Application exercise: introducing problem-solving using the nominal group case technique

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ABSTRACT

The short case involves identifying and solving a problem where building tenants are complaining about 'elevator wait time'. In the case/exercise students are given two minutes to come up with as many solutions as possible. Approximately 95% of the ideas developed address a 'capacity problem' when in fact the problem is simply one of 'human impatience'. The discussion and lecture that follows focus on the steps in the 'Rational Decision-Making/Problem-Solving' process. The main lesson from the case is that the first step – correctly identifying the problem is the most important step and the step that is frequently overlooked. A review of useful techniques for better problem identification and for improving critical thinking skills concludes the case.

Key Words: Rational Decision-Making, NGT, Six Thinking Hats

INTRODUCTION

Problem solving/decision-making is arguably the most important management function. Problem-solving/decision-making skills are used for developing and implementing strategy and for making long-term strategic as well as short-run tactical decisions. To a great extent, the quality of the manager's decision-making and problem-solving skill determines whether or not the manager adds value to the organization. With exceptions, managers typically aren't engaged in actual work processes, but rather in making sure that the processes function properly and that appropriate decisions are implemented. Ultimately, university business programs at both the undergraduate and graduate level are intended to impact, in a positive way, students' ability to make sound decisions and to correctly identify and find solutions to problems.

This paper discusses a teaching strategy that the authors have found to be useful in introducing problem-solving and decision-making in a variety of management courses. The approach uses a short case and initially employs the Nominal Group Technique that allows all students to participate and quickly identify solutions to a problem that is presented in the factual case before an open class discussion of the solutions that students have identified. The case along with the discussion and lecture that follows requires approximately 45 minutes and no outside resources. A more extended study of critical thinking skills and techniques can follow the introductory case.

The case: The elevator exercise

Students are told to assume they are employed by an investment company that has recently purchased a large modern office building in a nearby city. They are assuming the role of the leasing agent, renting office space to numerous professional tenants. It is the leasing agents' job to keep the tenants happy and to keep the building fully occupied. The building has 30 stories, four passenger elevators, one freight elevator and an interior stairwell. Since purchasing the building approximately 6 months previously, the leasing agent and the investment firm have received a large number of complaints from tenants in the building, complaining about the 'wait-time' for the elevators. Students are then told to individually (with no discussion) list as many ideas as they can in two minutes to solve the problem. The class is encouraged to think outside the box. Reasonable solutions are welcome, but so are "off-the-wall" solutions. Nothing is off the table. Students are encouraged to come up with as many ideas as they can think of in two minutes – with evaluation of the ideas to come later.

USING THE NOMINAL GROUP TECHNIQUE (NGT)

The Nominal Group Technique is similar to Brainstorming with the exception that everyone in the group writes down all of their ideas before sharing them with the group moderator. Individuals then read their entire list with no discussion until everyone has had an opportunity to share their ideas. This tends to improve the participation of those reluctant to share and to reduce the tendency for certain group members to dominate the generation of ideas. One negative factor with the Nominal Group Technique is a tendency for a good bit of redundancy in ideas listed. This sometimes results in a final list that is just the ideas that 'got the most votes'. This may result in reducing the robustness of discussion of various ideas and lead to the obvious or popular (but possibly poorer) choice. It is the moderator's role to insure that

all ideas are fully explored and to prevent the tendency to just focus on the common ideas. Using Bono's 'Six Thinking Hats' model is a useful technique to be used by the moderator (Bono, 1985). This technique will be discussed in more depth later.

Typical results of the exercise

Typically, individual students will come up with anywhere from 4 to 7 ideas in two minutes, 5-6 being the norm. For the typical class, 12 to 15 different ideas are common. Following are the 'typical' solutions the class identifies (in no particular order of frequency):

- Speed-up the elevators
- Add an elevator (exterior of the building)
- Convert the freight elevator to a passenger elevator
- Use the freight elevator for passengers only during peak hours
- Convert the stairwell to an escalator
- Develop an express elevator system (one elevator serves top ten floors only)
- Move heavy traffic tenants to lower floors; light traffic tenants to higher floors to reduce elevator usage
- Have elevators stop only on every other floor
- Start a 'health club' and encourage use of the stairs
- Encourage tenants to stagger hours; some starting at 7:30, others at 7:45, others at 8:00, 8:15 and so on
- Build a parking deck up the side of the building so everyone can park on their level
- Have helicopter pad on top of the building for upper floor tenants
- Build walkways at various levels from the building to neighboring buildings and use their elevators

Actual case results

The actual case solution is a classic. An architectural consulting firm was hired to study the problem and recommend a solution. The investment firm was expecting to have to make a significant financial investment to correct the problem. Which solution from above did the consulting firm recommend? None of the above! After studying the problem for several weeks, the consulting firm turned-in a report of 3 to 5 pages and recommended that mirrors be installed in each lobby in front of the elevators. The investment firm spent a few thousand dollars on mirrors (rather than a few million on new elevators), they were installed, and the number of complaints dropped substantially.

