Tools

Affinity Diagram

Collecting and Grouping Ideas

Background

The affinity diagram is a tool to gather and group ideas, issues, or problems. It helps teams to organize large volumes of information into major categories and apply unconventional thinking.

When to Use

- When a large number of ideas, issues, or problems need to be generated; grouped in natural groups; and summarized
- When communication barriers need to be dissolved
- When creativity and ownership are needed

How to Use

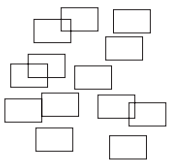
1. Write the idea, issue, or problem as a statement. Reach agreement on the statement and post it for all to see.
2. Each participant generates ideas, issues, or problems related to the statement and writes them on index cards--one per card.
3. Collect the cards from all participants, mix them up, and spread them out on a flat surface.
4. Have participants sort the cards into 5-10 related groups **without talking**. Allow approximately 15 minutes for participants to pick out cards that list related ideas and set them aside until all cards are grouped. Cards will probably be moved from one grouping to another. If consensus does not occur, duplicate the card and place in both groups. It is OK for some cards to stand alone.
5. For each card grouping, have participants create a title or heading that best captures the essence of all of the cards in the group. This is hard work but often leads to breakthrough thinking. Provide ample time for this part of the activity.

Hints

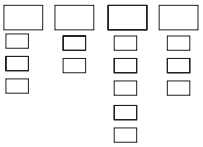
Encourage participants to react quickly without agonizing over sorting. If a participant disagrees with the placement of a card, the participant simply moves it. If consensus cannot be reached, make a duplicate of the idea and place one copy in each group. If clarification is needed during the process, a participant can give the "time-out" signal, at which time all participants move away from the table, break silence, and get quick clarification. When participants return to the table, silence is the rule.

How Does It Look

In Process



Final Outcome



Next Steps

The interrelationship digraph can be used to identify, analyze, and classify the cause-effect relationships among the ideas, issues, and problems.

Tools

Brainstorming

Generating Ideas

Background

Brainstorming is a common method for a group to generate a high volume of ideas on a given topic in an efficient and effective manner. With idea volume the goal, this inclusive process is implemented without criticism or judgement. Energy and openness result with group members creatively launching from others' ideas and innovative thinking. Brainstorming is a simple tool, but must be managed.

When to Use

- When new and fresh thinking is required
- When total participation is needed
- When many possibilities need to surface.

How to Use

1. The brainstorming question is identified, agreed on, and posted for all to see.
2. Each team member offers an idea without comment or criticism.
3. Each idea is written in large letters on a chart paper for all to see.
4. Ask the speaker if the recorded idea is written as intended.
5. Continue the process for 5 to 20 minutes, depending on complexity or importance.
6. As a group activity, review the written list to clarify ideas and discard duplicated ideas.

Variations

A. Round Robin Brainstorming. To ensure that all group members have an equal opportunity to participate, adopt the process of each person offering ideas, in turn. When a participate does not have an idea, they can say "Pass". The process continues until all ideas are offered.

B. 6-3-5. This is a silent method based on a single brainstorming issue. (1) Each group member has five minutes to write down three ideas on a sheet of paper.

(2) Each person then passes his or her sheet of paper to the next person, who has five more minutes to add three more ideas that build on the first three ideas.

(3) The rotation is repeated as many times as there are team members (e.g., 5 team members = 5 rotations.

Source: The Memory Jogger II by Michael Brassard and Diane Ritter

Next Steps

Use nominal group technique to identify the most important ideas. If the brainstorming process generated a large number of ideas, it may be necessary to limit the number of items ranked. A "one half plus one" approach would rank only a portion of the total. The process would be repeated for the remaining ideas.

Source: The Memory Jogger II by Michael Brassard and Diane Ritter

Cause and Effect Diagram

Identifying and Focusing on Causes, NOT Symptoms

Background

A cause and effect diagram is a visual tool used to graphically organize possible causes for a specific problem or effect by displaying them in increasing detail. Understanding causes and their effects provides direction for improvement efforts. This tool is commonly known as the fishbone diagram because the structure resembles the skeleton of a fish.

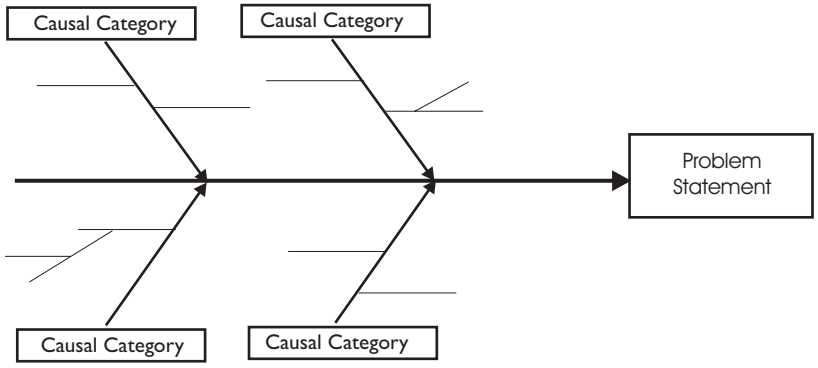
When to Use

- When focus is needed on the problem causes, not problem history or personal interest
- When focus is needed on process causes

How to Use

1. Determine major problem using brainstorming or check sheet.
2. Construct the diagram. Place problem statement in the box on the right-hand side of the diagram.
3. Draw diagonal lines to the "backbone".
4. Label each diagonal line as a causal category. Note: Traditional Production Process categories may include **machines, methods, materials**, or **people.** Traditional Service Process categories may include **policies, procedures, equipment/space,** or **people**. Both may include **environment** and **measurement**.
5. For each causal category, ask "Why does this happen?" Or "What could happen?" Push for deeper understanding. Stop when the causes are too far removed from the group's control. Write causes on lines linked to the appropriate "rib" bones.
6. Identify root causes that appear repeatedly across categories.

How Does It Look



Next Steps

Use Plan Do Study Act (PDSA) to develop an action plan to address the causal factors.

