best way to set up the proper environment is to include all relevant members involved in the decision making process. Even though they may be difficult to work with, they still have a part, and their role will help decisions move forward. Exclusion of stakeholders can potentially stop any decision making process.

Although creating a constructive environment involves many elements to consider there are logical steps to take (Plous, 1993). Start by identifying what you want to achieve. Next, decide whether the final decision will be a collaborative or individual effort. It is important to make sure all the right people are involved from the start.

Once you have all the right people involved, be sure everyone's opinions are heard. Encouraging participates to contribute to the discussions, deliberations, and analysis without rejection from group members helps to encourage a safe place to communicate effectively. Moreover, this helps to prevent the

stifling of the decision making process which can occur when members strive for a group consensus rather then aiming to generate the best ideas/solutions. This is known as “Group think”.

A lack of opposing views most often results in alternative ideas not being generated. Therefore, the group does not invested properly to ensure an informed decision is made. It is best to avoid groupthink and encourage useful input of all members during the critical beginning phases of decision making.

The Stepladder Technique

Groupthink behavior can be found in many team settings. It is important to spot it before it starts to hinder the decision making process. A helpful tool to use to avoid groupthink is the Stepladder Technique. As highlighted in the article, The Stepladder Technique: An Alternative Group Structure Facilitating Effective Group Decision Making, “The Stepladder Technique is intended to allay the problems associated with group decision making by structuring the entry of group members into a core group and by ensuring that each member contributes to the decision-making process.”(Rogelberg, Barnes-Farrell, and Lowe 1992). This decision making system structures the entry of members to the group which increases group effectiveness.

The Stepladder Technique has four requirements that are outlined below:

- All members have a review period which allows them sufficient time to analyze tasks before entering the core group.
- The entering member must make an introductory presentation where they put fourth a solution before ever learning of the core group's ideas.
- After each person enters and presents, time is given to reflect and discuss the problem with the new information in mind. This information is added to the core groups ideas; and
- After all members are introduced and presentations are complete, the final decision occurs. This can only happen once the group is complete.

Research on the effectiveness of the stepladder technique has shown that stepladder groups produce higher-quality decisions than conventional groups (Orpen, 1995). These steps make it difficult for any one member’s ideas to be excluded. In turn, the group gains input and a sense of perspective for all members of the group. Groupthink is no longer a concern for a group that implements the stepladder technique during the beginning stages of the decision making process. Moreover, a positive work environment is achieved, having each member being included equally.

Creating a positive work environment and generating a convergence of good alternates are the

foundation in group collaboration. When you generate good alternatives by introducing each member's ideas from the beginning it helps to create viable solutions to consider.

Explore Alternatives as a Group and Choose the Best Alternative

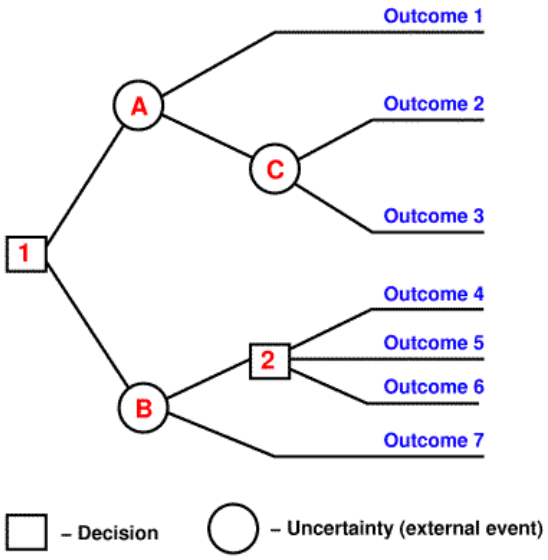
By this time the group has a complete list of alternatives to consider. Now, the focus is on exploring these alternatives including the feasibility, risks, and implications of each. Validating each choice helps to highlight the best solution on which to settle. The following tools may prove helpful when confirming the validity of decision alternatives. These tools include:

- **Starbursting** - a form of brainstorming, it is used to help generate questions to clarify and evaluate options;
- **Force Field Analysis** - access the positive and negative implications of the options; and
- **Cost-Benefit Analysis** - used to examine the financial aspect of the alternatives.

After evaluating the alternatives, choosing the best option is next. By this time the choice maybe somewhat obvious. In the case that more than one possible solution arises, **Grid Analysis** and **Decision Trees** are optional tools to employ to help the group reach a consensus on the best solution.

Grid Analysis

Grid Analysis is also known as a Decision Matrix, Pugh Matrix Analysis, or Multi-Attribute Theory. This tool has proven effective when faced with more than one good alternative to choose (Orpen, 1995). The technique works on a score system in which options are listed in rows and factors to consider in columns. After forming the grid, you work down the columns, scoring each factors on a scale of 0 (poor) to 5 (very good), identifying the order of importance for each. After averaging the weighted scores for each, the highest score will reflect the best viable choice. The Grid Analysis helps to reveal the best choice when faced with multiple options by taking into account important factors (Orpen, 1995) much like Decision Trees.



Decision Trees

Decision Trees are another helpful tool when

faced with multiple options. A series of squares, circles, and lines are used. This effective structure helps the group explore options, investing outcomes, and settle on the best choice by presenting a balanced look at the risks and rewards associated with each choice (Orpen, 1995). It allows the group to reflect on analysis of the alternatives outcomes and consequences within a framework. Below is a schematic example that illustrates the basic elements of decision trees as seen on the Time-Management-Guide.com website [figure1].

Figure 1. Squares represent decisions you can make. The lines that come out of each square on its right show all the available distinct options that can be selected at that decision analysis point. Circles show various circumstances that have uncertain outcomes. Each path that can be followed along the decision tree, from left to right, leads to some specific outcome. You need to describe those end results in terms of your main criteria for judging the results of your decisions.

Whether using one of the above tools, Grid Analysis or Decision Trees, a detailed look at the best alternatives is still needed when faced with multiple options. In the end, making sure the final decision makes common sense is very important.

Double-Check Your Decision Against Desirable Outcomes

The group must double-check to ensure that the final decision is the best possible. This should be considered in light of the information gathered and the consequences that follow. Hard work goes into developing, exploring, and highlighting the best final decision. Completing the previous steps thoroughly helps to ensure satisfaction with the final decision of the group. When double-checking for validity, each member should take time to review the work independently. This will help identify any remaining doubts that may exist and need to be addressed. This simple, intuitive step is just as important as all the other steps when making decisions.

Communicate and Actualize the Final Decision

Once the final decision has been made, the group must express and explain that decision to everyone involved in its implementation. The logical structure of the decision making techniques used should prove helpful when communicating the final decision to your appropriate audience. The more information provided about the final decision and the processes, the better the chances others will support it.

Conclusion

In this chapter we discussed how convergence and decision making has impacted our everyday lives. We saw how digital convergence has effected technological innovations, globalization, and communities. We saw how its impact has sped processes, created better flexibility within supply chains, and connected people to one another. That same convergence has also affected the way we collaborate. In exploring collaborative decision making we discovered what defines it, and what steps you can take to create the best solutions. Convergence will keep collaboration moving forward, both businesses and individuals who accept are more likely succeed in the future.

Employing an organized, systematic approach to decision making is required to achieve superior results during the collaborative process. Many tools exist to assist with the decision making process. To make decisions, especially complex decisions, without considering theories and techniques is risky and increases the chances of an unsatisfactory final decisions (Dawes, 1988). Lacking the proper processes leaves room for doubt, misinformation, and unwanted consequences. Since many variables will impact any decision that is made, it is necessary to engage in strong, foundational decision making techniques to help guide the thought process.

Glossary

Cognitive Communication - the knowledge and ability to communicate appropriately in a given situation.

Cognitive flexibility - a person's ability study situations, see alternatives, adapt, and handle those situations.

Communication competence - someone's ability to communicate to others in a situation.

Convergence - a collaboration pattern where the group moves from a state of having many concepts to a state of having focus on, and understanding of , the few worthy of further attention. Also, the coming together of different ideas, functions, or values into one cohesive unit.

Decision making collaboration scale - a measurement of collaborative traits in a person when they are making decisions.

Digital convergence - defined as the union of audio, video, and data communication into a single source.

Symbolic convergence - how, during the communication process, two or more private symbolic worlds

come together and begin to overlap.

Thinklet - the smallest unit of intellectual capital required to create one repeatable, predictable pattern of thinking among people working toward a goal.

Exam Questions

1. Define Convergence?
2. What are three types of digital convergence?
3. What are some "symbols" a group might share?
4. Name three industries impacted by digital convergence and how?
5. What are the pros and cons to decision making in a group environment?
6. What is “groupthink”? How can it be avoided?
7. When is it appropriate to use the Stepladder technique? How can it be beneficial to group decision making?

Thought Exercises

1. What is usually the first social response to new convergences? Are people welcoming or inhibiting of them?
2. How do you teach symbols to others quickly so to increase group interactions and speed the collaboration process?
3. Think about a group you were in and you had to make a group decision. What were successful components of that group? What were some barriers you had to work around?

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Chapter 14

Virtual Project Management Tools and Techniques

Introduction to Virtual Project Management

Virtual project management brings teams, product engineering, and processes into the 21st century through the use of e-collaboration technologies. It utilizes methods and a blend of conceptual, theoretical, and applied knowledge that will prove valuable for academics and practitioners. In addition, virtual project management will ensure that the highest level of client service and satisfaction are delivered to the customer. Virtual Project Management is how professionals and business associates can convene online and have private discussions, organize project details share and collaborate without having to be in the same physical location. There are several advantages to virtual project management for example; online virtual workspace software enables companies to extend collaboration opportunities from anywhere their employees can connect to the internet.

Definition of Virtual Project Management:

Virtual Project Management can be defined as a unique managerial style that can implement technology, culture, and cognitive knowledge to successfully manage a group of employees using information and communications technologies to collaborate from different locations. These virtual team members could be working in different sections or departments in the same building, scattered across a country or around the world. The virtual team can be connected by technology such as groupware, e-mail, an intranet, or videoconferencing and can be said to inhabit a virtual office. Although virtual teams can work efficiently, occasional face-to-face meetings can be important to avoid feelings of isolation and to enable team building (Free Virtual Library).

Virtual & Traditional Project Management

There are many similarities between virtual project and traditional project management. These similarities are the overall structure and methodology for managing teams as well as the types of teams that are formed to achieve a goal. Traditional project management assumes that a project is well defined, has its fixed budget, tasks can be exactly planned and allocated, and the main task of project management is to control project progress according to plan. However, organizations and objectives for projects change rapidly: many projects are done in distributed settings, crossing organizational boundaries, and pursue opportunities for innovation and new businesses. These types of assumptions are no longer true: Projects, whether managed virtually or traditionally, often start with an opportunity, a rough idea, or

problem recognition. The next step is to identify work structures, roles, and responsibilities. However, even during project execution different coordination and management strategies are needed to allow efficient collaboration between members from different organizations. The changes of partners, team members, customer requirements, or suppliers, will always be challenging situations for both Virtual and Classic PM.

Project Management Methodology

As with traditional project management, there are a variety of methodologies from which the virtual project manager can choose. A **methodology** in project management is a set of methods, processes and practices that are repeatedly carried out to produce a project's deliverables. It describes how things should be done. A project management methodology is used to map out what you need to do to manage a project from its start to closing. Your method includes every step in the project's life cycle, so you know when and how to complete each task in the project. As mentioned earlier in this chapter, virtual teams can work in different departments in the same building, be scattered across a country, or even located around the world. Depending on the locality, culture, and nature of the project, the virtual project manager must determine the most appropriate methodology for the project. Project managers need to make decisions concerning budget, current processes, and importance of the project, team size, technology, and available tools when choosing a methodology. Most traditional methodologies are bureaucratic, inflexible, and predictable. Virtual project methodologies - and more progressive methodologies in general - tend to be agile, flexible, and client-oriented. (Charvat, 2003). A flexible approach that is also standardized is the best approach (Project Management Institute, 2003). Many organizations use the Project Management Body of Knowledge (PMBOK) as a basis for their project management methodology, but there are many others including Agile, Projects IN Controlled Environments (PRINCE2), Rational Unified Process (RUP), and Six Sigma (Schwalbe, 2010). Table 1 contains larger list of methodologies and denotes which are applicable to virtual teams.

Table 1	
Project Management Methodologies	Suited for Virtual Teams?
Rational Unified Process	Yes
PRINCE2	Yes
System Development Life Cycle (SDLC)	Yes
Solutions-based Project Methodology	Yes
TenStep	Yes
The "Agile" Group:	Yes
Extreme Programming (XP)	Yes
Scrum	Yes
Crystal	No
Dynamic Sys. Development	Yes
Rapid Applications Development (RAD)	Yes
Unicycle	Yes
Code-and-fix Approach	No
V-methodology	Yes
Waterfall	Yes
Open Source	Yes
Spiral	Yes
Synchronize and Stabilize	Yes
Reverse Engineering Development	Yes
General Publication Methodology	Yes
Structured System Analysis & Design	Yes
Pramis	Yes
Offshore Development	Yes
General Drug Development	Yes
Classic Building Construction	Yes

*Source: *Project Management Methodologies* . Charvat, 2003.

So how does a project manger choose the right methodology? As in traditional project management, there is no one approach that is applicable to all virtual projects. Most organizations tailor their methodology to fit their unique needs (Schwalbe, 2010). Although virtual project management utilizes many of the same methodologies as traditional project management, the project manager needs to realize that no matter what approach they choose, they need to learn to give up some control, allow for more flexibility, and accept that individuality prevails over teamwork at times. Virtual projects cannot be micromanaged, so coordination skills become a vital quality of the virtual project manager (Pearlson, 2001). Virtual project managers must learn to work within systems as they can be constrained by the tools

available to manage the project and communicate with the virtual team. Once the project management method is chosen, the project manger must choose the best tools for the job.

