

## Effective Decision Making in Teams

http://www.foundationcoalition.org/teams

### Definition

A team is a small group of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable.<sup>1</sup> Although student teams may not satisfy all the requirements of the definition, the degree to which they do often determines their effectiveness.

#### Rationale

"Students do not come to school with all the social skills they need to collaborate effectively with others. Therefore, teachers need to teach the appropriate communication, leadership, trust, decision making, and conflict management skills to students and provide the motivation to use these skills in order for groups to function effectively."<sup>2</sup> Faculty members must take responsibility to help students develop their skills to participate on and lead teams.

#### Introduction

Individual decision making is the act of making up one's mind. Team decision making is the process through which a team chooses an alternative. Team performance depends largely on the choices made by the team. These choices, in turn, depend on the processes through which teams decide. Therefore, high performance teams require processes through which teams make high quality decisions. Faculty members may help teams improve their performance and reduce the likelihood of dysfunctional teams by working with students to help them improve their capabilities to make team decisions. This document provides resources for faculty members working with student teams on decision making.

Every day student teams make many decisions, ranging from small to large scale, both in terms of resources involved in making the decision and the impact that the decisions can have.

- A small-scale decision might be why, where, and when to hold the next meeting. This decision involves resources, in the form of time and energy, to evaluate and select the purposes, time, and location of the meeting. Inability to effectively make small-scale decisions rapidly and effectively may lead to a dysfunctional team.
- A large-scale decision might be determining the approach to adopt for the design project. This decision involves the time and energy of the individuals who research the different alternatives as well as their pros and cons. Some of the team members may have substantial commitment to one or more of the possible approaches. This decision has the potential to make or break a team.

### Why learn about effective team decision making?

Each student team has to make many decisions during its existence. These decisions may be made in ad hoc ways or using processes that increase the likelihood of an effective choice. The processes through which decisions are reached may dramatically affect the quality of the decisions and team performance. For example, the choice a design approach might be made by flipping a coin or by thoughtful analysis of the pros and cons of each alternative. To make informed choices in selecting team decision making processes, teams need to learn how others have thought about decision making processes.

#### Overview

In discussing information on decision making the aim is to provide individuals and teams with theoretical frameworks, strategies, and tools that they can use to make informed choices about how they will make decisions. Decision making will be examined from three perspectives.

- *Environments for Decision Making* The environment that a team creates for conversations plays a critical role in quality of its decisions. Two other minidocuments in the Foundation Coalition series on Student Teams in Engineering also present aspects of the decision making environment. The first minidocument is on Effective Intrateam/Interteam Communication, while the second minidocument is on Understanding Conflict and Conflict Management. The current minidocument invites students to consider attributes of environments for decision making that are likely to improve the quality of decisions reached. Then, it explores a specific type of environment called the Thinking Environment. Thinking Environments are described in more depth by Nancy Kline in her book, *Time to Think*.<sup>3</sup>
- Methods for Decision Making Teams can arrive at decisions in many different ways. The current minidocument presents seven methods by which teams might make decisions and examines advantages and disadvantages of each. Informed dialogue about the different methods may help student teams make more informed decisions about how they reach decisions.
- *Tools for Decision Making* As engineering companies established and relied upon multifunctional teams to plan and implement designs, they developed a number of tools to help teams share, organize, and visualize the information that might influence their decisions. The minidocument will present several of these tools that student teams could learn and use to make their decisions.

Skill with environments, methods, and tools for decision making will help each engineering graduate, because each graduate is likely to work on many teams in his/her career.

### **Environments for Decision Making**

How team members interact with each other creates environments for decision making. In examining environments, the focus is neither on the steps that a team might use to reach a decision nor how the various individual positions will be combined to reach a decision. The focus is on how team members listen to each other, how they formulate and ask questions of each other, and how they present their positions. An environment in which everyone on the team feels comfortable in sharing his/her ideas and proposing solutions raises the quality of the decisions.

