EDJ The IEDC Economic Development Journal

734 15th Street, NW Suite 900 • Washington, DC 20005 Volume 14 / Number 1 / Winter 2015

Manufacturing a Future that Works

By Kara Brown

A SMALL COMMUNITY'S BIG SOLUTION TO ALIGN MANUFACTURING NEEDS WITH EDUCATION IN LINCOLN COUNTY, NC

The Existing Business Program of the Lincoln Economic Development Association in Lincoln County, NC, responded to industry concerns over the imminent shortage of skilled workers and a retiring workforce by pulling together all stakeholders to find a local solution. The result won IEDC's Gold Award in Human Capital. The Manufacturing a Future that Works program is a high school curriculum developed by local industry to meet their specific workforce needs by improving the skills of the future workforce and developing and increasing a pool of knowledgeable workers that specifically brings youth into the workforce pipeline. This is a textbook example of aligning education and industry to improve the existing workforce.

manufacturing

A FUTURE THAT WORKS

By Kara Brown

INTRODUCTION

The "Closing the Gap: 2012 Skills Survey of North Carolina Employers" report concluded that "national trends indicate communities throughout the US are facing current or imminent shortages of skilled workers to meet the demands of the local employers. Compounding this issue is the aging of the workforce. An adequate supply of trained individuals is vital to the economic development mix in each of our geographic planning regions. A number of skills issues have been noted in this limited survey. These issues are sufficient to create concern for employers, workforce training resources and workforce planning agencies, including the local political entities that have responsibilities for planning and quality of life in the community. This study shows the greatest need is within the manufacturing sector…Aside from incentives that employers are using to keep their current skilled workforce, efforts are needed to equip the emerging workforce with the skills to fill the gaps identified in this survey and be prepared to replace the Baby Boomers that will soon retire."

As the agency tasked with fostering an economic environment that promotes an enhanced standard of living in Lincoln County, NC, the Lincoln Economic Development Association (LEDA) noted that the concerns of the local industrial community were congruent with the report findings. LEDA is fortunate to have under the umbrella of its Existing Business Program, the Industrial Manager's Association (IMA) whose membership consists of top level management of 35 manufacturers in the county.

Kathy Livsie, Mechanical/Mechatronics/Nuclear instructor with Gaston Community College, manipulates a robot while talking with Lincoln County students during the Manufacturing a Future that Works career expo. Held annually, the expo is an opportunity to expose students to local industries and career options and to create awareness of products manufactured in Lincoln County.

Functioning as a networking group, IMA develops alliances among existing industries, the education system, and officials by providing information and tools to support the needs of manufacturing throughout Lincoln County. Organized as a 501(c)(6), IMA has a strong voice representing the largest tax payers within the county on issues facing the community and manufacturers.

Even before the 2012 North Carolina skills survey report, economic developers and industries were focused on the lack of human capital development in a community of less than 80,000 people with over 20 percent of the population employed

Kara Brown is the existing business manager of the Lincoln Economic Development Association. (kara@lincolneda.org)

A SMALL COMMUNITY'S BIG SOLUTION TO ALIGN MANUFACTURING NEEDS WITH EDUCATION IN LINCOLN COUNTY, NC

The Existing Business Program of the Lincoln Economic Development Association in Lincoln County, NC, responded to industry concerns over the imminent shortage of skilled workers and a retiring workforce by pulling together all stakeholders to find a local solution. The result won IEDC's Gold Award in Human Capital. The Manufacturing a Future that Works program is a high school curriculum developed by local industry to meet their specific workforce needs by improving the skills of the future workforce and developing and increasing a pool of knowledgeable workers that specifically brings youth into the workforce pipeline. This is a textbook example of aligning education and industry to improve the existing workforce.

With the popularity of Science, Technology, Engineering, and Math (STEM) programs being developed in other areas of the country, the local group envisioned that a model program could potentially address local needs and began working to develop a STEM initiative for county students.

within the manufacturing sector. Known for being responsive to industry needs through its Existing Business Program, LEDA dedicated the program manager to work with industry to address these very concerns. This article details the events which culminated in a successful alignment effort between industry and education leaders, spearheaded by economic development, to address the existing skills gap and future workforce needs which were sure to adversely affect the manufacturing conditions in Lincoln County.

