

Cultivating Creativity

Boost learning by igniting students' imaginations

Gail Marshall

Gail Marshall is a writer and editor for The Fresno Bee, a major metropolitan newspaper in California. She also owns and operates a freelance business, Marshall Arts Communications Consultants.

When Sylvia Libow Martinez was a little girl, she didn't think of herself as creative. That would be her artistic friends who could make dragons and princesses come to life on a page with their paintbrushes, felt-tip pens and charcoal pencils.

"My mind didn't connect with my hands that way," she says.

It wasn't until her mind and hands connected with the tools of technology that she could not only make images pop off a screen, but she could make things – things that solved problems.

"Computers allowed me to be creative in a way not possible without these technology tools," says Martinez, now a programmer and engineer. "It also allowed me to see that creativity isn't just about the hand, it's about the mind and allowing yourself to be mindful of the world and the creative potential in every endeavor."

Today, Martinez teaches others to discover their own creativity through technology. She is the co-author of *Invent to Learn: Making, Tinkering and Engineering in the Classroom*. You'll also find her acting as a mentor and adviser to the Stanford FabLearn Fellows, a group of 18 educators working at the forefront of the maker movement in all corners of the globe. They teach in FabLabs, makerspaces, classrooms, libraries, community centers and museums – all with the goal of making learning more meaningful in the modern world.

Her book and workshops are designed to challenge teachers to venture out of their comfort zones and become learners side by side with students in this brave new world.

Everyone has a stake

She is not alone. There is a constant chatter in education about the benefits of creativity and how to teach it. Can it be taught? What does it look like in the classroom? Why is it important? What can children teach adults about creativity? What are the leaders doing right now to push this idea forward? Are our test-heavy classrooms creativity killers? How do we get more girls involved? Everyone from business executives to students has a stake in this vital, yet often viewed as loosey-goosey, concept.

Martinez sees two clear connections between the maker movement and creativity in the classroom.

"One is to make mathematics relevant to the creative process," she says. "Robotics, sensors, CAD-designed 3D fabrications and new programming environments add measurement, precision, analytics, prediction and mathematical accuracy to many kinds of projects.

"The second is design. Design is the engine that powers the ability to 'play' with powerful ideas and immediately bring them to life. Tools – both software and hardware – create the potential for a rich iterative design cycle where real things are made better by the ability to improve them, not just do over."

Martinez says the heart of her message in *Invent to Learn* is to place the child at the center of the learning experience.

"To create," she says, "is to bring something from inside yourself to the outside. This is what happens when children make things in a supportive learning community. They make their ideas real, and as this process unfolds, teachers who are

watching carefully can examine the creative process for signs of learning.

"The main job of a teacher is not marking or talking. It is being an anthropologist on a continual expedition to reveal how children approach their work."

Just don't mistake the words "child-centered" as meaning "no teacher needed."

"The art of teaching," she explains, "involves watching what a child does and says when a challenge arises, adding strategic comments without telling a child what to do, and shaping the learning environment toward invention and powerful ideas. Making things that come from your own imagination is a rich process that makes learning visible in a completely different way than tests. When a teacher sees that 'teachable moment,' it's because it's a live interaction between teacher and student. Teaching in this way becomes a creative endeavor, and is more satisfying to teachers."

If we don't know, we'll find out

If you want to take a peek inside a classroom to see how all this looks in real life, Martinez suggests visiting Tracy Rudzitkis of New York City. A computer teacher in a public middle school, Rudzitkis managed with very little fanfare or finances to create a makerspace in her school where children are welcome to drop in during lunch time. She often hosts up to 70 children at a time.

In one lunch period, Martinez saw children programming in several different computer languages, making stop-motion videos, creating animations, programming computer games, working with robotics, and building machines with electronics, motors and much more. The program has moved from being extracurricular to becoming a new science class Rudzitkis is offering during the school day. "I admire her optimism, enthusiasm and ability to do what needs to be done in spite of people saying it can't be done," Martinez says.

Rudzitkis has attended Martinez's summer institute for educators, Constructing Modern Knowledge, for seven years and this year will be a senior fellow.

It's no small detail that Rudzitkis is a woman in a field dominated by men. Martinez's next book is a passionate pursuit of that issue. It is all about girls and STEM – not just how to inspire the next generation of women scientists and engineers, but also how to make STEM subjects real and relevant to inspire all students.

"There are a lot of depressing statistics about how girls from kindergarten through careers are underestimated and devalued in these fields. I'm in the research phase now, and I'm already starting to collect a lot of stories about what's going right, not just what's wrong."

Martinez's discovery is showing tangible ways to help girls develop their creativity in their classes.

"Girls as a group tend to have some strengths that really support authentic learning," she says.

