

THE BALL POINT PEN ASSEMBLY COMPANY

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ABSTRACT

The ball point pen assembly exercise is a management simulation that can be used to experientially teach multiple concepts in the areas of management theory and related business disciplines. Its primary goal is to teach quality management, process and work redesign, and re-engineering, but the exercise easily lends itself to the demonstration of learning organization and empowerment. The exercise is most effective with 16-30 participants but it can easily be adapted for smaller or larger classes. It takes approximately an hour to complete and debrief. Complete details about this exercise are provided in this paper.

INTRODUCTION

Global competition has created the need for organizations to constantly reinvent themselves in search of greater efficiencies while maintaining high quality standards (Malone, Crowson, Lee, Pentland, et al., 1999). Work redesign and re-engineering are commonly used tools today, and for some organizations they are almost a way of life (Bernstein, Jackson, Byrne, 1997). The gains of such techniques can be sustained only if organizations learn to gain insights from their own and others' practices for continuous improvement (Sia, Tan, Teo, Wei, 1997).

The challenge for business educators is to prepare students to be managers and leaders in such continuously evolving and improving organizations. While readings, cases and lectures bring to students' attention these issues, we believe it is difficult for undergraduate students to grasp the significance of them

through the traditional methods. They often lack significant real-world experience to comprehend application of many management concepts. Experiential exercises bring theory and issues to life for them (Marsick and O'Neil, 1999).

It is not surprising that most business textbooks in general and management books in particular have incorporated experiential pedagogy to some extent. Even businesses are using this pedagogy with greater frequency for employee development (Brotherton, 1999). Despite the increasing usage of this pedagogy, it is still difficult to find inexpensive, user-friendly but worthwhile exercises for many complex ideas that are common in many management books. We believe this to be the case for work redesign and re-engineering. Textbooks in the areas of management theory, organizational behavior, operations management, organizational development, and human resource management often incorporate concepts of work-redesign, re-engineering and their influence on productivity and work quality. But experiential exercises related to these concepts are still limited and sometimes not very user-friendly. As a result, we have designed an exercise primarily to give undergraduate students a first-hand demonstration in the application of work redesign and re-engineering and their correlation with productivity and empowerment.

The Ball Point Pen Assembly Company

Materials Needed:

- At least 30 ball point pens that can be assembled and disassembled. We use the kind that you push in and out and have a spring in them.

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- At least four plastic containers of different sizes and shapes in which unassembled components can be stored. We often use empty yogurt containers of various sizes.
- A notebook to test the quality of the final assembled pens.
- A watch/stop-watch to time the teams.
- A board or flip chart to keep the scores of the teams.

Preparation for the exercise: (5-10 minutes)

- Put unassembled components of the same kind in one container each.
- Arrange the containers in no particular order on a long table in front of the classroom.
- Divide the class into four to five teams of four or five members each.
 1. Assign the order in which the teams will be going for the assembly.
 2. Put on the board in front of the class a table for record keeping as shown in Appendix 1.

Instructions to the participants/students: (5-10 minutes)

- Each team represents a company that is in the business of manufacturing ball point pens.
- You are competing with each other for an order from a very important retailer that demands that its suppliers meet rigid deadlines. The retailer will take as many pens as you can produce, but they must be of good quality.
- Good quality means that each pen must look properly assembled, can be pushed in and out (does not jam), and can write.
- Both cost and quality are important to this retailer. Each team member is paid one dollar a minute, and each pen that does not meet quality standards costs an additional one dollar to the company for repairs. (The reader may note that costing this way allows teams with different numbers of members to compete on equal footing.)
- You have two minutes to assemble the pens. (Reader may want to note that this short

period is given for many different reasons. First, it creates pressure to work fast; second, it saves on materials the instructor needs for the exercise; and third, it allows completion of the exercise in a one-hour time frame. As a variation, longer time periods can be substituted if there are enough time and materials.)

- You have five minutes to organize your team.
- During the team's five-minute period, one member may walk up to the table to take a look at the components required for the assembly. (Variation: The instructor may allow the observer to assemble one pen to see how the components fit together. The spring is the trickiest part to fit. If the teams figure out in advance how it fits, often there is less chaos during the assembly. Otherwise, some teams have to deal with malfunctions during the assembly which creates very interesting dynamics and, hence, opportunities for other teachings.)

