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Contacts:

Joe Steele
313-309-9132

jsteele@lift.technology

Eileen Pickett
502-693-5566

eileen@epickettconsulting.com

MakerMinded Web Portal Puts Manufacturing Education and Awareness at Tennessee Students' Fingertips

NASHVILLE, Tenn. – The Lightweight Innovations for Tomorrow [LIFT] national manufacturing institute today announced a new initiative, MakerMinded, to bring manufacturing and STEM activities, awareness and education directly to middle and high school students. MakerMinded will be launched initially in the State of Tennessee, home to its platform developer, Tennessee Tech University, and managed in the state by the Tennessee Stem Innovation Network (TSIN).

MakerMinded is focused on creating the next generation of manufacturing leaders by putting them in a manufacturing mindset and bridging the gap between educational and engaging activities and the students who can benefit from them. It does this through a digital platform that connects students and schools to market-leading Science, Technology, Engineering, and Math [STEM] and manufacturing learning experiences.

“Over the course of their high school careers, too many students lose interest in STEM-related courses and careers,” said Wes Hall, director, TSIN. “By delivering these fun, yet challenging and engaging activities directly to classrooms, we hope to keep more of them interested in continuing their STEM education beyond high school and eventually to the workforce. Engaging students early in middle school increases their knowledge of future STEM careers.”

MakerMinded aims to not just change students' attitudes about STEM and manufacturing, but also to encourage them to act by focusing on four key principles:

- Encouraging students to work together toward the goal of building awareness and engagement in STEM through campaign-style communications;
- Building a sense of community and uniting students by creating competition between schools for completing activities;
- Allowing students to own and lead STEM activities;
- Leveraging and bringing to scale STEM programs which have been impactful.

“Making STEM education both informative and engaging is vital to encouraging students to consider manufacturing as a viable career option,” said Emily Stover DeRocco, education and workforce development director, LIFT. “Contrary to popular belief, there are thousands of manufacturing jobs available, but a skills gap exists because students

are turning away from necessary STEM education and training too early. Our intention is to introduce MakerMinded first in Tennessee and then make it available to states across the nation as an important part of our national STEM education and advanced manufacturing workforce development strategies.”

According to Workforce Innovation Network (WIN) research, 11,000 manufacturing jobs were posted in the first quarter of 2016 for Tennessee alone, up 41 percent from the 7,800 jobs posted in the first quarter of 2015.

After year one of the MakerMinded program, partners expect to see more students engaged in STEM/manufacturing learning experiences, an increase in students pursuing further STEM education and training, students developing foundational technical skills, and an increased number of under-represented populations exposed to manufacturing and STEM fields.

“If we continue to allow students to turn away from STEM education without providing them the opportunity and encouragement to continue it, then we are doing them and our country a disservice,” said Larry Brown, executive director, LIFT. “We applaud both Tennessee Tech and the Tennessee STEM Innovation Network for making this program available.”

The Tennessee STEM Innovation Network will drive the Tennessee state rollout process, including:

- Customizing portfolio programs for local employers and organizations;
- Leading the statewide communications & marketing efforts for program implementation;
- Tracking progress for each school and the state;
- Sponsoring and co-hosting recognition events.

The Tennessee Tech University team will manage the MakerMinded platform and Tennessee-specific portal, including:

- Creating campaign materials;
- Developing and hosting the custom web portal for Tennessee’s program;
- Managing the leader board and reports;
- Ensuring consistent platform functionality.

For information about the *MakerMinded* program, visit www.lift.technology or contact LIFT Education & Workforce Director Emily DeRocco at ederocco@lift.technology.

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ABOUT LIFT

LIFT is a Detroit-based, public-private partnership committed to the development and deployment of advanced lightweight metal manufacturing technologies, and implementing education and training initiatives to better prepare the workforce today and in the future. LIFT is one of the founding institutes in the National Network of Manufacturing Innovation (NNMI), and is funded in part by the Department of Defense with management through the Office of Naval Research. Visit www.lift.technology to learn more.

ABOUT TSIN

The Tennessee STEM Innovation Network is a public-private collaborative between the Tennessee Department of Education and Battelle Memorial Institute, emphasizing a “kindergarten through jobs” philosophy by promoting the teaching and learning of STEM education and integrating real-world and hands-on learning in K-12 public schools across Tennessee. Visit: www.TSIN.org to learn more.