Check Sheet

Counting and Accumulating Data

Background

The check sheet is a data gathering and interpretation tool that allows teams to systematically record and compile data. The data shows how many times a given event occurs so that patterns and trends can be detected. It is an easy-to-understand format.

When to Use

- When facts are needed, rather than opinions
- When understanding is needed related to patterns and trends
- When agreement is needed based on the same data

How to Use

1. Agree on the data to be collected (definition of events or conditions observed; exactly what data to collect and how). Ask questions: What is the problem? Why should data be collected? How will the collected data be used? Who will collect, organize, and analyze the data? Note: Use cause & effect diagram or brainstorming to determine check sheet categories.
2. Construct an operational definition for each category.
3. Decide on the time period for data collection.
4. Select a sample size, if appropriate. Use a random sample and sufficient number (rule of thumb: square root of group).
5. Design the check sheet. It should be clear, complete, and easy to use. Data includes source (project name, location, who will record the data) and content data (column with defect or event name, columns to record data [e.g., collection days/dates], totals for columns, totals for rows, grand total).
6. Test the form. Do a "dry run" to ensure process consistency.
7. Tally individual data sheets. Maintain raw data for future needs.
8. Analyze the data without making early assumptions.
9. Take action on the data. Develop and implement the plan.

How Does It Look

Location of Accident	Tally	Total
Bus Stop	IIII	4
Cafeteria	𝍸 II	9
		3
TOTAL		134

Next Steps

A pareto diagram can be used to focus on problems that offer the greatest return on investment. Plan Do Study Act (PDSA) provides a systematic way to plan, implement, monitor and study results, and design next improvements.

Tools

Consensogram

Polling for Opinions

Background

A consensogram is a tool for polling a group for opinions. Each person's opinion counts equally. Group members can step back and look at the overall group more objectively.

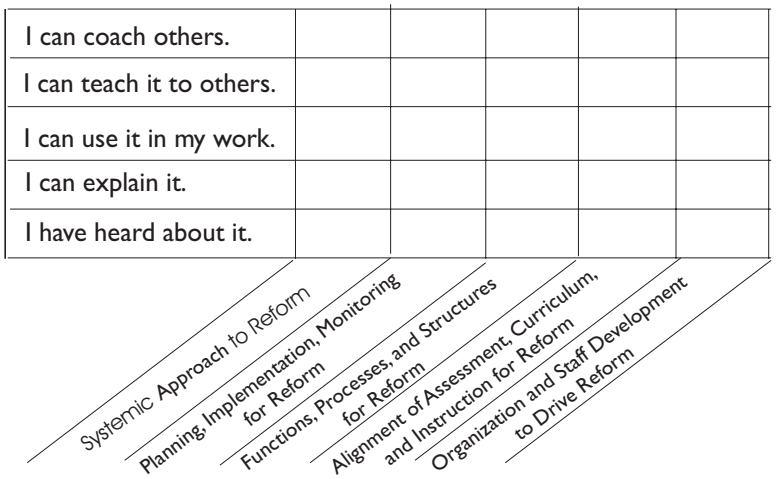
When to Use

- When the group prior knowledge needs to be activated
- When self assessment is useful
- When data can be used to adjust lessons to better meet learner needs
- When training effectiveness evaluation is needed

How to Use

1. Provide colored dots for each participant (one dot for each outcome). Suggestion: Use green as a starting point.
2. Invite participants to consider their understanding/competency (on an establish scale).
3. Ask participants to walk to the chart on the wall and place a dot For each scale to indicate prior knowledge.
4. Use the results to guide presentation/lesson/activities.
5. Repeat the poll at the end of the session. Use different colored dots. Suggestion: Use red as a stopping point.
6. Discuss next steps for continued learning.

How Does It Look



Next Steps

After the pre-consensogram, adjust instruction to meet individual and group needs. After the post-consensogram, make plans to addressed individual and group needs.

Tools

Expectations — *Encouraging the Formulation of Personal and Group Expectations*

Background

Expectations is a method of surfacing participant expectations for a meeting or a professional development session. It is common practice for a facilitator or presenter to share expected outcomes. By soliciting the expectations of participants, the meeting or session can be adjusted to meet both group and individual needs. The invitation to provide expectations conveys joint ownership and responsibility for the meeting or session.

When to Use

- When the facilitator or presenter is not familiar with the knowledge and skills of participants
- When the meeting or session can be strengthened with shared thinking and interaction

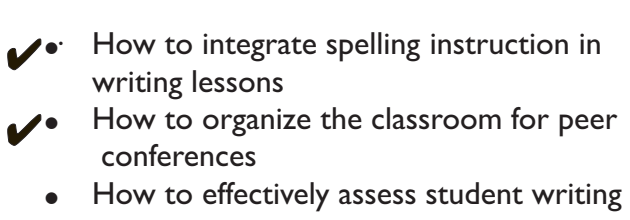
How to Use

1. Prior to a meeting or session, prepare a chart with the title "Expectations".
2. At the beginning of the session, share the planned content, process, and outcomes.
3. Invite participants to share their needs/expectations for the meeting or session.
4. Write each need/expectation on the chart paper.
5. Post the chart so all can see.
6. Address each need/expectation during the meeting or session.
7. As each need/expectation is addressed, check it on the chart.

Hints

Generally, most expectations can be met with the planned approach. If not, look for opportunities to include as many as possible.

How Does It Look



Next Steps

Use the expectations method at a future meeting or session. Encourage teachers to use expectations within the classroom, when appropriate.

Tools

Fish Bowl

Observing and analyzing group interaction for increased productivity

Background

Group work has two needs: to get the job done efficiently and effectively and to build a collaborative environment that enhances collective learning. Functional group roles include: task accomplishment and the strengthening of group interactions. Self-serving behaviors produce negative results for the organization and for its members. The fishbowl goal is to learn to maximize productive behaviors and minimize self-serving nonproductive behaviors.

When to Use

- When group member statements and behaviors contribute to ineffectiveness and inefficiency
- When collective learning needs to be accelerated.

