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Abstract Title: Challenging the Perceived Differences in the Issues of Managing Operations in the Service versus Manufacturing Sectors

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Challenging the Perceived Differences in the Issues of Managing Operations in the Service versus Manufacturing Sectors

Abstract:

A significant challenge for anyone teaching operations management is the perception that the issues challenging operations managers in the service sector are very different from those faced by operations managers in manufacturing. Offering separate curricula for each area is often impractical. In the case where a single course is offered, the focus may be more on one content area than the other often resulting in dissatisfaction for some students. This paper describes a process that allows a facilitator to simply and quickly test this perception. The participants, drawing from their experience, provide examples of why it is difficult to successfully manage day-to-day operations and then uses the Affinity Diagram of the Quality Management Tools and some of the logic (Thinking Process) tools of the Theory of Constraints to determine if the challenges facing operations managers in the service and manufacturing arenas are more similar or different.

Key Words:

Service and operations management

Affinity diagram

Thinking processes

Theory of Constraints

Teaching techniques

Introduction

As many economies grow, there is a frequent shift from a manufacturing to a service base or at the very least a significant growth in the importance of the service sector. As this shift in focus or base occurs, there is increasing pressure and expectations on educational institutions, specifically business management programs, to include specific management tools and skills in their curricula relative to not only the service and manufacturing sectors in general, but subsets of these sectors as well such as government, healthcare, distribution, etc. If each of these areas of interest are comprised of discrete issues and challenges then the only way the educational institution can succeed in meeting the needs of all of their students, assuming student interests parallel the diversity of the potential focus areas, would be to establish unique programs around each concentration area. For

many institutions this is not practical in terms of the number of courses that would be required and faculty and other resources to support such an offering due to budget or other constraints. As a result, many institutions strike a compromise between either offering a limited set of programs that fully support a subset of the market segments down to very specific details and a general program that covers the higher level details for all segments but very few segment specific details. In either of these cases, the resulting compromise is a lose-lose solution as either some market segments are completely left out or the details needed are missing. Perhaps if we examine the underlying conflict closer by challenging our assumptions, we will find a solution that allows us to offer the full field of content areas and the needed detail at the same time.

The Problem

In the business school of Metropolitan State College of Denver, we have chosen to lean towards one side of this conflict by offering a general program in management that has more detailed content in a limited number of subject areas. One result of this is that we offer a single course that addresses the management of the day-to-day operations of an organization titled “Manufacturing and Service Management”. While the content of this course is operations management, the very nature of the title implies that there are two discrete subject areas: manufacturing and service. We know that some of our students have a very strong idea of where they want to go in terms of their future career path meaning they have preconceived expectations of their educational needs relative to their identified career paths. If these students, for example, believe that they are going into the service sector, then anything titled “manufacturing” is perceived as of low, or no, value in terms of their educational needs. The same would be true for those students who see

themselves heading into the manufacturing or distribution arenas in terms of questioning the value of any content labeled with a service sector focus. At the same time we have other students who have no idea at all as to what the career options are let alone which option or direction to pursue meaning they need to be prepared for both manufacturing and service. If, as an institution and or instructor, our objective is to meet the needs of all of these students then we must cover both content areas without creating the feeling in one group that their time is being wasted when the topics don't match their direction of choice or in the other group, that critical content is being left out of one segment in favor of the other. How can we meet both of these seemingly divergent needs when there may be more content in any one concentration area, manufacturing or service, than a single class can accommodate yet alone both content areas together in the same class?

Within the content of a management philosophy known as The Theory of Constraints (TOC), there is a set of problem solving tools called the Thought Process Tools (TP) that are based on using logic and intuition to:

- Analyze a situation allowing us to separate symptoms, undesirable effects, from core causes or problems by using a structure called a Current Reality Tree.
- Identify the conflict that is allowing the core problem to exist by using a structure called an Evaporating Cloud.
- Identify and test possible solutions to the problem making sure that the proposed solution delivers the desired results while at the same time

identifying possible side effects and that actions needed to offset them by using a structure called a Future Reality Tree; and

- Build a plan for implementing the solution by using a structure called a Prerequisite Tree and a second structure called a Transition Tree.