*Classroom Activity* Before examining other ideas about highquality decision-making environments, consider involving students in conversations about the attributes of decisionmaking environments that would lead to outstanding decision making. Ask each team to describe at least five characteristics for a high-quality decision-making environment.

#### What is a Thinking Environment?

Nancy Kline is president of Time to Think, Inc. and, as a consultant, has observed and reflected on conversations and meetings for over twenty-five years. Based on her observations, she has created the concept of a Thinking Environment, which starts with the self-evident statement:

"Everything we do depends on the thinking we do first."3

A Thinking Environment would be constructed to raise the quality of thinking by each person in the room. In her book, *Time to Think: Listening to Ignite the Human Mind*, Kline presents the ten components of a Thinking Environment, each of which increases the quality of thinking by every participant.

# 1. Attention: listening with respect, interest and fascination to your team members

The first component of the Thinking Environment is constructed from the second underlying assumption:

The quality of our "thinking depends on the quality of our attention for each other."

From this assumption flow suggestions to listen respectfully, wait when the speaker is quietly thinking without saying anything, avoid interrupting the speaking, and avoid infantilizing the speaker. Each of these actions is based on derogatory assumptions about the ability of the speaker to think for herself/himself, and each of these actions reduces the ability of the speaker to engage in quality thinking.

#### 2. Incisive Questions: removing assumptions that limit ideas

Between the thinker and a good idea may be a limiting assumption. The limiting assumption can be removed with an Incisive Question that attempts to replace a limiting assumption with a freeing assumption. Example: "If you knew that you were intelligent (freeing assumption [to replace the limiting assumption that you are stupid]), how would you talk to Neil ([your boss], the goal of the [thinking] session)?" Incisive Questions, as opposed to advice, help the speaker think for himself/herself.

# 3. Equality: "Knowing you will have your turn improves the quality of your listening."

Equality is treating each team member as a thinking peer. Giving each team member equal time and attention and keeping agreements and commitments with one another raise the quality of thinking of each participant.

# 4. Appreciation: practicing a 5:1 ration of appreciation to criticism of your teammates and their ideas

Appreciation is just what is says—appreciating your teammates and their thoughts and opinions. A five-to-one ratio of appreciation-tocriticism helps people think for themselves. When we are valued by our teammates, then we are comfortable thinking for ourselves instead of working to "say the right thing." "Change takes place best in a large context of genuine praise." The practice of Appreciative Inquiry also recognizes the value of appreciation for cultivating quality thinking and improvement. With change comes the opportunity for ideal decision making to take place.

#### 5. Ease: "Ease creates. Urgency destroys."

"Ease is the space a Thinking Environment needs in order to stay intact." Ease contradicts the increasing emphasis on action and speed. Furthermore, as Peter Block notes, "If we decide to act on what matters, then we shift our consciousness about pace. There is always time to do everything that really matters: If we do not have time to do something, it is a sign that it does not matter."<sup>4</sup>

# *6. Encouragement: moving beyond competition with your teammates to collaboration*

Encouragement is the antidote to competition. If you compete with the thinker, "you may do any number of things to prevent her/him from being brilliant." If you encourage the thinker, you reinforce his/her confidence in the quality of his/her thinking. "When people are not competing with each other to be best, it is possible to think all the way to something good."

# 7. Feelings: allowing sufficient emotional release to restore thinking

Expressing our feelings when we are upset restores our ability to think carefully, thoroughly, and deeply. Ignoring our feelings leads to lower-quality thinking.

# 8. Information, Sometimes: providing a fuller, more accurate picture of reality

"The mind works best in the presence of reality.... Conversely, the mind seems to lose its edge when having to work in pretence, denial, or fabrication." Providing information in a thoughtful, timely manner can raise the quality of thinking. "Withholding information from someone can be an act of intellectual imperialism ...."

## 9. Place: creating a physical environment that says 'You matter."

Places may convey unworthiness because they are squalid; others convey the same message through opulence. Several innovate ad agencies promote creativity through thoughtful design.

