

**A CLASSROOM EXERCISE DEMONSTRATING THE IMPACT OF
STRUCTURAL AND PSYCHOLOGICAL EMPOWERMENT**

Timothy M. Gardner
Utah State University
timothy.gardner@usu.edu

and

Alexander C. Romney
Utah State University
alex.romney@usu.edu

Introduction

Employee empowerment yields important positive outcomes for employees, managers, and organizations. Yet too many employees feel disempowered at work, and their managers, while wanting to empower employees, often do not know how. It has not helped matters, that research on empowerment has been dichotomized between a structural and a psychological perspective. In this session, we aim to integrate the structural and psychological empowerment perspectives and introduce a classroom exercise that teaches students how to foster empowerment at work. Drawing upon experiential learning theory, this exercise simulates an airplane manufacturing organization and provides teachers with an important classroom tool to instruct students about the importance of empowerment, trust, and performance in organizational life. We have used this exercise in upper level undergraduate courses in organizational behavior, human resources, and general management as well as MBA and Master of Human Resources courses covering strategic human resources and labor/employee relations. This exercise would fit well into nearly any management class at the undergraduate or graduate level where the focus is on work systems and/or leadership styles and effectiveness.

Theoretical Foundation/Teaching Implications

Employees only contribute meaningfully to their organizations when they feel empowered to do so (Spreitzer, 1995). Employee empowerment can be broadly defined as “a process of enhancing feelings of self-efficacy among organizational members . . . by both formal organizational practices [structural empowerment] and informal techniques . . . [to provide] efficacy information” (Conger & Kanungo, 1988, p. 474). Empowerment has been shown to lead to greater job satisfaction, organizational commitment, and less strain among employees (Aryee & Chen, 2006; Avolio, Zhu, Koh, & Bhatia, 2004; Spreitzer, Kizilos, & Nason, 1997). However,

the benefits of employee empowerment extend beyond attitudes to more objective outcomes. For example, empowerment has also been shown to predict job performance (Chen & Klimoski, 2003; D'Innocenzo, Luciano, Mathieu, Maynard, & Chen, 2016), innovation (Spreitzer, 1995), customer satisfaction (Kirkman, Rosen, Tesluk, & Gibson, 2004), and lower rates of turnover (Sparrowe, 1994). Such positive objective outcomes from employee empowerment may help explain why more than 70 percent of organizations have adopted some type of empowerment initiative within their workforce (Spreitzer, 2008).

Despite the importance of empowerment in today's workplace, too few employees actually feel empowered and too few managers understand how to empower employees (Maynard, Gilson, & Mathieu, 2012). We argue that at least two of the reasons for this gap are a lack of experiential exercises that effectively teach employee empowerment and a division in the scholarly research on empowerment. First, while empowerment has been a topic of interest in management classrooms for many years, we are not aware of any exercise that effectively provides students with an opportunity to *experience* empowerment in the workplace. With this exercise, teachers will be enabled to co-create knowledge about empowerment with their students "through the transformation of experience" (Kolb, 1984, p. 41). Second, the dichotomy that exists in the research on empowerment includes one stream that focuses on the structural ways empowerment can be promoted, while another stream investigates the psychological experience of being empowered. Because of this division in the research literature, Spreitzer (2008) argues for the need to integrate these two perspectives: "We need to understand how social-structural empowerment can enable psychological empowerment – as well as understand how beliefs of psychological empowerment can enable the development of more social-structural empowerment through proactive behaviors aimed at changing the systems" (p. 57). These two

issues—the limited availability of experiential exercises that allow students to experience empowerment and the division in scholarly research between structural and psychological empowerment—motivated the development of this exercise.

Learning Objectives

In this exercise, we not only demonstrate ways that managers can foster both structural and psychological empowerment, we also illustrate the important outcomes that can result from empowerment initiatives. In introducing this empowerment exercise, we aim to provide an exercise whereby teachers can immerse their students in the experience of both empowerment and disempowerment. Moreover, this exercise will enable management teachers to help students understand what employee empowerment is, how leaders can develop it, and what effect it may have in organizations. More specifically, students will learn how structural and psychological empowerment relate to one another, observe the importance both types of empowerment can have on employee morale, and identify outcomes that result from an empowered team or workforce.