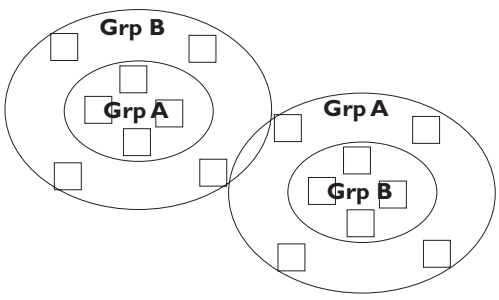
How to Use

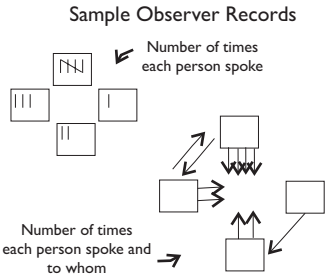
1. Divide the large group into two small groups: A and B. Each group takes its turn in the fish bowl and in the observers' ring.
2. Assign each group a task/problem to solve in the fish bowl. (i.e., develop a retreat agenda, where to have the next planning retreat)
3. First five minutes--Group A is in the fish bowl and attempts to solve the assigned task/problem. Group B observes and records productive and non-productive behaviors.
4. Second five minutes--A selected member of Group B provides (1) feedback on productive behaviors that fostered task accomplishment and strengthened group interactions and (2) key non-productive behaviors that contributed to decreased productivity.
5. Repeat the process with Group B in the fish bowl and Group A in the observer role. Assign Group B a different task/problem.

Hints

Record learning generated through group exchanges. Use the learning to increase group effectiveness and increased work satisfaction. (i.e., incorporate preferred group behaviors in ground norms)

How Does It Look





Next Steps

As a group, list productive and nonproductive behaviors to group effectiveness. Provide brief process reflection time after meetings.

Five Whys

Identifying Problems

Background

Five whys is the practice of asking "Why?" at least five times in a row to determine the root cause of a problem. Application of the strategy involves taking any problem and asking "Why: what caused this problem?" By repeatedly asking the question "Why?", the layers of problem symptoms are peeled away and the root cause is identified. Although this technique is called five whys, the question "Why?" may need to be asked more than five times. Five whys is one of the simplest tools to use and is easy to complete without statistical analysis.

When to Use

- When it is critical to identify the root cause of a problem
- When the problem is not completely understood
- When problems involve human factors or interactions

How to Use

1. Write the specific problem where it can be seen by all group members.
2. Ask "Why?" the problem occurs. Write the response on chart paper.
3. Each time the question is answered, ask "Why?" again, each time recording the response on chart paper.
4. Continue the process for at least five rounds.

Note: Ensure that all group members are involved and agree with the identified root cause.

How Does It Look

The problem is written so all group members can see and refer to it. After the repetition of "Whys" produces the likely causal factor, write the root cause so all group members can see it.

Next Steps

The determined cause is the target for planned improvement. Select the planning tool most appropriate for defining the improvement path for the identified cause.

Tools

Flowchart

Representing a Process Graphically

Background

A flowchart pictures the actual flow or sequence of steps in a process. A flowchart is comprised of a set of standard geometric shapes that represent task types. Lines and arrows connect the shapes. Notes can be added to provide more detail.

When to Use

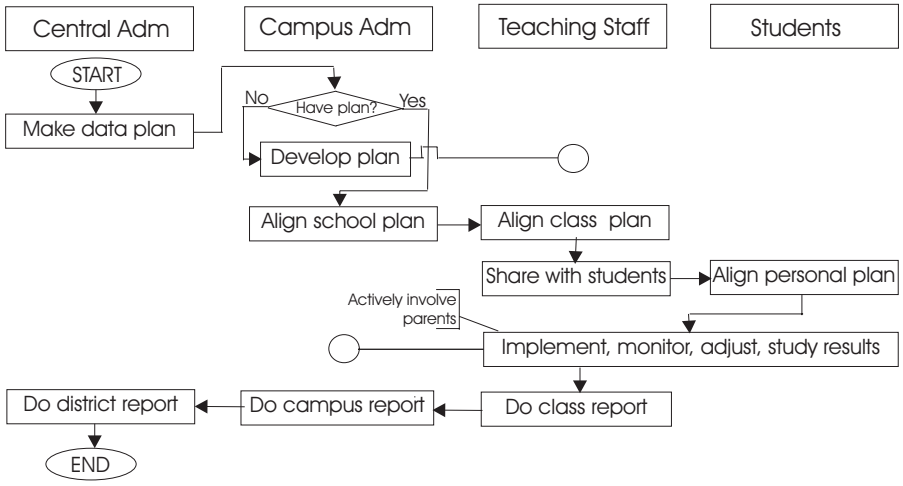
- When a sequence of events needs to be clarified or designed
- When gaps, redundancies, and inefficiencies need to be identified
- When task responsibilities need to be monitored
- When comparing the actual flow with ideal flow of work

How to Use

1. Determine the starting and ending points of the process.
2. Identify key tasks and decisions points in the process.
3. Record all tasks and decision points in the process using the appropriate shapes
4. (Deployment flowchart only) Identify responsibilities by arranging the tasks and decision points by responsibility. Indicate stakeholder groups who provide support for tasks.
5. Distribute the draft flowchart to impacted stakeholders for review.
6. Use feedback to improve the flowchart.
7. Collect data on the implementation for inclusion in the next revision.

Oval - starting and ending point
Rectangle - task
Diamond - decision point
Circle - support
Bracket - clarification note

How Does It Look



Next Steps

Share the flowchart with impacted stakeholders. Monitor the process to identify improvement opportunities.

Force Field Analysis

Identifying Positive and Restraining Forces for Change

Background

Force field analysis is used for identifying forces that help drive change and restrainers that inhibit change. It is a technique for weighing pros and cons of a proposed change, so the positives can be reinforced and/or the negatives minimized or eliminated.