ENVISIONING A MODEL PROGRAM

Since 2008, LEDA's existing business manager and IMA's Education Committee had been working with the local education system and then school superintendent on human capital initiatives. With the popularity of Science, Technology, Engineering, and Math (STEM) programs being developed in other areas of the country, the local group envisioned that a model program could potentially address local needs and began working to develop a STEM initiative for county students.

Working collaboratively, LEDA, IMA, and Lincoln County Schools studied and visited existing STEM programs in other states to learn if any could be duplicated locally. Although those considered were great examples of success, none were found to be a fit for the community of industries located in Lincoln County. Additional roadblocks to success included the costs associated with purchasing an existing model program and the departure of the school superintendent who was instrumental in the STEM initiative. Momentum came to a halt for making headway to address workforce needs in the county.

Fast forward to 2011, with the recession beginning to fade and without any progress having been made in over two years, conditions within the county had not changed. LEDA's Existing Business Program began to again hear the industrial community's concerns echo the same message as years before that "something" has to be done to secure the future of the local manufacturers.

Lincoln County, located northwest of Charlotte, NC, has a total population just fewer than 80,000 people. It is strategically located between Interstates 40 and 85 and 30 minutes from the Charlotte Douglas International Airport.

Lincoln Economic Development Association (LEDA) is a private, 501(c)(3) non-profit corporation charged with facilitating industrial and office development in Lincolnton and Lincoln County, NC. With a staff of five, LEDA's mission is to foster an economic environment that promotes an enhancement of the standard of living by creating more and better jobs for the citizens of Lincolnton and Lincoln County and an increased and diversified tax base to provide needed community services.

The organization's goals include retention and expansion of existing business, attraction of diversified base industries, improvement of the overall business climate within Lincolnton and Lincoln County, and the growth of stage two entrepreneurial companies.

This message was clearly delivered by Jack Timken, formerly with The Timken Company and then president of the company's charitable foundation, The Timken Foundation of Canton, OH. On a routine visit to follow up on grant projects, the foundation president asked what actions were being taken in workforce development by economic development leaders and education and industry management. His response suggested the efforts were insufficient to address the skills gap and the subject should be revisited.

Those words resonated loudly and once again IMA and LEDA began working to address the skills gap in Lincoln County. Realizing a required paradigm shift must occur on the local, state, and national level to ultimately address the skills gap challenges and create a total population of workers, LEDA and industry leaders focused on their local area of influence. With the goal to align industry and education to successfully create a pipeline of workers, it would require demonstrating to students, parents, educators, and the community that manufacturing is not dead, jobs aren't conducted in dark and dirty environments, there are high level positions available, and a great opportunity for advancement exists even for an entry level person in manufacturing.

STRATEGY FOR CHANGE

The need for workers from all sectors seemed to be the overwhelming concern of all employers, not just manufacturing. Good employees were needed immediately and not just in two or three years when the silver tsunami hit, but the pervasive questions were what do you do immediately and how do you go about cultivating workers.

After months of discussion between industry and economic development, a strategy began to emerge among industry leaders for influencing systematic change. IMA's Executive Board, with LEDA's support and resources, established a framework of short-, mid- and long-term strategies as a starting point to encourage initiatives to address workforce concerns and the skills gap in the county.

A short-term strategy for locating entry level operators encouraged industries to use their human resources departments to implement Career Readiness Certificate requirements, addressing their internal needs for locating entry level operators.

As a mid-term, 18-36-month strategy to train and develop technical talent, IMA would collaborate with Gaston College, the local community college, to guide its immediate and future plans for improving advanced manufacturing programs. Industry and college partnerships for new hire basic skills training and joint curriculum development that meets local industry needs were also proposed.

As a final long-term strategy (three years) for filling the pipeline, identifying early career pathway education and development opportunities to be offered through Lincoln County schools would be defined for earlier intervention. Through Junior Achievement program exploration, robotics programs, and technical education programs in the middle schools, reaching students early in their career exploration was identified as a deliberate effort to influence students before entering high school and promote local industry needs. IMA's Executive Board would act as an Education Committee because this strategy would take time to develop.

EDUCATING THE EDUCATORS

Armed with data supporting manufacturing's importance in Lincoln County, industry and economic development leaders began efforts to convince the local school system to become a partner in addressing the workforce issues facing the county.