Conflict occurs when we have two or more requirements that must be met for success yet the actions we feel compelled to take to yield each individual requirement are either mutually exclusive or consume more of a limited resource than is available. This is slightly different when the problem is between two people in that we, as an individual, no longer have two requirements. There is now a “Need” for each person that replaces the requirements. The actions or wants are still mutually exclusive or exceed the availability of some resource. In the Theory of Constraints (TOC) Thinking Processes (TP) we use the “Evaporating Cloud”, sometimes referred to as a conflict resolution diagram, to help us verbalize the conflict, explore the assumptions that make it exist, and then propose injections, changes in reality, that cause the assumptions to be no longer valid thus “evaporating the conflict.

We can apply the Evaporating Cloud to our problem to better understand the nature of the conflict and surface and challenge assumptions that allow the conflict to exist. Figure 1. is an example of this tool applied to our problem. The structure is composed of a single objective (entity A) that has two requirements that must both exist for the objective to be met (entities B and C) and the actions we believe are required or the conditions we believe must exist, prerequisites, to meet the needs of each requirement (entities D and

D’). The structure is read from left to right, from the tip of the arrow to its tail, by saying, “in order to ... (the statement at the tip of the arrow), I must (the statement at the tail of the arrow), because ... (the assumption or belief that connects the two entities together).

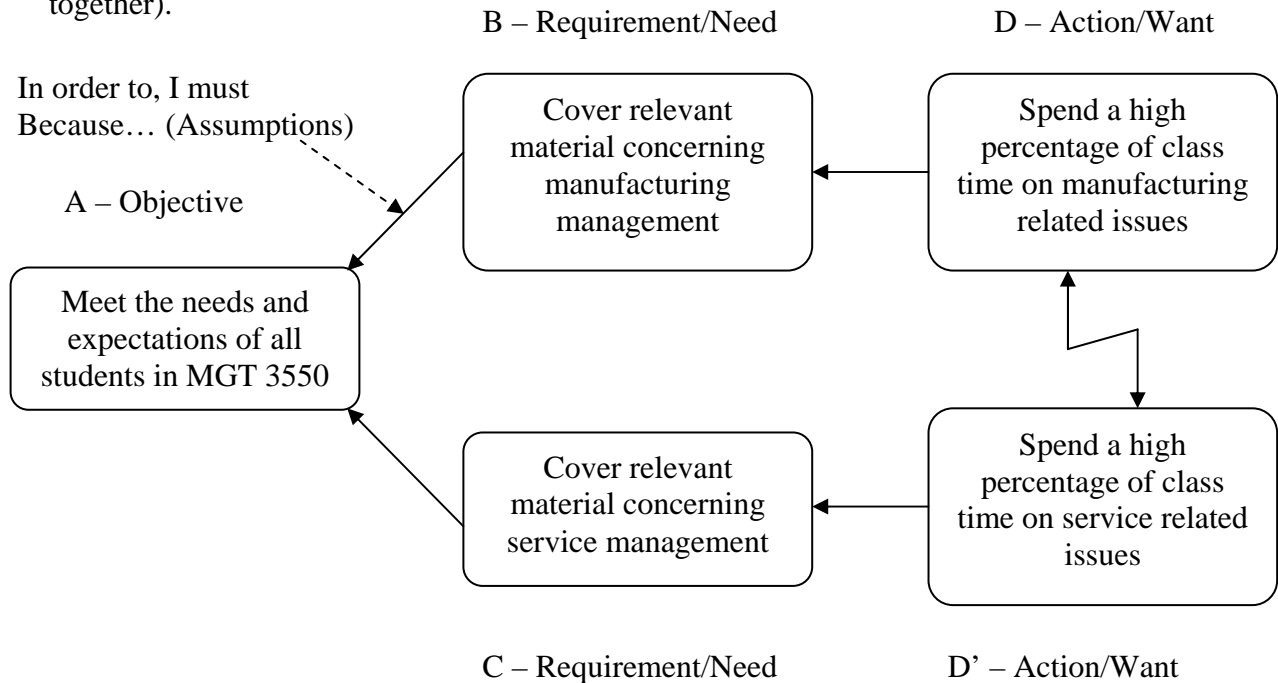


Figure 1. Evaporating cloud for Manufacturing and Service Management class

If we examine table 1 below which lists the assumptions underlying each arrow, we can