Project Management Tools and Technologies

Modern technology has made collaboration very easy. Many people can complete projects together seamlessly, no matter what time zone they live in. You can communicate with your virtual team members from the comfort of your own living room. The world is quickly becoming a small village and many tools out there that have made this possible. However, the success of collaboration not only depends on teammates, but also depends on the tools themselves. Tools ease collaboration by making voice and video flow smoothly. The tools should be capable of providing a virtual workspace for the team so they can accomplish their tasks. Tools like Skype, WebEx, Wikis, and e-mail have made all of this possible.

Skype allows you to place phone calls over the internet and features voice and video messaging. This saves money because there are no long distance fees associated to telephone calls. WebEx is a web conferencing tool a manager can use host a meeting and have team members join by calling a conference bridge to listen to instruction and share their desktop area to illustrate a point being explained. Wiki allows team members to post to a centralized location on the web and able to view each other's work asynchronously.

Conference Calls

A **conference call** is a telephone call by which a caller can speak to with several people at one time ("Conference Call." *Merriam-Webster).* The conference call is one of the most commonly used tools used in virtual collaboration. It is an easy and cost effective way for project team members to communicate from remote locations, both internally and externally.

There are a variety of services available for conference calling at varying price ranges. Large telecommunications providers, such as Verizon or AT&T, offer everything from flat-rate to premium teleconferencing packages. There are also a growing number of free conference calling tools, such as Skype and FreeConferenceCall.com. Services such as these can be accessed over the Internet or via landline and cell phone.

While participating in a virtual meeting over a conference line, there are points of etiquette to keep in mind. It is important to remember that others on the line cannot pick up nonverbal cues, which can be challenging for both the speaker and the listening. On the same note, you should realize that just

because others on the call cannot see you, they can still tell what you are doing on the other end of the call. Be sure to mute your line when not talking, so you don't disturb other call participants with back ground noises. Also, try to call in to the meeting from a quite location, free of distractions.

As is the case with live meetings, be on time and prepared. Calling in late is a distraction to others. Try to avoid multitasking and pay attention to the person that is talking. You should actively participate in the discussion and be ready to engage in conversation when called upon for status updates or questions pertaining to your project tasks. These teleconferencing manners are important for both leaders and participants and are a reflection of your professionalism ("Conference Call Etiquette" *AccuConference.com*).

A live virtual meeting is a meeting that simulates a real life meeting, when actually the meeting is being assembled by various devices and hardware such as phones and computers. Everyone can talk, type, and present ideas and feedback in a live virtual meeting, making it similar to a normal, face-to-face meeting. The only difference is that it is all done remotely.

Video Conferences

Video conferencing is another commonly used method of communication utilized by project teams. **Video conferencing** is a two way communication that allows two or more parties to collaborate in real-time using audio and video. It uses telecommunication technologies such as phone lines, cable lines, or satellite transmission and hardware based technology such as TV, or high definition cameras ("Conference Call Etiquette" *AccuConference.com*).

Video conferencing is a powerful tool that is used by many corporations to cut cost and distance. It's a great collaboration tool to be able to communicate with team members face to face.

There are many types of software and hardware tools used for video conferencing with a wide range of price points. In its simplest form, video conferencing can be accomplished for small groups using personal computers and webcams through services such as Skype. Skype is one of the most well known video conference services. Skype uses VoIP technology, "Voice over IP is the capability to carry normal telephony-style voice over an IP-based internet with POTS-like functionality, reliability, and voice quality. VoIP enables a router to carry voice traffic (for example, telephone calls and faxes) over an IP network" ("Glossary of Terms" *Web Conferencing Solutions*). You can call anyone's PC around the world for free through Skype. Skype is a useful real-time collaboration tool for teams in same or different regions.

At the highest levels, companies such as Cisco, provide premium services that transform entire

conference rooms into virtual meeting spaces, complete with video camera and large video conferences screens. These products come at a high cost but can be a good choice of large, multinational companies that can save time and travel costs, by allowing international project teams to meet without leaving there offices.

Instant Messaging

Instant messaging (IM) is a chat service provided by many companies which requires the install of software provided by the vender. Instant messaging gained popularity over e-mail services because it's instantaneous; you get a respond instantly, which makes it great tool for collaboration. The use of a chat room makes it very useful since everyone can see what everyone is discussing. It's free, simple and doesn't require much maintenance.

Using IM requires participants to have an account registered with the service provider to initiate the chat. Some of the most popular IM services are provided by Yahoo (Yahoo Messenger), AIM (AOL Instant Messenger), and Microsoft (Windows Live).

Blogging

A **blog**, or web log**,** is a type of website, usually maintained by an individual with regular entries of commentary, descriptions of events, or other material such as graphics or video. Entries are commonly displayed in reverse-chronological order ("Blog" *Wikipedia*). Blogging is used to harvest people's opinions on certain subjects and manners. Blogs are useful but are basic collaboration tools, once you leave a post, other can give feedback regarding your ideas. This will come in handy when collaborating on a project and determining the objectives, tasks, and deliverables for a project.

Virtual Project Management Software Packages

There are many software packages available for virtual project management (VMP) that offer a variety of options for time, task, and resource management to accommodate users need. The nature of the project and the skills of the project team determine what software to use. In VPM, you should consider an application that will be effective and easily utilized by the virtual team. Table 2 below outlines the tools some of the features available in collaborative project management software packages ("Collaborative software" *Wikipedia*). Table 3 list some common VPM software packages and offers a comparison of each according to their features.

Table 2	
Collaborative project management tools	
CPMT includes: • HR and equipment management • Time and cost management • Online chat • HR and equipment management • Time and cost management • Online chat • Instant messaging • Telephony • Videoconferencing • Web conferencing • Data conferencing • Application sharing • Electronic meeting systems (EMS)	• Synchronous conferencing • E-mail • Faxing • voice mail • Wikis • Web publishing • Revision control • Charting • Document versioning • Document retention • Document sharing • Document repository • Evaluation and survey

Software	Collaborative software	Issue tracking system	Scheduling	Project Portfolio Management	Resource Management	Document Management	Web-based	License
24SevenOffice	Yes	No	No	No	No	No	Yes	Proprietary
Assembla	Yes	Yes	No	Yes	Yes	Yes	Yes	Proprietary
AtTask	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Proprietary
Basecamp	Yes	No	No	No	Yes	Yes	Yes	Proprietary
Central Desktop	Yes	Yes	No	No	No	Yes	Yes	Proprietary
Cerebro	Yes	Yes	Yes	No	Yes	Yes	Yes	Proprietary
Clarizen	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Proprietary
codeBeamer	Yes	Yes	No	No	No	Yes	Yes	Proprietary
Collabtive	Yes	No	No	No	No	No	Yes	Open source
Concerto	No	Yes	Yes	Yes	Yes	No	Yes	Proprietary

(Table 3) Comparison of project management software

Choosing the Right Tool for the Job

The chances of working on a virtual team are becoming more and more likely in today's business world. While having all project team members together, in one location might be best for communication and collaboration, it is no longer a reality. Fortunately, collaboration software and communications tools can help increase communication of co-located teams (Phillips,2009).

There are many comprehensive tools available that can be used for project management, time reporting, bug tracking, issue management, and communications. So how does a project manager go about choosing the right tool for the job? A project manager should choose a toolset that is unique to the specific project's needs. The project manager needs to have a clear understanding of the day to day project management activities for which the tool will be used. Another factor to take into account is the future use of the software tools, which may not always be clear. Investing in software costs your organization money, so one should consider the return on investment. For example, a simple collaboration tool might fit the needs of your specific project and carry low cost. However, one must consider if it will be usable for other more complex projects. (Day, 2009). It might not be a good budgetary decision to pay less now, only to have to buy another new system for the next project.

When searching for project management software, there are a number of factors to keep in mind. At a basic level, the software should be able to manage activities, tasks, resources, and time lines. In addition to these basics, project management software can also offer document management, critical path analysis, milestones tracking, and budget management. Resource management is also another key function of a project management software package. Project managers should be able to assign teams or individuals to project tasks, enter specific skill sets for tasks, and enter cost/hourly rates for these resources (Baker, 2009). This allows the project manager to budget for the costs of completely tasks.

Of course, the most important part of the tool selection process for the virtual project manager is choosing the proper collaboration and communication tools. First, you should consider the make-up of your virtual team. Is your team spread out throughout the same building? In this case, conference calling might be an acceptable solution. You might be also be able to use your organizations shared network drives or SharePoint portal for document sharing. Is your team spread across different locations nation-wide? Or even co-located throughout the world? In these cases, consider the types of video-conferencing, desktop sharing, and file sharing tools that are most appropriate. When working on a virtual team, it is essential to consider the ways in which information is shared, how status updates and issues are tracked, and how your project management tools will effectively keep your project on-track and delivery a quality product to your stakeholders (Baker, 2009).

Now that you've examined your project's needs, how do you actually go about selecting the proper tool? The following are some steps that can help you through the process (Mochal, 2001).

First, plan your project. This seems obvious, but be sure your methodology and project is planned out before you purchase collaboration software. Know the project's objectives, deliverables, scope, time frame, and budget before choosing the software.

Next, analyze your business requirements. Determine what types of users will be part of the project team. For an IT project, you can use sophisticated and complex tools. For non-technology projects, it might be more effective to use more simple, straight-forward tools. Consider which functions are essential. Do you need video conferencing? How about file versioning? What are your scalability needs? Make these considerations and write out a list of your needs. Then weigh each item in the list on a numeric scale of importance. You can use this ranked analysis as a reference when comparing the software specifications.

Do your research. Create and long list of possible software packages. Review your project needs. Then trim this list down to a short list of possible vendors. Contact the vendors. Take into consideration initial costs, maintenance costs, and ongoing support. Be sure to ask for a trail version of the software. Most vendors are willing to offer this to potential customers. Actually testing out the system capabilities with a trial version is an effective way to see if the software is right for you. This simple step can save money, time, and headaches. Don't forget to let project team members give it a test drive. After all, they will be using the tools too, and their buy in is essential to cooperation and acceptance of using any new tool.

Now it's time make your decision. Purchase the software. Train your project team and give them clear expectations for use. You are now on your way to starting and managing your virtual project.

Pros and Cons of Virtual Project Management

As an organization or corporation grows, the team project managers have to adjust to working with colleagues and other clients that are geographically dispersed. Thus, when we mention how important virtual project management is in today's world, there are both advantages and disadvantages. The long term benefits of virtual project management can outweigh the cons, but to achieve this, virtual project managers and team members must be at same level of understanding.

Limitations

Managing a virtual project can come with many limitations. All of these issues are relevant to traditional projects; however, a virtual project manager needs to be aware of the increased difficulties that can arise on a virtual team. These include communication, trust, and cultural barriers.

Communication

According to Wikipedia, communication is defined as "a process of transferring information from one entity to another". In virtual project management, lack of face-to-face communication is the one hurdle that really distinguishes among the other limitations, making it most important. When communicating with team members face-to-face, discussion comes more naturally, and the physical act requires little thought. By contrast, virtual project management relies heavily on technology, rather than in-person communication, to communicate the objectives, progress, and ideas surrounding the project. Therefore, to communicate the project effectively, one must use tools that include e-mail, word processing, spreadsheets, development and project management applications, to name a few. With distributed teams, there can be many different tools and even operating systems that do not necessarily work well together. This can lead to inefficiencies and a breakdown in communications as team members ignore certain documents produced by team members because they cannot view the contents of the file. When communicating virtually, it is much easier for misunderstandings to arise. The project manager, project leads, and team members need to be more aware of listening or reading the message. Subtle changes either in voice inflection, vocabulary, phrasing, and actual content can all be tips to an underlying issue. (Ponce, 2009). This is a clear example of how imperative it is for to establish communication with all team members from the beginning of the project and to maintain communication daily so that everyone can be on the same page. While e-mail is the easiest way of communicating through writing for virtual teams, there are still flaws with this method. Even with all the advantages of e-mail, there are some characteristics of e-mail that hinder instead of help: e-mail can be time consuming, e-mail could compromise data security, e-mail can be misunderstood and e-mail can cause cultural confusion. (Brink, 2006). Due to this situation, it is vital that team members are conveying information to each other and the manager, be it though e-mail or telephone. Keep in mind that words can be conveyed in two meanings: *Denotative:* The literal, dictionary definition that does not lend itself to misinterpretation. Examples: book, pencil, paper. *Connotative:* The idea or meaning suggested by or associated with a word in addition to its literal meaning. Some words imply more than their dictionary definitions and reflect the emotions, culture, and experiences of both the person speaking and the people listening. These words are open to

misinterpretation. Examples: rich, bonus, hard-working. (http://www.jerry-cao.com/blog/). Tips for using communication tools such as e-mail, telephone, video conferencing, and instant messaging can be found in Table 4.

Communication Tool	Point to Remember
Voice Mail	• Update your greeting daily • Include a forwarding pager number or alternate contact • Speak clearly. • Keep messages concise
Email	• Use a subject line • Keep messages concise • Avoid sarcasm and irony • Include original messages in your replies
Audio Conferencing	• Select a quiet environment • Indentify yourself before speaking • Speak naturally • Use your mute feature when you are not speaking; this eliminates the transmission of background noises.
Video Conferencing	• Speak and act naturally • Be aware of a transmission delay. • Use presentation material, such as charts • Mute your location when you are not speaking
Instant messaging	• Keep your status current so others know if you are available • Keep messages professional.

Table 4: **Source:* http://www.jerry-cao.com/blog/.

Building Trust

Trust is something that does not happen instantly, but over time. Trust is directly proportional to communication. It is built on open communication with the team and presenting ideas in a constructive way. But when team members are located virtually, trust is hard to establish, especially when you can't see your team face-to-face on a constant basis and if trust is not established, the team cannot accomplish their goals. "Basically, [trust] comes down to team members being able to answer three questions about each other in the affirmative: 1. Do you have anything to offer me? 2. Can I count on you? 3. Will you get

it straight?" (Andrews, 2004). After asking these questions, there are 3 areas in which these questions can be answered in a virtual environment. They are:

Value - The first place to show value is in your first conversation with a team member. Even before you talk to any of your colleagues, you should make your qualifications available in the form of a resume, Web page or professional listing.

Commitment - If you want to deliver on expectations, you need to know what those expectations are. What is needed, by whom and when? Have you confirmed the specifications for what you need to deliver? Do you know everyone who needs to be contacted or provided with information? Are milestones in place and meetings scheduled? Can the work be done in the allotted time?

