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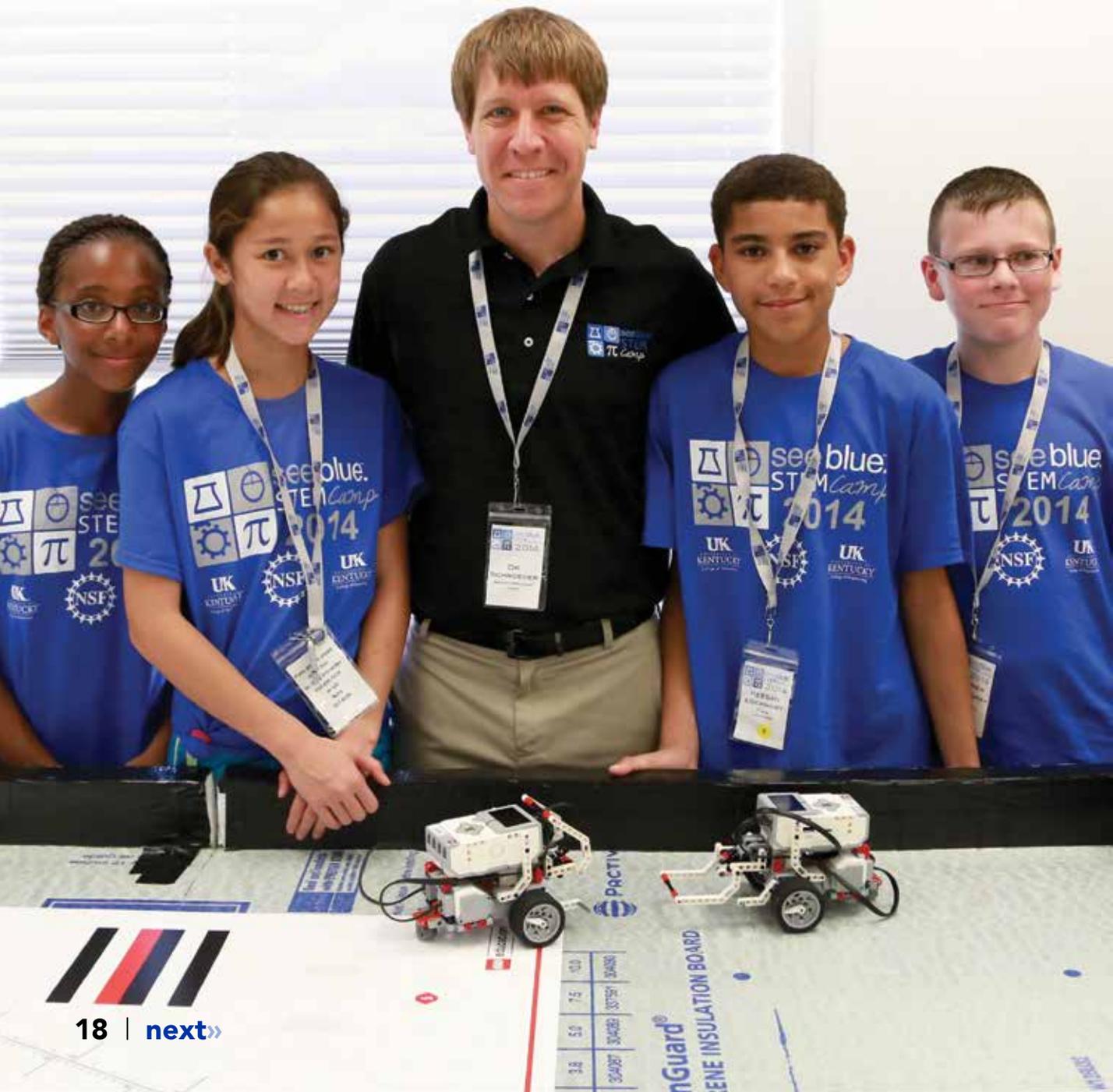
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Tinkering with Opportunity

UK Ph.D. brings science, math experiences to students statewide





During his childhood in Burnside, Kentucky, Dr. Craig Schroeder was always taking things apart and trying to fix them — a tinkerer.