When to Use

- When an analysis of the change environment will help increase the probability of success
- When honest reflection related to the problem's root causes is needed
- When collective thinking and shared agreement will help navigate the change process

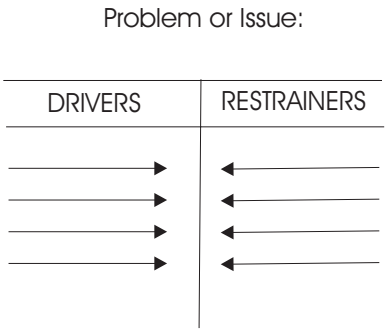
How to Use

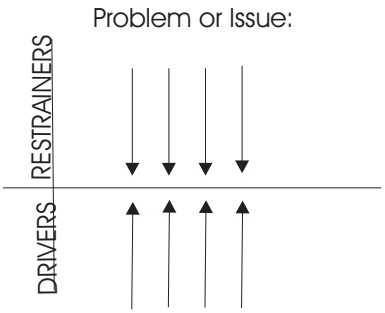
1. Draw a "T" chart with the problem or issue clearly stated above the top line. Label one side of the chart "Driving Forces" and the other side "Restraining Forces".
2. Brainstorm "driving" and "restraining" forces. Driving forces are actions, skills, equipment, procedures, culture, people, etc. that help achieve the goal. Restraining forces inhibit reaching the goal.
3. Prioritize forces for both driving and restraining forces. Note: The nominal group technique tool may be used.
4. Reach consensus on the "driving forces" that will result in the greatest gain and the "restraining forces" that will allow for the most progress if they are removed. Note: The 10-4 Consensus tool may be used.

Variation

Draw a horizontal line in the middle of the chart. Vertically, write each restraining force above the horizontal line. Vertically, write each driving force below the horizontal line. Rationale: Think of the gravitational pull. The weight of restrainers inhibits change. Driving forces must overcome the weight of restrainers.

How Does It Look





Next Steps

Develop an implementation plan that addresses key driving and restraining forces.

Gallery Walk

Collecting Information Related to Participant Level of Understanding

Background

A gallery walk provides participants with a structure to interact with each other and demonstrate their level of understanding without fear of being wrong.

When to Use

- When a review of knowledge and understanding is needed to guide next steps
- When participant interaction is appropriate

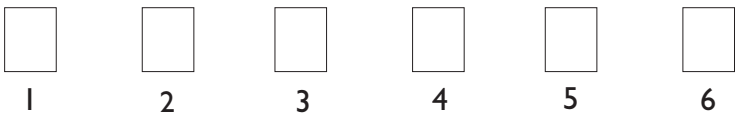
How to Use

1. Decide on the knowledge topics (3-6) for the gallery walk.
2. Write each topic on a separate sheet of chart paper. Post chart papers on the chart stands or tape to walls.
3. Divide participants into groups. The number of groups matches the number of posted chart papers.
4. Give each group a different colored, water-based marker. (Avoid duplicating colors, if possible. Colors designate group contributions.)
5. Assign each group to a posted chart paper.
6. Instruct participants to introduce themselves to their group members.
7. Instruct groups to designate a scribe.
8. Instruct groups to write, on signal, what they know about the topic that is written on the chart paper.
9. After 4-5 minutes, instruct groups to take their colored marker, rotate to the next chart paper, review the information, and contribute to the chart by adding information, revising information, or lining out incorrect information.
10. Continue the process until all groups have visited all charts and have returned to their original chart.
11. Instruct groups to review the cumulative contributions.
12. Each group "reports out" cumulative contributions.

Hints

The cumulative contributions serve as a needs assessment to determine what information needs to be reinforced, corrected, or clarified.

How Does It Look



Next Steps

Use information to foster a shared understanding.

Tools

Gantt Chart

Scheduling and Monitoring

Background

The Gantt chart is a simple tool for analyzing and planning complex projects. It includes a vertical list of tasks and uses horizontal bars to show the schedule of tasks. The bars show tasks that can be done simultaneously during the project implementation.

When to Use

- When a path of action and a schedule are needed to ensure that a project is implemented within an established time frame.
- When participants need a shared understanding of interdependencies within the project
- When resource allocation is needed

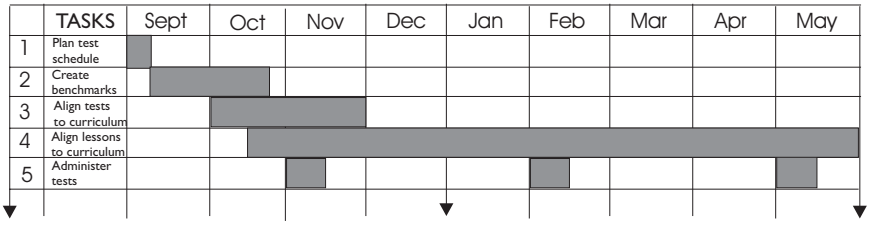
How to Use

1. List all tasks in the plan, showing earliest start date, estimated completion time for each task, and sequentiality.
2. List the tasks in the first column of a chart.
3. List the months, week, and/or days on the top row. Extend the timeline from project beginning to end.
4. Schedule all tasks. Note: Ensure that sequential tasks are executed in sequence. Ensure that dependent tasks follow prerequisite tasks.
5. Have the draft Gantt chart reviewed by direct stakeholders. Make adjustments, as needed.

Hints

- When possible, schedule parallel tasks so that they do not interfere with sequential tasks.
- Do not over-commit resources.
- Include some extra time for unforeseen delays.
- Computer programs, from simple to complex) can be used to manage projects (e.g., EXCEL, Microsoft Project).

How Does It Look



Next Steps

Project managers can use the Gantt chart as a monitoring tool. It simplifies keeping track of the whole project--linking completed tasks, with present tasks, while preparing for future tasks.

Ground Norms

Agreeing on Ground Norms

Background

Ground norms are guidelines to increase the efficiency and effectiveness of meetings.

