

Changing the Perception of Manufacturing to

Attract the Next Generation of Workers

(CPM Project)

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TABLE OF CONTENTS

1.0 INTRODUCTION.....	3
2.0 BACKGROUND	4
2.1 COMMUNITY INFORMATION	4
2.2 ORGANIZATION INFORMATION	5
3.0 STATEMENT OF PROBLEM	6
3.1 PROJECT NEED	6
4.0 CERTIFIED ECONOMIC DEVELOPMENT COURSES	7
5.0 STANDARDS AND TRENDS IDENTIFIED IN RESEARCH	8
6.0. ‘CPM PROJECT’	8
6.1 PROJECT COLLABORATORS	8
6.2 GOALS AND OBJECTIVES	9
6.3 TIME FRAME	9
6.4 PLANNING	9
6.5 PROJECT IMPLEMENTATION	12
6.6 SURVEY RESULTS	12
6.7 POST PROJECT REVIEW	13
7.0 CONCLUSION	14
8.0 REFERENCES	17
9.0 APPENDIX A	19

1.0 INTRODUCTION

Much importance has been placed on students obtaining a two or four-year college degree. However, not all intelligent students choose the college degree path, and these particular students are “falling through the cracks.” To address this issue, alternative career-options need to be highlighted at the seventh and eighth grade level and continue through to high school graduation. Skilled careers in manufacturing are rewarding, and tend to offer higher wages, training opportunities, and work-related benefits. Lack of information, and a negative misconception of the lack of profitable career opportunities in manufacturing, has limited the number of persons from Generation Z who are interested in pursuing a career in manufacturing. Many students currently perceive jobs in manufacturing as hot, dirty, and physically demanding, with low salary and few real long-term benefits. However, modern manufacturing has changed dramatically due to automation and new innovative technology. More effective educational programs are needed in order to change the negative misconceptions students have concerning the fulfilling careers available in manufacturing.

Changing the Perception of Manufacturing to Attract the Next Generation of Workers Project (CPM Project) will demonstrate how developing positive perceptions of manufacturing will give incentive to students to consider careers in manufacturing. Qualitative research data will provide insights into the problem of negative perceptions among high school students concerning careers in manufacturing. Empirical data will outline how these misperceptions are negatively impacting manufacturing recruitment efforts, as well as demonstrate the need to change the perception of manufacturing. Quantitative research will use both national and local data in the measurement of the various views and opinions concerning the perception of manufacturing among high school students, both pre and post programs. Both qualitative and

quantitative facts will be used to illustrate the need for creating a statewide program to provide all counties throughout Tennessee an easily applicable method for changing manufacturing misperceptions. These programs will have a positive impact on manufactures' ability to recruit the next generation of workers.

2.0 BACKGROUND

2.1 COMMUNITY INFORMATION

Henderson County is in the west-central part of the state, midway between Nashville and Memphis Tennessee. The southern boundary of the county is approximately 20 miles north of the Tennessee and Mississippi State line, and the eastern boundary is approximately ten miles west of the Tennessee River. The county seat is The City of Lexington, with three other separate municipalities within the county, which include Parkers Cross Roads, Scotts Hill, and Sardis. Henderson County is located within 500 miles of 76% of most of the major markets in the United States. This strategic location has made the Tennessee Certified Site within the Timberlake Industrial Park an ideal place for industry due to the easy access to Interstate 40 by State Route 22.

There are 2,114 companies within the county, with the majority of industry manufacturing machinery components and plastics. Due to the strategic location, distribution and logistics rank high among businesses in Henderson County. The largest business in the county is AutoZone, which employs 560 people. Other major industry includes Adient US, Columbus McKinnon Corporation, DeWayne's Quality Coating, Cooper Container, Falcon Plastics, Nidec Leroy-Somer, and Volvo Penta Marine.

The 2016 estimated population of Henderson County was 27,822, and the median household income was \$41,478. Over 17% of the citizens of the county were considered persons

in poverty.¹ Education attainment is a high priority in the county, with over 80% graduating from high school or higher education. The age-group between 18-64 composes over 60% of the population, with the median age approximately 40 years old. Between 2012 and 2016 it is estimated that 55% of the population, age sixteen years of age and older, were in the civilian work force. Although this variance seems slight, the fact that 42% of those in the workforce travel outside of Henderson County for employment does create a different scenario.