Arrow	Because ... (Assumption)
A-B	Several students have a predetermined interest in manufacturing
A-C	Several students have a predetermined interest in service
B-D	There is enough unique material about manufacturing operations management to fill an entire class
B-D'	There is enough unique material about service operations management to fill an entire class
D-D'	There isn't enough time to both as the issues for manufacturing and service operations management are more unique than similar
Challenge to D-D'	The operations management issues for manufacturing and service are more similar than unique

Table 1. Assumptions from the manufacturing and service management conflict

clearly see that the assumptions between A-B and A-C are valid and justify the need for both entities B and C to exist for us to meet the objective of meeting all student's needs and expectations. There is also no conflict between the requirements to cover both the service and manufacturing related content, as the assumptions supporting the needs of these entities are also valid. We can also accept the assumption that, if taken separately, each subject area has more than enough content to fill the available time of a single course. This leaves us with the assumption at the point of conflict itself, the D and D' entities, that there isn't enough time to do both because manufacturing and service management issues are too different to combine them within the available time of a single course and still meet the needs of the students. The last line in the table lists the challenge, or alternate assumption, to the D-D' original assumption. If it can be shown that this statement rather than the original assumption actually represent reality then the conflict between focusing on service or manufacturing evaporates as the concepts apply to both worlds and can be taught in a single block of time using one environment as the example. This requires the caveat of as long as a translation, if needed, is included for applying the concept to the other environment. What follows is the approach utilized with each section of this course to engage the students in testing this alternate assumption.

Methodology

The most common approach to test our alternate assumption, would be to identify the relevant operations management content of each sector, service and manufacturing, quantify the time needed to adequately cover each content item, compare for similarities and differences, add up the total time needed to see where we stand and then begin

discussing what to trim because we don't have enough time. This approach presents several obstacles:

- The students don't have the knowledge of what the established management tools and topics are so they can't be engaged to identify them. This is what they are in the class to learn thus, if we follow this approach, they are already possibly disengaged from or disillusioned with the process.
- Engaging the students in which topics to trim is unlikely to result in a true consensus where all feel that what is left is what is really important to them. It is more likely to result in a compromise where they all feel they may have given up something important thereby preventing us from attaining our objective of meeting all student's needs and expectations for the course.

While most students can't contribute to generating a list of the accepted operations management content and tools for either the manufacturing or service environments, they can easily draw upon their work experience to identify and write down a list of the challenges of managing the day-to-day operations of an organization regardless of whether their experience was in the service or manufacturing sectors. They can also do this even if they have no management experience because, even as a worker, they have experienced the day-to-day expectations and behaviors of their managers. All we have to do is ask them to complete the statement, "It is difficult to manage the day-to-day operations of an organization because...". With the use of a tool from the quality management tool kit, the Affinity Diagram, we can use these lists of issues to actively engage the students in testing our alternate assumption, and in the process, tailor their

expectations for the class to increase our chances of reaching the overall objective of meeting their needs.

The Affinity Diagram process, also known as the affinity chart, thematic analysis or the K-J method, is a very informal process used to engage all members of a group in the process of organizing an extensive list of issues into groups of common issues allowing for better understanding. The basic process is as follows:

1. Have each individual come up with his or her list of issues or conduct a brainstorming session to generate the list. For the purposes of our intended use, it is better to have each individual generate their own list as we aren't trying to have an all inclusive list and, when the rest of the process is followed, duplicate items may indicate certain issues are more important as they are common to a significant number of the individuals within the group.
2. The basic Affinity Diagram process would next have each person transfer the items on their list to separate note cards or sticky notes with one item per card/sticky note. Sticky notes are a better choice, as they will work on either a table or wall. We need to add an additional element to this step to facilitate our purpose. We need to use one color of sticky notes for manufacturing issues and a second color to represent service issues. The students need to write each item on the color sticky note that represents the reference environment they were thinking of when they identified the issue. If they had no one environment in mind then they should pick one color at random for that item and, if they have more than one

- item that they can't classify as to manufacturing or service then simply alternate which color of sticky note they use for each subsequent item on their list.
3. Split the individuals up into smaller teams of approximately 5-7 individuals per team and have each team do the follow steps with their sticky notes.
 4. Each team member places their sticky notes on the table or wall randomly intermixing them with those of other team members. The result would be similar to figure 2 below.