Exercise Overview

The exercise requires the class to be randomly broken into two teams assigned to two nearby rooms. Each team will manufacture paper airplanes according to defined specifications, using materials “purchased” from the exercise moderator, and submit the completed planes for inspection to the moderator for compliance with specifications and purchase. The goal of each team is to maximize the profit, that is revenue from the sales of the planes minus the cost of the paper raw materials. The red team will be managed with an empowerment enhancing work system and a manager adhering to a philosophy valuing their employees and their suggestions for improvement. The blue team will be managed with a traditional hierarchical work system and a

manager adhering to a philosophy that workers are hired hands to be directed and not consulted on improving performance. In other words, we will induce both structural and psychological empowerment in the red team while inducing a more hierarchical culture in the blue team. The teams will need to adapt to quality and productivity challenges built into the design of the plane. Typically, only the empowered red team is able identify the source of these problems resulting in greater productivity, quality, and profit. A detailed outline of the steps to prepare for and implement the exercise and the post-exercise lecture can be found in the Appendices.

The exercise and the accompanying lecture require at least 110 minutes, and ideally 120 minutes. The exercise itself could be completed in a typical 80-90 minute class session and the lecture-discussion completed in the next class session. Be aware that one of the highlights for the students is learning that the red team dramatically outperformed the blue team and that this difference is due to the (previously unknown) differences in philosophies of the leaders and the different work systems. If the lecture and discussion are held later, the results of the two teams should be revealed and a quick overview of the differences between the two teams' work systems described. So as to not take up too much space, we provide detailed instructions for carrying the exercise out in Appendix A. However, an outline of the steps to prepare for and implement the exercise and the post-exercise lecture are as follows:

I. Set up the exercise

A. Arrange for the setup of the two exercise rooms that must be completed well before the day of the exercise (See Appendix B).

B. Assemble the materials necessary for the exercise (see Appendix C).

C. Finalize the set up that must be completed just before the start of the exercise (See Appendix D).

II. Start and run the exercise.

- A. The instructor should start the exercise for both teams.
- B. Allow the team leaders to lead their teams according to the instructions they have been given (See Appendix E for detailed airplane manufacturing instructions).
- C. Conclude the exercise

III. Help students understand the key takeaways from the exercise.

- A. The instructor should reveal the performance of each team.
- B. The instructor should lead a discussion about why these performances exist.
- C. The instructor should deliver the lecture on the importance of empowerment.

The lecture and discussion should begin with a summary of the results both the red and blue team were able to achieve, both in revenue created and number of quality planes manufactured. The teacher can then facilitate a discussion about why the differences in performance were observed and what the students' experiences were in their respective teams. The following are some potential discussion questions teachers can use: How did it feel to be a member of the blue team / red team? How motivated were you to perform? What factors effected your team's performance? Have you been on teams before that were led and or operated in the same way the blue team/ red team did? What lessons can you take away from this exercise to inform your own leadership?

Session Description

During our session we aim to accomplish three things. First, we aim to provide participants a brief orientation about the nature of empowerment and why it is important. Second, we hope to lead participants through the basic logistics of how to run the exercise. This

will involve video of previous classrooms in which we implemented the exercise. Lastly, we will provide participants the opportunity to experience part of the exercise for themselves and debrief what we see as the key takeaways from the exercise and how students have typically responded to it. Here is a general timeline of what we aim to do:

- I. 10 minutes - Provide an overview of the empowerment literature why it is important, and why it is hard to teach.
- II. 30 minutes - Walk participants' through the logistics of the exercise and demonstrate the different steps with video we have previously recorded.
- III. 20 minutes - Have participants split up in teams and carry out production runs of the exercise so they can experience what it is like for students.
- IV. 30 minutes - Lead a discussion about the experience students have and answer any questions participants have. This last portion will also be augmented with video we have previously recorded of the way the exercise has been debriefed and students' reactions.