“Most of the time I was unsuccessful, but occasionally I was able to repair my remote control car or video game console,” Schroeder said. “I have an innate drive to fix things or make them work properly.”



Schroeder teaches math and science at Beaumont Middle School in Lexington. On summer vacation a few years ago, he picked up some Malcolm Gladwell books. Gladwell’s theories inspired the tinkerer in Schroeder.

In “Outliers,” Gladwell says innate talent is not the only key to success. For instance, what advantages took place in the childhood of a Thomas Edison or Mozart? Seemingly small things can make a big difference.

Schroeder started tinkering with ideas about what advantages he could create for students. For instance, Bill Gates has innate talents and abilities — but he also had the good fortune of growing up near a high school where he accessed a powerful computer at age 13.

Soon, Schroeder’s idea for See Blue STEM Camp was born (STEM stands for science, technology, engineering and math). At camp, rising fourth through eighth grade students take part in hands-on projects with real world applications, bringing STEM subjects to life. Plus, dozens of UK students help with the camp to gain teaching experience, receive mentorship from faculty, and witness the powerful impact of the camp’s unique teaching approach.

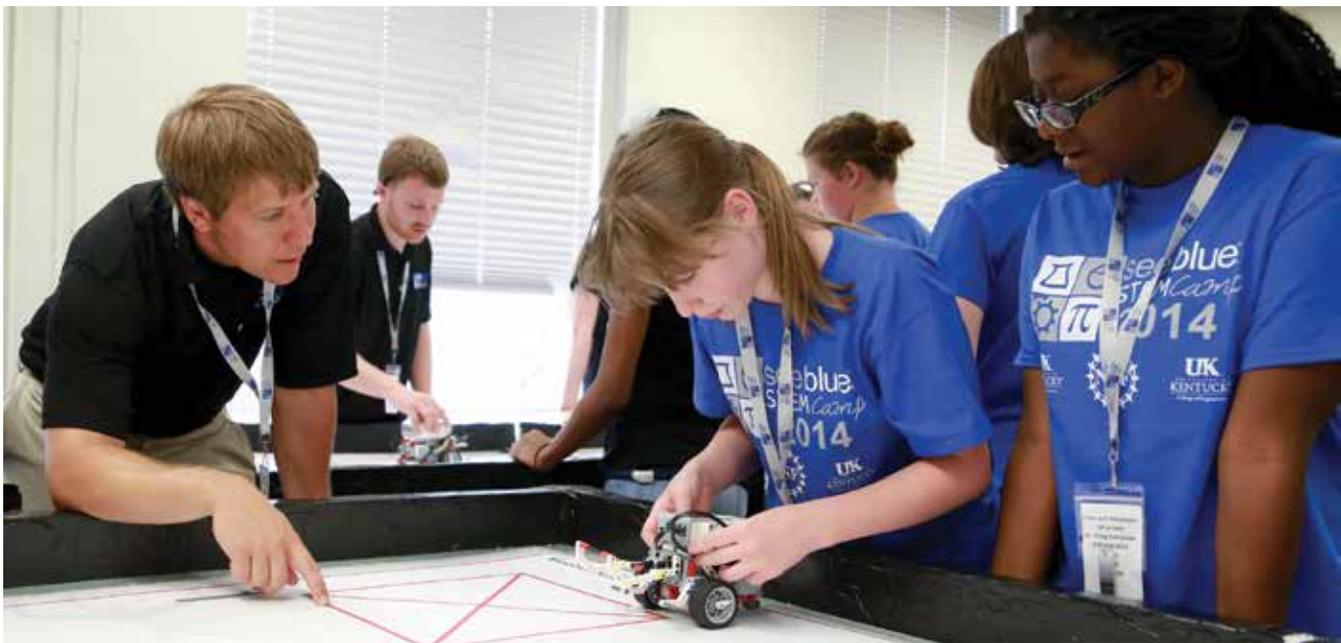
We recently talked with Schroeder about his background and how his idea for STEM camp evolved.