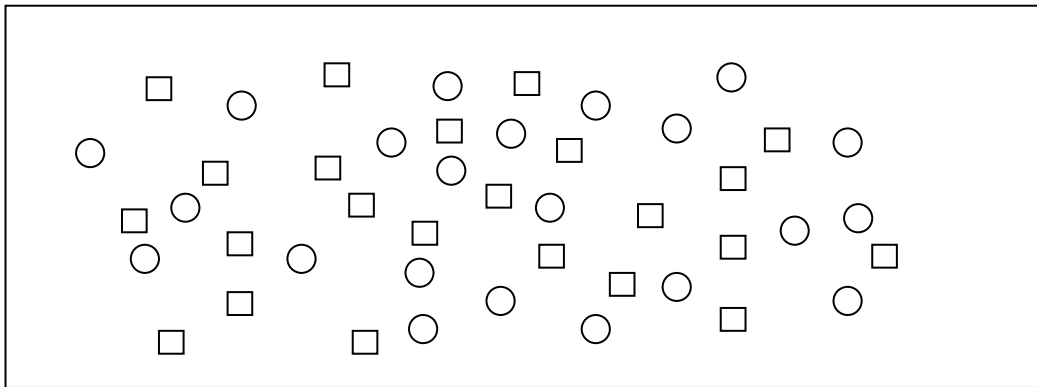


Figure 2. Random placement of cards, with one issue per card, prior to beginning the sorting/grouping process where, for the purposes of this paper, a \square represents a manufacturing issue and a O represents a service issue.

5. Each team member would then examine the individual items and, as they find two that seem related, move one of them next to the other. All individuals are doing this at the same time and, generally, without discussion so as not to influence the other members of the team. As this process continues, groupings of issues will naturally emerge.
6. Continue this process until the majority of the sticky notes are clustered into groups. There may be some items that don't fit into a group. There may also be some items that start to bounce back and forth between two groups. When this

happens, simply make a duplicate of the item on the same colored sticky note as the original and put one note in each group.

7. Develop labels for each group of cards using a third color sticky note. If two groups seem to be a subset of a larger group then a common “super group” label could be created with each sub-group placed under it. For example, if one group was personnel issues related to training and the other was personnel issues related to work habits then instead of grouping all of these under the single heading of personnel, training and work habits could be labeled as sub-groups of the super group personnel. The end result would look something similar to Figure 3.

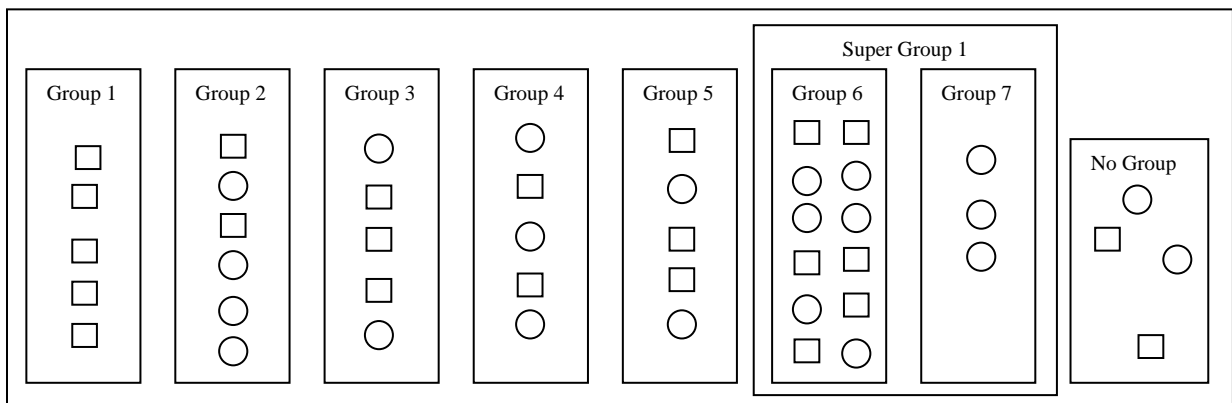


Figure 3. Final grouping of cards with titles for each group where, for the purposes of this paper, a □ represents a manufacturing issue and a O represents a service issue.