Thoroughness – In any project, things will go wrong. Vendors fail; hotels mismanage reservations; estimates are wrong. Unfortunately, the burden of any mistake is more likely to fall on the absent person who "didn't get the job done." To be considered thorough, you must take control of the situation. That means more double-checking and following up than in a face-to-face world. (Andrews, 2004). If these phases of trust are not followed in the virtual environment, it can definitely hinder the team and project immediately. Thus, trust is a big hurdle to overcome in virtual project management if the team member cannot be consistent to meet or exceed the standard to respond in a timely fashion to all requests, complete their commitments as promised, and be willing to help others when needed.

Culture

In virtual project management, teams are dispersed globally and a main issue is how to communicate and trust others who are from different cultures, speak a different native language and live in different time zones. Culture is a big obstacle to overcome in virtual project management, and it is essential that you work out the differences in language and time difference in order to have a successful project. For example, when dealing with developers in India, a virtual project manager in the U.S. might understand a deadline to be on a certain day, but the developers might have a different perception of what that deadline actually means due to how deadlines are viewed in the Indian culture. Also, if another country has a national holiday, you need to be able to recognize and accept that and work around it. Individuals from different cultures vary in terms of their communication and group behaviors including the motivation to seek and disclose individuating information and in the need to engage in self categorization. (Gudykunst, 1997). One major dimension of cultural variability is individualism-collectivism. (Hofstede, 1980). In individualistic cultures, the needs, values, and goals of the individual take precedence over the needs, values, and goals of the ingroup. In collectivist cultures, the needs, values, and goals of the ingroup take precedence over the needs, values, and goals of the individual.

(Gudykunst, 1997; Hofstede, 1980).

Advantages

As mentioned earlier, the advantages of virtual project management can outweigh the limitations, if the whole team is on the same page. To understand the advantages of virtual project management tools and techniques, let's look at the 3 examples: Cost, Convenience (i.e. Telecommute, Time Savings) and Diversity of knowledge.

Cost

When leadership and managers deal with costs on projects, they are always looking for ways to save money and still produce excellent results in the end. When they do this, the project could end up being successful or not successful and puts a lot of tension on the employees having to over work. Another way that leadership can save on costs is utilizing virtual project management tools and techniques. By implementing these tools and techniques, management can reduce costs and improve team performance. For example, to reduce project costs one major area is travel-related costs. These include the cost of travel itself, plus associated costs such as lodging, meals, parking, on-site commuting and others. Another way to reduce costs is to eliminate the need to assign dedicated project space. With virtual teams, transportation costs fall widely, at least in the beginning. Flying to the other side of the globe to have a physical meeting is very expensive, and both today and in the past, it was largely reserved for large and very prosperous organizations. With the advent of the virtual team, it is no longer necessary for organizations to fly halfway around the world for meetings unless they want to. With the power of the Internet and video conferencing, transportation costs can be dramatically reduced. (http://www.exforsys.com/career-center/virtual-team/virtual-team-benefits.html)

Convenience

According to dictionary.com convenience is defined as "anything that saves or simplifies work, adds to one's ease or comfort". This is exactly what convenience provides in virtual project management. It helps save time by traveling to places and also helps employees maintain benefits as well as a work life balance. One group works a typical business day, then closes down and hands off the project to the next

time zone. That group also works a natural business day before handing off to the next time zone, and so forth. The end result is a 24-hour virtual business day. (Landes, 2008).

By utilizing this type of technique employees have flexible hours to get their tasks completed and are happy with the organization. Another reason convenience is important is the time savings it provides employees in terms of not having to commute to the office everyday and it also helps save the environment. By saving this time in commuting, employees have the potential to work more hours than they would in an office since they won't be commuting. Due to both these conveniences, employees can have the potential to lead a healthier work style if they work virtually as they'll have more opportunity to exercise and they will also likely eat more meals made by themselves.

Diversity of Knowledge

Knowledge in virtual project management is a key target because it enables employees to interact with multiple sources of people around the globe who have expertise in different areas, thus allowing them to find their answers to questions faster. Hence, online meetings (e.g. WebEx), remote computer access, wireless technology, and conferencing systems offer a way for participants to join a complex discussion from anywhere. Since experts are very tough to get hold of, they would be inconvenienced in this situation because they can provide their informational part of the process, and then continue on with other business. This would help save time and cost since they would not have to travel to a client site.

Measuring Success in a Virtual Environment

Traditional Measures Apply to Virtual Projects

Obviously both project models have advantages and drawbacks over each other. The Traditional Model offers stability and security for workers in a sometimes volatile market. However, whether you choose to use traditional or virtual project management there are some strategies that will need to be implemented for a successful the project (http://www.dougsays.com/2009/12/virtual-project-teams-vs-traditional.html).

For example:

- **Assemble Project Team** - The project team is identified and assembled. Roles and responsibilities defined.
- **Define Project Objective-** Project purpose to be verified and objectives developed.

- **Define Project Scope -** Construct a Work Breakdown Structure (WBS) so that the project scope is understood by the stakeholders as well as for project documentation to all participants.
- **Construct a Plan -**Design documents, systems diagrams, project estimates, and preliminary deadlines to help project planners identify critical paths and target dates for the project.
- **Add Resources, Costs, and Risks –** This is essentially a Project Management evaluation period. Critical paths cost, resources, timelines, risk, and control strategies are analyzed and adjustments made.
- **Obtain Stakeholder Buy-in -**Project Management does a final review and gets sign-off from all parties involved. More importantly, this is where the client sign-off of the plan and budget takes place. It does not matter if the project is in a Traditional or Virtual Model; this is essentially the same for both.
- **Publish the Plan -** Plans are delivered to all parties and stakeholders. This is another phase that is identical for both Traditional and Virtual Project Models. At this point, the implementation of the project may begin.
- **Collect Progress Information -** As the project continues, the project managers will be collecting status information for reporting to the client.
- **Analyze Status-** It does not matter if the project is a Traditional or Virtual, the managers will review the progress and identify possible areas of concern.
- **Adjust the Plan and Project Change-** If necessary, the Project Managers will adjust the overall plan to help lessen risk and define scope changes. The plan is republished to the client and entire project team, and the process of collecting the project status and adjusting the schedule continues until the project is complete.
- **Close Project -**When all objectives have been met, the project is closed down and signed off by the client.

End product meets stakeholders' needs

Stakeholders are defined as being those who can influence the activities/final results of the project, whose lives or environment are positively or negatively affected by the project, and who receive direct and indirect benefit from it. Our goal as virtual project manager is to ensure we meet or exceed the stakeholders' objectives. To achieve this we must align our business and IT to the end product and ensure the product meets the stakeholders' business needs. This can be accomplished by employing sound team

based collaboration and the innovative visual and textual tools.

Milestones and completion are on time

In a project, an activity is a task that must be performed and an event is a milestone marking the completion of one or more activities. It is helpful to list the tasks in a table that in later steps can be expanded to include information on sequence and duration. This should be use to mark the formal end of iteration, indicate the completion of a project phase, validate a project progression, justify work already completed, and mark the successful completion of a major deliverable or deliverables. Milestones and completion monitoring can be crucial when pursuing stakeholders support for the project**.**

Meet your budget constraints

Meeting budget constrains is a challenging task for any project manager. Often, if the planned costs of a project do not meet the assigned budget, project managers tend to review or change the scope or finish date of the project in order to meet budget constraints. Occasionally, however, it is possible for the project manager and the project team to develop creative means by which to adhere to the budget and still meet the project timeline and implement the original scope. For example, identify those project deliverables that can be consolidated and managed by one resource rather than by two resources, then streamline the work, negotiate, while keeping the original project scope and quality.

Obstacles

All project teams, whether virtual or classical, face obstacles to success. Some of these obstacles can be identified as 'team killers'. They are false consensus, unresolved obvious conflict, underground conflict, closure avoidance, rigid team meetings, irregular participation, lack of accountability, and forgetting the stakeholders and customer. These can be a part of every team. However, some people suggest that virtual team problems can be solved by setting up e-mail list, opening chat rooms, and mounting desktop conferencing. These can help teams, but only when used in conjunction with the overall strategy of the project. Virtual teams face "barriers" which can be either technological or non-technological. Technological barriers would include such inconveniences as slow network, poor architecture, and lack of collaborative software. Virtual teams face problems encountered by all teams, people working with others in the organization and those face by the virtual nature.

Summary

- Choosing the correct project management methodology depends upon the nature of your virtual project. Take into account locality, culture, and nature of the project, the virtual project manager must determine the most appropriate methodology for the project. Project managers need to make decisions concerning budget, current processes, and importance of the project, team size, technology, and available tools when choosing a methodology.
- There are many different project management tools on the market. Before choosing a tool for you project consider the nature of the project, the makeup and locality of team members, needed features, and the cost of the software package.
- The three main limitations to virtual project management are communication, trust, and culture.
- The three main advantages to virtual project management are cost, convenience, and diversity of knowledge.
- To make the correct choice of using virtual project management, you must evaluate the pros and cons and take into account that your team can adapt to this change.
- The benefits can outweigh the limitations in virtual project management, if the process is followed correctly and everyone is aligned on the same page.

Exam Questions

1. What are some of the key factor in determining the best methodology to use for you virtual project?

2. You are managing a virtual project and need to purchase collaboration tools for your team. How would you go about choosing the best tool for your project?

3. What is the difference between Web conference and Video Conference?

4. What is an effective VPM tool would be used among a team located in different time zone?

5. What is the most important limitation in virtual project management?

6. Name 3 advantages of virtual project management and explain how they are beneficial?

7. How is trust involved in virtual project management and what are the questions to ask to gain trust in someone else?

8. What are the main reasons your organization uses virtual project teams?

9. What impact do virtual teams have on virtual team members' morale?

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Chapter 15

Adoption and Diffusion of Groupware

Introduction

Businesses have been adopting different techniques to enable employees to collaborate ideas in order to be as efficient and productive as possible. With the booming telecommunications revolution, we now have a gateway through which we can send and receive information in seconds. How can businesses leverage this high speed path to its greatest use? With the adoption of groupware, teams over the world can now converse as if they were in the same room. All a team's documents may be shared in one central location, and the projects can be tracked accordingly in the same spot. Anything saving time and making a team more productive will be adopted and this is where groupware comes in. A wide variety of groupware is now available; the challenge is to find the right one to fit your needs. Finding the right tool is not an easy task as you must research and investigate many tools in order to find the right one.

In this chapter, we will breakdown a method of adopting groupware by going over its background, some of the objectives and users in selections, advantages and considerations of each, different types of groupware, and will finish by showing real world case studies.

Background

So what is groupware and how was it formed?

In order to fully understand the benefits of groupware we should look back into its adoption. The term groupware can be traced as back as the late 1980s, when Richman and Slovak wrote (Richman & Slovak, 1987):

"Like an electronic sinew that binds teams together, the new groupware aims to place the computer squarely in the middle of communications among managers, technicians, and anyone else who interacts in groups, revolutionizing the way they work."

The key to most modern groupware utilities is the technology it is built upon. This may be a java based website that is hosted on the internet. However groupware was not always electronic based. In order to fully understand the elements of groupware we should break down each level. Groupware can be divided into three categories which are communication tools, conferencing tools and collaborative management tools otherwise known as coordination tools. Each has specific purposes for sharing information (Harbhag, 2009).

A Communication tool can be thought of as unstructured interchange of information. A phone call or instant messaging is examples of a communication tool.

Conferencing tools are at form of collaborating ideas in one location or utility. It refers to interactive work toward a shared goal. Brainstorming or voting is an example of this.

A collaborative management tool consists of interdependent work by separate people who are all working towards the same goal. Each team member might have different tasks, but they are all working on the same document or instance in order to accomplish the end results. A good example of this would be Microsoft Project. Although there is one project and one timeline all team members have different tasks that play a role in completing the project (Los Angeles Times, 1995).

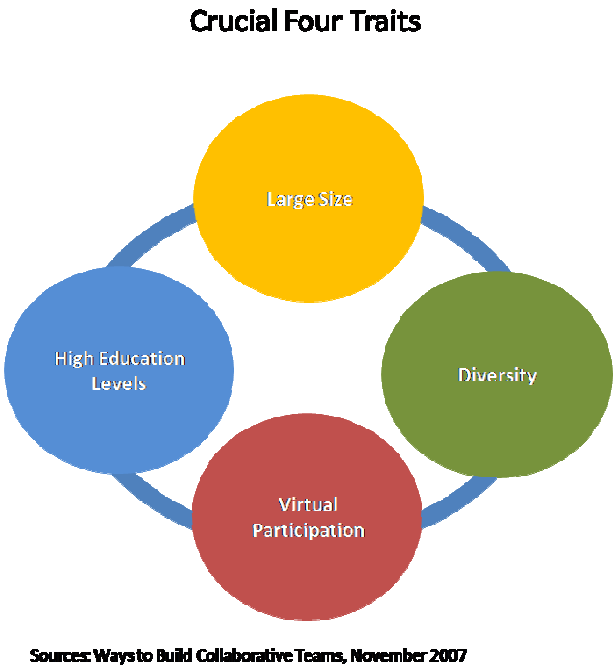
The first applications considered to be groupware were Novell's Groupise and Collabra's Share. These tools created a new partition in the industry which allowed a company to organize documents effectively. The most influential piece of software that was the staple of groupware is Lotus Notes. This was the first application that allowed collaboration on a company's private networks. This opened up the door for real time information being sent to and from all employees workstation. The World Wide Web becoming mainstream enabled the flood gates to open with groupware options. Now you did not have to be on the same network or in the same room as someone to share a document, you could literally be in another country. This also enabled the smaller application developing companies to get in the game by creating a thin client application accessible through a web browser. For every simple groupware tool there is a robust heavy duty system that the largest corporations need to run every day. The goal, as we will discuss, is to find the right tool for you at the right price.