BUILDING 21st CENTURY MANUFACTURING TALENT

Leading a MakerMinded Vision

Connecting the next generation of manufacturers and business leaders to the skills and experiences they need to be successful and to the companies that need their talents

MAKERMINDED.COM
OPENING MINDS TO ADVANCED MANUFACTURING



PROBLEM ONE: Innovation Demands Talent

Employer demand for skilled workers is rapidly increasing, yet current workers are not prepared to fill these jobs and students are not pursuing the STEM education and training that would prepare them for a career in manufacturing.

For the U.S. to become the world leader in advanced manufacturing – particularly lightweight metals manufacturing – an educated and skilled workforce is necessary to use the new manufacturing technologies and processes being developed.

PROBLEM TWO: Students Leaving Stem Behind

In eighth grade, students start considering careers, and these considerations become clearer through high school. By the time they are seniors, however, only 16 percent are proficient in mathematics and interested in a STEM-related (Science, Technology, Engineering, Math) career. Students are less engaged in STEM training, with fewer selecting college majors in STEM fields, making it even more difficult to encourage a career in advanced manufacturing once they reach high school and college age.

Roughly 28 percent of Bachelor's degree students enter a STEM field at some point during their postsecondary education. Nearly half of those students, however, leave STEM by either changing majors or leaving college completely, creating an even larger gap in the trained workforce.

The small share of students entering STEM fields displays the lack of preparation for those careers. For manufacturers, this “disconnect” between students gaining the foundational STEM skills and the educated, skilled, and ready workforce our manufacturers need must be a national priority.

PROBLEM THREE: Jobs Are Being Left Unfilled

Over the next decade, nearly 3.5 million manufacturing jobs in the United States likely need to be filled. Pending retirements coupled with a declining flow of new workers and an increasing need for talent have created a large skills gap resulting in estimates predicting that two million of those jobs will remain unfilled.

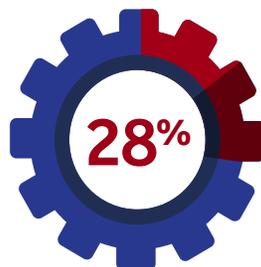
Employers seeking advanced manufacturing workers in the 5-state LIFT region posted over 91,000 online job ads during Q1 2016, up 26 percent from the 73,000 postings in the first quarter of 2015. In Tennessee alone, employer demand was reflected in 41 percent more job postings over the same time period. Building the pipeline of talent necessary to fill these jobs demands more solutions to prepare students and new workers with necessary STEM knowledge and skills.

MORE AWARENESS AND ACCESS ARE NEEDED

Numerous world-class initiatives are addressing the serious and growing disconnect between America's youth and the STEM knowledge and skills required to succeed in the new and exciting Advanced Manufacturing jobs. The challenge is awareness and access, with too few students, parents, and educators learning and sharing information about the programs and how to better engage young people in activities that connect them to the world of STEM. LIFT and its partners believe a recently developed initiative will help address this challenge.



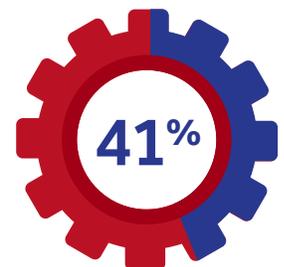
of senior year high school students are proficient in mathematics and interested in STEM



of Bachelor's degree students enter a STEM field at some point during their postsecondary education, but nearly half leave



increase of online advanced manufacturing job postings in the first quarter of 2016 compared to the first quarter of 2015



increase of advanced manufacturing employer job demand in Tennessee alone

THE SOLUTION

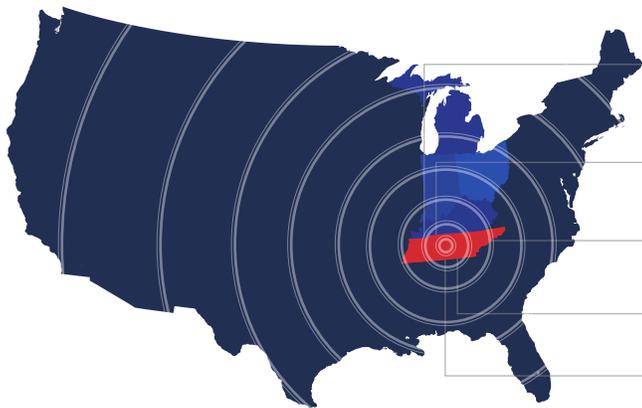
CHANGING MINDSETS AND INCENTIVIZING STUDENTS AND SCHOOLS TO TAKE ACTION IN STEM EDUCATION – FIRST IN TENNESSEE, THEN NATIONWIDE