When this stage is complete, each team should rotate to the other team’s areas so that each team not only sees how their issues sorted out but also those of the other teams. Instruct them to look for common individual and group issues as well as issues that didn’t come up at their table. They should also make a general observation as to the color composition of each group in terms of all one color or a mix of the two colors.

If grouping the issues were our only objective, we would be finished at this point. We have some additional work to do as we still want to use this data to address our alternate assumption. To facilitate this we can use another of the TOC Thought Process tools, the Transition Tree.

Figure 4 is an example of a Transition Tree with the entities related to our purpose. The tree is a cause and effect diagram read from bottom to top by saying, “If (the words in the entity at the tail of the arrow) then (the words in the entity at the tip)”. Entities with no arrows leading into them are accepted as representing reality and should first be read on their own to see if the reader agrees with their content. Entities that have one or more arrows coming into them are the unavoidable outcome of the entity or combination of entities that feed into them via the connecting arrows. The structure is based on sufficiency meaning that, while other things may cause the upper entity, the ones listed are sufficient to cause it. In cases where an entity has more than one arrow feeding into it and there is nothing connecting the feeding arrows, then each arrow represents an independent cause. In cases where an entity has more than one entity feeding into it and there is an ellipse connecting two or more of the feeding arrows, then each of the lower entities associated with the connected arrows must be present for the effect to occur. For the purposes of this Transition Tree, the entities with square corners are actions being taken, those with bold, dashed borders are the assumptions being tested and those with solid bold borders are the expected outcomes if the assumption is true. These entities, those with solid bold borders, tell us what to go look for in our reality to determine which assumption was more valid.