What was the problem? Simple human impatience – a need for a distraction. Tenants are typically running a bit late, are in a hurry, push the call button and have to wait 1-2 minutes during rush hours. In a cold, sterile lobby this can seem like an eternity. In reality, it will be impossible to have an elevator, immediately, every time one arrives at the elevator station. They may have to wait a minute or two during peak times. But the tenants need something to distract them during the wait – this is what the consulting firm concluded. Notice the typical solutions identified by the students. They almost always address the wrong problem. In almost every case they address a 'capacity' problem. The elevators are too slow, there are two few elevators, there is overuse of the elevators, etc. But capacity is not the problem. The problem is simply human

impatience. There is a need for a distraction. There is absolutely nothing unique about mirrors. Once one truly understands the problem, there are numerous solutions that will work. Flat screen televisions in each lobby, magazine racks, art displays, etc. A key lesson is that understanding the problem is most important. Then finding solutions is relatively easy. At this point the rational decision-making/problem solving process can be introduced.

RATIONAL DECISION-MAKING/PROBLEM-SOLVING PROCESS

There are five steps in the rational decision-making/problem-solving process (Daft, 2003):

1. Correctly Identify the Problem/Goal
2. Develop Alternatives
3. Evaluate Alternatives
4. Select and Implement the choice
5. Follow-up

In the case, students typically start at step two – by listing alternatives without critically thinking of step one. One of the most important lessons from the exercise is to stress that correctly understanding the problem or goal is the most important step in decision-making. Alternatives can be completely useless unless we truly understand the problem or goal.

Techniques for identifying/solving problems

In addition to the nominal group technique, there are many other approaches, some quite robust, that help define problems. This material can be provided as a follow-up to the case. These include:

- Brainstorming. An open, free flowing group activity where individuals share their idea with a moderator. The ideas developed are listed and discussed in an open dialogue. Individuals are encouraged to 'think outside the box' and to come up with as many ideas as possible. Ideas are not evaluated until the list is complete. A common disadvantage of the approach…some individuals tend to dominate the discussion. Other individuals with good insight and ideas are frequently reluctant to speak up. This significant disadvantage is somewhat overcome by use of the Nominal Group Technique. (Sink, 1983)
- Devil's Advocate. Individuals (or preferably teams) are assigned the specific role of identifying reasons why a choice (strategy, problem, goal, etc.) should not be considered or at least why it should be viewed much more critically before being chosen. Unlike many of the techniques identified, the Devil's Advocate technique did not grow out of the Total Quality Management movement. It was started several hundred years ago in the Roman Catholic Church. When someone was being considered for 'sainthood' certain priests were appointed with the specific responsibility to 'represent the devil' and to identify reasons why the person under consideration should not receive sainthood. (Winter, 2013)
- Delphi Technique. When using most group techniques there is a tendency for some participants to resist speaking against ideas presented by supervisors or favored peers. The pressure is to 'go along' …something related to Groupthink. The Delph Technique is an effort to avoid this and to have a more robust discussion of options. The Delphi Technique requires a bit more planning since participants may operate from different geographical locations. Modern technology does allow the Delph Technique to be a live

experience conducted in a slightly faster pace. In most Delphi Technique processes, individual responses are anonymous. This provides cover for individuals who are reluctant to argue against an idea presented by a supervisor or favored peer. No one knows who has generated the idea or the responses. A more critical evaluation tends to grow out of the anonymous nature of the exercise. There are several rounds of discussion and then voting to narrow decisions down to those critically evaluated and favored by the entire group rather than strong willed managers and/or favored peers. (Doyon, 1972)