First, economic developers needed to communicate the reality of the local story to educators. How much of the local economy depends on the manufacturing industry? The Lincoln County manufacturing sector not only provides much of the employment opportunity to the county population, but it is the highest wage earning sector in the community.

To those who believe that manufacturing isn't relevant any longer, the local statistics contradict this. Since 2009, over $130 million has been spent in Lincoln County on existing business expansions and over 350 jobs created. Additionally, over $114 million was invested through new industry and over 1,000 jobs created. With this much activity occurring in the manufacturing sector, Lincoln County is recognized throughout North Carolina as a hot spot for advanced manufacturing growth, and the workforce is essential to continued success.

Second, education leaders needed to see firsthand what modern manufacturing looks like in today's world of innovation and technology. Economic development leaders planned daylong trips to manufacturing facilities throughout the county, filled with tours, conversations with all levels of management, and opportunities for information sessions.

And lastly, everyone needed to understand what exactly is the "workforce gap or skills gap." How could there possibly be jobs going unfilled when there are people without jobs? There had to be conversation, lots of conversation among education system leaders, economic development, and industry. Small meetings featured discussions with key administrators from the education system. Larger panel opportunities for principals K-12 and industry management focused on the message of local workforce needs and strategies for alignment.

Illinois-based AptarGroup, Inc.'s Lincoln, NC facility serves as host industry for the student focused Manufacturing a Future that Works career expo. Christina Little with Aptar Lincolnton takes a show of hands to learn how many students have an Aptar product at home. The company is a leading global supplier of a broad range of innovative dispensing solutions for a variety of markets so the students easily identified with the locally produced products.

The message was always the same. If change was to occur for the good in Lincoln County to give every student the best opportunity for success and to provide industry with the workforce needed to prosper, this change would have to be accomplished together with each party participating in the solution.

As LEDA and IMA's strategy began to materialize, the greatest concern was whether or not industry could influence any area of the public schools. With a new superintendent and with so much of public instruction at the mercy of state directed programs, it was unknown how much or even if any effective change could be accomplished. However, it was fortunate for LEDA and IMA to find a willing partner in the new school superintendent. After many discussions, meetings, statistics, and industry visits, a commitment was once again in place to make industry's needs a priority and in the process, service a population of students that might possibly need the most assistance for being successful in their future.

RESPONSE FROM EDUCATORS

With limited amounts of discretionary time allowed to teachers in the classroom, the superintendent offered the best opportunity to quickly implement tactics and begin efforts to achieve industry alignment through the Career and Technical Educational (CTE) program. The partnership with the school system began as a pilot program in September 2012 in one 8th grade middle school CTE classroom. The program included industry participation in the classroom and opportunities for manufacturing tours during the school year. It soon expanded to all four of the district's middle schools. As a small scale effort, it was a valid first attempt, but in no way would it be large enough to impact the overall human capital deficit.

As educators, the local school district administrators and staff understood that not all students are bound for college and a four-year degree. The responsibility that educators shouldered wasn't to only prepare those students bound for college to be "college ready," but they needed to emphasize "career ready" as well. Those students who could take many paths after graduation needed to learn about their options, and the schools had to provide the students with the resources necessary to develop them into productive members of the workforce and society.

Lincoln County Schools chose to take a systematic approach to address the skills shortages and address "career ready" opportunities. Understanding how the development of a student happens and when the best opportunities for exposure occur, the district understood it was imperative to reach out to students early in their education and provide experiences and training, resulting in an interest and knowledge specific to the advanced manufacturing sector. The approach is to introduce opportunities early to help students make a good career choice the first time.

All parties agreed that students should be "career ready" and equipped with the basic skills needed by county employers or "college ready" and continue working toward a two-year post-secondary degree in manufacturing or four-year post-secondary education.

MANUFACTURING A FUTURE THAT WORKS

The school district resolved to offer an Advanced Manufacturing class through the CTE program to students in Lincoln County Schools and presented its resolution to IMA and LEDA with overwhelming approval. This was the first real step in addressing a long term solution to a long term problem. The only NC State Department of Public Education course supporting manufacturing was offered in Metals Manufacturing. Without a standard course of study in Advanced Manufacturing, industry leaders had the unique opportunity to create a program specific to Lincoln County – Manufacturing a Future that Works.