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Appendix A Exercise Guidelines

I. Set up the Exercise

There are three important steps for the setup of this exercise. The instructor will need to make arrangements several days or even weeks before the start of the exercise, assemble all the materials for the exercise, and make final arrangements in the 30 minutes before the start of the exercise.

A. Arrangements to be completed well before the day of the exercise

Reserve two rooms. Detailed instructions for this phase can be found in Appendix B. The exercise requires the use of two flat rooms, near each other, with six to seven tables in each room along with enough chairs for half the class in each room. Such space can be difficult to find during the most popular class times and should be reserved weeks or even months in advance. We generally use meeting space in our university's conference center.

Recruit leaders for the red and blue teams. When we first developed this exercise, we used randomly selected students from the class to play the role of red team and blue team leaders. The blue team leader was expected to use a tough, hierarchical management style as one element in a traditional hierarchical work system. Blue team managers selected from the class were uncomfortable giving direction to their peers and ignoring suggestions for improvement. Occasionally, frustrated blue team leaders would secretly seek input from their employees outside the notice of the moderator to try to improve quality and productivity. These problems were reduced when we started recruiting red team and blue team leaders from outside of the class and coaching them beforehand to stay in their role.

The instructor should recruit two students not enrolled in the class to play the roles of blue team and red team leaders. Approximately one week before the day of the exercise, the instructor should meet with each person individually to review the instructions and explain their roles. The leaders may keep copies of the instruction to prepare for the exercise. Special emphasis should be made to the (hierarchical) blue team leader that the activity is best understood as a "role play" and not a competition or experiment. Strongly counsel them to play the role of a hierarchical manager and resist the temptation to seek student "employees" input on how to improve quality and productivity; they are to make process improving changes on their own. We recommend the instructor moderate the blue team to further reduce the risk of the leader breaking character. Our experience shows these steps eliminate the gaming activity of the blue team manager.

Recruit a helper to facilitate the red team. As will be described below, the exercise unfolds across two teams, in two rooms, over multiple timed stages. A helper will be needed to facilitate one of the exercise teams. Because of the difficulties we have had with the blue team manager (described above), we advise using the helper to moderate the activities of the red team.

Randomly assign students to the two teams. By design, the red team will outperform the blue team. Random assignment reduces student concern that the results were due to more motivated or more skilled students on the red team.

B. Assemble the materials necessary for the exercise

The detailed list of materials needed for the exercise can be found in Appendix C. This includes the following:

- Blueprints for the paper airplanes; this is a special design that unless constructed carefully will have a split in the nose of the plane (described in detail below)
- Signs identifying the rooms for the red and blue team
- Instructions for the blue and team leaders (sans paper airplane blueprints)
- Instructions for the red team members
- Instructions for the blue team members which includes instruction for the following workstations: accounting, rework, quality control, production station 1, production station 2, and production station 3
- Table tents for the above blue team workstations
- Checklists for red team and blue team facilitators reminding them of how the activity should unfold and their responsibilities
- PowerPoint presentation to be delivered after the exercise. The slide deck includes several embedded videos that demonstrate how the blue team behaves much differently than the red team. Each slide has detailed teaching prompts.

C. Finalize the set up that must be completed just before the start of the exercise

The step-by-step details of what needs to be completed in the 30 minutes or so before the start of the exercise can be found in Appendix D. Many of the steps are self-explanatory. Below are additional details about several critical steps.

Room set up. Both teams will have six tables for production. The empowered red team leader and team members will have the opportunity to set up the production process any way they choose. The blue team room is set up in a way to limit the communication and information sharing across teams and from employees to the team leader. The blue team leader may not adjust the set up. The production process is broken into three stages that cannot be changed; the three production stations are separated across the room to limit information sharing. The specifics of setting up the two rooms can be found in Appendix D.

Deliver blueprints to the red and blue team managers. Unless the paper airplanes are made carefully and gently, the nose of the plane will split, causing it to fail quality control, and will not be purchased by the moderator, thus negatively affecting the teams' profitability. The instructions given to the team leaders in the week before the activity do not include the blueprints. This prevents them from practicing making the plan then identifying and fixing the quality problem. The instructor should provide the blueprints to the leaders a few minutes before the start of the exercise.