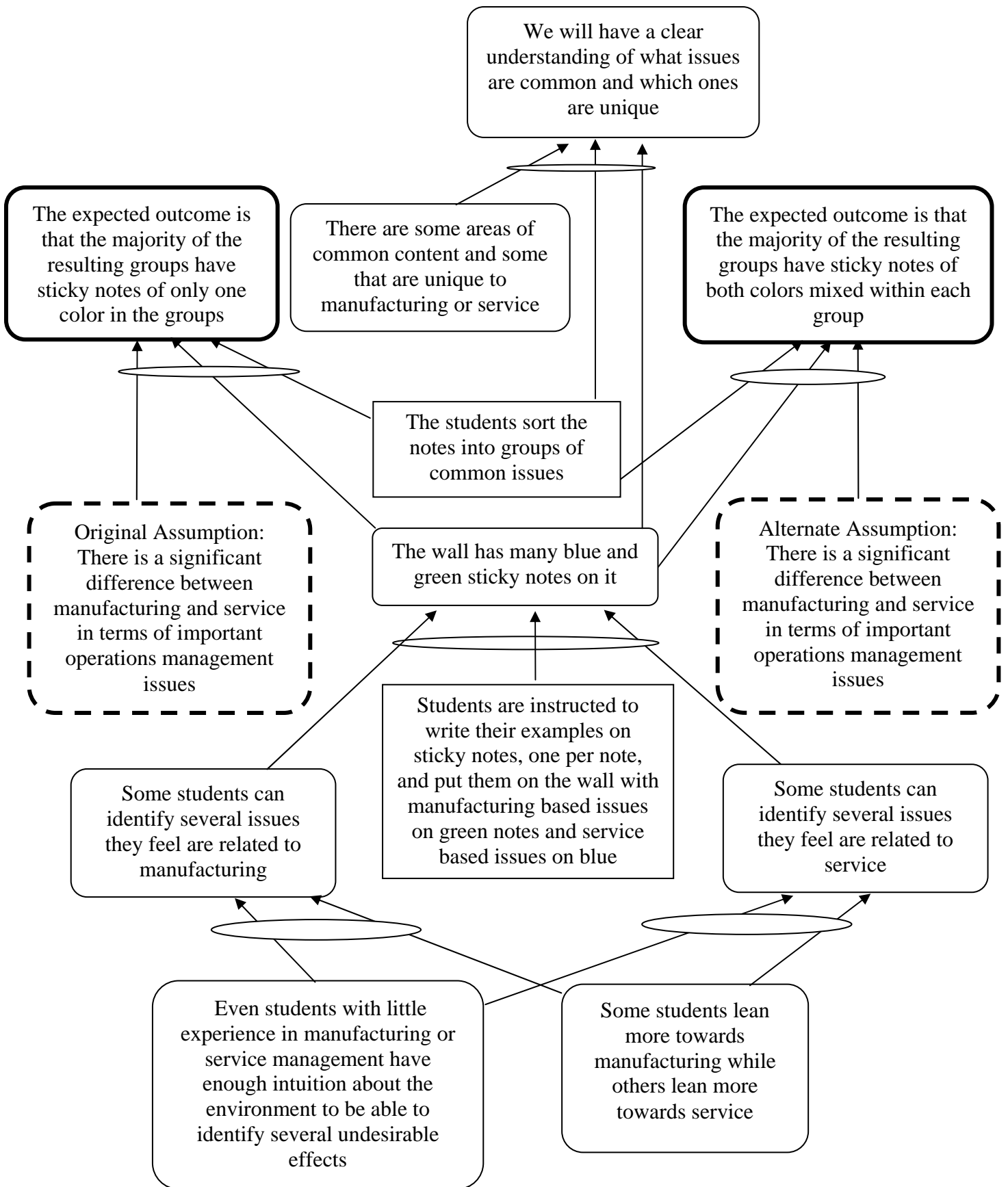


Figure 4. Transition tree to test our assumptions

In our case, our reality is each team's collection of sticky notes on each table or wall. After walking the students through this document it is easy to go back to our outcomes from the Affinity Diagram sorting process and see what the result is. According to our example, Figure 3, of the sorted and grouped issues, the issues in most groups are a mixture of manufacturing and service in terms of the reference environment they came from. The issues in Groups 1 and 7 have only one color sticky note within each of the respective groups indicating that the concerns listed in group 1 are only true for manufacturing while the issues in group 7 are only true for service. Before we accept this, we should remember that our data came from a sample, a single set of students within one class, and not the population. While it can be generalized that any group in our sample consisting of a mix of colored sticky notes, manufacturing and service, would indicate that these issues within that group are common to both worlds, the opposite is not necessarily true for the groups made up of only one color. For these groups we need to check with our students to see if the belief is that the issues are truly unique or there just wasn't anyone in the team who happened to have that concern on their list and have it associated with the other reference environment.

Outcomes

The common titles for the various groups that emerge from the process with some examples of the issues are:

1. Behavior – workers don't show up, people have a bad attitude, vacations, etc.
2. Materials – are unavailable, defective, late, etc.
3. Equipment – isn't capable of doing what I need, is broken, is too slow, etc.

4. Management – is always changing priorities, has us too busy with unimportant work, isn't available when you need them, etc.
5. Customers – don't tell us what they really want, keep changing their mind, are hard to work with, etc.
6. Information – is late, isn't available, is wrong, etc.
7. Training – people weren't trained properly, never trained, trained correctly but on the wrong process, etc.

At least one group is made up of only one color and, as such, needs to be reviewed to determine if the issues are really unique to only service or manufacturing. For example, from the above list of issues let's say that the issues that ended up grouped under the heading of customer were all color coded as being service issues. A quick poll of the students would get unanimous consensus that customers of manufacturers also don't always do a good job of telling us what they really want, also change their mind and can be hard to work with. An observation that should be made is that the items are not well aligned with the typical content found in a traditional operations management course whether it is focused on manufacturing or service. This should cause us to have a whole new set of questions in terms of our curriculum as, if the items the students have identified are really the things that block managers from being successful and we are not addressing how to solve these problems then we are again in danger of not meeting the needs of our students.

Summary

Instead of ignoring the potential concerns of our students in terms of feeling that their needs are not being met because of how we have chosen to deal with the conflict between

available time and the quantity of content for a course we can use some simple logical tools and the Affinity Diagram to engage the students in verbalizing the details of this conflict. We can then have them help us further understand the assumptions that underlie the conflict and then propose and analyze an alternative solution or perspective. As a result the students come to the conclusion that the issues involved in managing the service and manufacturing sectors are really more similar than unique and as such the concepts taught apply to both worlds. For us as instructors, this means that we are still responsible for delivering valid content and delivering it effectively but our success is no longer endangered by our students' expectations being based on the preconception that manufacturing and service are two totally different environments.

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