To begin developing the local program, it was important to understand the overall manufacturing climate within Lincoln County. LEDA conducted a survey of manufacturers within the county, asking such questions as: what percent of your workforce is eligible for retirement, what competencies do you wish were taught in high school, what skills are your workforce lacking, etc. Survey findings indicated foundation skills in manufacturing were overwhelmingly identified as needing to be taught in the high schools at 82 percent. For occupational or educational skills lacking in the workforce, machining and mechanical engineering split the vote at 43.5 percent each. (See figures 1 and 2)

Lincoln County is home to many European companies, especially German and Austrian. For the last 25 years, it has been home to the successful Apprenticeship 2000 program, modeled after a traditional German apprenticeship program and operated by a consortium

FIGURE 1

Select which area of competencies you wish were taught at the high school level

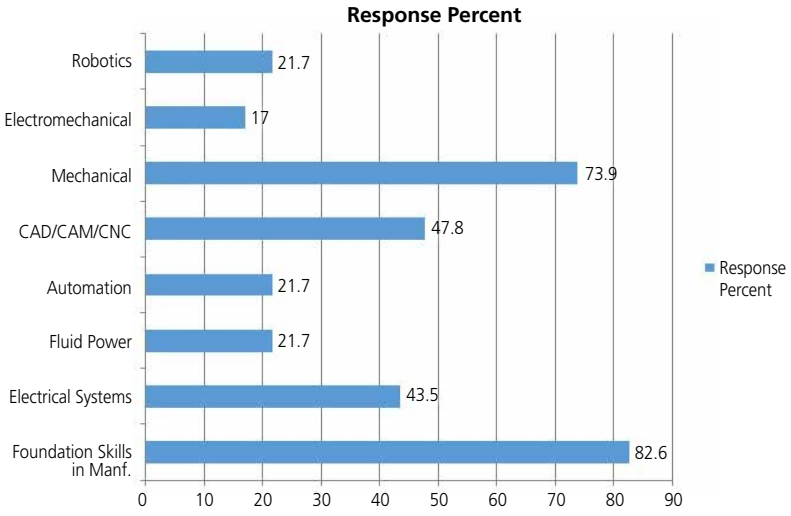
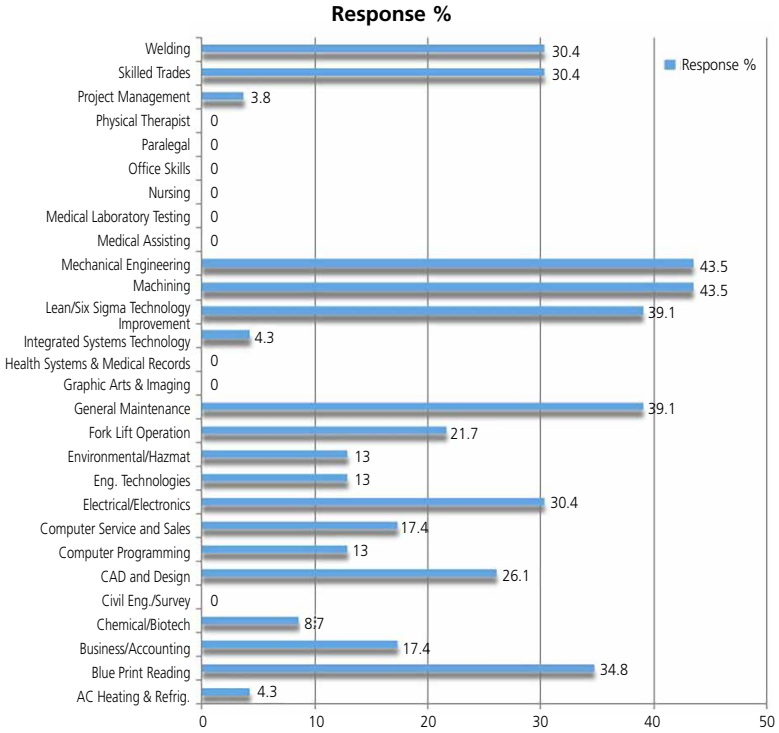


FIGURE 2

Please indicate which occupation or education skills your workforce has a need for or which skills you have identified as being in short supply during your recruiting efforts



Without a standard course of study in Advanced Manufacturing, industry leaders had the unique opportunity to create a program specific to Lincoln County – Manufacturing a Future that Works.