Distribute practice paper. Both team leaders are given yellow sheets of paper to practice the production process and project the materials needed for purchase. The leader of the empowered red team will receive 25 practice yellow sheets; the unempowered blue team is given only 10. During the 10 minute reconfiguration period (described below), the red team leader will be given another 25 sheets of yellow paper to practice and improve the production process; the blue team leader will not receive additional paper during this time.

Shepherd students to their proper rooms. It is important the students are not aware that the two teams are set up as empowered and hierarchical work systems. While students are arriving to the activity, the person helping the instructor should stand outside of the rooms to

help them find the right room and prevent them from seeing the differences in the set up of the two rooms.

II. Start, Run, and End the Exercise

A. Start the exercise for both teams

To be efficient with class time, it is best that the team in the room with the projection equipment finish the exercise first to allow the other team to move into the room when they are done. The instruction should start the exercise with the projection room team first then move over to the other room to start their exercise.

The announcement to start off each team's exercise should include the following points:

- Ask students to turn off their phones for the activity. This keeps their attention on the activity but also prevents them from learning about the working conditions of the other team.
- Explain that they are now working for a defense contractor. Their jobs will be somewhat tedious and boring, but they will be helping to make fighter planes to help defend freedom here and around the world.
- Explain the schedule of the exercise:
 - o 20 minutes of set up time with the Team Leader (red team)/General Manager (blue team)
 - o There will be a 7 minute production period where they will make as many planes, according to strict quality standards, as possible
 - o The instructor/helper will review the plans for conformance with the blueprints. Those that meet quality standards will be "purchased" and the team will be credited for \$5M per plane.
 - o There will be a 10 minute reconfiguration period to give the managers the chance to improve production and quality
 - o There will be a second seven minute production period where they will again make as many planes, according to strict quality standards, as possible.
 - o Finally, the helper/instructor will review the construction and quality of the plans and "purchase" those that meet standards and credit the team \$5M per plane

After these announcements, the instructor/helper should begin keeping time for the 20 minute set up period.

B. Run the exercise

Once started, the actual exercise will take approximately 54 minutes to complete. The stages and the amount of time required are listed and fully described below.

- Preparation period – 20 minutes
- Purchase raw materials 1 – 2 minutes
- Production period 1 – 7 minutes
- Selling period 1 – 3 minutes
- Process improvement period – 10 minutes
- Purchase raw materials 2 – 2 minutes
- Production period 2 – 7 minutes
- Selling period 2 – 3 minutes
- Total time – 54 minutes

Preparation period. Each team will have 20 minutes to read their assigned instructions, learn from the blueprints how to make the paper airplanes, set up the production process, assign individuals to production roles and make the decision about how many sheets of paper to purchase. The instructor/helper's only responsibility is to keep time, ensure that the teams leaders stay in role, and encourage both leaders to use the yellow practice sheets learn the production process. For the blue team, all the details of this process are described in their instructions. The manager should make all of the above decisions. For the red team, the manager and the team members have nearly the same set of instructions. The manager should collaborate with the team members to make the above decisions. When there are five minutes remaining, the instructor/helper should announce how many minutes remain in the stage.

Purchase raw materials. After the 20 minute preparation period, the team leader of each team should "purchase" the number of sheets of paper they believe their team can transform into paper airplanes in the first seven minute production period. The price of the paper drops the more that is purchased in a price schedule outlined in both leaders' set of instructions. For production period 1, the leaders should be given white sheets of paper described in the list of materials. This will prevent the teams from using left over paper in production period 2 (blue paper). Managers should be encouraged to have the person taking on the role of accounting record the purchased amount and cost on the accounting sheets that are in the students' instructions.

Production period 1. The manager may distribute the white paper to employees that will begin producing the paper. Before students begin folding, the instructor/helper should announce the start of the seven minute production period and begin keeping time. Teams should be regularly updated regarding the amount of time remaining. The primary role of the instructor/helper for this phase is to ensure the team leaders (primarily for the blue team) stay in role and that the blue team manager does not change the established production process. While the production setup must remain the same, the blue team leader may reallocate workers across the production stations as he/she sees fit.