This illustrates that groupware has been around for quite some time, and has evolved with the coming age of technology. Even a simple phone conversation consists of connecting people in order to share information. These simple "parts" of groupware can be joined to form a super groupware application. In today's high tech world companies are using all three types of groupware software. So this tool might have a voice communications portion, a conferencing tool for video, and a collaborative management tool for holding documents. Does this kind of software sound familiar to you? Google has just launched a massive groupware collaboration tool called Google Buzz. This incorporates their email client along with all of its features with a new social networking site that has collaboration at its core. You can invite a friend, setup a meeting, share a document, and watch the same movie all at the same time. Google Buzz has several groupware features with other added benefits. The key to selecting the correct groupware for your needs is to breakdown all of its features and select the groupware that best meets your needs. We will explain this in further detail within the chapter.

Groupware Objectives

Objectives and Features of Organizations

Organizations are struggling with how to get employees in different locations to work together more efficiently. At the same time, they are considering saving costs, and increasing the quality of results. In Ways to Build Collaborative Teams, by Lynda Gratton and Tamara J. Erickson, they describe four traits that are crucial teams.



Sources: Ways to Build Collaborative Teams, November 2007

Large Size: Based upon the research, the size of team has been increasing significantly due to new technologies. The larger team has more stakeholders, diverse activities, and utilize multiple skills. However, the research also indicates that less cooperation among the members in the larger size of team less cooperation. Unsure of this possibly however, the research indicates that there is less cooperation among the members in the larger size team.

Diversity: Frequently, a team is composed of diverse members who have different background and views. In the creative perspective, those diversifications could be a motivation for innovation. However, people share less knowledge with unfamiliar members if they do not know anyone else in the team.

Virtual Participation: Team members may work in a different location and time zone. The research shows that over time, teams learn to adapt and become more virtual.

High Education Level: Complex collaborative teams often require a variety of deeply specialized skill and knowledge to devise new solutions. However, according to the research, the greater the portion of highly educated people on a team, the more likely the team has unproductive conflicts.

Who Are the Users?

Organizations (Employees)/ Collaborative Team:

Most groupware that we have in the industry is for organizations. It provides effective functions to organizations. By utilizing groupware, team members perform their tasks in the less limited business environment. Multinational corporations have offices over the world. In order to manage this effectively, each office should communicate with headquarter or other offices. To overcome geographical and time limitation, the corporations require appropriate tools.

Ad-hoc work team:

Ad-hoc work teams are available upon request or composed for specified requirements such as World Cup, Olympics, or Joint Venture and so on. These specialists work together within limited time duration with high pressure. In this special business environment, the groupware would help them by providing technical functions.

How groupware helps the Organization?

Using Groupware is one of the ways that organizations could increase their operations efficiency.

Centralized data storage

In the organization, multiple users work simultaneously on the same set of data. It is important that there be a centralized data storage facility to allow for the management of a master copy. Users are allowed to access the data storage and update the latest version of the data. By using the groupware, multiple users save working time, reduce possibility of data duplication, and increase intellectual property of organizations. Indeed, in the manager perspective, they monitoring and gather information easily.

Communication Enablement

Groupware improves collaboration and communication by providing availability among users such as instant message services, internal/external mail, or chatting services.

Problem Solving Capabilities

Groupware enhances the problem solving capabilities of a group. With appropriate version management controls, users are able to gain access to only the most recent modifications to the shared data, allowing them to quickly make the best decisions. Effective communication increase the efficiency of the decision making process.

What Should be Considered?

Objectives

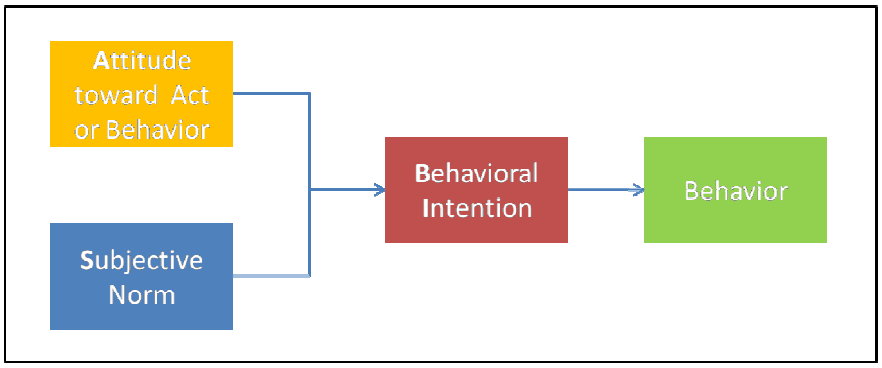
Various groupware has different functional traits. Before deciding on the type of tools, the organization should consider the purpose of them such as conversation, brainstorming, or sharing documents and so on.

Too Much Collaborative Tools

According to the latest reports there are hundreds of groupware options available, and more are developed every day. Another thing to consider is whethor or not the provider requires upgrading versions often to keep up to date.

Human Factors

According to the Theory of Reasoned Action (Sheppard, 1988), a person's performance of a specified behavior is determined by his/her behavioral intention (BI) to perform the behavior. Also BI is determined by individual attitude (A) and subjective norm (SN) concerning the behavior in question. In the IT perspective, variables such as design, characteristics, user's preference, nature of development, or implementation process etc. would indirectly influence users' BI. If people have positive impression, they will adopt the new technology or reject using it.



Source: Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989)

BI=A+SN

Cultural Factors

- **Familiarity:** There are many early adopters and they love new technologies. At the same time, many people do not welcome a change at their work since they should learn it again and it takes time to become a professional.
- **Items:** Different companies have different business characteristics and items. The groupware is a partial option, but it is not necessary. Food ingredient companies or some companies who

handle highly critical information might prefer to go to the new places directly to find special ingredients for their product and use physical collaboration for the information security.

- **Countries:** Countries in the world have different cultures. Some countries might prefer physical attended meetings.

Financial Factors

Generally speaking, IT implementation or buying a new technology can be costly. Organizations may also have a pricing issue with vendors. Under a limited financial budget situation, they should consider the best way to maximize value by choosing full or limited technical options.

Educational Factors

A user's education is one of the biggest barriers to groupware adoption. Generally, end-users did not know what the technology could do for them, they just consider it as a tool, and do not use it for their work. Moreover, IT people understand the technology, but they could not deliver the benefits to users. Users do not know the benefits and the IT works have difficulty explaining them.

Asynchronous and Synchronous Groupware

Asynchronous Groupware

Three well known forms of asynchronous communication would be email, group calendars and repository collaboration rooms (Griffiths).

Email is the most common groupware application outside of the traditional telephone. Email was designed to pass messages between two or more people. Communication happens after the receiver reads the communication from the sender and vice versa. Email is delayed communication. Outlook, Yahoo and Gmail are good examples of email applications.

Group calendars allow scheduling, project management, and coordination among one or more people. There are features that can detect when two or more schedules have conflict times and days. Have you ever been in a situation where you were trying to schedule a group meeting only to find it extremely difficult because someone had a conflicting schedule? Most scheduling calendars have features that can detect the best possible times and can show conflicting times without having to contact another. Email applications are asynchronous because communication is not in real time. HyperOffice and Huddle are

two good examples of asynchronous applications.

Collaborative writing systems provide both real-time support and non-real-time support. Word processors may provide asynchronous support by showing authorship and by allowing users to track changes and make annotations to documents. Authors collaborating on a document may also be given tools to help plan and coordinate the authoring process, such as methods for locking parts of the document or linking separately-authored documents. Synchronous support allows authors to see each other's changes as they make them, and usually needs to provide an additional communication channel to the authors as they work (via videophones or chat). SharePoint is a good example of a collaborative writing system.

Synchronous Groupware

Shared whiteboards allow two or more people to view and draw on a shared drawing surface even from different locations. This can be used, for instance, during a phone call, where each person can jot down notes (e.g. a name, phone number, or map) or to work collaboratively on a visual diagram. Most shared whiteboards are designed for informal conversation, but they may also serve structured communications or more sophisticated drawing tasks, such as collaborative graphic design, publishing, or engineering applications. Shared whiteboards can indicate where each person is drawing or pointing by showing telepointers, which are color-coded or labeled to identify each person.

Chat systems permit many people to write messages in real-time in a public space. As each person submits a message, it appears at the bottom of a scrolling screen. Chat groups are usually formed by having listing chat rooms by name, location, number of people, topic of discussion, etc.

Video communications systems allow two-way or multi-way calling with live video, essentially a telephone system with an additional visual component. Cost and compatibility issues limited early use of video systems to scheduled videoconference meeting rooms. Video is advantageous when visual information is being discussed, but may not provide substantial benefit in most cases where conventional audio telephones are adequate. In addition to supporting conversations, video may also be used in less direct collaborative situations, such as by providing a view of activities at a remote location.

Many systems allow for rooms with controlled access or with moderators to lead the discussion. Most of the topics of interest to researchers involve issues related to un-moderated real-time communication including: anonymity, following the stream of conversation, scalability with number of users, and abusive users.

Groupware design involves understanding groups and how people behave in groups. It also

involves having a good understanding of networking technology and aspects of that technology. For instance, delays in synchronizing views can affect a user's experience. All the issues related to traditional user interface design remain relevant, since the technology still involves people.

Groupware technology is used to communicate, cooperate, coordinate, solve problems and negotiate. The term groupware refers to a specific class of technologies relying on modern computer networks such as email, newsgroups, videophones and chats.

However, many aspects of groups require special consideration. For instance, not only do larger sized groups behave differently from smaller groups, but the performance parameters of the technologies to support different groups vary. A groupware system can't succeed unless the group is willing to adopt the system. In contrast, a single-user system can be successful even if only a fraction of the target market adopts it.

Benefits of Groupware

Some of the most common reasons why people choose to use groupware:

- Facilitating is faster, richer and more persuasive.
- Communication is enabled where it would not otherwise be possible. An example would be collaborating from different locations.
- It allows telecommuting
- Travel costs are cut down
- It brings together multiple perspectives and expertise
- One can form groups with common interests where it wouldn't be possible to gather a sufficient number of people face-to-face.

Case Study # 1

Cisco TelePresence – BMO Financial Group

The CEO of BMO Financial Group (ninth largest bank in North America) and senior leaders in its wealth management business in Toronto and Harris Private Bank in Chicago, discuss how Cisco TelePresence has become an integral part of their business: enabling and encouraging the drive for faster,

cheaper, wider, greener, and more effective collaboration across their global institution.

TelePresence is the latest state-of-the-art life size conferencing technology that provides an alternative way to communicate and conduct meetings virtually. This technology is the closest thing to a face-to-face meeting, bringing with it a unique and flexible client experience. Cisco's TelePresence is not video conferences as you know it.

It is a full HD video, advanced audio and it provides the ability to connect multiple locations with Cisco screens with absolutely no lag or delay in transmission. In addition, TelePresence allows users to share documents and applications among participants. In order to connect, each location will require a Cisco TelePresence Unit which uses a dedicated network to transmit data.

BMO Financial Group insists on the many benefits of choosing TelePresence.

- It is a state-of-the-art system.
- Cost effective, especially in the long run as it saves on travel.
- As the demand to connect Advisors and clients to their Subject Matter Experts (SMEs) increases, this technology enables Advisors to hold key meetings with participants located in several geographical locations at a fraction of the cost and without the challenges of travel.
- TelePresence also aligns with their cost management priorities and is consistent with BMO's effort to lessen the environmental footprint – a win/sin scenario for all.
- Potential increase in revenue and efficiency as a result of better accessibility to Deal Team and SMEs

Case Study # 2

Virtual Agency Collaboration Tool – American Family Insurance

American Family Insurance offers auto, home, life & annuities1, health, business and farm & ranch insurance. They operate in 19 states spanning from Washington to Ohio. They have been in business for over 80 years and takes pride in being known as a company with strong and stable customer and employee relationships.

Their earnings are over $4.8 billion in policyholder equity. Their success is measured not by the rate of return for shareholders, but by the value that they provide to their policyholders and their employees (American Family Insurance).

I had the pleasure of interviewing a Claims Adjustor who has been working for American Family for 12 years. This discussion focuses on the Virtual Agency Collaboration Tool. My goal is to explore the success/unsuccessfulness of the tool and to gain insight and knowledge of how employees react to change.

According to B.M. the company was known for sending employees on training trips. They averaged travel expenses for 200 people per month and approximately 2000 people for a mandatory annual training function known as the Annual Jamboree. Byron and his peers looked forward to the travel because it was a way of connecting with different regions that they would have never had face-to-face contact with. The only other means of communications was telephone and email.

This interview takes look collaboration from the perspective of "buying into the adoption of groupware. Each employee's travel expense reimbursement included food, transportation and hotel. This went on for most of the twelve years that Byron was employed at American Family Insurance.

After through research, CEO David Anderson decided that something needed to be done to reduce the cost of travel. He decided to invest in a training collaboration tool known as the Virtual Agency tool.

This tool has state-of-the-art training methods and technology that includes distance learning, virtual agency simulations, role-play and collaboration with peers and experts to help new agents.

CEO David Anderson Based His Decision on the Following Criteria:

- A blend of learning, practice and real-world application.
- Uses current technologies
- New agents would be able to engage in a variety of learning opportunities.
- Classroom interaction
- Virtual customer simulations.
- Role-play
- Online coursework
- Day-in-the-Life simulated environments.
- Virtual customer simulations

He did not consider the affects that it might have on employees. Here is a brief description of what happened.

Interview Questions:

RM: Did the employees prefer travel over the collaboration tool?

BM: Yes they did. We looked forward to the travel because it was a way to social network and interact with all levels of management that we would not have otherwise had an invitation to.

RM: Did the employees "buy into the concept" of using a tool for collaboration instead of face-to-face meetings?

BM: No, because the project was never explained to us. We were told that the new tool would eliminate travel and save the company money. Not knowing the facts or details, we became suspicious of the Virtual Agency. We started watching what we said if we was in the training room. We didn't know if the cameras were on or if our conversations were recorded. Many of our jobs have been eliminated because of Virtual Agency. Don't get me wrong, it is a fantastic tool. The features are great and I'm sure the company saved a "boatload of money." This did not help the moral of the company.

RM: How long has it been since Virtual Agency was implemented? Did it eventually get better?

