



Video

FULL DETAILS AND TRANSCRIPT

## Instructional Methods That Spark Curiosity (Part 1)

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Topic: Encouraging Girls in Math and Science

Practice: Sparking Curiosity

### Highlights

- Researchers view interest (e.g., student interest in a field) along a continuum, from short-term (situational) to long-term (individual). Long-term interest can withstand challenges and short-term frustrations.
- Students start with something that sparks their initial curiosity, and gradually move toward long-term interest if the curiosity is nurtured and supported over time.
- Teachers can greatly affect this process by supporting the initial, situational interest with a variety of techniques.
- Research shows a link between interest and both academic performance and later outcomes.

### About the Interviewee

Jon R. Star is currently Assistant Professor in the Graduate School of Education at Harvard University. Star was an Assistant Professor for five years in the College of Education at Michigan State University and earned his Ph.D. in Education and Psychology at the University of Michigan in 2001.

A former middle school and high school mathematics teacher, Star's research focuses on students' learning of mathematics, particularly algebra. Star has published in top-tiered journals in mathematics education and educational psychology; he was recently an author of a US Department of Education practice guide on Encouraging Girls in Math and Science. In addition, Star is a co-PI on two large US Department of Education-funded projects, one which studies the role of contrasting examples in algebra learning, and one which studies students' learning of ratio and proportion. Complementing his research on student learning of mathematics, Star is an experienced teacher of in-service and pre-service mathematics teachers.

## Full Transcript

Researchers think a little differently about interest than everyday folk do. We tend to think of interest as something that a student either has or doesn't have. "I'm interested in sports," or, "I'm interested in music." And sometimes teachers feel like there's not much they can do about that. A student comes into your class, and he or she is interested in horses or interested in space, and that's the hand of cards you're dealt. You have to work with it, not much you can do.

That's actually not what the research has shown us. Researchers think of interest more as a continuum where at one end of the continuum, it does look like that long-term interest—what researchers might call individual interest. It's something that is stable and long-term and it's—we are motivated to pursue things that we're interested in, and if we have frustrations in pursuing those things, we can deal with it. So that's where we're heading in the long-term interest, but for school kids, that's typically not what we see. We see the more beginning or emerging stages of interest, where a student starts just by being curious about something. Something sparks their initial curiosity. It gets their attention, and over time, when something gets their attention and they are engaging in some sort of task that they find attention-worthy, and they have a good experience with it—it's something that they enjoy—then they may return to that task. And that's how interest begins to form.

On the other end of the continuum of interest, we have long-term interest, or what researchers call individual interest. And that's the—when we say a student is interested in something, that's usually what we're talking about. It's something that's within you. It's an internal state, and I know what I'm interested in and I seek out opportunities to think in that area or to participate in that area. If I encounter challenges or frustrations, I can persevere because I have this internal, deep interest in a topic.

So that's where ultimately we're heading, and that's what will drive students to pursue, say, a math and science career is when that exists. So that long-term interest is something that we are certainly after. In the practice guide, we're not identifying specific recommendations that target that exactly—the long-term interest, the end point of the continuum. Rather, we're saying to teachers, "It's more likely that your

students, particularly at the K-12 level, are at some earlier phase where their interests are still developing. Whether you're tying into initial curiosity or whether their interests are just beginning to form and you need to think of ways to nurture and support that."

Long-term interests don't develop instantly. You don't snap your fingers or wake up one day and you're interested in something that you were not interested in before. It's a developmental process, and teachers can do a lot to help students as they move along that trajectory. If it's inspiring their initial curiosity, there's things about interesting and relevant context or problems or group work in technology. When they're starting to develop those interests, we may feel that we need to nurture them by, for example, providing them access to role models.

There's been a lot of research that shows this linkage between interests and academic performance. And we do see it at all grade levels, starting at a very young age when we try to assess kids' interest in elementary school. This is linked to elementary school performance and later outcomes as well. So we do see that link across all subject areas, across all ages. And as the authors of the practice guide, we really felt this was an area where we could capitalize. Teachers can really make a difference in kids' interest.

The research on interest that shows that there's a gender difference in interest, is really about a snapshot in time. It's as if someone took a camera and had a way to capture interest, and they took a picture of where students were at that moment in time—whether it was third grade or sixth grade or seventh grade. And when you do that, you do see these differences in students' interests. But that snapshot doesn't tell you how that developed or why it developed. It's just where students are at at that moment.

When we look to other research that looks at how interests develop, that's when we see that teachers can have a big impact on that development. This gender difference finding in students' interest is not something that handcuffs us. It's something that just shows us where students are at for a variety of reasons. Teachers can do a lot to build on students' curiosity that can ultimately change that snapshot.

We know a lot about how interest develops and we know that it's getting them on the road to believing that, "Math is something that is interesting, that I'm capable in, that there are career paths involving women that I can do that build on my strengths in math. That if I work hard in math, I can succeed." So interest plays into that equation of helping us move students in their interest and we need to look beyond this sort of snapshot view of gender differences and interest.

We are very comfortable saying, "Oh, my child or my student is interested in ballet. That will change because they're not necessarily going to be a ballerina." Whereas but if a student comes in and they say, "I'm not interested in math." Some teachers might think, "Oh well, it's a hopeless case. There's nothing I can do about it. They're not interested in math." Or parents will often say to their kids, "I'm not interested in math, you're probably not interested in math too."

So why is it that we think that their ballet interest is something that will change over time. We think about interest in that way with ballet, but not in math. And I think our practice guide is trying to push a little on that and get us to think about interest as being initially something that students are curious about and can we capitalize on that curiosity? Can it develop over time? Can we do little things in the classroom that support students' curiosity, that initial interest, which is what researchers call "situational interest." It's just in a situation.

For example, students are very interested in socializing and in group work. Often that's interesting to them. If a math task is situated in a group work context, then that might give it just that little bit of extra curiosity or interest that makes a math task that they might not have been particularly interested otherwise, interesting to them.

Similarly, if aspects of math tasks are just a little puzzling—we know that kids are interested and curious when they find something that's puzzling or something that's kind of counter-intuitive. That kind of draws their attention a little bit, and if we can situate a math task or a science task in something that's puzzling or counter-intuitive, that's going to initially spark their curiosity.

And that's what—there's a lot of little things like that that we're hoping teachers can think about, rather than thinking of interest as something that students either have or don't have that teachers can't really impact. Teachers might think, "Well, does that really make a difference if I just frame this task in terms of a puzzle? Or even if I change the names in this word problem so that they're students' names in my class versus some students that they don't know, how can that possibly make a difference?" So we're not saying that that is going to revolutionize student interest instantly, that that's going to turn students who don't seem to be interested into students who are loving math. It's not that easy. We know that.

But these little things do matter and they do add up. Every little thing does help. So there are many little things that teachers can do that really can make a difference.