2.2 ORGANIZATION INFORMATION

The Lexington-Henderson County Alliance was developed as the next step of the Comprehensive Economic Development Strategy, conducted by the United States Department of Commerce Economic Development Administration, through The Southwest Tennessee Development District (SWTDD). The focused objectives for LHCA result from the Strategic Opportunities to Advance the Region (SOAR) program. The SOAR program was designed to assist rural counties in assessing, developing, and executing economic development strategies.

The Lexington-Henderson County Alliance (LHCA) is a coalition between Henderson County and the cities of Lexington, Parkers Cross Roads, Sardis, and Scotts Hill. This coalition was established in 2016 to further the advancement of economic development in Henderson County. The LHCA Executive Board consists of the Mayor of Henderson County, and the Mayors of the cities of Lexington, Parkers Cross Roads, Sardis, and Scotts Hill. The executive board meets quarterly to establish guidelines, develop policy, and provide over-all guidance to the alliance. The LHCA Team consists of members from Tennessee Economic and Community Development, West Tennessee Industrial Association, Lexington Industrial Development Board,

¹ "QuickFacts." *U.S. Census Bureau QuickFacts: Henderson County, Tennessee*, Last Accessed on February 4, 2017 Retrieved from www.census.gov/quickfacts/fact/table/hendersoncountytennessee/PST045217.

Tennessee Valley Authority, Henderson County Chamber of Commerce, and Lexington Henderson County Alliance.

3.0 STATEMENT OF PROBLEM

Henderson County has seen a decline in the unemployment rate during the recent past years, dropping from 10.5% in 2013 to 3.7% in September 2017. To ensure that the present and future employment needs of industry are met, a program was needed to increase the number of prospective available workers in the pipeline. The need for qualified workers has been a consistent issue since 2016, and has been a major topic with members of our manufacturing community during the Quarterly Industrial Roundtable Meetings. Both Human Resource Managers and Senior Management stated that finding qualified workers is a high priority. One Senior Manager stated that students are taking jobs at fast food restaurants at lower wages since they are unaware of the opportunities in manufacturing. Discussions at the Quarterly Roundtable Meetings centered on connecting directly with applicants, in ways which included job fairs, billboard advertisement, and placing a very large banner outside the facility to attract applicants.

3.1 PROJECT NEED

A program was needed to change these negative perceptions, and provide opportunities for students, teachers, counselors, and parents to see and understand the new technology presently being used in local manufacturing facilities. The 'CPM Project' was created, and through this project educational material, educational tours of manufacturing facilities, and presentations to the seventh and eighth grade students were provided.

With a group of 90 persons participating in the tour aspect of the project, and 38 student

surveys completed after the tour, the project results aligned with those found by Deloitte and the ‘Manufacturing Institute Study’. The Deloitte study reported that 81% of those students who participated in educational programs and tours were “... more convinced that manufacturing provides careers that are interesting and rewarding”. In addition, 62% of the students were more motivated to pursue a career in manufacturing after participating in the programs. The ‘CPM Project’ report will confirm that additional education and manufacturer tours will change the negative misconceptions students have concerning the fulfilling careers available in manufacturing.

4.0 CERTIFIED ECONOMIC DEVELOPMENT COURSES

The Tennessee Managing Economic Development Organizations course was used extensively in setting up the Lexington-Henderson County Alliance. The course provided the framework for the strategic plan, guided the collaboration of team efforts to recruit prospects that lead to site visits, and assisted in setting goals and metrics to measure outcomes. The Tennessee Business Retention and Expansion course highlighted the importance of treating industry and our partners as customers. Building the relationships with academia, industry, chamber, and other government entities provided the groundwork for the ‘CPM Project’. Providing successful programs prior to the project, which met or exceeded our partner’s expectations, secured their participation in the ‘CPM Project’. The Tennessee Economic Development Finance Course provided the prior financial knowledge to partner with the Tennessee Economic Community Development staff to deliver incentive programs, which underscored the ability to bring much needed information and services to industry in Henderson County.