With the Manufacturing a Future that Works curriculum designed collaboratively with the school district and industries and the first phases financed through the reallocated bond money, Lincoln County Schools had remaining funds to add further initiatives in the school system.

of seven companies. Another consortium apprenticeship program began organizing in 2013, Apprenticeship Catawba.

With both programs working to recruit students in line with the apprentice disciplines in mechanics and engineering, as well as the industry survey pointing to the same areas of need, it was easy to identify what subjects needed to be taught at the centrally located Lincoln County School of Technology. A high school, functioning as a county wide vocational school, the School of Technology programs prepare students with the skills, both academically and vocationally, for entry into the labor market or for two-year or four-year college.

IMA determined to best address industry requirements, preparing students through the high school curriculum as Automated Operators/Mechatronic Systems Assistant would be the desired outcome. A student's completion of the curriculum at the high school level would help meet the need for entry level operator positions with local and regional employers as well as lay the foundation for continued education at the college level.

Knowing the state didn't have a curriculum available, the CTE director searched neighboring school districts to determine if others had implemented a similar local course. Only one school system had developed a Local Option Course, which meant it had developed a blueprint and purchased curriculum through a private vendor. However, this community had a large representation of industries with machining operations and designed the blueprint accordingly: safety, hand tools, quality management, and programming Computer Numerical Control (CNC) milling machines.

Lincoln County Schools had approved a bond issue several years earlier for $675,000 to be used toward developing a program in culinary arts and hospitality. Without a large demand of workers for this industry, the program had not been implemented. With the bond money still available, Lincoln County Schools and the CTE program recommended to the School Board to use these funds to support the alignment initiative between industry and the education system. With the board and county commissioner's approval, the alignment initiative received a budget of $675,000 and the parameters of the curriculum were defined.

Using the machining program as a guide, IMA representatives worked with a private vendor to design the Advanced Manufacturing curriculum as a four semester program. Item by item, manufacturing managers discussed what should be offered and in what order. For Levels I and II, the course curriculum would include:

- Math for technicians,
- Safety,
- Hand tools,
- Electrical systems,
- Blueprint reading,
- Power tools,
- Introduction to advanced manufacturing,
- Employability skills, and
- Mechanism technology.

In Levels III and IV:

- Lean manufacturing,
- Measurement and quality control,
- Math for technicians II,
- Pneumatics,
- Hydraulics,
- Sensor technology,
- Robotics,
- Material handling, and
- Computer integrated manufacturing I & II.

As the program grows, Levels V and VI will involve training in mechatronics, specifically in Programming Local Controllers (PLCs), mechatronics systems, electro pneumatics, and electro hydraulics.

With the Manufacturing a Future that Works curriculum designed collaboratively with the school district and industries and the first phases financed through the reallocated bond money, Lincoln County Schools had remaining funds to add further initiatives in the school system. Building upon earlier intervention and enhanced STEM initiatives, the district chose to build upon the current elementary STEM foundation by adding Engineering Is Elementary and CyberKids Robotics at all elementary and middle school levels. The addition of classes in the elementary and middle schools will be used to feed the high school program and further develop a pipeline of students.

Building upon earlier intervention and enhanced STEM initiatives, the district chose to build upon the current elementary STEM foundation by adding Engineering Is Elementary and CyberKids Robotics at all elementary and middle school levels. The addition of classes in the elementary and middle schools will be used to feed the high school program and further develop a pipeline of students.

TAKEAWAYS

In light of continuous improvement, the collaboration has several takeaways.

1. Begin the process well in advance of the time of implementation in the schools.
2. Have an advisory team consisting of manufacturing representatives to interact with the team of educators and provide input as a plan is developed.
3. Industries must agree on the common need, in this case, Mechatronics Operator positions. Without this common goal, it would have been impossible to develop a targeted advanced manufacturing curriculum at the high school level.
4. This program is developed to be successful because it is a pool of industries working together. No one industry alone can guarantee enough jobs to sustain the program, but together the risk is spread.
5. As training labs are developed, realize not all are equal. The team of industry representatives needs to be included in the decision making process and make in depth comparisons to get the best fit for what local industry is using and make sure the community college is prepared to transition the students once they graduate from high school.
6. Classes offered through the schools are weighted as honors classes to encourage students to enroll in the advanced manufacturing classes.
7. For the success of such a program, have a strong point person to keep everyone coordinated and moving forward. Without good communication among all stakeholders, program implementation would fail.
8. With the curriculum in place, the program must be sold by creating enthusiasm among the students to enroll in the courses. Under the branding of Manufacturing a Future that Works, a marketing effort was developed to promote the curriculum through industry tours to students and educators.