Mechanics of the Exercise: (20 minutes)

Once the participants have been organized and instructed, they are asked to go to the front of the room and start the assembly when the instructor says, "go". The instructor times each team and tells the team when to stop. While one team is working, the other teams act as observants. The instructor tests the quality of each assembled pen and uses observants' help on questionable pens. The team stays in front and helps with disassembly and replacement of parts back into the containers while the instructor tests the pen and writes the score on the board/flip chart for everyone to see.

Once all the teams have had their turn, the instructor gives at least the first team a second chance to repeat the task. If time permits, all teams can be given a second chance.

Debriefing: (20 minutes)

The reader should note that this exercise is more effective after the participants have been

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exposed to the concepts of structure, strategy, total quality management, learning organizations, and motivational techniques such as empowerment, participative management, and team-work. Here are the questions that can be used to facilitate discussion and demonstrate to the students the use of various management concepts:

- What organizational structures were used by the teams and what was each structure's impact on productivity?

The reader should note that some teams organize themselves into an assembly line with assigned specific and narrowly defined roles for each member while others choose to work as a team – each member completing all the steps. Students easily identify the two structures with organic versus mechanistic structure. In addition, the issues of job specialization, job scope and job enrichment can be brought forth.

- Did your team make conscious decisions about what strategy to use?

Please note that some teams consciously decide to work slowly to avoid producing any scrap/malfunctioning pens. It presents a good opportunity for the instructor to talk about “doing things right the first time ” and “quality is free.”

- What factors impacted your productivity?

It should be noted that students invariably mention the size, shape, and location of containers. They complain about some containers being too deep to get parts out quickly or tall containers that tumble. They complain about the containers being too close to each other and members bumping each other. All these concerns can be used to talk about re-engineering.

- What contributed to productivity gains?

During the simulation, the first group is allowed to repeat the task, and invariably their productivity is higher the second time. When asked why the improvements took place,

students mention factors such as learning from their first round and making adjustments in factors such as structure, placement of containers and positioning of team members. At this point, we talk about re-engineering – its meaning and significance and its relationship with productivity and how it can lead to lay offs and resentment by organized labor. Giving examples of companies that have used re-engineering for significant savings serves well here.

Students often also mention improving productivity by learning from the successes and failures of other teams. We use this opportunity to talk about learning organizations and also bench marking. Discussion here includes companies that are modeled by others.

- What other factors could have enhanced your productivity?

Students often mention springs that don't work well and often tease about the need to buy a new kit. This is a good opportunity to talk about the quality of raw materials and the relationship with suppliers in line with total quality management

- What did the observer note and how did the team use these observations?

This question and aspect of the exercise is primarily created to demonstrate the learning organization concepts. Teams where the observer notices the various components and their sequencing and brings his/her insights back to the team that listens and acts on these observations, usually does better than teams where the team is just too busy discussing structure and other issues, either to send an observer or to listen to him/her upon his/her return. The concepts of depth, width, and speed of organizational learning are appropriate to discuss here.

- How do you feel about being charged a cost for the non-working pens?

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This question helps bring out aspects related to Total Quality Management. There have been times when a team would significantly outproduce the other teams but still not have the lowest cost per pen because of the cost associated with the non-working pens produced by the team.

redesign (Crowston, 1997). In addition, it is simple to use and cheap to design. The primary materials needed for the exercise are inexpensive and readily available. Once the materials are secured, the exercise requires almost no prior preparation, especially in repeated use. It can be adjusted to fit different size classes and can be used in 50-minute class periods. Management trainers can use the exercise as part of their workshops on quality management, organizational re-structuring and re-engineering. Groups with varied interests can find value in this exercise.

CONCLUSION

It is a very versatile exercise that can be used in multiple business disciplines to demonstrate concepts that are commonly used in business curricula today. It is grounded in theory that supports coordinated efforts for process

APPENDIX 1

Group ID	Total Pens Assembled		Total Working Pens		Total Labor Cost		Total Scrap Cost		Cost Per Working Pen	
	1 st round	2 nd round	1 st round	2 nd round	1 st round	2 nd round	1 st round	2 nd round	1 st round	2 nd round

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