5.0 STANDARDS AND TRENDS IDENTIFIED IN RESEARCH

Prior to planning the ‘CPM Project,’ research was conducted on the studies by Deloitte and the Manufacturing Institute. These varied studies were conducted over a span of eleven years, and through their collaboration they developed in-depth studies and metrics that report the perceptions of manufacturing in reference to students, teachers, counselors, and manufacturing personnel. The partnership between Deloitte and the Manufacturing Institute provided national data, which included the percentage of students participating in manufacturing tours who had not considered a career in manufacturing prior to the events, and after taking the tour would consider a career in manufacturing. The research conducted by Deloitte in 2016 had 1,249 student responses in evaluating the positive impact the manufacturing events had on students. The report provided by Deloitte stated that 88% of the manufacturing month events were “interesting and engaging”; 89% of those surveyed were more aware of careers in their communities; and 84% stated that they believe that manufacturing provides career opportunities that are “interesting and rewarding.” The most important element of this research is that 64% of those surveyed were more “motivated to pursue a career in manufacturing” after the Manufacturing Month events.

6.0. ‘CPM PROJECT’

6.1 PROJECT COLLABRATORS

The ‘*Changing the Perception of Manufacturing to Attract the Next Generation of Workers*’, or ‘*CPM Project*’ was well received by students, teachers, government entities, and the public. Organizations that were involved included Falcon Plastics, University of Tennessee Industrial Services, Tennessee Economic and Community Development, Henderson County School District, Ayers Foundation, and the Tennessee College of Applied Technology.

Volunteers who aided the project consisted of various members of the Henderson County Commission, academia, business professionals, and retirees.

6.2 GOALS AND OBJECTIVES

The '*CPM Project*' had two main goals. The first goal was to improve the perception of manufacturing careers among high school students. The second goal was to increase the number of Henderson County students who actually considered a career in advanced manufacturing. Objectives had to be defined to achieve these goals. The objectives included forming a committee, obtaining manufacturing participation, and selection and recruitment of personnel required to fulfill roles. Budget and funding sources were then identified, parent permission forms and surveys were formulated, on and off-site logistics were examined, and event timelines were set. Creative methods were put into place to ensure that attendees would complete the surveys onsite.

6.3 TIME FRAME

The '*CPM Project*' began in October 2016 and took approximately one year to plan. The events were announced at the Quarterly Manufacturers Roundtable Meetings. The yearlong planning allowed time for staff and volunteers to market the program to all those involved to ensure buy-in of the program goals from participants, partners, and the public.

6.4 PLANNING

During the planning sessions and at the event, staff members from Lexington High School, Scotts Hill High School and the Ayers Foundation were actively involved. Throughout the process there were administrators, principals, counselors, teachers, and many staff members actively engaged in the development of the project. Without their input, support, and cooperation this event would not have been successful. The high school principals and staff

presented an introductory program on the manufacturing tour to students in the high school auditorium, which created buzz around the event and ensured student participation. Although limited surveys from academia were returned, all members from the school system indicated that the information concerning the event and resources received prior to the event were appropriate. To increase the number of survey responses from educators in 2018, research demonstrates that multiple methods of delivery are most effective. In the article *Improving Survey Response Rates: Four tactics To Increase Participation*, the author states that a response rate of 90.2% can be achieved by using multiple modes to motivate participants to respond to the survey. Therefore, a five-phase plan will be created to increase the number of survey responses from educators. Phase One will examine the delivery mode of the survey, which includes telephone, mail, online, or face-to-face interviews. Phase Two will modify the survey based on the outcome of delivery mode chosen in the planning sessions with educators. Phase Three will create new correspondence and survey, which will be used in conjunction with the new survey mode. If mail, email, or online mode of survey is selected, a letter will be sent in Phase Four with the survey attached, or a link to the survey will be placed in email. Phase Five will consist of a follow-up to educators who have not responded, stating “We recently contacted you about a survey but haven’t received your responses. We would really appreciate your participation. Your answers to the survey are very important since it will assist us in changing the perceptions of manufacturing in our community.”

From the observations of academia, students had been looking forward to the event and the work described during their tour was interesting. After the tour, educators had a positive opinion about a career in manufacturing as well and indicated that they would recommend that other students have an opportunity to take the manufacturing tour in the future.

Henderson County School District is doing an excellent job in providing students with varied career options, as well as providing training to meet the needs of industry in Henderson County. The Advanced Manufacturing Machining Technology class began in 2017 at Lexington High School, and includes classes in Manufacturing Technology, Electromechanical Technology, Mechatronics and Welding. The Engineering/Stem concentration includes Introduction to Engineering, Principles of Engineering, Digital Electronic, and Engineering Design and Development.