- Ishikawa Diagrams (Fishbone Diagrams). Developed by Professor Kaoru Ishikawa in the 1960's. It is a structured cause and effect analysis that uses a diagram-based approach for thinking through all of the possible causes of a problem. It is a structured way to identify undesirable outcomes and then to identify what the possible contributing factors are. These possible contributing factors are listed on a chart that looks much like the skeleton of a fish. This cause and effect approach is used to help discover the root cause of a problem or to uncover bottlenecks in processes. It is also helpful in identifying where and why a process is not working smoothly (Phillips, 2013).
- Five Whys Method. The five whys methods was developed by Sakichi Toyoda, founder of Toyota industries in the 1930's. The technique became more popular and widely used in the quality movement that began in the 1970's. The technique uses a "go and see" philosophy which is based on answers coming from people with hands on experience in the process rather than from a remote board room. It is a simple concept where a problem is addressed by drilling down to its root cause by asking "why?" five times. By the time five reasons have been identified why an outcome is being experienced, you will usually have gotten to the root problem.
- The Six Thinking Hats Method. A powerful technique for looking at decision making from different points of view. The 'White Hat' is the thinking hat. You focus on facts and the available data. The 'Red Hat' uses intuition, gut reaction and emotion to view an issue. The 'Black Hat' looks at a decision's potentially negative outcomes, why they may not work. The 'Yellow Hat' is the optimistic viewpoint that helps you see all the benefits of a decision. The 'Green Hat' is where you develop creative solutions to a problem. It is a freewheeling way of thinking with little criticism of ideas. The 'Blue Hat' is for those who are chairing a meeting. The chair may direct discussions to the appropriate 'Hat' given the situation they are facing (Bono, 1985).
- In using the 'Six Thinking Hats' approach to solving a problem the group must understand that there are six specifically designed approaches to consider and consideration of each can lead to a higher quality decision. The group moderator will typically begin by literally or metaphorically wearing the 'blue hat'. This involves managing the process. He or she will identify the subject, the goal, or the big picture under review. Next, the group will be encouraged to put on their 'white hat'. This involves identifying information, and facts. What is currently know for certain? Then the team is encouraged to put on their 'red hat'. This involves intuition and instincts. What are the feelings of the team, irrespective of facts? Following this, the moderator may call for putting on the 'black hat'. This involves negative reasoning. Why will a proposal not work? What obstacles must be overcome? Then the moderator (wearing the 'blue hat') will direct the discussion to 'yellow hat' thinking. This seeks benefits and harmony. What are the optimistic aspects of the situation? And finally, the moderator typically calls for everyone to put on their 'green hat'. This encourages creativity,

thinking outside the box. Are there creative solutions that have not yet been considered? As new ideas and inputs are developed, it may be appropriate for another short period of 'black hat' review, which involves looking at the possible solutions from a critical standpoint. Ultimately, all six 'hats' can help better define the problem, possible solutions, and obstacles that will need to be addressed. The 'Six Thinking Hats' provides everyone permission and encouragement to look at a problem from several angles and helps insure that a thorough and systematic review takes place that will hopefully result in a better decision. Discussion is limited to that associated with the 'hat' being worn. Most 'hat' discussions are limited to approximately 2 minutes per participant, with the exception of the 'red hat', where discussions are target to 30 seconds per participant.

TEACHING NOTES

Following the case, these points are likely to be experienced and/or reinforced:

- The most important step in the Rational Decision-Making/Problem Solving Process is to correctly identify the problem.
- In the case presented, most students begin at step two – identifying alternative without thinking through the real problem of the case. They view the problem as 'capacity' when in fact it is 'human impatience'.
- The case is short and can be presented in five minutes or less.
- Students identify their 'solutions' in 2-3 minutes without discussion.
- Each students reads their list and they are posted on a whiteboard. Redundant ideas are noted but not listed.
- Most students will develop 4-6 ideas.
- Most classes will develop 12-15 different ideas.
- Approximately 95% of ideas presented will address a 'capacity' problem, which is NOT the real problem.
- The entire exercise, discussion and lecture that follows can be completed in 45 – 50 minutes.
- The problem is simply human impatience. Many solutions could address this problem. Failure to correctly define the problem can lead to very expensive mistakes.
- There are a number of techniques that can help identify problems. These include: The Nominal Group Technique, Devil's Advocate Technique, Brainstorming, Delphi Technique, Ishikawa Diagrams, 5 Whys Methods, and the Six Thinking Hats method.
- The 'Six Thinking Hats' approach takes practice and time but may result in a more robust discussion and a higher quality outcome

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