Q: How does STEM camp help solve the education problems Gladwell outlined in his writing?

A: I have struggled personally in my career opportunities. Being from a smaller town there was limited exposure to careers in STEM. I knew what a civil engineer was, but had no idea about all of the different engineering disciplines and job opportunities. I wanted to change that for others. My dissertation research was around attitudes toward mathematics, and we know that the middle school years are a pivotal time in developing positive attitudes toward any subject. Many students are turned off to math and science during this time and have limited ideas of careers that are in these fields.

I wanted to attack these problems, so with the help of my colleague Mark Evans and UK engineering professor Dr. Bruce Walcott, we developed a small camp at Jessie Clark Middle School. The first year we had eight students. We weren’t able to target underrepresented populations, so in the second year, I worked with our youth service coordinator, Gabe Brown, and also wrote a grant to the Kentucky Girls STEM Collaborative to create some scholarships. We were able to have 28 students that summer.

We were constantly getting phone calls during this time from students outside of Jessie Clark that wanted to attend camp. I hate saying no, so we decided to do more. I worked with my wife — Dr. Margaret Mohr-Schroeder — at UK in the STEM Education Department along with Dr. Walcott to move the camp to the University of Kentucky and open it up to any student in the state. By bringing the camp onto campus, the students are able to visit professors in their labs and conduct experiments and research that couldn’t be duplicated in another setting. This authentic experience has led to



statistically significant growth in students' interest in STEM.

Last year we were awarded a National Science Foundation grant for \$750,000 over five years. We worked with youth service coordinators across the area to identify underrepresented students that would benefit from camp. We target any student that may have an interest in STEM or whose teachers believe would benefit from the camp, not just those that excel academically already. During the next five years we will track the students in the camp and see how they fare compared to a control group in terms of their success in STEM in school and career choices. While this camp won't fully solve the problem that Gladwell outlined, it does help to provide a solution.

Q: What drove you to seek your Ph.D.? How have your academic studies impacted your work as a middle school teacher?

A: After my first year of teaching, I knew I wasn't an effective teacher with all students and I wanted to be better. I enrolled in the master's program at UK armed with a year of experience and willingness to learn and change what I was doing. I finished this program in a year, and my mentor, Dr. Doug Jones, convinced me to stay in the program and pursue my Rank I (this is 30 hours beyond your master's). Having a disposition for learning and already in school, it made sense to keep going. At the end of the second year I only had a handful of

hours remaining for the Ph.D., so I decided it was now or never. I went for it always planning to return to the classroom to use what I had learned (I didn't realize at the time how rare that was). Six years later I am still there. With my academic background and connections, I have developed a cadre of great researchers and educators that share my passion for STEM and reaching underrepresented populations. I'm able to publish and share innovative instruction with others across the nation.

Q: It sounds like you are driven to go beyond minimum requirements in your personal and professional lives. Where does the ambition come from and what does it mean to you?

A: The ambition for me comes from my mother and father. Both grew up in poor families in rural communities, but they didn't let that set them back. They always worked tirelessly for our family. They instilled in me a drive to do the best I can. I continue that today. I view my students as my family. I want the best for them and I work tirelessly for them. I'm recently a father and I want every opportunity for my children as well. I think it has driven me even more in my professional work. I don't want any parent to have the perception I am not fully extending myself to help a student. Through my work I hope my children will benefit as well. Even if they don't go into STEM, undoubtedly I want them to view me and my wife as mentors that go above and beyond for others. <<

“I view my students as my family. I want the best for them, and I work tirelessly for them.”

— Dr. Craig Schroeder