When to Use

- When a shared understanding of guidelines is needed
- When a clear understanding can avoid conflict and increase participant satisfaction
- When participants need guidelines for shaping and elevating behavior

How to Use

1. Draft three or four norms and write them on chart paper.
2. At the beginning of the meeting...
   ...explain the rationale for ground norms,
   ...share the drafted norms,
   ...invite participants to delete or revise pre-determined, ground norms and add others, and
   ...post ground norms so all can see.
   Note: Save norms and post them at subsequent meetings.
3. When appropriate, walk to the norm chart and point to the norm being violated. This is a silent reminder for the group.

Caution

All groups violate ground norms on occasion. If norms are repeatedly broken, decide whether or not it is a problem. If so, talk with the norm breaker. If the problem persists, discuss the issue with the group. Change the norm, if necessary.

Variations

A. As groups/teams develop, ground norms can be revisited and upgraded to encourage higher levels of thinking and action.

B. When a meeting has the potential of being stressful or emotional, pre-draft ground norms to establish an expectation for elevated thinking and action.

How Does It Look

Basic Norms

Ground Norms

--Begin and end on time.
--One person speaks at a time.
--If you think it, share it.
--Respect the opinions of others.

Advanced Norms

Ground Norms

--Link learning to your daily work.
--Analyze and synthesize ideas for improved application.
--Remain open for way to share learning with others.

Next Steps

Do a quick assessment of a group's level of development. Pre-draft a few norms to be used at an upcoming meeting or training session.

Tools

Histogram

Summarizing Data Over Time

Background

A histogram is a specialized type of bar chart used to summarize data collected over a period of time. Individual data points are grouped to reveal the frequency. High bars indicate more points in the group; low bars fewer points in the group. The tool is used to reveal patterns or to determine a baseline.

When to Use

- When analysis of a large amount of data can reveal improvement opportunities
- When analysis can be used to predict future performance

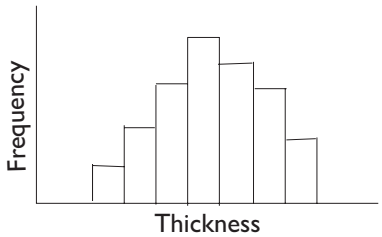
How to Use

1. Decide on the measure (e.g., scores).
2. Collect the data points on a process, product, or procedure. (at least 50-100 data points)
3. Count the data points and prepare a frequency table.
4. Determine the range (R) by subtracting the smallest number from the largest number.
5. Determine the number of class intervals (K). Note: roughly the square root of the number of data points.
6. Determine the class width (H) by dividing the range (R) by the calculated number of class intervals (K).
7. Determine the bar boundaries (end points).
8. Construct the histogram chart placing the values for the bars on the horizontal axis and the frequency on the vertical axis.
9. Construct the bar graph.
10. Analyze the findings. Determine centering (where distribution is centered), variation (spread of data), shape (normal bell, positively or negatively skewed, bi- or multi-modal distribution) and process capability (results compared to requirements).

Hints

The study of data patterns generates new learning. Collect enough data points to accurately reflect patterns. Collect data over sufficient time to ensure that all options are included.

How Does It Look



Next Steps

Use the findings to indicate if there has been a process change, to predict future performance, or to determine if requirements have been met.

Interrelationship Digraph

Identifying Cause and Effect Relationships

Background

The interrelationship digraph is a tool that enables a group to systematically identify, classify, and analyze the cause and effect relationship among critical issues. Key drivers and outcomes are determined that can help drive an improvement initiative.

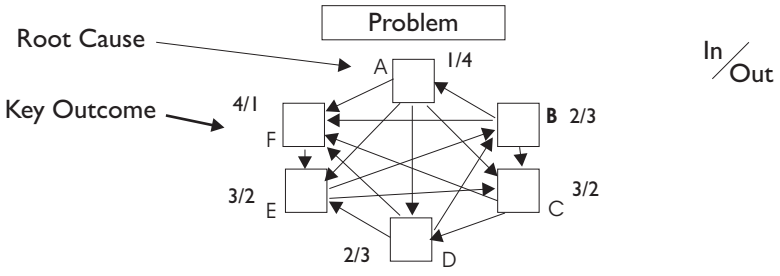
When to Use

- When multi-dimensional thinking is needed
- When it is critical to explore the interrelationships among all issues
- When group ownership is essential for an effort
- When the source of disagreement needs to be understood
- When root causes are important even though data are unavailable

How to Use

1. Agree on the problem statement.
2. Identify all of the issues. Note: Use affinity diagram to identify and categorize issues.
3. Number the ideas.
4. Choose any issue as a starting point. Work through them in sequence.
5. Look for cause/influence relationships between all of the issues. Ask "Is there a cause/influence relationship?" If yes, ask "Which direction of cause/influence is stronger?" Draw a one-way relationship arrow from the stronger cause to the effect. The arrow head goes toward the effect. **Do not use two-headed arrows.**
6. Tally the number of outgoing arrows and the number of incoming arrows. Write the number of outgoing arrows and the number of incoming arrows for each issue.
7. A high number of outgoing arrows identifies a root cause. A high number of incoming arrows identifies a key effect (outcome).
8. Focus planning efforts on the issue with the highest number of incoming arrows.

How Does It Look



Next Steps

Consider using the identified key outcome as a measure of overall success or as a source for redefinition of the original issue.

Jigsaw

An Efficient, Cooperative Way to Learn Material

Background

The jigsaw cooperative learning technique was developed in the 1970's by Elliot Aronson and his students. Each participant is essential for completion of the jigsaw activity and full understanding of the selected materials.

