

ShopRat.Org
A Grassroots Movement Empowering Tomorrows Engineers and Techies

Douglas C. Acheson, Chris Salow

Purdue Engineering and Technology at IUPUI, Shop Rat Associates LLC

Abstract

Educators of tomorrow's engineering and technology workforce are continually looking for ways to recruit a student population that can adequately grasp and apply the concepts being taught in higher education. Here in the United States, academia has for the last decade or so witnessed a decline in the overall abilities of incoming American students. Whether it is analytical math skills or pride-in-workmanship, there seems to have occurred a disconnect somewhere along the way between "the greatest generation" and today. For quite some time now, discussions have been abounding about the broken educational system in the United States. The question is: Where do we begin to fix it? The answer: Young people!

Towards that end, a non-profit organization in Jackson, Michigan called ShopRat.org is spearheading efforts to encourage and empower young people through a very unique and empowering program. The Shop Rat project is preparing tomorrow's engineers and technicians to learn to build for the future and to embrace the values of teamwork, creative problem solving and ingenuity. This paper features the ShopRat non-profit organization and advocates the dissemination and promotion of the ShopRat mission.

Introduction

As the United States has advanced and prospered, its masses have left the farm and factory. We enjoy economical goods produced in distant, low-wage societies and are spending more of our time on information and entertainment activities. We've become tethered to our email, Utube, Ipods, Game Cubes and HD plasma screens. Life has been good, we can get what we want and we're getting used to not having to be accountable for much of anything these days. Though comfortable with our current status, some are seeing the need to sound the alarm on our apathy. We're forgetting how to invent, design, create and repair even the simplest of fixtures that surround us in our everyday world.

Most young people today either choose not to or are not being afforded the opportunity to become mechanically-inclined. While in the not-so-distant past, drafting, shop and small engine repair were mainstays in junior and senior high. Summer vacations were often filled with creative endeavors such as building a tree house, constructing a soap box derby car or morphing Dad's old lawnmower into a home-built go cart. While in today's American society, it's more of a matter of achieving the highest level in a video game.

There are however, individuals and organizations on the horizon that are passionately preparing to address this crippling phenomenon. One such organization, ShopRat.Org, is slated to take the next generation by storm with its mission to empower those who aren't afraid to hold a tool. Using an exciting and innovative approach to turn kids on to mechanical know-how (like custom chopper builds and Shop Rat TV), this Michigan-based organization is determined to make a difference.

Background

Back when the Soviet Union shot Sputnik into orbit, a panicked United States responded by improving math and science instruction in the nation's schools. Now that the United States is facing an increasingly competitive world market driven by digital globalization, how is our education system stepping up to the demand for graduates skilled enough to keep our country on the cutting edge?

Released in September 2006, "The Workforce Readiness Report Card" from the Partnership for 21st Century Skills, et al. found the nation's new workforce entrants "woefully ill-prepared for the demands of today's—and tomorrow's—workplace."

Among the skills identified as critical to success in the 21st century workforce are:

1. A combination of basic knowledge and applied skills, with applied skills trumping basics as in the top five most important for any level of education;
2. Professionalism/work ethic, teamwork/collaboration, and oral communications, which are rated the three most important applied skills;
3. And creativity/innovation, which is projected to increase in importance for future workforce entrants.

The "Workforce Readiness Report Card" sounds a serious alarm for the current state of education in the United States...But while the United States battles its domestic issues, serious international threats are undermining its status as a global competitor. Producing and maintaining a prepared workforce is an ongoing challenge within an era of increased mobility of goods, services, labor, technology and capital throughout the world. Nations around the world, such as India and China, have invested in education and technology to overcome barriers of communications, distance and time to provide competitive products and services usually at much lower costs than those produced domestically. The result is a host of new threats to the American competitiveness on the horizon.¹

Those countries that produce the most important new products and services can capture a premium in world markets that will enable them to pay high wages to their citizens. In many industries, producing the most important new products and services depends on maintaining the worldwide technological lead, year in and year out, in that industry and in the new industries that new technologies generate. But that kind of leadership does not depend on technology alone. It depends on a deep vein of creativity that is constantly renewing itself, and on a myriad of people who can imagine how people can use things that have never been available before.

Strong skills in English, mathematics, technology and science, as well as literature, history and the arts will be essential for many; beyond this, candidates will have to be comfortable with ideas and abstractions, good at both analysis and synthesis, creative and innovative, self-disciplined and well organized, able to learn very quickly and work well as a member of a team and have the flexibility to adapt quickly to frequent changes in the labor market as shifts in the economy become ever faster and more dramatic.²

About ShopRat

The Shop Rat Foundation is a nonprofit organization established in 2004 that recognizes and acknowledges the need to focus attention on future generations of skilled craftsman. It is the goal of the Foundation to promote and protect the future of the skilled craftsman (Shop Rats); establish educational and training programs for middle school and secondary education students; and to provide financial assistance to young Shop Rats seeking advance training at recognized apprentice programs and/or community colleges.