BM: We've had the tool for about 3 or 4 years. I can't say that it was better; we just learned how to adapt and adjust to the new tool. Some of us felt that if we wanted to keep our jobs, we'd better adapt to the changes.

Section Summary

Thousands of collaboration tools are on the market today. I am sure there is one specifically suited for your needs. Taking the time to ensure employee security is good leadership practice. Before choosing a collaboration tool, whether it is Virtual Agency, TelePresence, WebEx, SharePoint we need to make sure that there is employee buy-in of the product to avoid problems such as those experienced by American Family Insurance.

Diffusion of Collaborative Technology

Implementation of collaborative technology is the adoption and diffusion of a collaborative technology across an organization. The adoption process involves the decision to adopt the technology in specific organizations or across organizations in a network. Rogers defines diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 1995). The diffusion process covers the stages where the technology is assimilated into

the organization (Munkvold, 1998). Diffusion is linked to organizational change. It can be a catalyst for organizational change or an implementation tool of organizational change. Diffusion is the final step in the implementation of a collaborative technology. Some common successful implementations of collaborative technologies supporting distributed work include the widespread use of email and teleconferencing. Diffusion is preceded by the phases of:

- Investigation
- Determination of potential value
- Decision to use a particular collaborative technology
- Adoption of a collaborative technology

Within the context of a single organization, the success of a collaborative technology is determined by the adoption of the technology by all collaboration participants (Mark & Poltrock, 2001). The adoption of any new technology is influenced by a number of factors. These factors include short term fads or fashions that create an anti-innovation bias that can cause organizations to reject technically efficient innovations, outside influences that guide organizations to make independent, rationally efficient choices, and organizational imitation based upon the decisions of other organizations (Abrahamson, 1991).

Research in the adoption and diffusion of collaborative technology in interorganizational networks has primarily focused on interorganizational systems (IOS), such as Supply Chain Management and Electronic Data Interchange, intended for linking customers and suppliers through automating the information exchange among them (Cavaye, 1996) (Grover, 1993). The most common form of IOS is Electronic Data Interchange, which permits instantaneous computer-to-computer transfer of information.

Diffusion Process Approaches

(Rogers, 1995) states that “the innovation decision and therefore the speed of diffusion on the individual level is strongly influenced by the innovation characteristics (relative advantage, trialability, observability, compatibility, and complexity). Collaborative technology must also serve both end users and management constituencies. Their needs influence the selection, adoption, and diffusion of a collaborative technology. Collaborative technology is embedded is the network of organizational activities and “the benefits of systems usage for the individual are tied to the usage of the group as a whole” (Rogers, 1995).

(Rogers, 1995) describes 5 steps in the adoption of an innovation such as collaborative technology: (1) Knowledge of the innovation; (2) persuasion to use it; (3) decision to adopt it; (4) implementation of

the innovation; and (5) confirmation that adoption was appropriate. Distance and culture may act as barriers to diffusion (Mark & Poltrock, 2001). In addition, (Mark & Poltrock, 2001) identify that once an innovation such as collaborative technology has been adopted, users may re-invent the collaborative technology by finding new applications for its use.

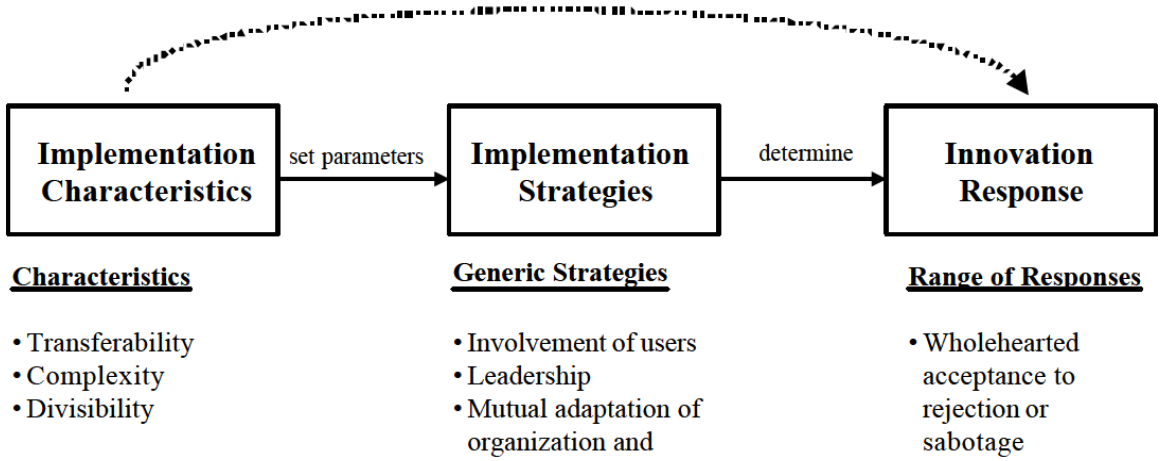


Figure 3: Implementation Characteristics (Leonard-Barton, 1988)

(Mark & Poltrock, 2001) (Rogers, 1995) propose 4 elements to consider when examining the diffusion of innovation (in this case collaborative technology).

1. The innovation and the adopter's perception that it is new
2. The means by which the innovation is communicated to others
3. The social system in which the innovation spreads
4. The length of time over which an innovation is adopted

Two fundamental approaches to technology diffusion are the Top down model and the evolutionary model. As may be expected from the titles, these two approaches start at the opposite ends of the organizational hierarchy. A top down model is usually associated with an organizational change (i.e. an organization wide business problem to be solved). The evolutionary model grows from a localized solution to a business problem and is often driven by a lack of the larger organizations ability to solve the problem due to other priorities or a lack of capacity.

Top down model:

In a top down model, organizational change is imposed from senior management. Diffusion is at the tail end of this top down approach. An example of the Top Down Approach is the use of collaboration technology as a standardized email tool in an organization. The collaboration technology itself is an

instrument of organizational change. (Kotter, 2007) identifies 8 key factors in successful organizational change:

1. Establishing a Sense of Urgency
2. Forming a Powerful Guiding Coalition
3. Creating a Vision
4. Communicating the Vision
5. Empowering Others to Act on the Vision
6. Planning for and Creating Short-Term Wins
7. Consolidating Improvements and Producing Still More Change
8. Institutionalizing New Approaches

An example of a Top Down Approach is the FBI Virtual Case File project (VCF). VCF was designed to manage documentation for investigations and prosecutions across FBI offices. This procedural process was subject to a culture secrecy in local offices (reluctance to share information) and outdated desktop computer equipment.

Two key reasons for the FBI VCF failure were (Grimes, 2005):

- FBI application development processes exclude users. "It is essentially impossible ... to anticipate in detail and in advance all [user] requirements and specifications." The bureau should adopt extensive prototyping and usability testing with real users.
- Senior FBI management improperly delegated project leadership to contractors, lacking its own adequate skill base for IT modernization.

Evolutionary model:

The evolutionary model starts with serving a particular business purpose (limited scope) within a group of the larger organization. As usage grows, awareness of the collaborative technology capabilities and applicability to other business problem reaches the stage of recognition of generic use across the organization. The evolution (growth in usage across the organization) will fundamentally change the original application and its general usefulness may be difficult to maintain.

(Brown, Lincoln, Groen, & Kolodner, 2003) present an overview of the evolution of the Department of Veterans Affairs national-scale HIS. This collaboration technology brought together distant offices of the Department of Veterans Affairs and evolved from facilities that began using newer

technology to meet local needs and improve efficiency. This technology has now evolved into an organization wide ‘‘three-tiered’’ architecture. VistA applications are now built on a common data dictionaries and databases, and use the same core building blocks to provide functions such as security, device access, and communications.

Implementation Factors to Consider

- Intended purpose and scope of the collaboration technology
- Determining the scope of change and resistance to change
- What processes are changing for which groups
- Repetition – people like consistency in work (we do things this way)
- Ease of use (utilitarian approach…does it make work easier)
- Does it eliminate problems/bottlenecks
- Does it introduce just another distraction (i.e. like meetings) to getting work done or does it facilitate focus on work and speed of workflow & decision making
- Timeframe of change/implementation
- Big-bang or incremental rollout
    - What factors guide each choice
    - What risks are associated with each choice
- Top down or evolutionary approach
- Key factors to consider:
    - Training
    - Architecture
    - Maintenance
    - Collaboration technology infrastructure
    - Freshness and timeliness of updates
    - Organization of knowledge and ease of access

- Clustering of information

Measuring Success

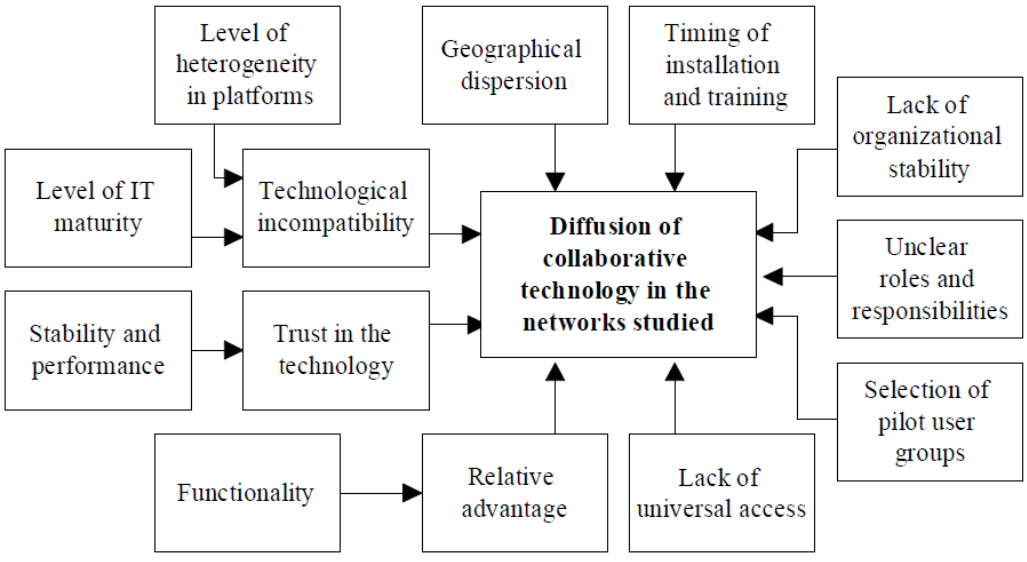
(Davis, 1989) says "people tend to use or not use an application to the extent they believe it will help them perform their job better". In his work he outlines 10 key scales for Usefulness and Ease of Use:

Scale Items		Factor 1 (Usefulness)	Factor 1 (Ease of Use)
Usefulness			
1	Quality of Work	.80	.10
2	Control over Work	.86	−.03
3	Work More Quickly	.79	.17
4	Critical to My Job	.87	−.11
5	Increase Productivity	.87	.10
6	Job Performance	.93	−.07
7	Accomplish More Work	.91	−.02
8	Effectiveness	.96	−.03
9	Makes Job Easier	.80	.16
10	Useful	.74	.23
Ease of Use			
1	Cubersome	.00	.73
2	Ease of Learning	.08	.60
3	Frustrating	.02	.65
4	Controllable	.13	.74
5	Rigid & Inflexible	.09	.54
6	Ease of Remembering	.17	.62
7	Mental Effort	−.07	.76
8	Understandable	.29	.64
9	Effort to Be Skillful	−.25	.88
10	Easy to Use	.23	.72

Figure 4: Factor Analysis of Perceived Usefulness and Ease of Use Questions (Davis, 1989)

Issues Influencing the Diffusion of Collaborative Technology

Figure 5: Issues identified as influencing the diffusion of collaborative technology in networks studied (Munkvold, 1998)



Chapter Summary

In summary, this chapter will gave you a detailed look into the expanding world of groupware. We introduced the background and gave a comprehensive overview of how it has shaped into the essential components of everyday business. Starting off as just simple tools these applications have been combined into massive utilities that run the core of communication and collaboration. Many businesses have become reliant on groupware and trust it with their most important documents and projects. Selecting the right tool is essential to running a business at its optimal level. We will describe these methods which will make it easier to better determine your type of organization or group and help find its perfect match in groupware selections. After breaking down the groupware's adoption and usability we will demonstrate business' use cases that have infused their success in the real world.

Related Areas of Research

- Uniform adoption theory
- Group decision making support
- Knowledge Management (Organizational Memory)
- Virtual Organization facilitation
- Linkage to workflow management or interaction

Exam Questions:

1. Define the diffusion of Groupware?
2. What phases precede diffusion?
3. What are the six key reasons that organizations pursue collaborative technology for interorganizational systems?
4. Identify any 2 key innovation characteristics that impact the speed of diffusion of groupware?
5. List any 5 factors influencing the diffusion of groupware.
6. Name two types of groupware?
7. Define asynchronous and synchronous groupware.
8. Name three advantages of groupware.
9. What is a good leadership practice regarding groupware?
10. What are the four traits that are crucial for teams?
11. How does Groupware help the organization?

Solutions for Exam Questions:

1. The process by which an innovation is communicated through certain channels over time among the members of a social system.
2. Investigation, determination of potential value, decision to use a particular collaborative technology, adoption of a collaborative technology.
3. Reduce the risk in the organization, pursue economies of scale, benefit from the exchange of technologies, increase competitiveness, overcome investment barriers, encourage global communication.
4. Relative advantage, trialability, observability, compatibility, complexity.
5. Training, architecture, maintenance, collaboration technology infrastructure, freshness and timeliness of updates, organization of knowledge and ease of access, clustering of information.
6. Asynchronous and Synchronous
7. Asynchronous – is software that enables multiple users to collaborate not at real time or at the same time. Synchronous – is the opposite of asynchronous. It works in real-time and allows multiple users to collaborate in groups at the same time.
8. It brings together multiple perspectives and expertise, It enables collaborating from different locations that would have otherwise been impossible to have a face-to-face, It is a cost-saving mechanism.
9. A good leadership practice regarding groupware includes taking the time to ensure employee security.
10. Large Size, Diversity, Virtual Participation, and High Education Levels.
11. Centralized data storage, Communication Enablement, and Problem Solving Capabilities.