However, studies have shown that schools in other communities are not as proactive in meeting the needs of manufacturing. Adam Mawyer made several recommendations in reference to changing the negative perception of manufacturing in the study '*Perceptions of the Manufacturing Industry Among Secondary Students.*' These recommendations included hosting outreach programs to present the career opportunities in manufacturing to both students and parents, encouraging manufacturing managers to promote the benefits of working in manufacturing at school events, and integrating manufacturing examples in school curriculum when working through mathematical problems. Other recommendations might include increasing the school districts role in funding resources for career planning, offering guidance counselors in middle school training and information on varied careers in manufacturing, and providing professional career planning to middle-school staff members, with a focus on advanced manufacturing. By providing funding and manufacturing career training, more teachers would be better qualified to offer various career options within the classroom related to industry.

The staff with Falcon Plastics was very pleased with the Manufacturing Tour and would like to participate in next year's tour. To expand the opportunities for students to see other

manufacturing facilities, it is recommended that regional partnerships be formed to create a coalition of committed industries who are willing to participate in Manufacturing Tours.

Economic Development Organizations, Manufacturer Associations and Chambers of Commerce have pre-established networks, and by working together could offer the students four to six different touring opportunities. A Manufacturing Tour Coalition could offer a reduction in time and cost, as well as increase the public awareness of the excellent career opportunities in advanced manufacturing.

6.5 PROJECT IMPLEMENTATION

The Manufacturing Tour event began with setting up the welcoming area at 7:00 a.m. on October 20, 2017. The welcome area was on north side of Falcon Plastics, to ensure the safety as the bus entered and exited the parking area. In developing logistics for the event, the welcoming area was purposely designed for student safety, as well as to ensure that the entrance located at the front of the building remained accessible to Falcon Plastic customers.

Due to the number of those participating, students were divided into two separate groups, named Group A and Group B. As the tours, began both Group A and Group B were further subdivided into smaller groups to allow each set to observe first-hand each department, which included the computerized use of “Sawyer” the robotic arm, maintenance, production, and logistics. These smaller groups of four to six students provided the opportunity for students and staff to network, creating a direct link to possible applicants from those high school students participating in the tour.

6.6 SURVEY RESULTS

The ‘*CPM Project*’ survey results determined that the manufacturing events did indeed change the perception of a manufacturing career in the minds of high school students.

Of the students who took the tour:

- 79% indicated afterward that they would consider a career in advanced manufacturing.
- 89% stated that the tour provided them new and previously unknown information about careers in advanced manufacturing.
- 90% stated that the tour helped them to understand how STEM subjects learned in school are put to work in advanced manufacturing industries. STEM is an education program designed to prepare students for careers in the fields of science, technology, engineering, and mathematics.
- 89% recommended that other students have the opportunity to participate in this tour.

6.7 POST PROJECT REVIEW

As the student responses indicated, the students were excited about “Sawyer” the robotic arm, which demonstrated the various functions the high-performance robot could accomplish working hand-in-hand with employees. “The robots were very interesting, not as labor demanding as I thought”, a male student stated on his survey. A female student commented, “I liked seeing Sawyer at work. I also think it’s cool how these machines can use pictures to reject a part.” These positive statements and many more were provided when students filled out the survey after the tour (See Appendix A). The surveys provided insight into what the students experienced from their own point of view and will assist in streamlining and improving tours in the future.

After the event the team discussed highlights, challenges, and suggestions for next year. Important suggestions included presenting *Interview Do’s and Don’ts*, which would include the reason for not bringing friends to the interview, and why wearing appropriate clothing to an interview is important.

7.0 CONCLUSION

The *'Changing the Perception of Manufacturing to Attract the Next Generation of Workers' Project (CPM Project)* succeeded in demonstrating how developing new positive perceptions of manufacturing can provide an incentive to students to consider careers in manufacturing after graduation. The percentage of students who, after the tour, indicated that they would consider a career in advanced manufacturing was higher, at 79%, than had been anticipated; in comparison, only 64% of students nationwide indicated that they were “motivated to pursue a career in manufacturing”. The change in perception was reflected in many of the comments written on the surveys after the tour. The comments specific to the positive perception of the manufacturing facility included plant cleanliness, organized workspaces, and the pleasant temperature of the plant.