   An annual manufacturing career fair within a warehouse at one of the advanced manufacturing facilities hosts high school Career and Technical Education students to highlight future possibilities within industries. Web sites, creative videos, and visuals are being developed to emphasize the curriculum and the jobs of the future in manufacturing.

SECURING RESOURCES

For Lincoln County Schools, LEDA, and IMA, an introduction class to manufacturing was a success. With the initial goal of offering a class at each high school beginning in fall 2014, and after registration, the program numbers were very impressive: a total of 161 students registered for the first manufacturing classes. This provided a strong indicator of interest among students and raised the bar for success.

In order to expand the program, additional funding was necessary. North Carolina is fortunate to have the Golden Leaf Foundation, a nonprofit organization established in 1999 to help transform the state's economy, specifically in rural counties. Through the application process, Lincoln County Schools was invited to submit a grant request for the Manufacturing a Future that Works program.

The Golden Leaf Foundation saw a program that aligned with their objectives of skill and labor force development. Through the grant program, the school district received enough additional funds, $200,000, to pay for the necessary equipment to expand the basic program from each of the four high schools to the Lincoln County School of Technology where the advanced programs in Career and Technical Education are administered.

TAKING IT TO THE NEXT LEVEL

The program's success has recently reached new heights. Lincoln County is also fortunate to have The Timken Company of Canton, OH, as one of its largest manufacturing employers and also a pillar of support in the community. Over the years, Timken's foundation has generously supported various projects within the county. As a stakeholder in the development of human capital, the program was presented to Timken and its foundation for additional funding for future expansion. With a request of $400,000, this would bring the overall funds allocated to Manufacturing a Future that Works to $1.2 million. Lincoln County would be well on its way to having a complete curriculum in Advanced Manufacturing and Mechatronics paid for and implemented.

Recalling it was Jack Timken's own words that prompted a second look at STEM initiatives and workforce investment efforts, Lincoln County Schools applied for a grant from the Timken Foundation. The application explained in detail the curriculum and how it had been designed by the local manufacturing management, down to the smallest details. IMA leadership had been involved even to the point of selecting machinery and determining the number of students who should work in teams at each station.

The application explained in detail the curriculum and how it had been designed by the local manufacturing management, down to the smallest details. IMA leadership had been involved even to the point of selecting machinery and determining the number of students who should work in teams at each station.

A $400,000 grant to the program, developed to address Timken's concerns, would support completing the curriculum with six levels of instruction introduced in two phases to the students and would certainly go far in human capital investment and workforce development. The Timken Foundation must have agreed as it awarded a $650,000 grant to the program in September 2014.

INDUSTRY OPPORTUNITY

With funding in place to fully implement the Manufacturing a Future that Works curriculum, the opportunity now exists to create even more opportunity for existing industries. Because the School of Technology is approved to offer college courses, this facility can now be utilized after traditional school hours for continuing education purposes. The local community college is considering ways the machinery can be used for special training opportunities for industry, abbreviated classes, boot-camp training opportunities, and many other possibilities to serve the workforce.

FINAL THOUGHTS

The implementation of Manufacturing a Future that Works is a testament to the power of collaboration between industry and a local school system. A long term commitment by all stakeholders is imperative to the initiative's success. Industries have to be willing to be advisers/mentors and to participate in educational opportunities for students, parents, and educators. The school system must offer programs that respond to future needs of the workforce and that provide opportunities to prepare our students to be college or career ready. As economic developers, we have a responsibility to promote the needs of our industries and align our resources.

Industries have to be willing to be advisers/ mentors and to participate in educational opportunities for students, parents, and educators. The school system must offer programs that respond to future needs of the workforce and that provide opportunities to prepare our students to be college or career ready. As economic developers, we have a responsibility to promote the needs of our industries and align our resources.