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Chapter 16

Ideation & Brainstorming Techniques

Introduction

In his book Applied imagination: Principles and procedures of creative problem solving; Alex F. Osborn concludes that "the average person can think up twice as many ideas when working with a group than when working alone"[1]. Osborn was an executive in the advertising industry when he began to publish books about the ideation techniques commonly used in the advertising industry. Osborn's works are widely recognized as the foundation for modern techniques in ideation. Osborn's work focused specifically on brainstorming and established two main rules for effective brainstorming: the more ideas generated the better, and ideas should not be criticized. Although Osborn's theory is promising, subsequent research which tested Osborn's theories has shown that more ideas are generated when individuals work alone rather than in groups[2]. Poor group performance during ideation sessions has been attributed to three main factors: production blocking, evaluation apprehension and free riding[2]. This chapter discusses how these three factors inhibit ideation in group sessions and proposes solutions to overcome these obstacles. ThinkLets specifically created to negate the effects of production blocking, evaluation apprehension and free riding are also introduced to provide concrete patterns for ideation sessions.

Obstacles to Ideation and How to Overcome Them

Production Blocking

Production blocking occurs when an individual is not given the opportunity to articulate an idea to the group immediately after generating the idea. Recent studies have shown that when an individual is prohibited from expressing their ideas immediately there is a negative impact on the group ideation process[3]. Sometimes, group rules mandate participants wait their turn to articulate ideas and suggestions. This is an example of production blocking. This type of production blocking can adversely affect idea generation performance - waiting to articulate an idea can result in people forgetting their idea; also hearing another group member's idea could make the individual feel their original idea is irrelevant. Any of the previous scenarios could prevent the original idea from being shared with the group.

Also, when ideas are articulated in a group, cultural norms may dictate that only one idea should be shared by an individual when it is their turn[3]. To identify potential production blocking scenarios in ideation sessions, carefully examine the process of how a group member will generate ideas and the subsequent articulation of the idea to the group. Any interruption in this process will likely be

categorized as production blocking and can have a significant negative impact on the idea generation process.

To minimize the negative impact of production blocking during the group ideation process, techniques utilizing modern technology as well as simply a pad and paper have been created. Both technology and paper-based solutions have one thing in common: the elimination of verbal communication during the idea generation process. A fundamental problem with verbal communication in the ideation process is that only one person can talk at a time. While one person is talking the rest of the group must wait for that person to finish, thereby instigating production blocking. Research has shown that by using "brainwriting" techniques, the negative impact of production blocking can be minimized[4]. In the "brainwriting" technique used by Paulus and Yang, groups of four were created and given the following rules: each member of the group was given several slips of paper to write on; each individual would write an idea down and pass the paper to the right; and finally, upon receiving a slip of paper, each individual was to read the ideas on the paper, add their own idea and pass it on[4]. During this process individuals were instructed not to communicate verbally. Such techniques allow individuals to generate and articulate ideas without interruption and with minimal materials.

Technology has also played a role in creating techniques that help diminish the negative impact of production blocking within the group ideation process. Research has shown that by using electronic brainstorming techniques the negative effects of production blocking can be minimized[5]. In electronic brainstorming, group members have their own computer and can record ideas by typing them into the application. All ideas are recorded anonymously and each group member can see the ideas generated by the entire group, including their own. Production blocking is hence minimized as individuals can immediately record their idea as soon as it is generated.

The examples given in this section of production blocking and techniques to overcome production blocking are not meant to be comprehensive; it is reasonable to assume that in ideation sessions many other scenarios of production blocking will occur. The goal is to be able to identify when production blocking is occurring and create a clever way to minimize the effects. Identifying production blocking will likely be the responsibility of the ideation session leader but the session leader should keep in mind that it may be beneficial to involve other group members in creating methods to overcome production blocking. Merely recognizing that production blocking is occurring can be the key to significantly increasing the effectiveness of an ideation session. Methods to overcome production blocking are much easier to discover once production blocking has been identified.

Evaluation Apprehension

The Evaluation Apprehension Theory was proposed by N.B. Cottrell in 1972. According to Cottrell, our performance in social and other activities involving a group setting is directly affected by the perception that we receive social rewards and reprimands based on our peers' evaluation of us. Evaluation apprehension occurs when people working in a group environment restrict their performances or full potential of their contribution out of concern or fear of what their peers will think of them and their ideas[6]. This is one of the major obstacles of brainstorming processes and can seriously hinder the flow of idea and creativity generation.

Brainstorming facilitators should be fully aware of evaluation apprehension and can do several things to alleviate the pressure participating members of a group may feel. Creating an atmosphere of acceptance and encouraging a free flow of ideas is critical[7]. Participants should feel comfortable sharing any idea they may have, regardless of its relevance. It is also important for the facilitator and veteran participants to be mindful of novice ideas. Elaborating on such input and perhaps deriving a more feasible solution from that particular idea will help newcomers feel like they are making effective contributions[7].

Another issue brainstorming facilitators contain is monopolized conversation and input from more experienced participants. Brainstorming is intended to be a group exercise, with all members having equal opportunity of providing input. One dominant participant can intimidate others and prevent collaborated discussion, which limits ideation output and defeats the whole purpose of brainstorming. The participants should be able to feed off each others' ideas to generate more solutions, which is difficult to do when one person is constantly controlling the direction and flow of the ideation process[7].

One suggestion for removing potential evaluation apprehension in a brainstorming session is conducting online brainstorming and collecting ideas before the meeting[7]. This will lessen and possibly obliterate any potential evaluation apprehension members of the group, especially novices, may have. This will also make the atmosphere more open and even the playing ground for the actual brainstorming meeting.

These are some suggestions to help alleviate evaluation apprehension and produce free flowing ideas and strong brainstorming and ideation sessions.

Free Riding

Free riding in group work occurs when one or several members of a group contribute so little to a

group project that if the same grade is given to all members of the group, the grade would be misleading and unfair (Börjesson, Hamidian). Psychological mechanisms are discussed as reasons for free riding in groups[8]. Roles are established by group members. The roles which group members assign themselves and others are done so mostly unconsciously according to the members' "social map," which provides a feeling of orientation and safety[8].

Examples of these roles are: the member who is very active and dominating and monopolizes the attention of the group; the ambitious member who is very diligent, likes to steer the conversation and gives protection to those sharing his opinions; the victim, who lets others do the work, because he feels they know and are able to do much more than him; the punching bag, who personalizes conflicts more than others and makes a complex conflict clearer and releases the others of responsibility[8]. The idea of roles shows a different perspective of how and why a person would be more likely to free ride in a group project.

Another reason for free riding in brainstorming groups can be derived from the economic theory of public goods. According to this theory, the temptation to free ride varies with group size not only because increases in size lower the identifiability of individual contributions, but also because they decrease the perceived effectiveness of individual contributions[9]. Perceived effectiveness refers to members' perception of the difference it would make to the group or to themselves if they decided to contribute. In large groups, not all individual contributions are typically required for the product; consequently, members may feel that their particular contribution is dispensable[9]. In keeping with the ideas of roles, in large groups the more dominant members may have such an overwhelming input of ideas that less confident members may refrain from expressing their own for fear of having their idea dismissed.

To reduce free riding in group brainstorming projects, it is critical to ensure that each group member has an opportunity to contribute his or her ideas. One way of doing this is having participants contribute ideas in a fixed sequence; a "pass" can be announced if participants have no new ideas upon their turn[9]. By giving each participant a turn, productivity can be significantly increased and the temptation for group members to free ride can be avoided. Another method to reduce free riding is valuing every proposed idea. Group members can become alienated if they feel their idea is perceived as inferior by their peers. Even if the idea is not strong, it should be addressed with sensitivity so future input and potentially successful ideas are not discouraged.

The Knickrehm Method is also a good way to avoid free riding. This method suggests that the professor grade the group project and use group evaluations as an additional factor in awarding points to each member of a group. Each member of a group is asked to evaluate every other member (excluding themselves), distributing a set of number of points among the other group members respective to their

performance. Of course, these evaluations remain confidential and are seen only by the professor[10].

In summation, free riding is a concept that may reflect in a group project for some very distinct reasons. Group size creates an element for a group member to receive credit from the efforts of the remaining group members. Lack of confidence in a group member may produce inadvertent free riding. If a group member takes a submissive role he/she may not contribute as much as the rest of the group.

The ideas for remedying free riding seem quite unanimous. It is suggested to make sure every group member understands the project and the results to be achieved. Also make sure that every group member has an equal opportunity to contribute ideas to the project and establish a peer grading system, which will ensure that each member works for their grade under the idea that the remaining group members will determine their grade beyond the project.

Thinklets For Idea Generation

Ideation Thinklets

You will recall from a previous chapter that a **thinklet** constitutes the smallest unit of intellectual capital required to create one repeatable, predictable pattern of collaboration among people working toward a goal[11]. As a result, there are a large number of thinklets and for the purposes of this chapter, thinklets related to ideation. Before we begin the discussion some of these in detail, it is important to note a few things.

First, there is no thinklet for every situation. Each exercise is built to fit a particular scenario or elicit a specific response that the moderator or leader is attempting to achieve. This means that having a wide range of thinklets at your disposal is critical to achieving the appropriate collaborative atmosphere required to accomplish the goal. Second, as a result of the above, each thinklet could have pitfalls or negative outcomes if used in the wrong scenario or with the wrong intention. A thinklet built for ideation or divergent processes, as will be discussed in this chapter, will be a poor choice for an exercise of choosing a solution. For the reasons above, we will be delving into these areas of the thinklets we discuss to appropriately qualify the situational aspect of using these patterns.

Change of Perspective

In order for us to fully delve into ideation thinklets, we must first consider creative work as a whole. **Search for Ideas in Associative Memory** (SIAM) is a cognitive model which assumes that

humans have two memory systems, the long-term memory (LTM) and the working memory (WM)[12]. The LTM is assumed to be the storage area, which is permanent and has unlimited capacity for previous acquired knowledge[12]. This knowledge is stored into a complicated network with numerous levels, categories and association and is partitioned into **images**. Images are knowledge structures that group together items of the knowledge according to different principles such as the similarity or typicality of the items[12]. For example, the items bed, shower, kitchen, sleep, and food may be grouped together into the image called home.

As a result, in order to spur true creativity, external stimuli can be used as an intervention to lead individuals to different areas of their knowledge networks. This can instill a new perspective, which allows the individual to combine items of images that are typically unrelated. Therefore, the generated ideas will cover larger areas of the possible solution space[13]. This intervention or external stimuli results in the cognitive process called a **change of perspective** (CoP)[13]. Again, this allows the individual to, what many refer to as, think outside the box.

There are three main methods to drive a change of perspective. **Analogy** has the individual search for similar situations and use the knowledge about these situations to generate ideas for the creative task[13]. To find a similar situation, the individual uses images of the given creative task and selects characteristic items[13]. **Provocation** challenges the assumptions of the creative task to generate a new perspective on the creative task[13]. This helps the individual make links between images that are typically unrelated and think in a more creative fashion. This also allows them to overcome occupational blindness related to tasks that they are familiar with performing. **Random** changes the perspective with external stimuli which are unrelated to the creative task[13]. To generate new ideas, the individual combines knowledge about a random element with the items of the creative task[13].

As a whole, CoP is a powerful tool to elicit creativity. It does not tie to a specific thinklet but rather to ideation in the large. As a result, you will need to consider this mechanism to get better results from ideation focused exercises.

Verbal Ideation or Brainstorming

The most common thinklet used for ideation is **brainstorming**. Brainstorming is a group creativity technique designed to generate a large number of ideas for a solution of a problem. This method was popularized by Alex Fackney Osborn, as discussed earlier, in his book called Applied Imagination where he proposed that groups could double their creative output with brainstorming[1]. Although research on this has proven otherwise, it is very widely used and many other ideation thinklets stem from this concept, so we will go into sufficient detail on the setup and process of brainstorming.

There are four basic ground rules to brainstorming[1]. First, **focus on quantity**. This rule aims at facilitating the maximum amount of ideas with the assumption that quantity breeds quality. The basic premise is that the chance of producing a unique and effective solution is significantly increased with the number of ideas generated. Second, **withhold criticism**. The focus of this is to ensure that the validity or viability of an idea is not discussed during this exercise. Instead, individuals are encouraged to withhold judgment and focus on extending or adding to ideas. As a result, participants do not feel reserved from generating unique comments. Third, **welcome unusual ideas**. This ties into the last point of suspending assumptions and allows for new ways of thinking. This also reinforces the focus on quantity, which is increased by welcoming unusual ideas. Lastly, **combine and improve ideas**. This uses the process of association to combine good ideas into a single better solution.

Now we are ready for the method and process of brainstorming. The first step is to **set the problem**. This is the most important step, which entails the definition of the problem you will have individuals ideating to solve. The problem cannot be too large and must have a clear and concise end goal. Usually, the moderator will put this in the form of a question, such as what feature does our product not provide but is needed?

Next, **select the participants**. This group should be a good mix of individuals that are core to the project and those that have project neutrality. This will allow for more unique idea creation and also bodes well for change of perspective. There also should be a recorder of these ideas. This can be the moderator or another third party if the moderator needs to focus on continued flow and generation reinforcement.

During the session, the facilitator leads the exercise and ensures that the ground rules are being followed. These typically begin with the leader presenting the problem and any further explanation if needed and asks the group to begin creating ideas. The idea collector records these as they arrive and insures the recorded verbiage is accurate to depict the idea of the individual. Next, the ideas are categorized and the list is reviewed to ensure that all participants are satisfied with the outcome and to remove any duplicative or infeasible entries. The process is depicted on the next page in Figure 1.