Selling period 1. After completing the first production period, the instructor/helper should inspect the completed planes for proper construction and compliance with quality standards. The quality standards are outlined in both leaders' instructions and include the following three requirements:

- Airplanes must conform to the design specified in the blueprints.
- There should be no tears in the paper, especially at the nose of the plane.
- The two wings must be level and even with each other (i.e. the entire wing deck should be at the same level).

Paper airplanes made during the first production period that meet these requirements are considered "purchased" and the team accountant can credit their accounting statement with \$5M each. Planes that do not meet these standards are rejected and are not purchased. Managers should be encouraged to have the person taking on the role of accounting record the revenue generated on the accounting sheets that are in the students' instructions.

Process improvement period. In this next stage, the team leaders have 10 minutes to reconfigure their operations to improve the productivity and quality of production. The red team leader may seek the input of their employees. The instructor/helper should give to the red team manager the additional 25 sheets of yellow practice paper to improve the production process. The blue team leader must figure out improvement on his/her own and does not receive additional practice paper.

Purchase raw materials. After the 10 minute process improvement period, the team leader of each team should “purchase” the number of sheets of paper they believe their team can transform into paper airplanes in the second seven minute production period. For production period 2, the leaders should be given blue sheets of paper described in the list of materials. This will prevent the teams from using left over paper from production period 1 (white paper). Managers should be encouraged to have the person taking on the role of accounting record the purchased amount and total cost on the accounting sheets that are in the students’ instructions.

Production period 2. The manager may distribute the blue paper to employees that will begin producing the paper. Before students begin folding, the instructor/helper should announce the start of the seven minute production period and begin keeping time. Teams should be regularly updated regarding the amount of time remaining. The primary role of the instructor/helper for this phase is to ensure the team leaders (primarily for the blue team) stay in role and that the blue team manager does not change the established production process. While the production process must remain the same, the blue team leader can reallocate workers across the production stations as he/she sees fit.

Selling period 2. After the completing the second production period, the instructor/helper should inspect the completed planes for proper construction and compliance with quality standards – outlined above. Paper airplanes made during the second production period that meet these requirements are considered “purchased” and the team accountant can credit their accounting statement with \$5M each. Those that do not meet these standards are rejected and are not purchased. Managers should be encouraged to have the person taking on the role of accounting record the revenue generated on the accounting sheets that are in the students’ instructions. The accounting person should also be encouraged to calculate the profit/loss for each production period and the total profit/loss for the entire exercise.

C. End the Exercise

The instructor should collect the completed accounting sheets from the person on each team responsible for accounting. Nearly every time the red team will have dramatically outperformed the blue team. Both teams should be encouraged to collect and recycle all unwanted instructions and paper airplanes. If the audio-visual equipment is in the room of the blue team the table tents should be collected to continue to hide the differences between the work systems of the two teams. Before joining together as a class, both teams should be told not to discuss their team’s performance on the exercise – as “it is not a competition.”

III. Help students understand the key takeaways from the exercise

In this stage of the exercise, both teams should be together in the room with audio-visual equipment. The instructor should dramatically reveal the operational and financial performance differences between the red and blue teams using the information from the two teams’ accounting sheets. This should be followed by an open discussion from both teams trying to explain the difference. Finally, the instructor should lecture and discuss empowerment using the provided slide deck.

A. Dramatically reveal of operational and financial performance differences of the two teams

The instructor should explain that the exercise was not a competition but a role play. Using the two teams' accounting sheets he/she should reveal the blue team results first then the results of the red team. Generally, the blue team has lost tens of millions of dollars while the red team has made tens of millions of dollars.

B. Discuss the reasons for the differences

The instructor should allow the students to discuss why the red team outperformed the blue team. Very quickly it is revealed that the leaders behaved differently, and the work systems were set up differently.

C. The instructor should deliver the lecture on the power of empowerment showing how the stages of the exercise and the behavior of the students differed across the red and blue teams. Empowerment results in positive attitudinal, behavioral, operational, and financial outcomes. All are well illustrated in the videos.

