

LESSON 4



PAPER AIRPLANE SIMULATION

There were major changes around the turn of the century in how workplaces were structured and work organized. These changes occurred at different paces in different industries and, in modified form, continue today. Systematizing and justifying the new management practices, Frederick Winslow Taylor contributed his name to our language. “Taylorism,” according to the dictionary, means “scientific management.”

With the help of paper airplanes and chocolate, this lesson shows students a key aspect of the changes occurring at the workplace: the attempted capture of workers’ skill and knowledge by management.

Goals/Objectives

1. Students will gain a first-hand appreciation of the impact that “scientific management” had on the lives of working people.
2. Students will acquire a theoretical understanding of the stages of Frederick Taylor’s scientific management.

Materials Needed

- 35 sheets of 8½” by 11” scratch paper.
- A large chocolate bar.
- A camera or reasonable facsimile.
- **Student Handout #4: Frederick W. Taylor: Taylorisms.**

Time Required

- One and one-half to two class periods.



Procedure

1. Ask for volunteers who have two things in common: each has to be able to make a paper airplane that can fly, and each must like chocolate. (There’s never any difficulty finding volunteers!)
2. Choose five volunteers (four in a smaller class) and send them out of the room. Close the door.
3. Explain to the rest of the class that you are a factory owner. Your factory produces paper

airplanes. As the owner, you own the building in which the workers labor, you own the materials with which they labor, and you own the finished product. Ask students what you *don’t* own. Answer: the workers’ *knowledge*—they are the ones who know *how* to produce the planes. Explain that you are going to acquire this knowledge from the workers without them realizing it.

Ask for a volunteer to “photograph” the workers as they produce the planes. This volunteer should receive a small piece of

chocolate in payment after he/she completes the job.

4. Bring the five volunteers back into the classroom. Explain that they are all workers in your paper airplane factory. You are going to have a contest. The first person to complete five airplanes that *fly* will be declared the winner and be given a large part of a chocolate bar.
5. Seat them at desks in front of the class. Give each one two sheets of paper for practice. They should make the practice planes and fly them. (Emphasize that only the “contestants” may fly planes. Unless you enforce this, the result will be chaos.)
6. After they’ve practiced, give them each five sheets of paper. Get two more volunteers—one to judge when the planes are complete, the other to serve as the timekeeper. Explain to the workers that each should continue making planes until all five planes are finished.
7. Have them begin. The timekeeper should record when each of them completes all his/her planes. Make sure that throughout this process, the photographer is busy recording all the different methods of plane construction.
8. When all the workers have finished their planes, ask the first person who finished to throw all five of his/her planes. If the judge determines them “airworthy,” this person is declared the winner and given the chocolate—if not, continue to the next fastest person until a winner is determined. Award smaller pieces of chocolate to the timekeeper, photographer, and judge.
9. Explain to the workers that before the contest you (the teacher) owned the factory, the raw materials—paper—and the finished products—paper airplanes—but they owned the knowledge of how those planes were produced. This fact caused you, as the own-

er, some problems: workers could demand high wages for their skills and, in the event of a strike, they could successfully halt production by withholding their skilled labor.

“Let’s see how our little contest is going to change the rules of the game.” (Keep the workers at the “workplace,” in other words, seated as they are in front of the class.)

10. On the board or overhead projector make two columns: one labeled “owner” and one “worker.” In a discussion question/answer format with students, complete the “owner” column, then move on to the “worker” column (see next page, **Paper Airplane Discussion**). When you get to the point in the discussion where you talk about who you could hire to do the work, emphasize this point by firing skilled workers, sending them back to their seats, and hiring other students as unskilled workers: immigrants, children, women, etc.
11. Tell students that this process, called “scientific management,” was developed by Frederick W. Taylor.
12. Distribute **Student Handout #4: Frederick W. Taylor: Taylorisms**. Review this sheet with students. Have students save these “Taylorisms” for a later lesson. (Note: The quotes in this reading are from Taylor himself. Occasionally two separate quotes have been joined to form a more complete idea. No meanings have been changed. Source: Harry Braverman, *Labor and Monopoly Capital* [New York: Monthly Review Press, 1974], pp. 85–123.)
13. Assign homework: (a) Write a short essay explaining why many managers and owners would probably appreciate Taylor’s scientific management techniques and why many skilled workers probably would object to them. (b) What are some of the techniques workers might use to resist putting scientific management into effect?

PAPER AIRPLANE DISCUSSION

Owner

What knowledge do I now have that I didn't have before?

Step-by-step knowledge of actual process of production.

Time required at each step of the process.

What can I do now that I have acquired this new knowledge by taking pictures of the production process?

Could enforce fastest speed as the norm for all workers.

Could force all workers to produce planes in the same manner as the fastest worker.

What can I change about the process of making paper airplanes? (Remember, my goal is to cut costs and increase profits.)

Can fire highly paid skilled workers and hire cheaper unskilled workers.

These new workers could be assigned one minute task, say a particular fold.

Workers would do one thing over and over, passing each part on to the next worker, assembly-line fashion.

Now that I have the knowledge of how planes are produced, whom could I get to be my unskilled workers?

Women, children, immigrants, etc.

If there had been a union at the paper airplane factory, what might happen to it?

Workers building one small part of airplane are more easily replaced. Consequently, strikes would be less effective.

Workers

What will be some of the consequences of the changes in production for the workers if the same people are kept on? How will the character of their work be changed?

Paid less.

More boring work—doing one thing over and over again.

More watched and regulated by their employer.

Work greatly speeded up.

How might workers feel differently about the process of making paper airplanes?

Less pride—they no longer make the entire planes themselves.

Less satisfaction or interest as there is no *thought* involved in the work—workers have been stripped of all brainwork.

Less independent and powerful—more dependent on owners for instructions. (No longer have the same ability to stop production as skilled workers.)

How could these changes affect family life or personal relations?

Less fulfilled, workers could take out their frustrations on family.

Paid less, a family's standard of living would decline.

On the job, workers will not know each other as well with managers able to enforce stricter rules.

With older, slower workers fired and younger, stronger workers hired, resentments would be created, making it hard to keep a union together.

STUDENT HANDOUT #4



FREDERICK WINSLOW TAYLOR Taylorisms

Taylor's Process:

Before: "The shop [factory] was really run by the workmen and not by the bosses. The workmen together had carefully planned just how fast each job should be done. The manager fully realizes that the combined knowledge and skill of the workmen who were under him was certainly ten times as great as his own."

Stage One: "Managers assume the burden of gathering together all of the traditional knowledge which in the past has been possessed by the workmen and then classifying, tabulating, and reducing this knowledge to rules, laws, formulae."

Stage Two: "All possible brainwork should be removed from the shop and centered in the planning or laying out department."

Stage Three: "The work of every workman is fully planned out by the management at least one day in advance, and each man receives in most cases complete written instructions, describing in detail the task which he is to accomplish, as well as the means to be used in doing the work: not only what is to be done, but *how* it is to be done and the exact time allowed for doing it."

Effect: "The full possibilities of my system will not have been realized until almost all of the machines in the shop are run by men who are of smaller calibre and attainments and who are therefore cheaper than those required under the old system."