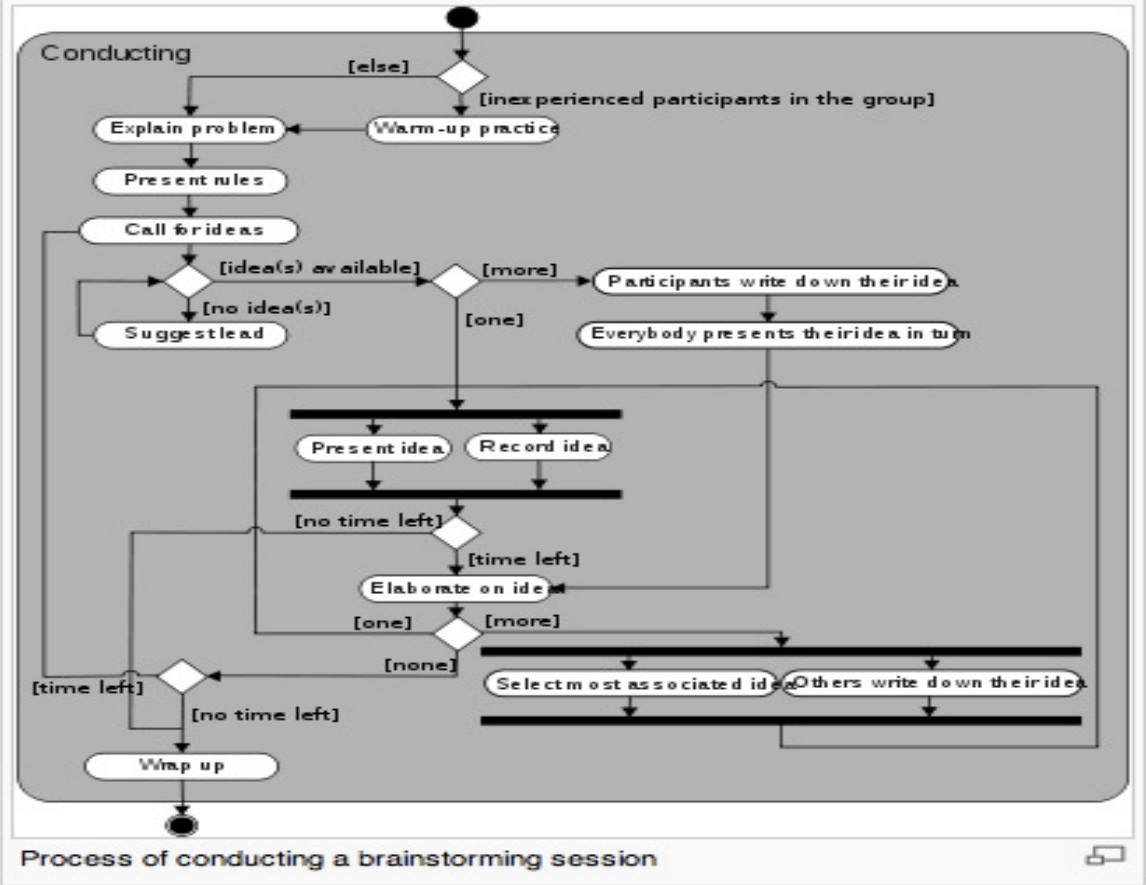

Figure 1

A large part of brainstorming is not just in the generation of ideas but also the evaluation step. We will not focus on this here, as this step is really the utilization of thinklets geared to reduce quantity and weed out for quality (convergence). However, it is worth mentioning that this in reality is the final stage of brainstorming and without this, the ideas created have no value.

There are many variations to brainstorming. Some of these warrant a closer look and will be discussed in more detail later in this chapter. However, for the purposes of this section, **nominal group technique** and **group passing technique** are worth noting. Nominal group technique is really a process of leveling the playing field for participants. This is done by having individuals write down their ideas and submit them anonymously to the collector. Again, this allows for more flexibility and openness with idea creativity. This technique can also be used to rank ideas based on anonymous voting. The group passing technique is a method by which ideas can take new shape and be more thoroughly explored. This process involves individuals writing an idea down, passing it to the next individual and adding to the idea that they receive. This technique may not elicit the highest amount of unique ideas, but it sets in motion

creative idea exploration without the need for organizing or ranking first.

There are two concerns in regards to verbal brainstorming that need to be discussed. One is to consider the time/space limitations of verbal ideation. Based on the requirement of having instant idea compilation and sorting, this pattern is only geared for same time-same place or same time-different place scenarios. What this means is that individuals are present live in the process. While phone technology has allowed for this to be feasible, it poses a large limitation with the growing global collaboration needs. As a result, you will need to be cognizant of the individual's availability to be present during this exercise.

Second is the discussion we alluded to earlier in regards to brainstorming research. While the belief was that brainstorming develops a larger amount of ideas based on the four rules that Osborn lays out, brainstorming studies compiled by Stein[14] puts forth a common finding that individuals produce an equal or fewer number of ideas when participating in verbally interactive groups than they do when working independently[15]. In fact, further research has shown that as groups grow larger, the creative ideation by individual group members falls off[16]. Furthermore, it was found that nominal groups continuously outperformed verbally interacting groups in overall idea generation and quality. All these are due primarily to the pitfalls discussed earlier in this chapter in regards to free riding, production blocking and evaluation apprehension.

The next section of thinklets is geared to address the concerns mentioned above.

Thinklet Concerns

Electronic and Directed Brainstorming

We will begin our discussion with **electronic brainstorming**, a computerized mechanism for ideation. This is sometimes also referred to as **brainwriting**. It can be in the form of email, peer to peer software, or perhaps browser based. The general concept is that the moderator poses the problem to individuals electronically and group members contribute independently by sending their ideas back. The four guidelines of Osborn's technique and the overall brainstorming method continue to hold true in this pattern.

This type of brainstorming addresses the concerns over traditional verbal ideation. First, now that individuals can work on creating ideas outside of a live conversation, the boundaries of when and where this exercise takes place have been removed. This allows for more global teams to continue generating

idea processes without the restraint of individual time and space. Second, this really becomes a nominal group technique. Things such as evaluation apprehension and free riding are no longer a concern. This has been proven in many studies to generate a much higher quantity and quality idea pool. Lastly, one last factor that this eliminates is that of **cognitive inertia** (or cognitive uniformity)[17]. This factor states that task relevant ideas expressed by the group members may be more similar to one another than if each member had not been exposed to the ideas of the others as they worked[17]. Additionally, there may be motivational pressure toward group uniformity in verbally interactive groups, since interpersonal agreement is more psychologically comfortable than disagreement[17]. For these reasons, electronic brainstorming is becoming the preferred method of ideation over verbal brainstorming.

Directed brainstorming is a type of electronic brainstorming where the leader directs the group with stimuli and problem statements through a series of time controlled exercises. This usually requires a special type of software but its only drawback is again, the necessity for individuals participating live. However, it continues to keep ideas anonymous and is really geared for fast idea generation with continued moderator support for getting individuals out of creativity ruts. This method works on the premise of the facilitator consistently providing predetermined prompts with the intent of directing the problem solving efforts of the participants[15]. Directed brainstorming can also be used after an initial brainstorming session to narrow down the list of ideas and purposefully restrain the ideation process.

With that, we will now switch gears to numerous different thinklets. You will notice that many of them utilize the methods of brainstorming discussed above. Also, this list is by no means exhaustive and will be focused on divergent ideation patterns.

OnePage

OnePage[18] is a pattern geared for smaller ideation groups. Its ideal size is no larger than 5 individuals and it is best utilized when the topic is already narrow and the expected amount of ideas will be small.

The premise is that all group members work off of the same page or idea chart and add ideas, in response to one question, simultaneously to this page. Most likely this is done through computerized collaboration tools but can be done on a white board that all team members can access in parallel. It gets its value similarly to electronic brainstorming but works best for smaller groups or fewer ideas as it gives the sense of liveliness and accomplishment to the participants.

This pattern should be avoided in several scenarios. First, in large groups, this could lead to information overload making ideas hard to manage and sort. Also, this does not work well for groups that

are tasked with multiple problems or questions. Lastly, for some of the reasons above, any question that is expected to generate a large amount of ideas should be avoided for this pattern.

LeafHopper

LeafHopper[18] is ideal for situations where participants will be asked to brainstorm on several topics. It accounts for different interest levels of participants and is not concerned with equal input from each participant to each question.

The setup is relatively straightforward and once again typically hinges on an electronic program to hold topics and ideas. The moderator inputs all the topics and directs participants to hop around and add ideas and input as they see fit amongst the topic. This all happens simultaneously and allows for individuals to follow their interest or expertise when contributing comments. Once again, this works well for groups that need to ideate on multiple topics relatively simultaneously. If there is a need for all participants to address all issues to some level or equally, this pattern should be avoided.

We will discuss another thinklet geared to multiple topics in a more serial fashion next in this chapter.

DealersChoice

DealersChoice[18] pattern is made for addressing multiple topics but with some individual restraint. It requires that all or particular individuals address particular topics and the order of topics presented can matter.

Using electronic tools, the facilitator assigns certain individuals to certain topics. The facilitator is responsible for moving participants from topic to topic once he/she is satisfied with the comment output. Again, participants are working simultaneously but in a topic directed fashion. There are a couple more wrinkles to this that can change the effect of this pattern. First, the facilitator can hop the entire group around from topic to topic. This way everyone is contributing to the same question at any given time. With this, the facilitator can choose to only pop in topics to the group once satisfied with the previous input. This keeps the group moving and also creates new stimuli as creativity exhausts. Secondly, the facilitator can get agreement that individuals will work on all topics to some extent. This could work in smaller groups but as the group grows, so does the difficulty of getting this commitment.

DealersChoice should be avoided if the order in which topics are addressed is not important. It also can have limited value if there are individuals that have no expertise or interest in multiple topics. Forcing their hand may be detrimental to the ideation process and produces poor quality ideas.

OneMinuteMadness

To wrap this up, we will discuss this pattern as it can be used as an add-on to other divergent processes listed above. The main premise of OneMinuteMadness[18] is a checks-and-balances approach to brainstorming, specifically in an electronic fashion. Its purpose is to consistently have the facilitator intervene and do a quick evaluation of the currently submitted comments to ensure that the participants are not flowing too far from focus.

The overall flow of this takes form of a standard electronic brainstorming session with the caveat that in certain time intervals, the entire group will stop and the facilitator will review the current list of ideas. At this point, if comments are starting to stray from the focus area, the facilitator can eliminate these and instruct the individuals again on the area that needs more attention. Once this is completed, the facilitator opens the gates for more ideas. This process continues in this circular mechanism until the facilitator is content with the quantity and quality of the ideas generated.

This process should be avoided if the group will need to spend an extended amount of time really developing ideas. It's meant to be a quick method for stirring ideation and is true to its name. It allows individuals to go mad for an allotted amount of time prior to being cut off and brought back down to earth.

Conclusion

This chapter has discussed various ideation and brainstorming techniques, focusing on three major obstacles faced during the brainstorming process: production blocking, evaluation apprehension and free riding. As you now know, these three factors can have severe adverse effects on the idea generation process if allowed to interfere. We have provided for you some suggestions and methods on how to overcome these hurdles. It is extremely critical that you are aware of such problems that can arise during a brainstorming or ideation session and are well prepared to counter them when they come up. We have also discussed Thinklets, especially those relative to the three hurdles we mentioned. You now have a good idea of several different types of thinklets, which ones are more effective for what type of ideation session and how to use thinklets to optimize brainstorming and ideation processes.

You should now have a good understanding of problems faced when ideating and brainstorming, how to overcome them and using thinklets to ensure successful and productive idea generation.

Exam Questions

1. Describe a time when production blocking has occurred in a group you were working in. What measures were taken to minimize the effects of production blocking? If none, describe one method that could have been used to minimize the effects of production blocking.
2. Describe a technique other than those presented in this chapter, which would overcome production blocking.
3. What adverse effects can evaluation apprehension have on the creativity and free flow of ideas in a brainstorming session?
4. What are some other techniques you can think of that will help alleviate evaluation apprehension in group brainstorming sessions?
5. Based on the current methods, when thinking about reducing free riding, what do you think would be any new and improved methods to reduce free riding in group projects?
6. According to the psychological reasons behind free riding, when dealing with group members in a project which role do you typically take on during the projects?
7. Describe the electronic brainstorming and its main advantages over traditional verbal brainstorming.
8. Name the thinklet best used for ideating on multiple topics where contributor participation on each topic is required and the order of how these are presented could matter. Then describe how it is setup and any variations that could occur within this pattern.

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Glossary

Glossary

Acquisition: KM process method that focuses on innovation, benchmarking, and collaboration.

Active Goal Set: subset of goals currently being assessed by subconscious cognitive mechanism for changes in yield.

Agreement: mutually acceptable commitment.

Ambient Properties: characteristics like light, noise, air quality, and temperature.

Analogy: process whereby structured knowledge from a well-known source domain (in the form of objects, simple relations, and higher-order relations) is mapped on to a less well-known target domain.

Architectural Programming: process of design planning in architecture.

Benchmarking: organizations use this in the acquisition process to compare the best practices of other organizations to their own procedures and identify areas for improvement and expansion.

Blog: type of website, usually maintained by an individual with regular entries of commentary, descriptions of events, or other material such as graphics or video.

Brainstorming: process for generating creative ideas and solutions through intensive and freewheeling group discussion.

Build Commitment: to move from fewer to more group members who are willing to commit to a proposal for moving the group toward attaining its goal.

Build Consensus: move from less to more agreement among stakeholders so that they can arrive at mutually acceptable commitments.

Capital: assets people try to maintain and increase in order to develop, and financially flourish. The five capitals are natural, human, social, manufactured, and financial.

Change of Perspective (CoP): allows the individual to think outside the box.

Clarify: to move from less to more shared understanding of the concepts in the set of ideas shared by the group.

Classroom Design: educational goals, perspectives, and philosophies to provide an environment that will support learning.

Cognitive Communication: knowledge and ability to communicate appropriately in a given situation.

Cognitive Effort: consists of three sections: communication, deliberation, and information access. Attention is a key component and is limited to distractions that may interfere with members focus.

Cognitive Flexibility: person's ability to study situations, see alternatives, adapt, and handle situations.

Cognitive Inertia: task relevant ideas expressed by group members may be more similar to one another than if each member had not been exposed to the ideas of the others as they worked.

Cognitive Process: psychological process involved in acquisition and understanding of knowledge, formation of beliefs and attitudes, decision-making and creative problem solving.

Collaboration: joint effort towards a group goal.

Collaboration Engineers: design collaboration processes that are combinations of fundamental patterns of collaboration.