One of the main obstacles in engaging young minds today is boredom. We are surrounded by a fast-paced, entertainment-driven, ever-changing society. In order to capture these kids' interest, educational programs need to be unique, interesting, relevant and most of all "cool". The Shop Rat organization realizes this and through the use of choppers, hot rods, robotics, custom wheel chairs and a host of other core projects, this cool factor has become a reality. By utilizing such projects, a robust curriculum has been constructed and is being delivered with great success. Each of these projects require that a generous amount of math, science and physics is taught in a relevant useful way. In this model, much of the base knowledge for continued education can be obtained in these programs. Other positive aspects include team building, problem solving, conflict resolution and confidence - all characteristics needed in today's work environment.

Shop Rat Associates is designed for individuals who enjoy inventing, building, maintaining, modifying and engineering; whether it's a personal project or the way you make your living. The Shop Rat project is about learning from the past to build the future and embracing the values of teamwork, creative problem solving and ingenuity.

Education of young people is the major focus of Shop Rat Associates. The need is recognized to develop well-planned programs that provide an opportunity to expose young Shop Rats to a variety of careers that utilize their minds and their hands. The first Shop Rat program is well under way and is supported by the Jackson Area Manufacturers Association (JAMA), local area educators and parents. Shop Rat teachers are developing the curriculum to be accredited by the State of Michigan. *Their mission is to expand educational programs and provide a model for similar groups across the nation.*

The goal of the organization is to build a community of young Shop Rats who will excel in challenging careers dedicated to creative and innovative advancements in engineering, manufacturing and construction.

Unique Teaching

Shop Rat Educational Programs are conducted in a classroom environment that teaches safety, work ethic, teamwork, manufacturing techniques and actual hands-on experiences in a shop environment with the added "cool" factor that only Shop Rat can provide. Kids are working with many types of tools: from mills and lathes to all types of quality gauges. The program also encourages kids to incorporate otherwise perceived "boring" skills like math and



science into building a cool project like a chopper. This approach separates Shop Rat from other educational programs: the ability to grasp the attention and concentration of more kids over the course of an entire program. Additionally, young Shop Rats learn the valuable lesson of giving back. At the time of this writing, Shop Rat Associates has already constructed the first of three motorcycles (built by young Shop Rats) to donate to charity. This not only instills charitable values, but in many cases will count towards high school requirements for students volunteering in their community.³

Specifically, within the "Chopper classes", students:

1. Brainstorm to design components of the bike - like the rims for example. Component designs are then incorporated into a classroom session at the local community college where students use CAD to create a formal drawing from their concepts.
2. Use machining skills to utilize the CAD drawing to machine the component if feasible.
3. Create flow diagrams and procedures for the project they have done in the class.

Additionally, if a student shows that he/she has a good understanding of a machining method, they are asked to help instruct other students in the class. This has shown great results in teamwork and confidence building.

The Shop Rat educational staff reviews the Michigan state high school education standards and benchmarks when deciding on class curriculum. Current standard benchmarks are available for review for math and science. The staff is also in the process of creating the same for English. The Shop Rat organization works very closely with the local business and education community to effectively integrate the program into the school system to fill industry needs, satisfy educational requirements and assure that students will receive credits towards graduation.

Many engineering-related educational initiatives are already in place across this country (PLTW, etc.). The goal of Shop Rat Associates is to tie in as many programs as possible and add the cool factor. This idea translates well on many levels, allowing this idea to enhance many programs for the best possible result: creating a generation of kids that will make up the Engineers, Inventors, Designers and Skilled Tradesman to take on the challenging task of the future.

Leveraging the Culture

Great advancements in society are generally fueled by great causes. It could be the cause of a culture or a king, the cause of discovery or defeat, the cause of theology or scientific theory. It is and was no different in this great country - the United States of America. But perhaps it is the very *lack* of a cause that is contributing to our woes of becoming an increasingly uneducated and unskilled society. If one examines the “causes” this country has rallied around to become who we are, it may strike us that we have perhaps become “A country without a cause”.

The cause of discovery – Searching for new worlds, riches and eventually, religious freedom.
The cause of expansion – The settlers, westward expansion and the “taming of the wild”.
The cause of progress – The industrial revolution, the building of the “good life”.
The cause of resilience – Pulling ourselves up by the bootstraps to recover from the Great Depression.
The cause of freedom – Banding together in the Great War effort of WWII.
The cause of rebuilding – Post war prosperity and innovation.
The cause of national pride and security – Sputnik, the great space race, the cold war. The cause of ...