# 10. Diversity: adding quality because of the differences between us

Homogeneity "is a form of denial." The world isn't all the same. The degree to which a team mirrors the world's diversity, which enables it to more closely model solutions for the world, is the degree to which the team is willing to confront the challenges raised by its diversity.

*Classroom Activity* Ask each team to select four components of the Thinking Environment. For each component, ask each team to describe several ways that they could include that component in their activities.

Practicing these ten components, teams effectively communicate and collaborate. Through effective communication and collaboration teams can make powerful decisions. Through powerful decision making teams can thrive with regard to what they can accomplish

### What are different methods for team decision making?

Many types of decision making models can be studied and used by teams. Understanding decision making models allows teams to make intentional choices about which model might be most appropriate for the various decisions that they confront.

Individuals benefit from understanding decision models by becoming aware of how cognitive and affective biases can both positively and negatively impact how we work to influence our team on making a decision. Being aware of our biases can limit any negative impact from our biases. The models below describe how we work to affect and manipulate the team decision-making process, sometimes in productive ways and at times in detrimental ways for team decisions.

As a team, understanding decision-making models so that the team can make the best decision is valuable. The "best decision" is described as a decision that (1) would not have been thought of by an individual alone, (2) is a sound solution to the problem, (3) is a decision based upon input, as unbiased as possible, from each team member, and (4) addresses the team's goal for the decision-making process.

Johnson and Johnson describe seven methods/processes that a team might use to make a decision.<sup>5</sup> Each method, along with its strengths and weaknesses, is discussed below.

### *Method 1. Decision made by authority without group discussion* Process: The designated leader makes all decisions without consulting group members.

Strengths	Weaknesses
Takes minimal time to make	<ul> <li>No group interaction</li> </ul>
decision	<ul> <li>Team may not understand</li> </ul>
<ul> <li>Commonly used in</li> </ul>	decision or be unable to
organizations (so we are	implement decision
familiar with method)	<ul> <li>Low on cooperation scale</li> </ul>
High on assertiveness scale	(see conflict paper)
(see conflict paper)	

#### Appropriate Times for Method 1

 Simple, routine, administrative decisions; little time available to make decision; team commitment required to implement the decision is low.

#### Method 2. Decision by expert

Process: Select the expert from group, let the expert consider the issues, and let the expert make decisions.

Strengths	Weaknesses		
Useful when one person on the team has the overwhelming expertise	<ul> <li>Unclear how to determine who the expert is (team members may have different opinions)</li> <li>No group interaction</li> <li>May become popularity issue or power issue</li> </ul>		

#### Appropriate Times for Method 2

• Result is highly dependent on specific expertise, clear choice for expert, team commitment required to implement decision is low.

#### Method 3. Decision by averaging individuals' opinions

Process: Separately ask each team member his/her opinion and average the results.

Strengths	Weaknesses
<ul> <li>Extreme opinions cancelled out</li> <li>Error typically cancelled out</li> <li>Group members consulted</li> <li>Useful when it is difficult to get the team together to talk</li> <li>Urgent decisions can be made</li> </ul>	<ul> <li>No group interaction, team members are not truly involved in the decision</li> <li>Opinions of least and most knowledgeable members may cancel</li> <li>Commitment to decision may not be strong</li> <li>Unresolved conflict may exist or escalate</li> <li>May damage future team effectiveness</li> </ul>

#### Appropriate Times for Method 3

• Time available for decision is limited; team participation is required, but lengthy interaction is undesirable; team commitment required to implement the decision is low.

#### Method 4. Decision made by authority after group discussion

Process: The team creates ideas and has discussions, but the designated leader makes the final decision. The designated leader calls a meeting, presents the issue, listens to discussion from the team, and announces her/his decision.

Strengths	Weaknesses	
<ul> <li>Team used more than methods 1–3</li> <li>Listening to the team increases the accuracy of the decision</li> </ul>	<ul> <li>Team is not part of decision</li> <li>Team may compete for the leader's attention</li> <li>Team members may tell leader "what he/she wants to hear"</li> <li>Still may not have commitment from the team to the decision</li> </ul>	

#### Appropriate Times for Method 4

• Available time allows team interaction but not agreement; clear consensus on authority; team commitment required to implement decision is moderately low.

