



FACTS AND SUCCESS STORIES

WHY THE NRL AND ITS INDUSTRY ADVISORS MATTER





RAVING ABOUT ROBOTS

HOW THE NRL IS FIGHTING STIGMAS, ONE 'BOT AT A TIME

Those involved in the NRL—from students and educators to Industry Advisors—know firsthand the value of this organization (not to mention the fun to be had). Who would have thought that a few robots could raise awareness and drum up interest in the face of a challenging workforce crisis? In the battle for skilled labor, it's an invaluable tool you have at your disposal. Use the facts and testimonials in this toolkit to your advantage during discussions with teachers, administrators and parents—as solid evidence of the benefits of the NRL.



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FACTS AND STATS

A SNAPSHOT OF EDUCATION AND MANUFACTURING WORKFORCE DEVELOPMENT IN AMERICA

- 52% of American teens have little or no interest in a manufacturing career (Source: The Foundation of the Fabricators & Manufacturing Association, Intl)
- Only 8% of high school counselors see their primary role as helping students plan and prepare for their careers after high school; 51% ranked this role as their lowest priority (Source: National Center for Education Statistics)
- 64% of high school students rank personal experiences and interests as the greatest influences on their future careers; other things (including parents, teachers, social media and school counselors) were significantly less influential (Source: The Manufacturing Institute)
- K-12 public school counselors have an average caseload of 471 students each, while high school counselors serve 239 students each (Source: American School Counselor Association)
- 75% of Americans surveyed either agreed or strongly agreed that a bachelor's degree would lead to a good job; only 50% agreed that an associate's degree would lead to a good job (Source: 2013 Gallup poll)
- Only 29% of business leaders report any meaningful collaboration with higher education institutions (Source: Gallup and the Lumina Foundation)
- 40% of employers surveyed said that the high school graduates they hired lacked enough of the soft skills they need even for entry-level jobs (Source: America's Promise Alliance)
- 74% of manufacturers report that the skills gap has negatively impacted their company's ability to expand operations; 69% expect the shortage in skilled production to worsen (Source: Deloitte Consulting LLP and The Manufacturing Institute)
- Currently, there are 5 million vacant jobs across the country; these vacant jobs cost businesses as much as \$23,000 per unfilled position (Source: CareerBuilder study referenced in the U.S. Chamber Foundation's report, "Managing the Talent Pipeline: A New Approach to Closing the Skills Gap")





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STORIES FROM THE BATTLE TRENCHES



LYNN MAHUTA
CEO, MAHUTA TOOL CORP

“Among the things we’ve heard from young people about our industry is that there are no jobs in manufacturing—and the jobs that exist are boring, doing the same thing over and over. **But the reality is that precision manufacturing needs highly skilled workers**, the kind who could go on to engineering, but would rather work with their hands as well as their head (many, after earning a journeyman’s card, do go back to school and earn their engineering degrees later on).

So Mahuta Tool Corp. has gotten involved with the National Robotics League **to find qualified candidates for apprenticeships** so that we can continue to grow our business. As a sponsor and mentor of a local high school team, we’ve seen these students become interested in the machine tool trades. We were even able to hire a student after his graduation from high school. And within a month on the job, we offered him a tool-and-die apprenticeship.

We often find ourselves wishing more young people were well-versed in **problem solving, math, communication and teamwork**, and the NRL helps with all these things. Students on a robotics team often are on different class schedules, so they must find ways to communicate about progress or problems. The students also learn to work as a group to get a project done on time and on budget. And at the matches, they learn what works and how they will improve their ‘bot to compete another day.”

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EMILY LIOVAN

PRESIDENT, SATTLER COMPANIES

“Meeting Jake on the robotics team was another great experience for Sattler Companies. What impressed me the most was that he convinced me he was the best investment I could make in a new employee. He was absolutely correct. Jake has the academic and technical skills for Sattler Companies and is entering as a freshman in manufacturing engineering at the University of Akron. He is a great employee and I observed all that firsthand during our NRL Team experience.”



ROB DINARDI

PRESIDENT, L&S MACHINE COMPANY

“L&S Machine Company in Latrobe, Pa., supports the NRL program for a variety of reasons; but mainly, because it allows us to interface with the kids that someday eventually enter the workforce ... One in particular, Zack, found his calling in working in a machine shop from high school and going on to employer paid studies at Westmoreland County Community College. I believe, if not for the NRL program, he would have floated from menial job to menial job with little education. We also support the NRL kids through their college years as they make great interns with mechanical knowledge, not to mention the team interactions they get from the program.”



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CPL. ZAC HOLMES (USMC)

FORMER NRL COMPETITOR

“There was some talk of starting a robot club at our school and I was quite interested, having seen the show. We worked mostly out of the school’s racquetball court. It was pretty loud. Eventually we progressed to 15-pound robots, which are cheaper and easier to work with.

One of the more technical things I remember doing was **determining which of two materials offered less drag**. We used a makeshift gauge, made with cardboard, some notches and a spring. On another occasion we needed to **test something for torque**. Again, without store-bought tools, we simply used a wrench of a known length and a known weight at the end of it. A little math later and we had it in foot-pounds.

I also used some equations from my physics book in an attempt to find out how much mass, at what radius and RPM, we would need to take advantage of the gyroscopic effects it would produce. **We hadn’t covered the material in class yet and it was a bit above our heads**, so I’m not sure if the final formula was accurate, but **it was fun to work on** nonetheless.”



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CALLIE NICHOLS

NRL COMPETITOR

“My brother had been on my school’s NRL team and I thought it looked really cool. After I joined, I really got into wiring. We started with a kit ‘bot—we put it together and I wired it. Then we made our main ‘bot, Juggernaut, which had a 5-inch-diameter cylinder in which all the components had to fit. **I loved the challenge.** So when I got to wire it, I was able to learn different ways to do it in the small space.

To be successful in robot combat, **you have to be able to recognize a problem and solve it fast.** Usually you only have 20 minutes between matches—and sometimes less. Once I had to completely rewire our ‘bot in that time. You learn that you can’t take a break—you have to want it and keep working for it. So every time something went wrong, there was another learning opportunity. We had to put our belts on backwards to prevent them from snapping, and we had to figure out how to keep our ‘bot running even though it was hot. We used so much science there that my brain hurt after our four-hour meeting. **I don’t think there is any better way to learn about engineering than robot combat.**

The most exciting competition was the national one at the Mall Of America because that was the first time our robot worked perfectly. It was great because we’d put so many hours into it. Getting second place in the rumble was great because **all our hard work had paid off.** We had a switch fire and I got to get rid of it and fix the problem. I love finding out what’s wrong with things, then fixing them. I think that’s exciting.”