34 CONSTRUCTIONISM AND CREATIVE LEARNING: INTERVIEW WITH MITCHEL RESNICK

How you see yourself as a constructionist?

When I met and started working with Seymour Papert, one of the biggest influences on me was Seymour's emphasis on the interplay between constructing things in the world and constructing ideas in your mind. For me, that's always been the essence of constructionism: the back-and-forth between creating things in the world, which enables you to create new ideas, which then pushes you to create new things in the world, and on and on in a never-ending cycle of creating things and creating ideas.

Another thing that attracted me to constructionism was the attention to building on people's interests. That was a central aspect of constructionism for Seymour. I loved it when Seymour said, "Education has very little to do with explanation. It has to do with engagement, with falling in love with the material."

What do you think are defining features of what you consider constructionism or constructionist projects?

In recent years, I've been talking about constructionism through a framework that I call the "Four P's of Creative Learning": Projects, Passion, Peers, and Play. For me, those are all essential elements of constructionism. I feel that the seeds of all four Ps are in Seymour's writing and in the core constructionist community, though not always played out fully. In my own work, I see myself as trying to nurture some of the seeds that have been planted by Seymour and the constructionist community. Of the seeds that Seymour sowed, some have sprouted and flourished, some are still in the ground, some sprouted and were stomped on by systems that made it difficult for them to keep growing. So I think Seymour planted the seeds for all the things that I'm working on now with Projects, Passion, Peers, and Play, but the seeds need nurturing.

Nurturing can take on many different forms: new technological tools that enable the seeds to be expressed and grow, new ways of pedagogically supporting them, new types of activities that let them come to life, and so on. To nurture the seeds, I think about how can we support kids working on projects that are based on their passions, in collaboration with peers, in a playful spirit.

Of course, the framework itself evolves sometimes. I sometimes talk about a fifth P: Purpose. Purpose in the sense of making a meaningful difference in the world. You can be passionate about superficial things, but purpose involves something that's going to make a meaningful difference to you, your community, to those you care about, to society at large. Seymour started out as an activist. He had to run away from South Africa because of his anti-apartheid activities. Purpose was always part of what was motivating Seymour. To the extent that Seymour's motivations and missions are the underpinnings of constructionism, I think that Purpose is something that needs to be there and is something that motivates me as well.

Can you think of any particular, or particularly difficult, choice points in your trajectory or in the history of constructionism that might be instructive for how constructionism will grow and develop in the future?

What comes to mind are ways of engaging with schools. On one hand, there are many constraints of schools that make it very difficult to play out the vision and mission of constructionism. On the other hand, the desire to reach broadly and diversely means that it's very important to engage with schools. That tension has led different people to make different choices at different times. In the constructionism community, it's sometimes talked about as evolution versus revolution. Can we work within the existing system to bring about change, or do we need to come up with fundamentally new systems to play out the constructionist vision?

With most of the projects we work on in my group at the Media Lab, we usually don't start with looking at the current curriculum or standards. We usually start in a very child-centered way. What is going to be deeply engaging for kids? What do kids want to work on? What do kids want to create? We are convinced that if the tools we build support Projects, Passion, Peers, and Play, rich learning experiences will result. With this approach, it can sometimes be difficult to fit into the existing structures of schools.

On the other hand, we do want to reach broadly, so there's clearly a tension. Currently, use in schools is the fastest-growing part of the Scratch community. So we're constantly trying to figure out how we can support

Scratch in schools while also staying true to our commitment to Projects, Passion, Peers, and Play. There's some use of Scratch in schools that does not align with our values and our visions. We want to push against that and offer alternative pathways for introducing Scratch that are more aligned with constructionist values.

What are some opportunities brought about by the international movement for computer science education? What should we be cautious about?

Obviously, the growing cultural support for kids learning to code presents an opportunity. It allows us to offer more kids coding-based activities that we see as rich learning experiences, helping kids develop their creative capacities and creative thinking. There is an opportunity to ride on the back of the interest in coding to try to bring in new visions of education and learning; we sometimes call it the Trojan Cat model. As more people pay attention to coding, there's an opportunity to extend the reach of Scratch, not just as a language, but as a philosophy, which builds on Logo philosophy, building on constructionism. It provides an opportunity to bring that philosophy into schools.

But of course there are also pitfalls and dangers. In computer science education, the goals are often about teaching some core computational concepts or preparing students for careers as professional programmers. That can be a good thing to do, but it is also a narrow focus. With that narrow focus, we risk not paying enough attention to supporting the development of creative capacities.