#### Method 5. Decision by minority

Process: A minority of the team, two or more members who constitute less than 50% of the team, make the team's decision

Strengths	Weaknesses			
<ul> <li>Method often used by</li> </ul>	Can be railroading			
executive committees	May not have full team			
<ul> <li>Method can be used by</li> </ul>	commitment to decision			
temporary committees	<ul> <li>May create an air of</li> </ul>			
<ul> <li>Useful for large number of decisions and limited time</li> </ul>	competition among team members			
Some team perspective	Still may not have			
and discussion	commitment from team to			
	decision			

#### Appropriate Times for Method 5

 Limited time prevents convening entire team; clear choice of minority group; team commitment required to implement the decision is moderately low.

#### Method 6. Decision by majority vote

Process: This is the most commonly used method in the United States (not synonymous with best method). Discuss the decision until 51% or more of the team members make the decision.

Strengths	Weaknesses	
<ul> <li>Strengths</li> <li>Useful when there is insufficient time to make decision by consensus</li> <li>Useful when the complete team-member commitment is unnecessary for implementing a decision</li> </ul>	<ul> <li>Weaknesses</li> <li>Taken for granted as the natural, or only, way for teams to make a decision</li> <li>Team is viewed as the "winners and the losers"; reduces the quality of decision</li> <li>Minority opinion not discussed and may not be yellowed.</li> </ul>	
	<ul> <li>and may not be valued</li> <li>May have unresolved and unaddressed conflict</li> <li>Full group interaction is not obtained</li> </ul>	

#### Appropriate Times for Method 6

• Time constraints require decision; group consensus supporting voting process; team commitment required to implement decision is moderately high.

#### Method 7. Decision by consensus

Process: Collective decision arrived at through an effective and fair communication process (all team members spoke and listened, and all were valued).

Strengths	Weaknesses	
<ul> <li>Most effective method of</li> </ul>	Takes more time than	
team decision making	methods 1–6	
All team members express	<ul> <li>Takes psychological energy</li> </ul>	
their thoughts and feelings	and high degree of team-	
<ul> <li>Team members "feel</li> </ul>	member skill (can be	
understood"	negative if individual team	
<ul> <li>Active listening used (see</li> </ul>	members not committed to	
communication paper)	the process)	

#### Appropriate Times for Method 7

• Time available allows a consensus to be reached; the team is sufficiently skilled to reach a consensus; the team commitment required to implement the decision is high.

Method 7 takes well-practiced communication skills by all team members. Review prior section on environments for decision making and other minidocuments on effective communication and conflict management.

#### Methods for Decision Marking- Retrospective

These seven methods/strategies for decision making all have strengths and challenges. However, repeatedly, Method 7 (Decision by consensus) has positive long-standing results regarding team decision making.

*Classroom Activity Ask each team to review the seven methods for making team decisions and construct methods for how they will make small-scale and large-scale decisions.* 

# What tools are available to assist teams in making decisions?

In addition to creating an environment for effective decision making and reaching consensus on methods for making decisions as a team, there are tools that can assist teams in formulating and reaching decisions. Many of these tools were developed in the 1990s as companies worked on improving quality and introducing self-managed teams into the workplace. Detailed descriptions of these tools can be found.<sup>6–8</sup> Faculty members and students who would like to become proficient in the use of these tools are encouraged to consult these references. However, brief descriptions of frequently used tools may help introduce student teams to decision-making tools and help them to apply these tools:

- Brainstorming (for more information, please see [6–10])
- Affinity Grouping (for more information, please see [6, 7, 11])
- Multivoting (for more information, please see [6, 7, 12])
- Criteria Matrix (for more information, please see [6, 7, 13])

Many other tools are available to facilitate creativity, planning, and quality control. [14–17]

### Brainstorming

The goal of the brainstorming process is to generate many options related to a specific purpose. Subsequent processing will allow the group to prioritize and/or group ideas. The focus of the brainstorming process is generating ideas. See [9 10] for details.

