

INTRODUCTION

What if . . . ? That question became the title of a comic book series Marvel published in the late 1970s and early 1980s. In this popular series, Uatu, who observed alternative realities from his lunar abode, asked questions such as, What if Spiderman joined the Fantastic Four? Issues in the *What If* series turned the characters' lives upside down, killing them off in alternative realities and sometimes having a superhero choose a life of crime. It ignored the rules the characters normally lived by and created wild worlds from a totally different angle.

In this book, we invite you to play with the idea of *what if* as it relates to your children's learning and success. What if we could create a world in which the educational system matched what we know about how children learn? What if school actually offered programs that matched the demands of the future world that our children will inhabit?

It's easy to complain about the problems of parenting and schooling. We've been there ourselves! As parents, we lived with the anxieties about our children's education in and out of school. We sweated over each math test and over the topic sentences in our fifth grader's Martin Luther King Jr. essay. Were we providing enough time at home for our kids to practice those tricky fractions? Maybe their topic sentence didn't conform to the textbook example—would

the teacher give them more opportunities to get it right? Luckily, the kids turned out okay.

As scientists, and during our own years of raising children and beyond, we've had a lot of time to examine what works in education. Our hope for this book is that it will help you move beyond the anxieties and get a glimpse of what really works. We show you the pockets of excellence—there are some wonderful schools and classrooms out there that we can learn from. We share the latest hype, the latest data, and the latest evidence-based practices that allow your children to reach their fullest potential—intellectually and socially—in a complex global 21st-century world.

WHAT IF A SCHOOL COULD BECOME A RAINFOREST?

We visited Friends' Central School outside of Philadelphia on the day that the students in Grades 2, 3, and 4 were studying the rainforest. The rainforest was *everywhere*—stuffed animals climbed paper trees with broad green leaves, rippled crepe paper on the floor represented flowing streams. We entered Indonesia in Ms. Papino's second-grade classroom and New Guinea down the hall—complete with walls adorned with children's valiant attempts at primitive masks. The masks had signage—as at a museum—that highlighted a bit about the creators and the history of the places from which the masks originated. Mr. Briggs's fourth graders were using math and reading skills to build a boat that would take them on a journey to Treasure Island. The scene is rich in content learning as information seeps through the vine-covered hallways and children use their burgeoning skills for an authentic purpose: to read written directions, make measurement calculations, and to write a paragraph about their boat-building plan.

But—and this is critical—children are learning more than just their ABCs and 123s in this rain forest. Five other 21st-century skills pop out of the thick foliage—skills that, together with *content*, we

call the 6Cs. We've identified the 6Cs as the key skills that will help all children become the thinkers and entrepreneurs of tomorrow. These skills will also help children become contributing members of their communities and good citizens as they forge a fulfilling personal life. *Collaboration* comes in the form of boat-building partners who work in concert, consulting with one another to fabricate a boat that can last through a virtual trip. *Communication* enters through the books the children write to describe what they will find when they arrive at Treasure Island. *Content* includes the measurement, the geography that surrounds the forest, the science that emerges in the study of the ant-eating echidna and the mountain weasel. *Critical thinking* makes the boat possible as the students gently evaluate each other's boat-building plans for stability, speed, and seaworthiness. One plan based on the directions might work, but another will surely fail. *Creativity* abounds as engaged students come up with novel ideas, some of which garner laughter. Should they paint the boat with green monsters to ward off evil spirits? Or put lions and tigers on flags to keep pirates away? *Confidence* oozes when students tear up plans and start over, recognizing that they had to think more about the boat's materials and what to take along.

Perhaps most stunning is that every summer the Friends' School faculty rethinks how to deliver the rich content of the curriculum in a new and engaging way. They ask themselves how they can transform a traditional classroom of right-angled walls into rainforests, mountain villages, and themes like "flight" so that they and their students can learn the basics through the 6Cs. The teachers themselves become excited students in a theme-based environment that raises them out of the confines of their desks. Here they are constructing new knowledge and entering into an expansive and vibrant educational arena. Here, in this kind of a classroom, we meet what Professor John Bruer, an expert in the developing brain, called *knowledge transformers* rather than just *knowledge digesters*.

WHAT IF ALL STUDENTS HAD THE CHANCE TO MAKE A RAINFOREST AT SCHOOL?

What if all schools could design classrooms that fostered the 6Cs? What if our report cards for each individual child looked at their progress as they moved through the levels of learning in each of the 6Cs? What if parent–teacher conferences focused on the 6Cs—content, collaboration, communication, critical thinking, creativity, and confidence—in addition to how your child did on the last test? What if the report card you received gave you a fuller profile of your child’s strengths and weaknesses?

A report card based on the 6Cs captures the skill set that kids growing up in the 21st century must have for success. How does it differ from the report card of a standard straight-A student? Although we all want our children to achieve, each child is more than just his or her grades. People whose skill set is limited to content sometimes do wonderfully in school but never seem to get anywhere on the job. When that new spot opens up at the plant, will anyone think of them for the management position? (Maybe they lack the ability to collaborate.) Or when their laboratory has to develop a new method, they run in the other direction (maybe due to a lack of creativity?). Looking through the lens of the 6Cs, we get a more complete picture of our children’s strengths and weaknesses.