The MakerMinded web portal, designed by Tennessee Tech University, brings together actionable information, the power of competition and campaign communications to saturate the learning infrastructure with a manufacturing mindset to bridge the gap between activities and programs that engage and educate youth and the students who can take advantage of them. The solution delivers a diverse portfolio of successful STEM awareness and education activities to schools and students in a simple, accessible platform including both national and local-level STEM and manufacturing career exploration activities, project-based learning, formal educational resources, and other experiential learning opportunities.

MakerMinded was founded on four core principles that not only change attitudes about STEM and manufacturing, but also drive students and schools to act.

- Campaign-style communications
All students and schools work towards a common goal—building awareness and engagement in STEM
- The power of competition
Schools compete for points acquired for completing activities, which builds community, unites disconnected students, and empowers all stakeholders
- Student-driven programs
Students and schools own STEM activities
- Leveraging, not reinventing, successful activities
MakerMinded brings to scale impactful programs and saturates the marketplace with STEM.

EXPECTED OUTCOMES



- Changed perceptions and broadened understanding among students regarding manufacturing
- More students engaged in STEM/manufacturing learning experiences
- An increase in students pursuing further STEM education and training
- Students develop foundational technical skills
- Increased number of under-represented populations exposed to manufacturing and STEM fields

HOW IT WORKS

The portfolio provides students with alternative options to gain foundational STEM/manufacturing skills emphasizing work-based, project-based and problem-based learning. Other key components include using cutting-edge technology, relevant “real-world” content, and industry partnerships that provide mentorship, subject matter expertise, and other learning experiences.

The programs and activities encouraged via MakerMinded provide students with a comprehensive array of foundational, technical and employability skills and essential experiences core to understanding and being prepared for STEM/manufacturing careers.

SAMPLE ACTIVITIES IN THE MAKERMINDED PORTFOLIO

A few examples of the programs and activities that are part of the MakerMinded Portfolio include:

- [FIRST Robotics](#)
- [Learning Blade](#)
- [SkillsUSA](#)
- [Science Olympiad](#)
- [Destination ImagiNation](#)

ALIGNMENT TO LIFT WORKFORCE & EDUCATION GOALS



Attracting students and workers to educational pathways and careers in manufacturing



Ensuring students gain STEM foundational skills for success in manufacturing



Linking & leveraging resources and related initiatives on the ground today

Potential to reach over 3,800 middle and high schools and 5.9 million students across the 5-state LIFT region.

ABOUT THE PROJECT

MakerMinded will have a national scope with roll-out first in Tennessee to set the standard for future expansion.



BATTELLE Education



The Tennessee STEM Innovation Network will drive the Tennessee state roll-out process, including:

-  Customizing the portfolio programs for local employers and organizations
-  Leading the statewide communications & marketing efforts for program implementation
-  Tracking progress for each school and the state
-  Sponsoring and co-hosting a recognition event

The Tennessee Tech University team will manage the MakerMinded platform and Tennessee-specific portal, including:

-  Developing and hosting the custom web portal for Tennessee's program
-  Managing the leader board and reports
-  Ensuring consistent platform functionality

LAUNCH AND EVALUATION IN TENNESSEE

Fall
2016

Roll-out coinciding with the school year kick-off

- Roll out across Tennessee with 100 middle and high schools signed-up and active on the platform
- Initially leveraging Tennessee STEM Innovation Network's STEM Platform Schools and schools partnered with their Regional STEM Innovation Hubs

Fall
2017

Fall 2017 – Year one results report

o Metrics to be collected:

- Schools activated and engaged in the MakerMinded platform
- Activities/programs completed by students (at school, county, and state-levels)
- Percentage of students who indicate interest in pursuing further STEM/manufacturing education and careers (through participation surveys)
- Real-time feedback of students' experiences with programs and activities
- Reported completion point variance in schools, to determine areas of strength and weakness
- Manufacturing industry awareness and interest as demonstrated in STEM surveys pre- vs. post-implementation
- Number of rural and iZone schools that participate in the program