Combine and Improve Ideas: uses the process of association to combine good ideas into a single better solution.

Commitment: to assume an obligation to expend resources to fulfill the terms of an agreement.

Communication: process by which information is exchanged between individuals through a common system of symbols, signs, or behavior.

Communication Competence: someone's ability to communicate to others in a situation.

Conference Call: telephone call that allows a person to speak with several people at the same time.

Configuration: how the hardware or software of a ThinkLet is designed including the specified setting of the activity.

Confirmation Bias: tendency to filter information to retain only what conforms to ones preferences and to reject what does not.

Conflict: process which begins when one party perceives that another has frustrated, is about to frustrate, or has some concern.

Consensus: state in which all stakeholders are willing to commit to a proposal.

Control: facilitators role as group members look for directions and validation.

Convergence: move from having many concepts to a focus on an understanding of a few deemed worthy of further attention.

Convergence ThinkLet: activity that moves the group from more ideas to fewer ideas.

Convergent Thinking: bringing relevant information together and coming to a firm conclusion based on the information.

Conversation Tools: optimized to support dialog among group members.

Conversion: process that involves taking the existing knowledge and turning it into useful procedures.

Cooperation and teamwork: means listening to one another's differences in an attempt to absorb both sides of a conflict while finding an even faced solution so that all voices are heard and taken into consideration.

Corrective Thinking: to make something standard or back to the original state.

Creativity: mental characteristics that allow a person to think outside the box, which results in innovative or different approaches to a particular task.

Decision Making Collaboration Scale: measurement of collaborative traits in a person when they are making decisions.

Decomposition: breaking a problem into a set of subcategories.

Deliberation: careful consideration before a decision.

Deliverable Efficacy: judgment of the degree to which its existence constitutes having attained a group goal.

Deliverables: existence of tangible or intangible work product, which signifies that a group goal has been attained.

Design Pattern: vehicles for communication that enable the users of the pattern language to name and share complex concepts without having to explain them in much detail.

Design Science: problem solving process.

Design Validation: design that does not violate the constraints of the program problem.

Desktop / Application Sharing: allow participants to view content on their computer that is being displayed on a remote host computer.

Digital Convergence: audio, video, and data communication into a single source.

Directed Brainstorming: type of electronic brainstorming where leader directs the group with stimuli and problem statements through a series of time controlled exercises..

Distraction: divides attention, or prevents concentration.

Divergence ThinkLet: activities that move the group from having fewer ideas to having more ideas.

Divergent Thinking: a thought, which leads to different directions, regardless of how conventional and original they may be.

Duet: prompts arranged in pairs (AA-BB-CC-DD-EE).

Electronic Brainstorming: computerized mechanism for ideation.

Enterprise Portals: web-based interfaces to applications, databases, and systems which provide a gateway for employees to access information kept both internally and externally to the organization.

Evaluate: to move from less to more understanding of the instrumentality of the concept in the idea set shared by the group toward attaining group and private goals.

Expertise: ones knowledge and past experiences in a particular field.

Explicit Knowledge: documented information and data existing in database which should be the foundation in the decision making process.

Facilitation: process of enabling groups to work efficiently, effectively, and cooperatively towards a common goal.

Facilitation Process Model: uses three symbols to illustrate the flow from ThinkLet to ThinkLet.

Facilitator: person who leads the facilitation process and group in the right direction towards the common goal of the organization.

Fast Harvest: type of ThinkLet activity used to quickly get the most ideas about a specific category.

Focus: importance of positive procedure verses efficient results.

Focus on Quality: facilitating the maximum amount of ideas with the assumption that quantity breeds quality.

Focus Theory of Collaboration: causal model for group productivity; degree to which people making a joint cognitive effort achieve their common goals.

Frame of Reference: set of norms, values, or ideas that affect the way somebody interacts with others, either in everyday life or in a particular situation.

Free: group members interact with one another by expanding upon the solutions of others, arguing with previous solutions, or generating entirely new solutions.

Free Brainstorming: type of ThinkLet activity used to ass breadth to ideas.

Generate: to move from having fewer concepts to having more concepts in the set of ideas shared by the group.

Goal Congruence: degree to which individuals perceive working toward group goals. Instrumental to attaining private goals.

Goal Definition: must set the objectives, ownership, and scoped use of the collaboration space, as well as establishing a time line.

Goal Intention: intention to realize a specific wish.

Goal Likelihood: how attainable the goal is to achieve.

Goal Utility: how useful a goal is if it is achieved.

Goal Yield: how useful a goal is reduced by how likely it is to be achieved.

Goals: desired state or outcome.

Group Passing Technique: method were ideas can take a new shape and be more thoroughly explored.

Group Productivity: degree to which the group achieves its goal.

Group Support System (GSS): collection of collaborative software tools used to structure meeting activities.

GroupThink: when a group does not consider all the alternatives because they are more concerned with a cohesive solution.

Group-Dynamics Tools: optimized for creating, sustaining, or changing patterns of collaboration among people making joint effort toward a goal (idea generation, clarification, evaluation, organization, or consensus-building).

Hardball Strategy: strategy where you refuse to give in.

Human Capital: knowledge, skills, and abilities of individuals, which make up an organizations intellectual capital.

Images: knowledge structures that is grouped together by item of the knowledge according to different principles such as the similarity or typicality of the items.

Impartial Outsider: person that can lead a meeting without influencing the decisions being made.

Implementation Intentions: specify when, where, and how goal-directed behavior is to be initiated.

Implementation Plan: detailed listing of activities, costs, expected difficulties, and schedules that are required to achieve the objective of strategic plans.

Improved Thinking: making current conditions or performance better

Information: knowledge obtained from investigation, study, or instruction.

Innovation: occurs in the acquisition process when new knowledge is produced after existing knowledge is applied.

Instant Messaging (**IM)**: chat service provided by many companies which requires the installation of software provided by a vendor.

Instrumentality: degree to which one believes that committing to a proposal will advance ones private goals.

Interaction: how group members relate to each other.

Interaction Interventions: enables, assists, or simplifies communication between meeting participants.

Interest: advances your private goals.

Interest-based Negotiation: negotiation process where you strive to attain an interest.

Intrinsic Motivation: desire to work on something because it is interesting, involving, exciting, satisfying, of personally challenging.

Involvement: calls for students to actively be more involved in their learning experience.

Jointly-Authored Pages: technologies that provide one or more windows that multiple users may view and to which multiple users may contribute, usually simultaneously.

Knowledge Management: management of organizational knowledge for creating business value and generating a competitive advantage.

Knowledge Portals: more specialized and focus on particular areas of business. They can be customized to meet the needs of users from all areas of the organization, ensuring that they receive only information appropriate to their needs.

Knowledge Pull: revolves around reacting to the competition.

Knowledge Push: signifies the efforts that are involved in quickly recognizing and responding to customer needs.

Ksa's: individuals knowledge, skills, and abilities.

Labor: people doing the work, as well as tasks and work load defined by the individuals job description.

Land: asset on the ground, such as a building, stalls in a parking lot, a conference room, and any other shared space within the physical building.

Leading: organizational role which includes the activities like: establishing a clear vision, communicating the vision to allow subordinates to willingly commit, offering information, knowledge, and methods to understand the vision, and being able to please all stakeholders through handling conflicting interests.

Likelihood: degree to which an individual subconsciously believes a goal to be attainable.

Mental Model: explanation of someone's beliefs, ideas, images, and verbal descriptions that we consciously form from our experiences which guide our thought and actions.

Methodology: set of methods, processes and practices that are repeatedly carried out to produce a

projects deliverables.

N-Way Flow: where many individuals will trade off speaking or many times attempt at speaking at the same time.

Negotiation: discussion intended to produce an agreement.

Nominal Group Technique: process of leveling the playing field for participants.

Non-Verbal Communication: ability to enhance the expression of ideas and concepts without the use of coherent labels, through the use of body language, gestures, facial expressions, tone of voice, use of pictures, icons, and symbols.

One Way Flow: majority of information is passed in a single direction from one to many.

Oral Communication: ability to explain and present your ideas in a clear language, to diverse audiences.

Organize: move from less to more understanding of the relationship among concepts.

Pace: how rapidly or leisurely the group activity moves.

Paraphrasing: restatement of a text or passage, using other words.

Participant: individual who takes part in the collaboration process.

Pattern Layer: way of thinking about how people move through each phase of goal attainment.

Patterns of Collaboration: observable regularities of behavior and outcome that emerge over time in teamwork.

Perceived Instrumentality: degree to which stakeholders judge outcomes of the proposal that would increase likelihood or utility of private goals.

Perceived Shift in Yield: subconscious perception that the overall yield for the active goal set has changed.

Phenomenon Layer: consists of theoretical underpinnings for the outcome that collaboration engineers seek to affect with their collaboration process design.

Planning Thinking: anticipate and prepare for future circumstances or events.

Polling Tools: optimized for gathering, aggregating, and understanding judgments, opinions, and information from multiple people.

Position-Based Negotiation: negotiation process where you battle over a position.

Practitioner: executes a repeatable collaboration process in his or her own domain.

Problem Structuring: identifying relevant variables in a problem situation and the important relationships among these variables.

Process Layer: focuses on what a group must do or the steps a group must take to attain goals and solve problems.

Protection: process that signifies the steps taken to secure an organizations knowledge from potential illegal activity and improper use.

Provocation: challenges the assumptions of the creative task to generate a new perspective on the creative task.

Quartet: prompts arranged in blocks of four (AAAA-BBBB-CCCC-DDDD).

Random: changes the perspective with external stimuli which are unrelated to the creative task.

Reactive Thinking: making decisions quickly in order to solve an urgent problem, situation, or condition.

Reduce: to move from having many concepts, to a focus on fewer ideas deemed worthy of further attention.

Relationship: logical or natural association between two or more persons.

Resources: what people share including land, labor, and capital.

Respect: treating something or somebody with consideration or showing esteem for it.

Rich Site Summary (RSS): format for delivering regularly changing web content to users subscribed to specific feeds.

RSS Feed: web-conferencing tool that is purchased from a vendor and installed in-house to the hard drive.

Satisfaction: fulfillment of a need or want; contentment.

Satisfaction Response: emotion with respect to goal attainment.

Scripts: instructions and sequence of events used by the facilitator in order to invoke a specific pattern of thinking in the group.

Search Engines: allow a user to search within a search space a keyword.

Search for Ideas in Associative Memory (SIAM): cognitive model which assumes that humans have two memory systems, long-term memory (LTM) and working memory (WM).

Select the Participants: group should be a good mix of individuals that are core to the project and those that have project neutrality. This allows for more unique idea creation and change in perspective.

Set the Problem: entails the definition of the problem that you will have individuals ideating to solve.

Seven Layer Model of Collaboration: abstracts the why, what, and how of effective team collaboration into seven categories for designers of collaborative systems and facilitators of collaborative processes.

Shared Editors: optimized for the joint production of deliverables like documents, spreadsheets, or graphics.

Shared-File Repositories: tool that allows users to store digital objects that can be simultaneously updated from multiple locations.

Sharing: joint use of a resource or space, and can refer to the alternating of a finite good.

Social Tagging: allow user to tag digital objects with keywords.

Software as a Service (SaaS): web-conferencing tool which allows for online collaboration and utilize streaming tools.

Solo: prompts organized such that each prompt derives from a different criterion than the one that preceded it (ABCD-ABCD-ABCD-ABCD).

Space Configuration: addresses the seating layout of the room.

Spatial Organization: most researched aspect of work, it can either facilitate or inhibit the collaboration process.

Stakeholders: people who can influence the activities/final results of the project.

Stimuli: questions or limitations that are placed on the group thinking process, that allows the best type of information to be collected from the group.

Streaming Media: multimedia that are constantly received by, and normally presented to, and end user while being delivered by a streaming provider.

Streaming Tools: tools which allow organizations the capability to hold conferences, meetings, or remote access, the ability to choose how meeting will be observed by participants, and offers ability to share documents or files electronically between participants.

Stress Test: what if scenario that takes the world as given but assumes a major change in one or more variables in order to see what effect this would have on various indicators.

Structure: describes how rigidly or flexible the group activity.

Sub Goal: resource or action necessary to achieve a main goal or interest.

Symbolic Convergence: how two or more private symbolic worlds come together and begin to overlap.

Syndication Tools: provide notification when new contributions are made to a digital object.

System Thinking: solve large problems that are generally broad.

Tacit Knowledge: embodied or informal knowledge inherently derived from a person based on their personal experience and perspectives.

Task Focus: moderations ability to produce stimuli that effectively move the group to use the most appropriate pattern of collaboration.

Task Intervention: focus on the participants attention on the group task.

Techniques: reusable procedure for invoking useful interactions among people working toward a group goal.

Technology: solution for streaming video over IP networks.

Theme Seeker: type of ThinkLet activity used to find common ideas among contributions.

ThinkLet Description Document: provides a brief, yet detailed description of the ThinkLet.

ThinkLets: named, scripted activities that produce known patterns of collaboration among people who work together.

ThinkLets Notation Model: formal textual methods for documenting and communication group process designs.

Tools: instruments or apparatus used in performing an operation for moving a group towards its goals.

Video Conferencing: two way communication that allows two or more parties to collaborate in real-time using audio and video.

Video Tools: allow users to send and receive both streaming sound and moving images.

Virtual Project Management: unique managerial style that can implement technology, culture, and cognitive knowledge to successfully manage a group of employees using information and communications technologies to collaborate from different locations.

Web-Conferencing Solutions: collaboration software equipped with voice and video sharing capabilities, desktop/application sharing, instant messaging (IM), shared whiteboard, and basic security features.

Welcome Unusual Ideas: allows for new ways of thinking.

White Collar Work Environment: research associated with the fields of environmental psychology, interior design, and ergonomics.

Win Conditions: achieved when the stakeholder comes out of the project/process as a winner.

Withholding Criticism: focus is to ensure that the validity or viability of an idea is not discussed during the exercise.

Written Communication: ability to write effectively in a range of contexts and for a variety of different audiences and purposes.

Yield: multiplicative function of the utility and likelihood an individual ascribes to attaining a goal or a set of goals.

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