Consider what your own 6Cs profile might look like. What strengths do you have that you can celebrate? What areas can you develop even more? How do you communicate about your own skills, or lack thereof, to your child?

We ask you as you read this book to think differently and to ask, “What if?” What if our schools and homes integrated the 6Cs as a suite of skills that will help children to be socially adept, flexible thinkers who take joy in a lifetime of learning? “What if” is a phrase

we hope you will think of often as you read this book because we have designed it to help you consider how learning can be different—for us and for our children.

WHY DID WE WRITE THIS BOOK?

Every year for the past 4 decades, babies, toddlers, and preschoolers have marched into our laboratories with their parents in tow. Our laboratories are the places where *children teach adults* how they learn language, how they master number skills, and how they learn to read. The information children share—some even before they utter their first words—becomes the fodder for books like this one. We used data from our learning labs and others around the country to write our books, *How Babies Talk* and *Einstein Never Used Flashcards*. Children themselves have helped us fill the wide gap in what we actually know.

Working with other scientists around the globe, we have uncovered many new features in the fascinating landscape that is child development, and we are now poised to share that knowledge so that educators and innovators can design the best possible programs, toys, apps, and classrooms for all children. Although the world beyond the ivory tower stresses the importance of teaching children content, content, and more content, we see a broader vision for our children that includes the mastery of many skills and competencies. We understand that robots can memorize the facts, but only children have the potential to socialize, be good citizens, think, and create. With years of research at our fingertips, hundreds of published papers behind us, and 13 books to our names, it is time to share the collective wisdom from the science of learning and to embrace a new way of thinking about thinking: the 6Cs. And share we do—in our *Huffington Post* blog; on a blog for the Brookings Institution; in

our tweets (@kathyandRo1); by offering our consulting services for companies like Disney, LEGO, K’Nex, Crayola, and Fisher Price; by serving on the board for nonprofit organizations for children such as Choices, Frontiers of Innovation, Alliance for Childhood, Jumpstart, and children’s museums; and now in this book. We also share our work through our attendance at academic conferences and speeches we give to professional and lay audiences around the world. Sometimes in the pages of this book we take you with us to these venues, sharing our excitement and how much these events teach us. Describing some of our experiences in communicating and sharing our latest scientific findings, interacting with leaders in our field, and learning from others’ presentations allows you to be a “fly on the wall,” seeing these events through our eyes.

Scientists like us have to come out of our academic closets. With our peers, we are poised to weigh in on the issues of the day that concern children. If scientists do not share what we know, the void will be filled by those with little experience or with values that are more in line with the marketplace than with the betterment of children. Just as the fast food industry fills us with empty calories, what we call the “learning industry” has convinced many among us that the memorization of content is all that is needed for learning success and joyful lives.

We wrote this book because we are parents and grandparents. We raised five children, and we know how hard it is to sift through the many options available to families. We know that feeling when every time you look at your smartphone you think, Seriously? Can there really be more products for improving children’s intelligence? Are these people kidding—attaching a tablet to a potty chair? Although we often dismiss the worst of what we see, we know that many families feel at a loss when deciding what their children *really* need. Here we offer a set of guiding principles so that you can ensure your children develop all the skills they need to reach their potential and still be happy and well-adjusted.

A SNEAK PREVIEW

Success. We all want our children to achieve it so that they can fulfill their potential. But how exactly do we define success? Chapter 1 explores our assumptions about success and examines how we might define it in a 21st century, global world. Is the current education system preparing our children for success in this climate? We join many who think it is not. But we need solutions, not more complaints.

In this book, we rethink education in and out of school that is inspired by the science of learning. Chapter 2 begins our quest by describing how we got into this educational quagmire and by pointing the way forward. Chapter 3 explores the educational question from a “glocal” perspective by reflecting on how global scientific solutions can be molded to fit local educational problems. Chapter 4 suggests that what counts as education in and out of school will have to address the needs of a dynamic, international workforce. Educational systems that prepare children for success will have to embrace not only “hard” skills like reading and mathematics but also the so-called “soft skills” that are the bedrock for these academic achievements. What are these glocal competencies informed by science and consistent with the needs of the workplace? Chapters 5 through 10 lay bare a scientific answer to this question. On the basis of the latest evidence from child development, we chart a solution with what we call the 6Cs: collaboration, communication, content, critical thinking, creative innovation, and confidence. These competencies reflect how children grow and learn.

Chapter 11 demonstrates how these competencies fit together into a unified system that becomes a framework for education and a potential new report card for the 21st century. Dotted throughout, the “Taking Action” sections allow you to bring the learning home with concrete examples that explore where you are as a learner and how you can best help your child achieve his or her fullest potential.

Using these techniques, we think that all children can be successful and can profit from the tools suggested by the science of how children learn.

CONSIDER THE POSSIBILITIES

What if this book inspires you to sponsor your school's next Teacher Appreciation Day? What if it helps you organize your thoughts about how children learn so that you can present them to your local PTA? What if what you learn here helps you choose a better school for your child? What if the evidence we present here is exactly what you need to write that letter you've wanted to write to your school board or congressional representative? What if the 6Cs offer you a whole new, helpful framework for bringing academic lessons to life at home?

We hope that these and many more *what ifs* will come to mind as you read this book. Thanks for reading!