"One way is that they tend to have better 'soft' skills like collaboration and coming to consensus. Research also says that they value experiences that are grounded in real life and helping other people."

It's easy to see that the real-world technology and the open-source, collaborative nature of the maker movement play into these strengths. However, too many classrooms are closed systems where sterile textbook exercises are the only problems and competition stifles creativity.

"Schools tend to favor and reward only one kind of problem-solving. Linear, analytical approaches are seen as 'academic' and 'rigorous' while things like talking to others, thinking out loud, tinkering and trying lots of different approaches are seen as emblematic of a confused, naïve approach to learning.

"This is the way creative people work, and honestly, most scientists and engineers. No real job is done in a vacuum where you never talk to others and never make a mistake. We do so many children, not just girls, a disservice by discounting their natural problem-solving styles. It discourages and disempowers them, convincing learners that their ideas and passions are not wanted. If we want to solve the problems that face us in the future, we have to expand what we mean by being 'good' at STEM and [understand] that creativity is the key to every subject," Martinez notes.

Delivering inspiring curriculum

Creative catalyst, performance coach and inspiration impresario.

That's the job description for Kevin Carroll in his own consulting firm, and what better way to describe a man who started the rubber bracelet craze, whose inspirational quote appeared on 17 million Starbucks grande cups and who has worked with the National Hockey League, ESPN, Nike, the National Basketball Association, Walt Disney Company, Mattel, Hasbro, Procter & Gamble, Discovery Channel and Capital One, just to start. He was also a keynote speaker at ISTE 2014 in Atlanta.

Carroll is the author of several books, including *Rules of the Red Rubber Ball*, *What's Your Red Rubber Ball?!*, and *The Red Rubber Ball at Work*. So, what is with the bouncy thing?

"A red rubber ball saved my life," says Carroll, who now travels the world telling his story. In Facebook language, "it's complicated" describes his upbringing. As a child, his troubled parents abandoned him and his two brothers in a trailer for nearly a week with little food or water. His grandparents stepped up to raise the boys, and they did their best trying to guide them through life in a very rough urban neighborhood.

There was one saving grace on those mean streets: a playground. And it was there that he discovered the simple

thing that saved his life, a red rubber ball used in four-square, kickball and many other childhood games. Eventually, that red rubber ball led him to make friends, pursue healthy sports and eventually assemble a dazzling résumé that includes meetings with heads of state.

"I believe that the 'red rubber ball' is an activity that inspires us, brings us joy and sparks our imagination to dream big!" he says. "Discovering one's 'red rubber ball' empowers a student to make a commitment to chase and pursue it daily.

"Imagine if a teacher would ask a student: What brings you joy? What inspires you? What do you find irresistible and tickles your brain? The 'red rubber ball' questions and the answers provided by a student would assist a teacher/educator with valuable insights to craft and deliver curriculum that inspires students. Imagine school buildings and classrooms filled with students who arrive each day excited to actively participate in their learning experience."

Carroll is known for being a passionate advocate for encouraging curiosity and play in schools. Is there a connection between those things and creativity?

"Absolutely!" is his emphatic answer. And it's not just his idea.

Here are three insights and reminders that he enjoys sharing about the role and value of curiosity and play as catalysts for a student's creativity:

- "Play isn't the enemy of learning... it's learning's partner." – Dr. Stuart Brown, a pioneer on research on play
- "Fresh air, nature and regular physical activity breaks are considered engines of learning." – Finnish education philosophy
- "I have no special talents. I am only passionately curious." – Albert Einstein

Can creativity be learned?

Scott McLeod, Ph.D., of Ames, Iowa, knows exactly what it's like to have a creative child at home.

He is the director of learning, teaching and innovation for Prairie Lakes Area Education Agency and an ISTE member. In August, he will take a position as an associate professor of educational leadership at the University of Colorado in Denver.

But at home, he and his wife, Betsy, are the parents of three bright children. His son, Colin, 12, turned his family's ping-pong table into his own little maker factory.

In a blog a few years ago, McLeod wrote in detail about what life is like with the constant creativity of a maker at home. Every box becomes a dozen kinds of inventions. At the end, he challenges teachers: "Are you ready for him?"

Now, a few years later, he says, "There are individual teachers that are ready for my maker son. They find ways to

accommodate his interests in creative writing, board-game making, and social media and digital video creation as part of his classroom assignments. And there are other teachers who have failed to tap into his potential."

So, can creativity be learned?

"I think we are born creative," he says. "The challenge is to keep schools from squelching our natural creativity. Classrooms can be powerful socializing mechanisms that turn active, inquisitive, curious creators into passive, disengaged, 'just tell me what to do' rule followers."