Again, if one examines the causes that have shaped our country and fostered innovation, we find that we have lived an entire generation without any type of profound cause! Our media-sponge brains have endured a barrage of strikes against national strength, science, government, and innovation. Vietnam, Watergate, Bhopal, India (Dow Chemical Spill), the Exxon Valdez, Enron, global warming, species extinction, Iraq, etc., etc., etc. We are subconsciously telling our kids that it isn't cool to be a scientist, engineer or innovator.

At the same time, our prosperity (apathy really), has conditioned us to be constant thrill seekers. Entertain me, stimulate me, wow me and shock me. Show me or give me something that is flashier, bigger, faster, louder or more impressive to my neighbors. So, in a way we are more innovative in some areas, but most appear to be geared towards entertainment or stimulation. One recent phenomenon, the “reality show”, is enjoying runaway success by bringing someone else's “life on the edge” into our living rooms. A couple of such shows, “Monster Garage” and “Orange County Choppers” may be very valuable to educators after all. Perhaps by mimicking their objectives, we can inspire young people into the fields in which we know are vitally important to the future of this nation – namely engineering and technology.

The culture of today has downplayed the value of being an engineer or scientist, but exalted being a renegade that doesn't play by the rules but is quick to “put the torch” to existing structures and add their own brand of “bling”. So while we are waiting for a cause, why not leverage this cultural phenomenon and reach the kids where they are? ShopRat.org is doing just that. As seen in the “Unique Teaching” section above, kids are invited to create their own rendition of “outrageous machine” by design and fabrication.

More Outrageous Activities

Some other “culturally current” endeavors that the Shop Rat organization is kicking off include *Shop Rat Musick*. ShopRat producers have electronically created rhythmic, driving, studio-mixed music geared towards today's young listening audience. As the ShopRat web site sez' “Rat Musick is made 110% out of tools you can find everyday in a shop or someone's garage at home. We have used everything from a drill to a sander to a forklift... you name it. There's no limit to what can be used in this rhythm driven mania!”

Another initiative is thirteen episodes of *Shop Rat TV*. The promo for the series was filmed October 26th and 27th of 2006 and featured Shop Rat careers related to the motor sports industry. Motor sports celebrities Jessie Harris, who drives the 300 mph BIC® Lighter "Queen of Diamonds" jet dragster, and Tom Sneva, 1983 Indy 500 winner, two-time USAC National Champion and the first person to officially lap the Indianapolis Motor Speedway in excess of 200 mph. will co-host the first episode.



Subsequent episodes will feature Shop Rat careers in industries as far ranging as aerospace to the arts.

Yet another event is the "North – South Motorcycle Build off" during the June 8-9, 2007 Wheels of Thunder event in Jackson, MI. This event pits teams of young Shop Rats from Michigan and Alabama against each other to assemble a custom chopper in two hours!

Be Outrageous - Support ShopRat.org

Shop Rat Associates announced on November 18th, 2006 the introduction of the Shop Rat Founders Club. This elite membership will only have 1,913 members, representing the year Henry Ford introduced the first "automated" assembly line. One of the Founding Members will be awarded the Official Shop Rat Chopper built by Orange County Choppers, featuring original designed Shop Rat wheels. The value of this one of a kind chopper is \$175,000. The Foundation, once funded, will grant scholarships to the next generation of "Shop Rats" to further their education and training to prepare them to enter the workforce in one of several types of craftsman careers such as automotive, manufacturing, etc.



These young people will be building our nation's economic strength and you can help make this happen by becoming a Shop Rat Founding Member. For more information on how to become member of the Shop Rat Founders Club, contact Shop Rat Associates, LLC at 517.596.8000 or visit the Shop Rat website at www.shoprat.org.

Conclusion

The ShopRat organization is an outstanding program of vision and engagement helping to prepare America's youth for the realities of the new world economy. Competent, timely, motivating and practical, it serves as a superb model to educators in what each of us can do to make a difference – one student at a time. In our quest to solidify long-term efforts of recruitment put forth by educational institutions, engineering and technology educators should consider aggressively supporting efforts such as the ShopRat organization. The Shop Rat organization needs University-Level Educators to support its' program beyond the High School Level and incorporate the Shop Rat mantra into higher education environments. It is our responsibility as educators at all levels to support future generations of engineers and techies to succeed in these fields and to ensure a stronger and more stable America, built by Shop Rats. The ShopRat organization has done the hard work of planting the seed. Will you allow it to grow in your district?

Bibliography

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