#### Keeping the End in Mind

In working through a process, visualizing the end result is helpful. For the brainstorming process, the end result is a large set of Post-It<sup>TM</sup> notes on a flat surface; written on each note is one response to the charge.



#### Ground Rules

- Make sure that all participants have a clear, shared understanding of the charge for which they are generating ideas.
- Every idea should be posted, and comments on any idea are not permitted. Remember that the goal is to generate many ideas at this stage. Processing ideas will come later.
- Strive for flexibility of ideas. Welcome wild ideas that can act as triggers to stimulate breakthroughs into new directions.

### Affinity Grouping

The goal of the affinity grouping process is to categorize the ideas generated by the brainstorming process. Similar ideas can be grouped together to obtain a more organized picture of the ideas.

#### Keeping the End in Mind

In working through a process, visualizing the end result is helpful. For the affinity process, the end result is groups of Post-It<sup>™</sup> notes with a header card for each group.



#### Ground Rules

- Decide whether talking will be allowed as participants group idea notes into clusters. Results will be different if talking is allowed.
- Participants may take each idea note and put it with another idea note to form clusters of notes.
- Participants may move a note from one cluster to another.
- If an idea note is repeatedly moved from one cluster to another, make a duplicate, so that it may be placed in both clusters.
- After the clusters have stabilized, one member of the group will solicit suggested wording for a header card. Allow the team to reach consensus on the text for each header card.

### **Prioritization Matrix**

#### Purpose

To prioritize tasks, issues, alternatives, etc., to aid in selecting what tasks, issues, or alternatives to pursue.

#### Keeping the End in Mind

The purpose of the exercise is to construct a matrix like the one shown on the right. The criteria used to evaluate the quality of the options (tasks, issues, alternatives, etc.) are placed across the top while the options under consideration are placed down the left. The numbers in brackets are the weights for the different criteria. The value of the prioritization matrix is twofold. First, it shows the entire group the process of evaluating each option. Second, it focuses the group on each component of the decision process and then generates the overall results from the individual decision components.

#### **Steps**

1. Generate a set of criteria to be used in evaluating the quality of the decision. In the example shown above, the group generated three criteria.

2. Construct a matrix with options down the left and selection criteria across the top.

### Multivoting

The goal of the multivoting process is to allow a team to determine the higher priority and lower priority options from a set of alternatives. Multivoting is quick and easy. However, it does not provide for a detailed analysis of the different alternative. A team might want to use multivoting to determine higher priority options from a large list of alternatives. Then, the team might use more detailed and time-consuming analyses to select the highest priority alternative.

#### Keeping the End in Mind

In working through a process, visualizing the end result is helpful. For the multivoting process, the end result is a list of options, each with a number of votes (perhaps zero). If an option has more votes, then the team has assigned a higher priority to that option.

- Option 1
- Option 2 • • • •
- Option 3
- Option 4
- Option 5 • • •

With this result, the team has chosen option 2 as the highest priority. Options 4 and 5 have tied for second highest priority. The team may want to analyze the priority of these three options in greater depth.

#### Ground Rules

- Assign each participant the same number of votes. A rough rule of thumb is that each participant may receive a number of votes equal to the number of options divided by three. For concreteness, each participant might vote with sticky dots or small Post-It<sup>™</sup> notes.
- Participants vote simultaneously by placing their sticky dots (or notes) near or on their preferred options.
- In some versions, participants may cast, at most, one vote per option. In other versions, participants may cast multiple votes per option, although the maximum number of votes per option may be limited.
- Options receiving more votes are ranked as higher priority.

	Criterion 1 [2.3]	Criterion 2 [1.2]	Criterion 3 [3.5]	Option Totals
Option 1	1	5	3	18.8
Option 2	3	2	2	15.3
Option 3	2	0	1	8.1
Option 4	1	0	1	5.8

3. Each person allocates a weight (priority) to each criterion. The higher the weight, the more important the criterion is to the individual. The sum of the weights that each person allocates to the criteria must be 1.0.