In describing our goals with Scratch, I often say that we want to help kids learn to think creatively, reason systematically, and work collaboratively. Many efforts in computer science education focus on helping kids learn to "reason systematically"; with Scratch, we also focus on engaging kids in "thinking creatively" and "working collaboratively." We created Scratch in a way that allows kids to make all sorts of different projects—interactive stories, games, animations, simulations—so that they learn to express themselves creatively. And we integrated the Scratch programming language into an online community so that kids learn to work collaboratively.

At least initially, the constructionism community focused on individual learners and didn't pay as much attention to the social side of learning. One of the biggest differences between Logo and Scratch is that Scratch was launched with an online community. We were thinking about that social interaction right from the beginning. It's not that previously people had

ignored the social side, but it wasn't as prominent, and tools to support it didn't exist.

I'm not fully comfortable with the current focus on "computational thinking." I'm certainly in favor of helping kids develop as computational thinkers, but it's not enough. In addition to helping kids to develop their thinking, we want them to develop their voice and develop their identity. This is, again, something that I learned from Seymour. When you're constructing something, you're getting your ideas out to the world—you're developing your voice, your ability to express yourself. And you're developing your identity. You start to see yourself differently, to see that you can play a role in the world, that you can take charge of the technology and make things happen with it.

I prefer the phrase "computational fluency" to "computational thinking." I take seriously the analogy between learning to code and learning to write. In both cases, you learn to organize, express, and share your ideas. And as you become more fluent, with either writing or coding, you start to see more ways that you can contribute actively as a member of society.

Another phrase from Seymour that's associated with constructionism is "powerful ideas." When Seymour talked about powerful ideas, he was referring to ideas that empower you to do more things, to create more things, to learn more things. Seymour always felt that schools didn't pay enough attention to powerful ideas, and I think that's true of current efforts around computer science education, which are often focused too narrowly on learning particular computer science concepts, or somewhat more broadly on developing thinking skills. Seymour would have wanted it to be broader than that, and so do I.

Where do you see constructionism in the next ten to twenty years?

I'll answer it two different ways, one focused on tools and activities, and the other on how it might change systems and structures. I think the constructionist community has always tried to look at each new wave of technology and say, "How can we empower kids to design, create, and share with this?" As microcontrollers became smaller and less expensive, we developed LEGO Mindstorms, because we could then put the computer inside of a LEGO brick. As use of the Internet became more widespread, we made an online community for Scratch.

Sometimes it's more difficult than at other times. Mobile devices are a challenge. Of course, they're great for sharing, but there's less screen real estate for creating things. So each new technology has some ways in which it can open up new possibilities, and some ways in which there are new challenges.

It's also important to try to change spaces and systems in the world so that they're more open to constructionist approaches. When I think about changing schools, I sometimes think about it in terms of breaking down barriers or crossing boundaries. There are lots of barriers in schools today. There's the barrier between disciplines. We're trying to break those down, supporting activities that cut across disciplines. There's the barrier between ages, with kids segregated kids by grades. We know that kids can learn a lot by working with others of different ages. That's why we have initiatives like our Computer Clubhouses, where kids of many different ages work together. There's the barrier of time, with schools locked into fifty-minute class periods and one-week units. Kids need more time to work on meaningful projects. And there's the barrier between inside-of-school activities and outside-of-school activities. My hope is that schools become much more integrated into the community, that people from the community are coming into the schools, and bringing in their expertise, and that kids from the schools are going out to the communities.

When Seymour wrote *Mindstorms* in 1980, he expected that the proliferation of computers in society would naturally lead to breaking down many of these barriers in schools. He was right that computers would spread through society, but he was overly optimistic about the impact on schools. The proliferation of digital technologies has opened up the potential for dramatic change, but in most places the barriers have not changed much in the nearly forty years since Seymour wrote *Mindstorms*. Obviously, there are some good examples, in particular schools, where new technologies have been used to break down barriers, but it has not happened throughout the culture. For me, that's still the ultimate goal—to really change the nature of the spaces and structures and systems that are constraining a lot of learning experiences these days.

I sometimes say that I'm a short-term pessimist and a long-term optimist. I know how difficult it is to make serious change in educational systems. It requires shifting people's mindsets and shifting bureaucratic structures that are resistant to change. But I'm a long-term optimist, because I really believe that the constructionist learning approach is critical for helping young people thrive in today's fast-changing society—and it will be even more important in the future. Students engaging in constructionist experiences will be better prepared to thrive both in the workplace and outside of the workplace. Over time, parents, educators, and policy-makers will take notice of the value of the constructionist approach. Ultimately that's going to win out.

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