

Using a Plant Tour to Help Teach Job Order Costing

Timothy Creel
Lipscomb University

Veronica Paz
Indiana University of Pennsylvania

Christine Olear
Penn State University

A plant tour offers accounting students the ability to see what they are studying in managerial or cost accounting in a real-world business setting. A tour of the Nissan plant in Smyrna, Tennessee is discussed in this paper. The students enjoy the field trip and expressed positive feelings about the experience of learning accounting material outside the classroom. While in the plant, students see many elements of managerial or cost accounting after discussing them in class, including job order costing and the aspects of the product cost. A virtual tour can take the place of a physical plant tour.

Keywords: plant tours, job order costing, manufacturing accounting

INTRODUCTION

Taking an accounting class on a field trip to tour a manufacturing plant offers many benefits to students. This article examines a tour with an accounting class visiting the Nissan Manufacturing Plant in Smyrna, Tennessee. During the visit to the plant, participants witness many of the concepts taught in managerial and cost accounting classes in a real-world setting as students see business operations take place in front of them. For many students, the plant tour is the first time they have visited a manufacturing plant. This article addresses best practices for taking students on a plant tour, including the elements of manufacturing accounting students witness in the plant, substitutes such as virtual tours when visiting in person are not available, and teaching methods related to the tour and accounting concepts.

LITERATURE REVIEW

A plant tour used in an accounting class both teaches and reinforces accounting principles. Dunn (2016) found that learning manufacturing elements help students learn many business concepts assisting students in multidisciplinary aspects of learning. Getting students outside the classroom environment to experience new ideas leads to a greater understanding of the subject matter in the course (Ratnayaka, 2017). Mitchell, Turner, Montgomery, and Hartley (2016) found that student performance increases with field trips in areas of student interest. Students visiting a manufacturing plant helps support educational elements such as

visual learning, learning in a real-world environment, fun learning experiences, and student involvement in learning course materials.

A plant tour allows students to visually see accounting principles and concepts covered in class in a real-world business setting. The positive views of educational literature support the value of visual and real-world experiences in learning. Visual learning assists in associating images with ideas and concepts (Aguilar and Paletta, 2019). Brisland (2010) found that visual experiences create connections to new concepts and past information. After completing a college field trip with accounting students, Gribbin (2005) found the students enjoyed the tour and felt it helped bridge concepts taught in the classroom by a real-world experience. Strage (2008) found real-world applications along with student engagement to be student's best learning environment.

My experience with taking students to visit the Nissan auto manufacturing plant in Tennessee was the student enjoyment of the experience. It created a fun learning environment for the attendees. The student participation was robust in the class meeting after the trip, as the plant tour was discussed by those who participated. Jarrett and Burnley (2010) found that a fun learning environment created positive student feelings and greater student engagement.

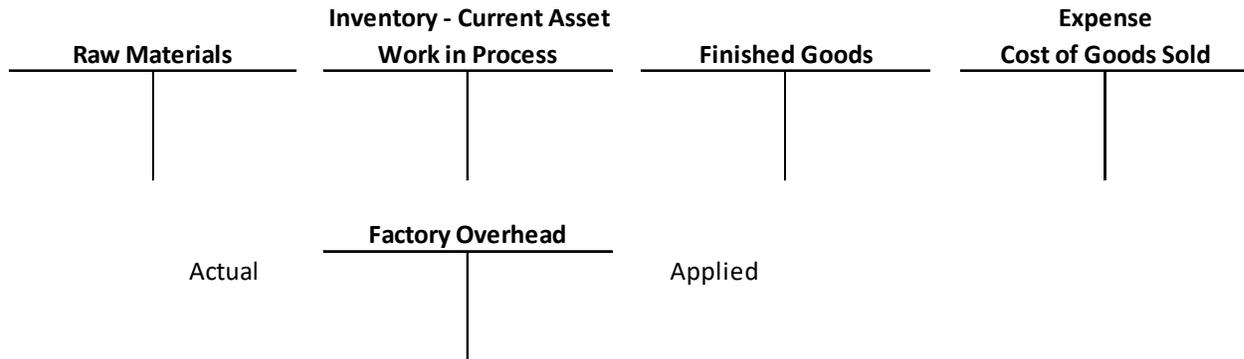
HOW TO COMPLETE A PLANT TOUR

**FIGURE 1
THE NISSAN PLANT IN TENNESSEE**



A plant tour is a way for a student to visualize material covered in an accounting classroom. The best classes to take on a plant tour are undergraduate or master's level cost or managerial accounting classes. The professor should cover the course materials before the class attends the plant tour. Job order costing should be covered, including the flow of production costs through inventory accounts, including raw materials, work-in-process, finished goods, and others, including factory overhead and cost of goods sold (see Example 1 below). The costs of making a product should be discussed, including direct materials, direct labor, and manufacturing overhead, along with what makes up the manufacturing overhead account. Accounting concepts including sustainability, Just-in-Time Inventory systems, Total Quality Management (TQM), lean manufacturing processes, quality control, and process reengineering should be discussed in class before students visit the plant since the students will witness these concepts on the tour.