Appendix B Arrangements to be Made Before the Day of the Exercise

- Make reservations for two flat rooms for 180 minutes. The complete activity (exercise plus lecture and discussion) will run 120 minutes; this allows 30 minutes for set-up and 30 minutes for cleanup. For both rooms, reserve six round or square tables with enough chairs for half the students enrolled in the course. In one room (blue team – hierarchical) reserve a seventh table. The two rooms should be close to one another to allow the instructor to move back and forth between the rooms in a timely manner. One of the rooms should have a projection screen or a white wall for lecture and discussion after the exercise.
- Find two students, not enrolled in the course, to act as leaders of the red and blue teams. Ideally, find a blue team leader that is comfortable with the hierarchical leadership style and a red team leader comfortable with an empowering leadership style. Meet individually with both students to provide copies of the instructions (sans the paper airplane blueprints), answer questions, and explain their roles. Explain to both that the activity is an exercise is not an experiment. They should give their team the desired experience by following the role instructions rather than try to make the most profit outside of the rules. Emphasize to the blue team leader they will be tempted to seek the help of the students to improve productivity and quality. He/She should be counseled to remain in their role as a hierarchical leader and not to try to improve productivity by empowering the team members and seek their suggestions for improvement. Remind him/her that students at different production stations should be discouraged from interacting with one another.
- Find a helper (student, staff, or faculty) to facilitate the exercise for the red team. The instructor will facilitate and supervise the exercise for the blue team. After they have read the instructions, provide for the helper a properly made plane and provide to them the checklist of steps that need to be taken during the exercise. Ensure they know the quality standards of a properly constructed plane.
- Randomly assign half the students to the red team and half the students to the blue team; communicate these assignments to the students well before the day of the activity. To avoid competition between the two teams, explain that the reason for this split is that the activity works best with smaller groups.

Appendix C Materials List

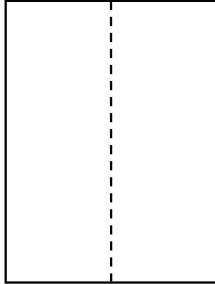
- Audio-visual stand to be placed in the room with the projection screen
- Computer; to be placed in the exercise room with the projection screen
- Speakers to connect to the computer or the technology to connect the computer to the room's audio-visual system
- One sign printed in red with the words "Red Team"
- One sign printed in blue with the words "Blue Team"
- One sign with a list of the students assigned to the red team
- One sign with a list of students assigned to the blue team
- One copy of both the red team and blue team leader instructions (sans blueprints) to be given to the leader in the pre-exercise meeting described above
- Two copies of the paper airplane blueprint to be given to the leaders of the red and blue team just before the start of the exercise
- Copies of the instructions for the students, to be available just before the start of the exercise. For the red team, print team member instructions equivalent to half the size of the class. For the blue team, print one copy of the accounting instructions, one to two copies of the rework instructions, one to two copies of the quality control instructions, and enough copies of the instructions for production station 1, production station 2, and production station 3 for each third the remaining students assigned to the blue team. Ideally, print all instructions in color.
- Make table tents for the different workstations for the blue team. Print the following on landscape oriented cardstock: General Manager, Production Station 1, Production Station 2, Production Station 3, Quality Control, Rework, Accounting.
- Paper-clipped bundles of yellow paper: two bundles of 25 sheets for the red (empowered) team and one bundle of 10 sheets for the blue (hierarchical) team
- Two bundles of 50 sheets of white paper and two bundles of 50 sheets of blue paper; one bundle of each color should be given to the instructor (red team room) and helper (blue team room)
- Properly folded paper airplane made according to specifications to train the helper facilitating the exercise for the red team
- Two checklists of steps to be completed during the exercise; one for the instructor and one for the helper facilitating the exercise for the red team
- Mobile phones for the instructor and helper to keep time for the different stages of the exercise
- PowerPoint presentation for the lecture after the exercise; copies of slides for all students
- One roll of painter's tape

