

## **Stimulating Technology Projects for Your Gifted Classroom**

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I would like to talk about some ways of challenging and stimulating gifted and talented students in the classroom. Inter-disciplinary and multi-dimensional problem solving is needed to blend together a variety of constraints into a solution that is reflective of all the concerns of a particular problem. This is a hallmark of the world of work, and the essence of teamwork on-the-job. While doing this may sound overly complex for students, I assure you it is not.

G&T students naturally want to think about big and complex problems. They prefer to be unbounded in their imagination, so use this enthusiasm to their advantage. I have always been amazed at the creative power of students. Pound for pound they put us grown-ups to shame with their original thinking. Years ago, in two hours time in my robot lab, 4<sup>th</sup> grade teams designed some very useful robotic devices, and spoke with confidence in front of their classmates about what they were trying to accomplish. Gifted students are every bit worthy of a tough challenge.

Current brain research indicates young brains are normally wired to handle complex problems, and gifted students are especially adept at making intuitive leaps and connections between different subject matter. We are creatures possessing multiple intelligences. So don't be afraid to challenge your students with broad, open-ended problems, even ones that encompass such big questions like, ...How would you have designed the city you now live in? Let them build models or construct diagrams to depict their thinking. Or maybe you might challenge them to redefine how school is organized, taught and held during the year. You just might be very surprised at what your advanced students propose.

Here is some more good news. The complexity of inter-disciplinary and multi-dimensional problem solving can be taught another way. Complexity can be broken down into segments to illustrate the impact different concerns and design constraints have on the solution.

For instance, take that re-design of the city I just mentioned. First, have your G&T pupils try and re-design the city only from an environmental viewpoint, and then look at what they come up with. Now lay those designs aside...and this time re-design the city only from an economic viewpoint. Compare how the two designs look. Lay them both aside and re-design the city from just a high tech viewpoint...and then compare the three designs. Keep doing this to show how different single design aspects alone can affect the re-design.

To arrive at an acceptable re-design, means to choose aspects or specifications of the different viewpoints and blend them together in the final design. You can show your gifted students this process in action at your local City Hall as town planners, developers, citizens, environmental groups, activists, politicians, engineers, and lawyers haggle over how a new project will be implemented in your community. As students approaching a design challenge, they face the same questions these professionals will face. Maybe they should do some role-playing in class to simulate what goes on in the real world. Maybe they should attend a town meeting when such issues will be discussed.

Perhaps your local council member, alderman, or supervisor may be able to challenge your gifted class with a problem currently under discussion, and the students could try to solve it. Wouldn't that be a nice way to show relevancy to what your students are studying? Can you reach out to your town leaders?

Can you envision the positive impact of having your gifted students out in their community, learning how to make a difference – perhaps even being featured in a newspaper story? Think about what that would say about the power of gifted and talented education. And don't forget to tie the students into local neighborhood businesses where owners might have a problem that G&T student teams could be challenged to solve.

As you know, oral and written communication skills are absolutely necessary in the world of work. And that means all students should be busy developing those skills while in school, but it does not have to be just the routine grammar exercises we all remember. Sure they need the basics, but they also need to learn how to be articulate their subject matter. When you grade their work, grade it twice – once for technical correctness and once for how well they express themselves. Drive the point home on the importance of communication skills. Let them work in teams and present their work orally in class as well as in written form.

I once communicated with a college professor at Drexel University who challenged engineers to write stories and poetry about their favorite technologies. Could your gifted students do the same, or maybe construct a science fiction story about the future uses of a now emerging technology,...like gene splicing, advanced virtual reality, home energy generators, or a space station on the moon? Would this not let them soar creatively and at the same time appreciate the value of the written and spoken word?

Incidentally, science fiction is one of the few literary genres that actively and consistently explore the inter-disciplinary/multi-dimensional impacts of a future set of circumstances. Science fiction can be a natural and valuable ally to your classroom activities. Many of our country's great scientists and engineers and inventors grew up reading science fiction, learning to understand the interrelatedness of things. Take the time to explore this exciting and ever changing connection between technology, science, history, language, and social studies.

Earlier, I suggested going outside of the classroom to interact with your leaders in City Hall. So what's to stop you from bringing the outside into the classroom? Probably right there in your school's neighborhood are many talented individuals and business people, both active and retired, who would just love to come and share their life experiences with your students. Can you see this resource as a living testimony to the values you teach every day? Just how much do you know about the living library of talent that resides in the homes just a few paces from your schoolyard? Don't you think this might be something to explore? Maybe these folks could be mentors on team-based projects that your gifted students undertake?

Let G&T students explore the everyday products and services they come in contact with to learn the relevancy and technology content of these mundane, and often taken for granted things. Consider exploring the technology content of:

- Clothes Making and Design
- A Football Game Broadcast
- The Modern Dental Office and Getting a Filling
- How the Telephone System Works
- Manufacturing Products Like Cars and Stoves
- Growing and Delivering Foods

Perhaps you can invite the local fire chief or police chief in to discuss how technology has affected the ability to perform their jobs and protect citizens. In addition, they could discuss how their technology has changed over the years.

Let G&T students try designing technologies that address such timely topics as:

- Preventing Car Theft
- Preventing Use of Stolen Firearms
- Stopping or Preventing High Speed Car Chases
- Saving People From Burning Buildings
- Making Automobiles Safer in Accidents

Here is an example from my old industry, the electric utility. It is now becoming possible for people to think about generating their own power on-site at their home, business, or factory. Can your G&T students learn about the new technologies becoming available, and design systems for their own homes?

Is your school building blessed with no problems whatsoever? If there are some problems with the building, could your gifted students try and solve, or propose some solutions, to the problems...or maybe even propose something totally different that would enhance education?

## **Resources for Improving STEM Education for the Gifted**

Receive a Complimentary Subscription to Gifted Education Press Quarterly. Contact [Gifted@GiftedEdPress.com](mailto:Gifted@GiftedEdPress.com)

Hero of Giftedness -- Amir Abo-Shaer, Director Dos Pueblos Engineering Academy Goleta, CA. <http://bit.ly/pu7j2G>

Read The New Cool: A Visionary Teacher, His *FIRST* Robotics Team, and the Ultimate Battle of Smarts by Neal Bascomb. <http://amzn.to/mT215Y>

*STEM: Science, Technology, Engineering and Mathematics Education for Gifted Students* by Harry T. Roman. <http://bit.ly/hQIqaO>

Also see <http://bit.ly/bEfF3i> for additional information on STEM Education for Gifted Students.

Review of STEM Education for Gifted Students in the Latest International Technology and Engineering Educators Association Newsletter. <http://bit.ly/opE14y>

Order STEM Education for Gifted Students by Harry T. Roman via Amazon.com. <http://amzn.to/qy9uBf>