4. The total weights for the criteria are obtained by summing the individual weights. Enter these weights in the matrix in brackets along with the criteria.

5. Going one criterion at a time, rank order all the options, etc., with respect to the criterion using the multivoting technique. Enter the vote totals for each option into the matrix.

6. Find the product of the vote totals and weight for each option and sum these products for each row.

7. The rows with the highest sums are the options of highest priority. Be sure to discuss any row which has a low total but seems like it should be retained.

#### How might I work with students to improve their group decisionmaking skills?

Students can improve their decision-making skills through awareness that decision making is not a random act but rather a process involving effective thought, initiation, communication, and practice. Activities to improve individual and group decision making are shared below.

#### Example 1 (20-25 minutes)

Learning Objective: Students should be able to identify how they typically make decisions.

**Classroom Activity** Individually ask students to list the sequence of steps they use in approaching and solving problems. Next, ask teams to combine the individual problem-solving sequences into a consensus problem-solving sequence. Then, individually ask students if they use the problem-solving sequence with decision making or if decision making is more an emotional response for them. Have individual students identify what changes, if any, they want to make to their decision making methods. Ask teams to share individual insights from their reflection. Finally, present an openended problem (e.g., estimate the number of basketballs that would fit in the rooms) or a design problem; ask teams to use their problem-solving sequence to generate alternative solutions and choose an alternative. Compare results across teams in the class.

#### Example 2 (15 minutes)

Learning Objective: Increase the likelihood that students will act on their proposed changes to their decision-making methods.

**Classroom Activity:** Students will create a personal action plan of what changes they want to make to their decision-making methods identified in Example 1. Students put the date and their names on paper and answer the following questions individually:

- 1. My current decision-making method is primarily \_
- 2. My decision-making method is effective in the following ways:
- 3. I need to improve/change my decision-making skill set in the following areas: \_\_\_\_\_\_.
- 4. My decision-making skills improvement goals are as follows (be sure your goals are specific, attainable, and measurable):
- 5. These people and these resources can help me accomplish my goals:
- 6. These are my action steps and time table to accomplish my goals:

A step in which team members share their responses may be added (would take another 20 minutes).

#### Example 3 (45 minutes)

**Learning Objective:** Students describe how involvement of more persons in the decision-making process affects the accuracy of the decision (adopted from Johnson and Johnson exercise<sup>4</sup>).

**Classroom Activity:** Explain that the exercise focuses on the accuracy of estimates made by different combinations of individuals. Start with a large jar full of a known quantity of beans set before each group of 4–8 students. Students will be asked to estimate the number of beans.

- 1. Working individually, students need to estimate the number of beans and write their answers on pieces of paper.
- 2. Next, pair students. Each pair constructs an estimation scheme,

- 3. Now, each pair joins another pair and generates an estimate.
- 4. Finally, groups of four partner, and groups of eight construct estimates.
- 5. Have each group of eight present their decision of the number of beans. Compare the decisions made to the actual number of beans in the jar (this is the fun part)
- 6. Now, have the students in teams of four answer the following questions: (a) How were the decisions made by each group? (b) How did increasing the number of group members impact the decision-making process for the individual? (c) How did increasing the number of group members impact the decision-making process for the group? (d) Did groups become more efficient or less efficient in their decision making as group size increased? Do the teams think there is an "ideal" group size for effective decision making?

More activities can be found in Johnson and Johnson.<sup>5</sup>

#### Acknowledgement

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Whether you're just getting started or looking for additional ideas, the Foundation Coalition staff would like to help you incorporate student teams into your engineering classes through workshops, Web sites, lesson plans, and reading materials. For suggestions on how to start, see our Web site at



<<u>http://www.foundationcoalition.org</u>> or contact Jeffrey Froyd at <u>froyd@ee.tamu.edu</u> or at 979-845-7574.