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Edutainment? No Thanks. I Prefer Playful Learning

Introduction

Let me start with a contrarian point-of-view: I don't like edutainment.

What do I mean by that? Am I a stodgy professor who wants to keep play and fun out of the learning process? Certainly not. In fact, my research at the MIT Media Lab focuses on ways to integrate play and learning. I have found that many of people's best learning experiences come when they are engaged in activities that they enjoy and care about. Based on these ideas, I have helped develop new toys that provide children with opportunities to learn as they play (and play as they learn).

So why don't I like edutainment? The problem is with the way that creators of today's edutainment products tend to think about learning and education. Too often, they view education as a bitter medicine that needs the sugar-coating of entertainment to become palatable. They provide entertainment as a reward if you are willing to suffer through a little education. Or they boast that you will have so much fun using their products that you won't even realize that you are learning—as if learning were the most unpleasant experience in the world.

I also have a problem with word "edutainment" itself. When people think about "education" and "entertainment," they tend to think of them as services that someone else provides for you. Studios, directors, and actors provide you with entertainment; schools and teachers provide you with education. New edutainment companies try to provide you with both. In all of these cases, you are viewed as a passive recipient. That's a distorted view. In fact, you are likely to learn the most, and enjoy the most, if you are engaged as an active participant, not a passive recipient.

So I prefer to focus on "play" and "learning" (things that you do) rather than "entertainment" and "education" (things that others provide for you). My preference is for "playful learning" rather than "edutainment." It might seem like a small change, but the words we use can make a big difference in how we think and what we do.

An Example of Playful Learning

What do I mean by "playful learning"? I think the idea is best illustrated through an example.

Alexandra, an 11-year-old girl, wasn't very excited about school. But she loved coming to the Computer Clubhouse, an after-school center where young people (ages 10-18) from low-income communities work on creative projects with new technologies. At the Clubhouse, Alexandra learned how to manipulate digital images and create animations on the computer. She became particularly excited when two volunteer mentors (from a local university) organized a Clubhouse workshop for building "marble machines"—whimsical contraptions in which marbles careen down a series of ramps and raceways, bouncing off bells and bumpers.

The mentors, Karen Wilkinson and Mike Petrich, brought a variety of craft materials to the Clubhouse: pegboard, wooden slats, bells, string, marbles. They also brought a collection of tiny computers called Crickets, small enough to fit inside a child's hand. Crickets can be programmed to control motors and lights, receive information from sensors, and communicate with one another via infrared light. Children can use Crickets to make their constructions come alive—for example, making a motor turn on whenever a touch sensor is pressed, or whenever a shadow is cast over a light sensor.

Alexandra became interested in the marble-machine project right away. She cut wooden slats to serve as ramps, and inserted the ramps into a pegboard. She began playfully rolling marbles from one ramp to another, trying to create interesting patterns of motion, without the marbles dropping off. As the marbles dropped from one ramp to another, Alexandra giggled with delight.

Next, Alexandra created a Cricket-controlled conveyor belt with a small basket on top. Her plan: the marble should roll down a ramp into the basket, ride along the conveyor belt inside the basket, then drop onto the next ramp when the basket tipped over at the end of the conveyor belt. How would the conveyor belt know when to start moving? Alexandra programmed the conveyor-belt Cricket to listen for a signal from another Cricket higher up on the pegboard, alerting it that the marble was on its way. The conveyor-belt Cricket waited two seconds, to make sure the marble had arrived safely in the basket, before starting to move the conveyor belt and basket.

Alexandra worked on her project for several weeks, experimenting with many different configurations of the ramps, and adjusting the timing of the conveyor belt. She playfully tried out new features—for example, putting bells on the ramps, so that the marbles would make jingling sounds as they rolled past.

Alexandra decided to enter her marble machine into her school's science fair. But when she talked to her classroom teacher about it, the teacher said that the marble machine was not acceptable as a science-fair project. The teacher explained that a science-fair project must use the "scientific method": the student must start with a hypothesis, then gather data in an effort to prove or disprove the hypothesis. The marble machine, said the teacher, didn't follow this approach.

Alexandra was determined to enter her marble machine in the science fair. With support from mentors at the Clubhouse, she put together a sequence of photographs showing different phases of the marble-machine construction. Even though Alexandra never wrote a hypothesis for her project, her teacher ultimately relented and allowed her to enter the marble machine in the school science fair. Much to Alexandra's delight, she was awarded one of the top two prizes for the entire school.

Learning through Play

What did Alexandra learn while working on her marble-machine project? A great deal. Although Alexandra's teacher was concerned that the project did not use the scientific method, I see the project as a wonderful example of the scientific method. True, Alexandra did not start with a single overarching hypothesis. But as she playfully experimented with her marble machine, Alexandra was continually coming up with new design ideas, testing them out, iterating based on the results. Each of these design ideas can be viewed as a "mini-hypothesis" for which Alexandra gathered data. Over the course of her project, she investigated literally dozens of these mini-hypotheses. While positioning the ramps, for example, Alexandra tested different angles to try to find the maximum range for the marble. Alexandra also experimented to find the right timing for the conveyor belt. She modified the conveyor-belt program so that the basket would make one complete revolution, returning to its original location, properly positioned for the next marble.