Appendix D Final Arrangements to be Made Before the Start of the Exercise

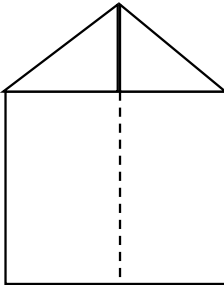
- Set up the computer and the audio-visual equipment. Ensure the sound and projection work properly.
- On the doors of the rooms for the red team and the blue team, use the painter's tape to hang the signs identifying room color and the students assigned to each room.
- Set up the room for the blue team exercise. Arrange three tables in a row on the left side of the room and three tables in a row on the right side of the room. Place the seventh table and one chair at the front of the room. For the tables the left side of the room, place the following table tents in order: Production Station 2, Accounting, Production Station 3; for the tables on the right side of the room, place the following table tents in order: Quality Control, Rework, Production Station 1. On the seventh table, at the front of the room place the table tent for General Manager. Place the required number of instructions for the blue team and an equal number of chairs (described in the materials list above) on the appropriate tables. Neither the blue team manager nor students may adjust the production set up.
- Set up the room for the red team exercise. Arrange three tables in a row on the left side of the room and three tables in a row on the right side of the room. Distribute an approximately equal number of red team instructions and chairs (described in the materials list above) at each of the tables. The red team leader and students may decide to set up production any way they please.
- Ask the blue team leader to sit at the front table described above. Ask the red team manager to sit at one of the tables with their team members.
- Provide to both the red team and blue team leaders the blueprint for the paper airplanes to be made a few moments before the start of the exercise. They should not have an opportunity to practice making the paper airplanes.
- Provide to the red team leader the first bundle of 25 sheets of yellow paper; provide to the blue team leader their bundle of 10 sheets of paper. Remind both leaders to use the yellow sheets to practice the production process during the 20 minute set up period.
- The instructor and the helper should each find a small work area in their assigned rooms. Each should have their packets of blue and white paper and their check sheet of the flow of the exercise.
- To avoid students from seeing the different set-ups of the rooms, the helper should stand outside of the rooms to help people find their correct room.

Appendix E: Airplane Manufacturing Instructions

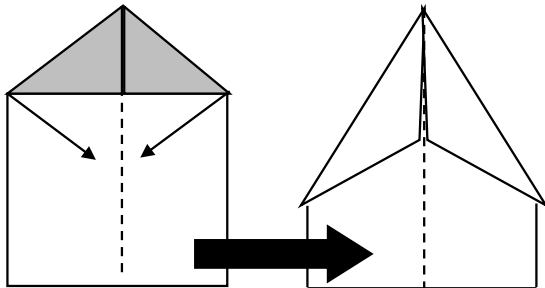
1. Fold paper down the center and reopen.



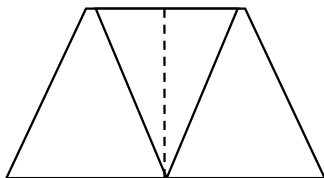
2. Fold top corners down until they meet evenly in the center.



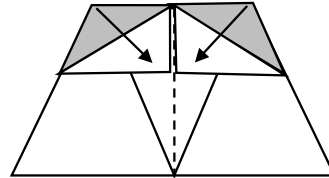
3. Once again, fold the top corners in until they meet evenly in the center.



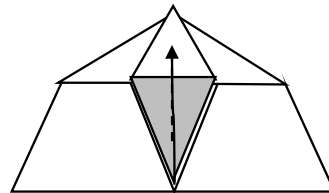
4. Fold down the newly created tip until flush with the bottom of the paper.



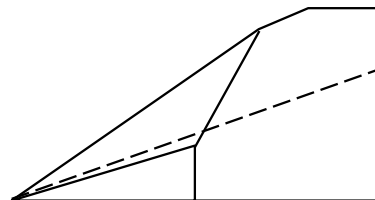
5. Once again, fold the top corners in until they meet evenly in the center.



6. Now take the tip which was folded down in step 4 and fold it so it once again points upward. **Important:** the two tips that now sit on top of each other must be aligned. If the tips do not meet go back and alter the folding so that they do.



7. Flip the plane over. Fold it in half lengthwise. From the side, the plane will look like the one below. Proceed by folding the wings of the plane down along a diagonal line as depicted by the dotted line below. The edges of the wings should be flush with bottom of the plane.



8. The Final product will look like the plane below.