When to Use

- When all participants need to learn the selected materials
- When active participation for learning is needed

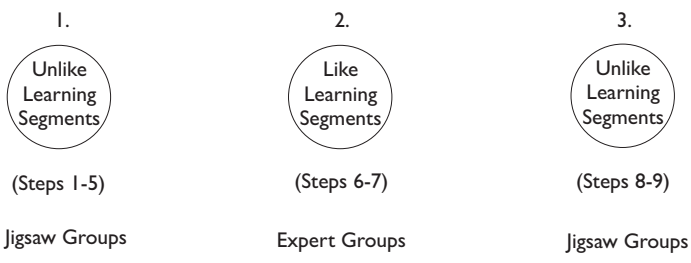
How to Use

1. Preselect five to six learning segments.
2. Divide participants into small "jigsaw" groups of five to six participants.
3. Appoint one participant from each group as the leader.
4. Assign one learning segment to each participant within the group. Make sure each participant has direct access only to his/her own assigned learning segment.
5. Provide time for each participant to read and become familiar with his/her assigned learning segment.
6. Form temporary "expert" groups by having one participant from each "jigsaw" group join other participants assigned the same learning segment.
7. Each "expert" group discusses main points of their learning segment and rehearses the presentation they will make to their "jigsaw" group.
8. Participants return to their original "jigsaw" groups to present their assigned segment to group members and encourage others to ask clarifying questions.
9. At the end of the session, provide a quick check for understanding.

Hints

Float from group to group, observing the process. Provide the leader with private, suggested interventions, if a participant is dominating the learning discussion.

How Does It Look



Next Steps

See more information at http://www.jigsaw.org.

Matrix Diagram

Finding Relationships

Background

Matrix diagram (table, chart) enables group members to systematically identify and analyze information. It is an orderly arrangement of data, especially one in which the data are arranged in columns and rows in an essentially rectangular form.

When to Use

- When information needs to be clear and communicated
- When work needs to be distributed appropriately

How to Use

1. Select the key factors affecting a successful implementation.
2. Select group members who have knowledge related to the factors.
3. Select a matrix format.
4. Select and design relationship symbols (if applicable). Note: a matrix can be text only.
5. Complete the matrix.

Variations

A matrix diagram is based on related factors and how they affect each other. More important than the tool is "matrix thinking"--linking component parts and identifying relationships. Design the matrix to improve the quality of conversation that leads to better decisions. A matrix can be simple or complex.

How Does It Look

Simple:

Data Matrix				
Product Service	Customer Expectations	Input Measures	Output Measures	Process Measures

More Complex:

Legend:

- ◇ Prime Responsibility
- △ Secondary Responsibility
- ◯ Keep Informed

	Central Adm	Campus Adm	Teaching Staff	Students
District Planning	◇	△	◯	◯
Site Planning	◯	◇	△	◯
Classroom Planning	◯	◯	◇	△
Student Planning		◯	△	◇

Next Steps

The matrix is an implementation planning and monitoring document. The key to success is ongoing monitoring with adjustments, as needed.

Nominal Group Technique (NGT)

Ranking Ideas

Background

Nominal group technique (NGT) is a tool to quickly reach consensus on issues, problems or solutions. Each group member ranks the items. A group ranking is produced by combining individual rankings.

When to Use

- When group commitment is needed
- When individual group members need to participate without feeling pressure from the group

How to Use

1. Generate the list of issues, problems or solutions using brainstorming. Note: If the list is large, refer to "Brainstorming" description for ways to get the list to a manageable number.
2. Write the statements in large letters on chart paper. Use a "bullet" to identify each statement. Leave space between each statement.
3. Distribute post-it notes to each group member that equal the number of statements on the chart paper. (e.g., 10 statements = 10 post-it notes)
4. Each group member will number each post-it note, one through the number of statements, using numerals. (e.g., 1 - 10.)
5. With the **largest number the most important ranking** and the **smallest number the least important ranking**, each group member attaches a post-it note beneath each statement on the chart paper.
6. The facilitator and a group member add all post-it note numbers for each statement and write the total number beside each statement.
7. The list is rewritten in priority order--from largest number to smallest number. The result is a ranking from most important to least important.

Variations

A. Rather than using post-it notes, the statements are labeled with letters--A through the number of statements (e.g., A - J). Each group member records the corresponding numbers on a piece of paper and rank orders the statements. The individual rankings are combined to produce the overall ranking.

B. Each group member is given 100 points. Each member distributes the points among as many or as few choices as desired.

C. Each group member numbers five post-it notes, 1-5. Each member distributes the notes among five choices. Five (5) is most important.

Next Steps

Develop strategies and action plans to address the highest priorities.

Pareto Diagram

Focusing on Key Problems

Background

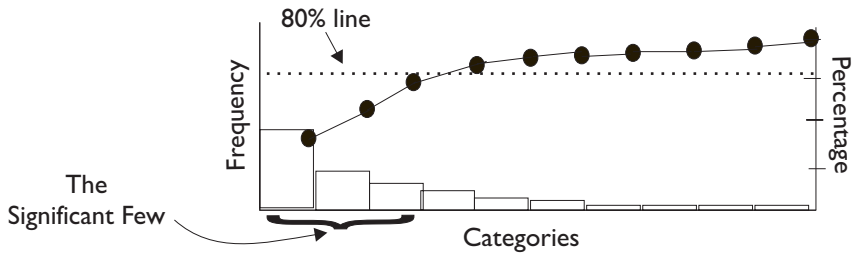
The Pareto diagram is a simple bar chart that ranks related measures in decreasing order of occurrence. The purpose of the diagram is to separate the significant aspects of a problem from the trivial ones. The proven Pareto principle: 20% of the sources cause 80% of any problem.

When to Use

- When finding the cause that has the greatest potential for positive impact, if solved
- When a path is needed for solving problems: greatest impact to lesser impact

How to Use

1. Determine the problem. Write it as a statement.
2. Select logical categories for the identified problem. (Data can be divided into categories by time, location, type, or symptom.) Note: Brainstorming or actual data can be used.
3. Choose the most meaningful unit of measure--frequency or cost.
4. Select the time period for the study.
5. Collect the data. Construct a frequency table from the data. List the categories in decreasing rank order by frequency.
7. Calculate the cumulative frequency for each category (the number of occurrences in the category plus all frequencies in categories above it).
8. Create a chart: horizontal axis with scale (divided into equal parts, same number as there are categories--all the same width) and vertical axis with left scale (frequency) and right scale (divided into four equal sections labeled 25%, 50%, 75% and 100%).
9. Label the bars for each category (horizontal axis), label the frequency scale (left vertical axis), and label the percentage scale (right vertical axis).
10. Draw bars and the cumulative frequency line based on the data.
11. Review the data. Identify categories that are significant compared to those that are trivial. Note: You may find that the significant few categories make up approximately 80% of the data.