**FIGURE 2
FLOW OF COSTS IN JOB ORDER COSTING**



The plant visit should be carefully coordinated with the class schedule and set up well before the event. This paper discusses a visit to the Nissan Plant in Smyrna, Tennessee, just outside of Nashville. The Nissan plant is one of the largest plants in North American, with more than 8,400 employees and the capacity to produce more than 640,000 automobiles per year (<https://www.nissanusa.com/experience-nissan/news-and-events/where-are-nissans-made.html>). Pre Covid-19, the plant offered free tours every Tuesday and Thursday morning and afternoon, but you had to make reservations well before the visit. The downsides may be the time it takes for students to attend as the tour lasts 1.5 hours, and including the commute may be longer than the time of a typical class period. It may not be easy to arrange a plant tour for online courses or night classes due to student schedules, but the idea of using a virtual tour discussed in the next section may be a better fit in some situations. The professor will want to contact local plants to see which ones offer tours or can accommodate a group of students. The professor must arrange transportation in advance through the university or amongst the class members depending on the number attending. The local chapter of the Institute of Management Accountants (IMA) may help with this and some even set up annual plant tours for members. Local IMA chapters enjoy inviting students to their activities and meetings. This may present an opportunity to take them on a plant tour and network with local accounting professionals from the IMA at the same time.

The students are assigned a one to two-page paper to discuss what they learned and liked about the tour and its relation to what we covered in class. The assignment is due before our next class meeting and offers them a chance to reflect on the learning experience. This exercise strengthens the class discussion during the next meeting.

The next class meeting will include a discussion of both the tour and its relation to the material. During this discussion, the professor questions the students regarding them seeing material presented in class on the field trip, what they found interesting, if they find the plant tour of value, and what they learned from the visit? The class discussion is robust during this meeting as the students discuss the experience. They state seeing many elements discussed in class, and they enjoyed seeing them in the real world. Students typically are surprised at the amount of automation Nissan uses and the size of the plant. The students felt the plant tour was a positive learning experience.

SUBSTITUTES FOR A PLANT TOUR

During the last several months, due to Covid 19, plant tours were unavailable. Hopefully, manufacturing plants will start public tours again soon. During this period, I used a YouTube video of the Nissan plant as a substitute for the physical visit to the plant. When using the virtual tour, complete all activities in the same order as an actual trip to the plant. Cover the accounting material before watching the video in class and discuss the material after watching the video. In this case, I would cover the material in the prior class meetings and include the video and discussion in our next meeting after a short review of

material from the last class. The students enjoyed this approach as a substitute. In the past, students unable to attend the plant tour watched the YouTube video from the plant also writing the paper like the students who participated in the plant tour. The YouTube video from the Nissan plant can replace a plant tour in an online class to reinforce class material as part of an online discussion question or assignment. The link to the YouTube video follows, and the video is around 6 minutes in length. Videos from the Nissan plant and other manufacturing companies such as Ford, Boeing, and even the Apple plant in China can be found and accessed on YouTube at www.YouTube.com.

Nissan Plant Tour

LTC - How Nissan Builds The Altima (and other cars) - YouTube

Apple Plant in China

Apple's Chinese Factories: Exclusive - YouTube

Ford F-150 Plant Tour

F150 Factory Tour | How Ford Builds An F-150 Every 53 Seconds - The Haul - YouTube

Boeing Factory Tour

Boeing Everett Factory Tour | Boeing 747, 767, 777 & X & 787 Assembly Line – YouTube

WHAT DO STUDENTS SEE ON THE PLANT TOUR?

The students arrive at the Nissan plant and first see a video introducing them to the company and its products. The tour participants board along the tram (see Example 2 below) and travel through the plant. It takes around an hour to tour the plant in the vehicles. They see different lines making vehicles from start to finish, from a frame to quality testing of a finished automobile. Along the tour, the students witness all areas of job order costing and product cost along with many other concepts covered in the class such as sustainability, quality control, process reengineering, and a Just-in-Time inventory system.

**FIGURE 3
TOUR TRAM**



Raw Materials Inventory



Work-in-Process Inventory



Finished Goods Inventory



Direct Materials



Direct Labor



Factory Overhead



CONCLUSION

Taking students on a plant tour allows them to witness many managerial or cost accounting elements in a real-world setting. The field trip will enable them to visualize and experience job order costing such as work-in-process inventory, the aspects of product cost such as direct materials and labor, and other business practices such as sustainability or a Just-in-Time inventory system.

The professor needs to set up the tour in advance and plan it soon after covering the material in class. The student must complete a reflective learning experience paper and participate in an excellent discussion of the tour in the following class meeting. The students view the plant tour as a positive learning experience for both accounting and non-accounting majors. A virtual tour of the Nissan plant or other plants can take place instead of a physical plant tour for students unable to attend the tour, night classes, or online courses.

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