



**FAST FACTS**

**Project :** Engineering Design/ Development

**Teacher:** Scott Karjala, skarjala@portervilleschools.org

**School:** Harmony Magnet Academy

**Location :** Strathmore, California

**Website:** portervilleschools.org/harmony

**Start/End date:** January-May 2014

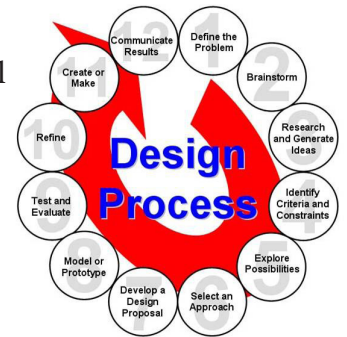
**Mentors provided by:** Agilent Technologies, Citigroup Inc., Hewlett-Packard Company, MasterCard, Merck & Co., Inc. and SunPower Corporation

**Contact:** David Neils, ITP Founder/Director 970-481-9795 davidn@telementor.org

# Engineering “journey” helps students discover life lessons

“It’s about the journey of seeking a well-justified, original solution to a real-world problem,” Scott Karjala says of his Engineering Design and Development (EDD) course.

Karjala’s EDD students work in teams for an entire school year to design, develop and test an original solution to an open-ended, technical problem of their choosing by applying the engineering design process. But EDD is not focused on producing a marketable process or product, and it’s not intended to be an “invention class” or a “patent generating class.” Rather, it’s about discovery.



For example, students with an interest in electronics and aeronautics who apply the design process to address pilot errors may find their results point to an ergonomic solution centered on organizing and displaying information in the cockpit rather than developing a new piece of instrumentation or a new control device. Or perhaps students interested in chemistry and medicine find that redesigning the way people enter and are processed through an emergency room is a more effective way to address the rate of disease transmission in a hospital than formulating a new chemical disinfectant.

Solutions to real-world problems often require authentic resources and expertise, however. That’s why Karjala requires his students to work with mentors who help them learn and apply skills in mathematics, science and technology, plus hone their organizational, communication and interpersonal skills.

In the past, Karjala struggled to secure professionals to work alongside his students, because finding qualified, enthusiastic volunteer mentors takes a lot of time. He says, “In the past, I had students cold call or write to professionals to be mentors for their projects. It was difficult and didn’t work! The mentors weren’t dedicated to helping with the whole project.”

So when Karjala learned about the International Telementor Program (ITP) and how it provides vetted professionals who coach students in conducting authentic work, he was cautiously optimistic it would provide a solution to his challenge.



***“ITP feels like it was custom made for this class. ITP mentors have experience in industry. This is the most important value that ITP brings to students.”***



### **Getting good vibes**

*Students demonstrate the “Good Vibe Dryer,” designed to shake water off an umbrella to prevent mildew growth on the fabric*

At first, Karjala “..had no idea what to expect,” but after partnering with ITP this past spring, he says, “ITP feels like it was custom made for this class. ITP mentors have experience in industry. This is the most important value that ITP brings to students.”

Karjala regrets he didn’t have the opportunity to partner with ITP until second semester. He feels mentors would have been more effective if they had worked with students from the beginning of the school year, so that’s the plan moving forward. “Mentors will work with my students for 36 weeks. They will help with the whole design process—brainstorming project ideas, research, design, marketing, design proposals, prototype development and testing—not just the last few steps.”

At the end of the EDD class, students present their projects to a review panel. It’s a chance for each team to showcase the work they completed over the course of the year. It’s also an opportunity to be reminded that no one knows the exact outcome of a journey when it begins and that real lessons are in the journey itself, not necessarily the project outcomes.

### **Scott Karjala, Harmony Magnet Academy Teacher**

“Sometimes the results are impressive and might even change the world,” says Karjala. “But sometimes, solutions, when tested, prove to have little value in solving the problem or solution attempts will prove to cause as many new problems as they solve. For all EDD students, however, the unique learning opportunity is gaining skills that will positively influence how they tackle professional and sometimes personal scenarios for the rest of their lives.” 🌍

### **STUDENT BENCHMARKS**

**After researching, designing and making a 3-D models of their designs, students:**

- ☑ Build prototypes
- ☑ Create test criteria and procedures
- ☑ Test and evaluate the prototype
- ☑ Redesign and refine their prototype
- ☑ Create a portfolio documenting their project
- ☑ Present final design and project at trade show



### **A job well done**

*A judge congratulates students on their “Splatter Free” frying pan cover which prevents grease burns. It allows pan contents to be flipped or stirred without removing the lid.*

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The International Telemotor Program ■ David Neils, Founder/Director