Next Steps

Focus planning and implementation on the significant few.

Plus/Delta Chart

Collecting Feedback for Improvement

Background

A plus/delta activity is a quick way to collect feedback on "What went well?" and "What can be improved?" It can be used as a process check or a culminating activity for a project, meeting, or professional development session. It can also be used to assess a current situation or to review how a team is functioning.

When to Use

- When reflections can provide information for improvement
- When feedback is needed from all participants

How to Use

1. Draw a T-chart.
2. Label the left column "plus" **(+)**.
3. Label the right column "delta" **(△)**.
4. Ask participants to reflect on what went well? Record responses in the "plus" column. Note: The facilitator will determine whether participants offer responses randomly or round robin.
5. Ask participants to reflect on what could be improved. Record responses in the "delta" column. Note: Randomly or round robin.

Variations

A. Participants can write pluses and deltas on post-it notes and attach them to a prepared T-chart.

B. Participants can complete a prepared individual T-chart. The individual charts can be compiled and results can be shared at a later time.

How Does It Look

+	△
Learned something new	Three-hole punch the handouts
Training was informative	Use realistic situations for PDSA
Hands-on was helpful	Provide space for notetaking
Good examples	

Next Steps

Review the reflections. Make adjustments as needed. In future upgrades (products, processes, or structures) include ideas from reflections. Call attention to the source of the change.

Multi-day professional development sessions provide an opportunity to model the use of reflection results to better meet the needs of participants. Giving participants credit for the upgrades encourages continuous improvement thinking.

Tools

Run Chart

Identifying Trends

Background

A run chart is a line graph of data plotted over time. The purpose is to study the system to identify trends, patterns, shifts, or cycles.

When to Use

- When comparing performance measures before and after implementation of a solution
- When early identification of system performance is needed

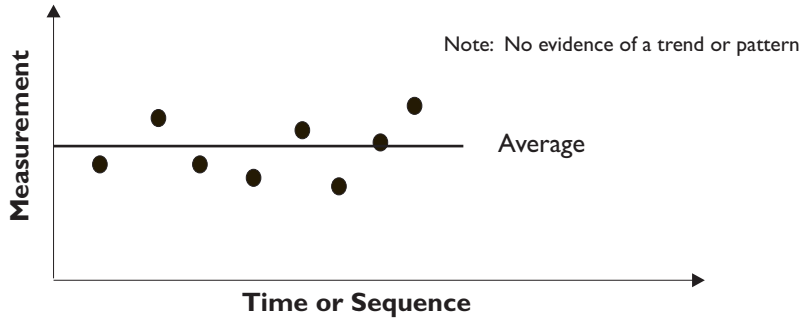
How to Use

1. Determine the process performance measure to be tracked.
2. Collect the data. **(25 data points is a rule of thumb)**
3. Create a graph with a vertical and horizontal axis. The vertical axis is the full range of measurements. The horizontal axis is the data collection time sequence.
4. On schedule, plot the collected data. Watch for trends, patterns, shifts, or cycles. If none appear, calculate the average: the sum of the measured values divided by the number of data points.

Hint

Resist reacting to normal variation in data points. Focus energy on recognizing meaningful trends and patterns. **Seven data points roughly forming a pattern (upward or downward) is a rule of thumb for system impact.**

How Does It Look



Next Steps

Explore strategies that can positively impact the performance of the system toward goal. Goal Examples: (A) Improved student achievement as shown by an upward pattern in reading comprehension (B) Improved student discipline as shown by a downward pattern in

Scatter Diagram

Measuring Relationships Between Variables

Background

A scatter diagram is a tool used to study and identify the possible relationship between the changes observed in two different sets of variables. In addition to the relationship, the tool provides a picture of the outliers--those that defy the expected relationship. Often there is much to be learned from the study of outliers.

When to Use

- When causes need to be analyzed
- When hunches need to be tested

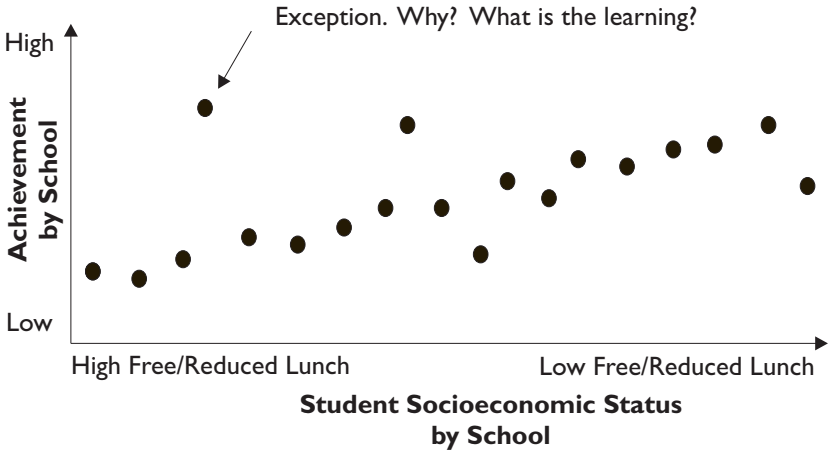
How to Use

1. Identify two factors. They can be (A) a quality characteristic and a factor that affects it, (B) two related quality characteristics, or (C) two factors suspected of relating to the same quality characteristic.
2. Draw and label the horizontal and vertical axes.
3. Draw the scale for each axis.
4. Plot the data points.
5. Look for patterns. What can be learned from the pattern?
6. Look for outliers. What can be learned from the outliers?

Hints

A scatter diagram can be constructed if a relationship is **believed** to exist between two system factors. The scatter diagram is used to analyze causes and identify patterns. Exceptions to the pattern may offer your greatest opportunity for new learning.