Although the results of this project demonstrated the positive perception of manufacturing, many students are receiving information about careers from parents. Therefore, creating programs aimed at changing the parents' misconception of manufacturing would further increase the success in promoting careers in manufacturing. As manufacturers try to recruit young talent, holding a “Parents' Night” is a winning strategy in the attempt to fill the talent pipeline. In the coming year, the Lexington-Henderson County Alliance will create a “Parents' Night” to market careers in manufacturing directly to parents; this program will be specifically designed to influence the parents of high school students in the community. The parents can see and hear straight from employees in manufacturing that, for the most part, they like their jobs and find their jobs interesting. During “Parents Night” both students and parents will also learn about the opportunities for career advancement, and lucrative salaries offered in manufacturing.

Since “Parents' Night” is relatively a new approach, no long-term studies have been

conducted to determine the total impact on changing the misconception among students whose parents attended the event. However, this type of recruiting technique has been so successful that the Toyota Motor Corporation in Indiana scheduled three “Parents’ Night Out,” which were held in October 2017, January 2018, and March 2018. This type of recruiting was highlighted in an article entitled “To Recruit Workers, Manufacturers Go to Parents’ Nights” in *The Wall Street Journal*, and from the parents comments these events have shown success in convincing parents that careers in manufacturing are both lucrative and rewarding.

Although the goal of the *CPM Project* was to change the students’ perception of manufacturing, the tour also improved their understanding of how STEM subjects are actually applied in real world practices. The technology in manufacturing is changing and will require employees to have an understanding of math, critical thinking, and to work as a team. Ninety percent of the students stated that the tour helped them understand how STEM subjects are put into practice in advanced manufacturing, which solidifies the connection between STEM educational programs and careers in manufacturing.

The *CPM Project* changed the perception of manufacturing as well as provided benefits for students, academia, employers, and the entire community. The benefits to the students and academia included real world insights into careers in manufacturing, and how STEM skills are actually used in the workplace environment. The benefits to the employer included the creation and cultivation of student interest in careers in manufacturing, as well as creating a direct pipeline to future workforce. This direct pipeline will make recruiting Generation Z much easier since 79% of the students on the tour would consider a career in advanced manufacturing. Providing future employees for manufacturers in Henderson County will assist in the growth of

industry, which in turn creates an increase in the tax base for the community and perpetuates a cycle of prosperity.

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9.0 APPENDIX A

Student Comments
<p>Advanced Manufacturing</p> <ul style="list-style-type: none"> • <i>I liked being able to relate the product to my life. I also like the Robot.</i> • <i>The robots were very interesting, not as labor demanding as I thought.</i> • <i>I like how quick the products get shipped out.</i> • <i>I liked the robot testing the straps for the fire extinguisher.</i>
<p>Real World Robotics</p> <ul style="list-style-type: none"> • <i>I liked seeing Sawyer at work.</i> • <i>It's cool how these machines can use pictures to reject a part.</i> • <i>A machine having the ability to judge parts is amazing to see.</i> • <i>I like the robot and watching how most things are machine operated. This makes things much easier than a person making things by hand.</i> • <i>I liked how the machines were efficient. I also like the robot.</i>
<p>New Manufacturing Perception</p> <ul style="list-style-type: none"> • <i>I like the good environment as well as the clean floor and organized workspace.</i> • <i>I liked how nice the people were, and how they all looked like they enjoyed what they do.</i> • <i>I like the room with all the tools. I strive to have that level of organization.</i> • <i>I like the work environment and the friendly people.</i> • <i>Very helpful to understand the manufacturing process & to know how plastic products are made.</i>
<p>Manufacturing Careers</p> <ul style="list-style-type: none"> • <i>Quality seemed like the best choice for myself, it kept my attention.</i> • <i>I liked how nice and respectful everyone was to us. The benefits are very good.</i> • <i>The people were very nice, and the benefits of having a job here.</i> • <i>How friendly the employees are and the culture of the factory.</i> • <i>It was a great learning experience. I enjoyed it.</i> • <i>Very interesting to learn how they do it.</i>
<p>Employees and Guides</p> <ul style="list-style-type: none"> • <i>I liked how they switched guides for the different sections.</i> • <i>I like how polite and welcoming everyone was.</i> • <i>Everyone was really cool to talk to.</i>