Finding success stories

McLeod travels internationally in his work and has seen many schools that impress him. Two stand out when it comes to empowering students: the Discovery and Unlimited schools in Christchurch, New Zealand, and the American School of Bombay in Mumbai, India. These learning environments typically focus on deeper thinking, greater student agency, authentic (and often community-embedded) work and rich technology infusion.

What does that look like in a typical classroom? McLeod points to The Hewlett Foundation website, which describes deeper learning at King Middle School in Portland, Maine.

"Imagine that you walk into an eighth grade classroom. A small group of students is cheering. They've just discovered that the wind turbine they designed and built can produce almost six volts of electricity. One of the students tells you that she had to redesign the blades several times, but she persevered. Why? She was inspired by a book she read in English class, *The Man Who Harvested the Wind*, about a man in Malawi who built a wind turbine out of scrap metal to bring electricity to his village.

"Another student shows you a map she made in social studies class. She points to the areas where wind turbines could be built in her state. And she proudly presents her persuasive essay, which explains the value of wind turbines.

"These students are engaged in deeper learning, which means they are using their knowledge and skills in a way that prepares them for real life."

Creativity in real life

What does creativity in "real life" look like through the eyes of students? Meet Miles Rasmussen, 16, a sophomore at Churchill High School in Eugene, Oregon. He already sees a future for himself as a nature or wildlife photographer.

He just got back from a two-week family trip to Belize and is still exhilarated. He took along his drone and GoPro and Nikon cameras.

"I took tons of pictures and videos of snorkeling, Mayan ruins, the jungle, different towns and lots of wildlife," he says. "I cannot wait to finish the editing!"

You can be certain that his requisite recounting of “what I did on my spring vacation” essays will go far beyond the norm for the average sophomore.

Miles didn't wake up one morning shooting drone footage off exotic islands. His creative expression through photography began about age 6, when he asked for a camera. At that time, his world was his family's backyard.

He has learned much of what he knows the old-fashioned way: trial and error. “I've gotten really good at finding online resources such as instructional videos on YouTube and online forums.”

As he grew older, he took classes at school in digital photography, which taught him to use the digital camera and digital media. His world is much broader than the backyard now, and he has used his family's vacations to the ocean and mountains as the settings for his photos and films. He has extended his world beyond the bounds of his own eyes and footsteps.

Support beyond the classroom

Miles' parents, Anne Williams and Matt Rasmussen, are not techies, so Miles has led the way to much of his own progress. As the price and sophistication of his equipment grew larger, they made sure he had “skin in the game” by requiring him to earn at least part of the money.

They have supported his creativity, though some new technology – like the drone – gave them pause. It was especially concerning when the Federal Aviation Administration (FAA) got involved and the media reported stories of people misusing the device and causing interference with other aircraft.

But Miles did his research online. “Just a few weeks before I planned to buy my drone,” he said, “a new law took effect that required all drones to be registered with the FAA. At first, I was worried, but it was easy to figure out how to do it. I got the drone registered as soon as I got it. I haven't had any problems, including when we had to take it through customs in Belize.”

Miles compliments his parents on their support of his curiosity and creativity. Their willingness to explore the outdoors with him, allowing him to explore the natural world they love, just poured fuel on his creative fire. His first videos were daily

diaries of their vacations, including a trip to their cabin in Rosswood, British Columbia, and a one-night winter camp in the Oregon Cascades.

“I haven't always followed this myself, but be open-minded to your kid's ideas, even when they push you out of your comfort zone,” Anne Williams advises. “Take the time to really listen, observe and explore with them. You'll be encouraging them, and chances are you'll find yourself genuinely interested in what they are up to.”

Technology can make every classroom creative

Veteran educator and ISTE member Mark Gura of Jupiter, Florida, says “through technology, every classroom can be a creative classroom.” Students and teachers can say much more now that there are these wonderful tools to help them say it. It's the democratization of the media, he says – in other words, it's for everyone.

Gura grew up in New York City, where he taught for more than three decades. A prolific writer, he recently completed his fifth ISTE book, *Make, Learn, Succeed: Building a Culture of Creativity in Your School*. He also teaches graduate teaching courses online, and as a former teacher of visual arts (among many other subjects) and as a technology director, he says he has been involved in promoting creativity his entire life.

He is convinced that the best place to inspire teachers to be creative is right at the beginning, in our teacher education programs. Classroom teachers need to make developing student creativity a goal.

Light a fire

In his own teaching, he sees the power of firsthand joy.

“The great thing about this is that once a student has had a few experiences like this, the experience of education itself is transformed, as the old saying goes, ‘Education is not the filling of a bucket but the lighting of a fire!’ What I want people to know about student creativity is that engaging students in activities to develop their creativity is one predictable way to light that fire.

“I've spent a lifetime in pursuit of that, and I think that in the end, it is probably the very most important thing we educators can do for our students. By using student creativity as a focus, we have a very clear path to take toward that goal!”

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