How Does It Look



Next Steps

Look for patterns, peaks or troughs, and outliers. To become more skilled at interpreting scatter diagrams, refer to tool books. A web search provides some assistance.

Tools

Systems Framework — *Solving Problems*

Background

Systems Framework is a systematic way to collect information related to a problem and engage participants in a process that leads to a clear vision of problem resolution.

When to Use

- When participants have common experience related to the problem
- When participants have agreement on the problem issue

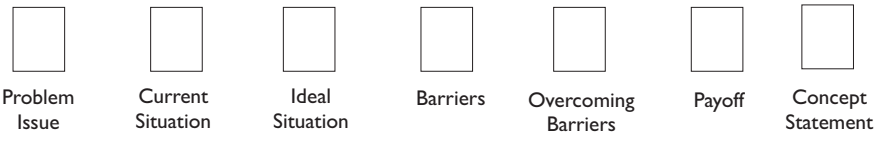
How to Use

1. Write the **problem issue** on chart paper and post it.
2. Brainstorm the **current situation** related to the problem. Chart responses. Post them next to the problem issue.
3. Brainstorm the **ideal situation** related to the problem issue. Chart responses. Post them next to the current situation.
4. Brainstorm the **barriers** to achieving the ideal situation. Chart responses. Post them next to the ideal situation.
5. Brainstorm ways to **overcome barriers.** Chart responses. Post Them next to the barriers. (You may want to use the nominal group technique (NGT) tool to identify the highest impact ways to overcome barriers.)
6. Brainstorm the **payoff** if barriers are overcome. Write a single statement to describe the payoff. Post the statement next to the overcome barriers.
7. Develop a concept statement to guide problem resolution action.
   (A) State the problem issue from #1 (i.e., To improve student achievement)
   (B) Bullet the highest-impact ways to overcome barriers from #5.
   (C) Add the payoff statement from #6.

Hint

The Systems Framework provides a concept statement for action plan development. (See samples on pages 21-22, 65.)

How Does It Look



Next Steps

Develop action plans aligned to the concept statement. The action plan includes: actions, responsibilities, resources, timeline, monitoring structures/processes with a timeline, and evaluation structures/processes with a timeline.

10-4 Consensus

Making Decisions

Background

A consensus decision represents a reasonable decision that all members of the group can accept. It is not necessarily the optimal decision for each members. It is more difficult and time consuming than a democratic vote or an autocratic decision.

When to Use

- When a team is stuck in trying to reach a consensus on a topic
- When agreement is needed in a situation

How to Use

1. Each member gets 10 total votes.
2. In each rotation, a member may cast up to four votes on one or more item(s). For example, four votes for one item, two for one item and two for another, or one vote for each of four items.
3. A member may choose to pass without casting votes. Anyone passing can vote at the end of the round or wait until the next round.
4. After each round, the team takes time to dialogue about the different perspectives of team members in an attempt to come to a shared understanding and direction.
5. The next round, each member can cast up to four votes in the same manner as the first round.
6. The round continue with voting and dialogue until all members have cast all their ten votes.
7. The team reviews the decision to understand perceptions, feelings, etc.

Hints

Consensus is a group decision believed to be the best approach for the organization at the present time. It does not suggest unanimity. Each individual should have the opportunity to be accepted by the group, to express opinions, and to have his comments listened to.

How Does It Look

The continuum from voting to consensus places 10-4 consensus close to consensus. The power is in the dialogue.

Consensus Guide

- Present your position.
- Seek out and accept different opinions; disagreement improves the decision.
- Seek to understand the reactions and comments of others.
- Explore options acceptable to all participants.
- Ensure participants accept the solution for basically similar reasons.
- Avoid conflict-reducing techniques (e.g., voting, averaging, etc.)

Tree Diagram

Mapping Implementation Tasks

Background

A tree diagram, also called a systematic diagram, breaks down a broad tasks or goal into increasing levels of detailed actions that must be completed to achieve the goal.

When to Use

- When a complex project becomes the focus of work and needs to be monitored for completeness
- When all stakeholders need to see the whole picture

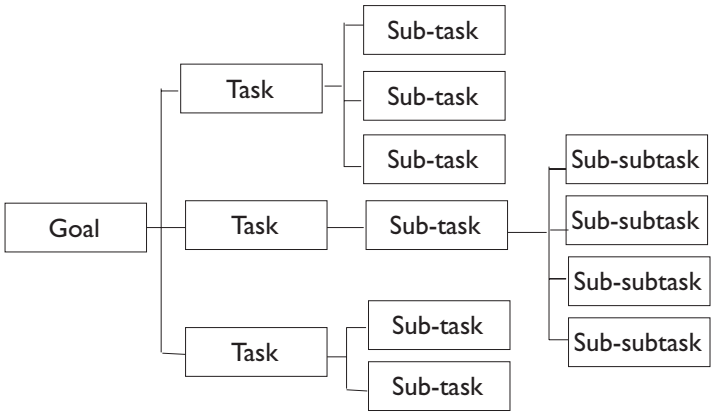
How to Use

1. Write the goal statement as a complete sentence.
   Note: The goal statement could come from a project charter, the root cause of an interrelationship digraph, or a category in an affinity diagram.
2. Generate the first level of major sub-goals. These becomes the means by which the goal is accomplished. Note: Brainstorming
3. Complete the diagram for each major sub-goal. Keep asking the question, "What needs to happen to achieve this goal or solve this problem?"
4. Review the completed tree diagram for completeness and a l logical flow.
5. Assign responsibilities for completion of the action steps. Note: A matrix diagram can be used to record assignments.

Hints

The tree diagram is used to generate a specific list of action steps which must be completed.

How Does It Look



Next Steps

Establish a time line. A Gantt chart can be used to provide a detailed implementation schedule to better orchestra the work.

Tools

Behaviors Matrix *Descriptor*

Background

When to Use

How to Use

Hints

How Does It Look

Next Steps

Tools

Tool *Descriptor*

Background

When to Use

How to Use

Hints

How Does It Look

Next Steps

Support Materials