Alexandra's playful explorations with her marble-machine were not a sugar coating for science experiments; rather, play and learning were fully integrated in her project. Alexandra experimented with ramp angles and conveyor-belt timing not to get a reward or a grade, but as an integral part of her play experience. In other words, Alexandra was driven by "intrinsic motivation," not external rewards. That distinction is critical. As Edward Deci wrote in his book *Why We Do What We Do*: "Self-motivation, rather than external motivation, is at the heart of creativity,

responsibility, healthy behavior, and lasting change." Indeed, in our studies, we have found that youth who have short attention spans in traditional school classrooms often display great concentration when engaged in projects that they are truly interested in.

Alexandra's project was far from easy: she worked very hard on her project, and parts of the project were very difficult for her. But the challenge of the project was one of the attractions. Too often, designers and educators try to make things "easy" for learners, thinking that people are attracted to things that are easy to do. But that is not the case. Psychologist Mihaly Csikszentmihályi has found that people become most deeply engaged in activities that are challenging, but not overwhelming. Similarly, Seymour Papert has found that learners become deeply engaged by "hard fun"—in other words, learners don't mind activities that are hard as long as the activities connect deeply with their interests and passions.

Where to Look for Playful Learning

In 2002, I was invited to give a keynote address at a conference in Singapore. A major theme of the conference was the need to improve creativity and innovation in the society. Although students in Singapore score very high in international math/science exams, government officials are becoming concerned about a lack of creative thinking among students.

Because of my interest in robotics activities, the conference organizers arranged for me to visit a school where students were actively involved in designing and building robots for a nationwide robotics competition using the LEGO MindStorms construction kit. I spent several hours working with the students, and I was very impressed. The students had a playful spirit, and they had built and programmed a creative collection of robots. It was clear to me that the students learned a great deal through these activities. It was, in my mind, a great example of playful learning.

Before leaving the school, I asked one of the teachers how they integrated the robotics activities into their curriculum. She looked at me with a horrified expression. "Oh no," she said, "we would never do these activities during the school day. Students work on their robotics projects after school and on the weekends. During school hours, they need to focus on the core subjects."

What a missed opportunity, I thought. Robotics activities provide great opportunities for students to learn important mathematics and science concepts—and learn them in a much more meaningful and motivating context than in traditional classrooms. Moreover, robotics activities can help students develop as creative thinkers, one of the Singapore government's top priorities.

Unfortunately, many schools throughout the world have a similar resistance to playful learning. Teachers and administrators are often skeptical of playful-learning activities, seeing them as "just play." Too few educators recognize the importance of leveraging student interests and passions. Traditionally, playful learning has been more prevalent in pre-schools and elementary schools than for older students. Research has shown that play activities can help young children learn many important things: how to count, how to tell a story, how to share, how to get along with others. But even in the younger grades, current trends are moving against playful learning. In new guidelines for pre-school teaching in the United States, the word "play" never appears.

So where should one look to find playful learning? Museums provide some of the best examples—particularly children's museums and science museums. In Singapore, it is the Singapore Science Center, not the school system, that organizes the nationwide robot-design competition. And Karen Wilkinson and Mike Petrich, the mentors who introduced Alexandra to marble machines, first developed the marble-machine activity at the Science Museum of Minnesota, and later refined it at the Exploratorium in San Francisco.

Children's museum and science museums have a long and successful tradition of hands-on activities that help children learn through playful exploration and inquiry. As Howard Gardner writes in his book *The Unschooled Mind*: "As institutions, schools have become increasingly anachronistic, while museums have retained the potential to engage students, to teach them, to stimulate their understanding, and, most important, to help them assume responsibility for their own future learning."

Interestingly, the most innovative museums have not necessarily been the leaders in the creative use of computers and other digital technologies. Some museum educators and designers are concerned that computers will draw people into virtual worlds and away from the physical-world, hands-on experiences that have, traditionally, been at the core of the museum experience. There is some basis for their concern: when computers are used simply to present images, videos, and other information on large screens, as is the case in many museums, then computers are, in fact, at odds with the hands-on tradition. But that need not be the case. Today's computers can take on many different forms and functions, as evidenced by the tiny Cricket computer that Alexandra integrated into her project. The Cricket is designed to feel more like a craft material than an "information-processing machine." Our hope is that children will see Crickets as just another object in their bin of construction parts. Indeed, we were thrilled when Alexandra listed the parts of her marble machine and mixed the Cricket with all of other materials: ". . . slopes, stoppers, a Cricket, LEGOs, . . ."

To support the creative use of new technologies in museums, our research group at the MIT Media Lab helped to start a collaborative network of museums called the Playful Invention and Exploration (PIE) Network. We are working together to develop a new generation of technologies (such as the Cricket) that bridge the divide between the physical and digital worlds, and a new generation of hands-on activities (such as marble machines) that integrate art, science, and engineering. Through these types of activities, the PIE Network aims to provide the next generation of children with new opportunities to engage in creative inquiry and inventive exploration—and to experience the joys and benefits of playful learning. Though we are starting with museums, we hope that these ideas, technologies, and activities will spread to homes, schools, community centers, and beyond. Our ultimate goal is a world full of playfully creative people, who are constantly inventing new opportunities for themselves and their communities.

This essay will be published in 2004 in the Associazione Civita Report on Edutainment. *I am grateful to members of the LEGO Learning Institute and the Playful Learning Panel for many stimulating discussions about the nature and value of playful learning.*