UNCERTAINTY X DESIGN

Realizing more promising futures starts in the *here-and-now*. This book prepares young people to become the creative authors of their own lives by teaching them to approach current and future uncertainties with an unshakable sense of possibility. It explains how students can benefit from opportunities to take creative action when facing uncertainty *by design*. The book introduces a framework for educators, researchers, and parents to understand, develop, and examine learning experiences aimed at helping young people unleash their creative potential, both now and into the future.

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Educating for Possible Futures

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For Olivia and all young people,
may you always see the possible
in the uncertainty you face now
and into your futures.

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Preface

It's a feature, not a bug.

—Unknown Origin[1]

Uncertainty is a "feature" of learning and life, not a "bug" in the system. This book is about helping young people learn how to approach the uncertainty they face with an unshakable sense of the possible. More specifically, this book describes how students can benefit from opportunities to take creative action in the face of uncertainty *by design*. In this way, this book serves as a prolonged exercise in possibility thinking – providing insights, scenarios, and applications for educators and researchers committed to supporting young people in embracing uncertainty and becoming the creative authors of their own futures.

Although this book is aimed at educators, educational designers, students of education, and researchers, it is relevant for anyone interested in exploring new possibilities for designing educational learning experiences. This book can help support and structure possibility thinking for individuals and groups, including parents wondering what might be possible for their own children.

In fact, parents often turn to education with the hope that it will equip their children to not only learn academic subject matter but also be able to put their learning and unique talents to creative use – benefitting their own lives and the world around them. Consider, for instance, the following conversation between two parents who will soon be sending their children to school:

[1] This is a common phrase used in computer science and technology. Although the precise origin of the phrase is unknown, its popularity has been attributed to Grace Hopper (1906–1992), an early pioneer in the field of computer science, who worked on the Harvard Mark II computer. A problem in the system was traced to a bug (i.e., a moth) trapped between the relay contacts in the computer. The bug was removed and taped by Hopper to the logbook, which serves as the basis of errors in computing being called "bugs" (www.computerhistory.org/tdih/september/9/).

PARENT 1: I can't believe it's already time to send our kids off to school! They grow up so fast.

PARENT 2: Yeah, I know what you mean – they just seem to get bigger and smarter each day. It seems like only yesterday we were bringing them home from the hospital! What do you hope for your child this year?

PARENT 1: I'm feeling excited and anxious – a bit nervous too! Of course, I just want them to do well academically. But also, more importantly, that they find joy in learning! What about you?

PARENT 2: Absolutely – academics are important for their future success but really what's most essential is the development of creativity, critical thinking skills, and resilience. We need to provide them with an education that will prepare them for a future of uncertainty.

PARENT 1: That's true! Education should be more than just memorizing facts and formulas – we must think bigger and bolder when it comes to preparing our children for their futures. It needs to become dynamic, so they can access knowledge in multiple ways on the go or through digital resources such as podcasts or videos – all while creating meaningful connections within the classroom setting itself.

PARENT 2: Absolutely, and there are many innovative tools available to teachers these days that make it easier for them to provide a well-rounded education. We need to focus on creating an environment where students can be active participants in their own learning – not just passive recipients of information. We also have to think about how technology can be used ethically and responsibly.

PARENT 1: That's a great point – we need to make sure that our kids are learning the skills necessary for them not just to survive but really thrive in an ever-changing world. What if, instead of "teaching" students traditional subject matter, schools become more like incubators where students practice problem-solving and experimentation?

PARENT 2: Absolutely! Schools should encourage exploration and risk-taking so that their future is much brighter than ours! And I believe it won't take long before such educational paradigms start playing out on a large scale within classrooms across the globe . . .

PARENT 1: You're right, and it's something we should explore further. We need to bring together parents, educators, students – everyone who has a vested interest in this conversation – so that we can begin to map out our visions of education for the future!

PARENT 2: That's a great idea! We should arrange a meeting and get the ball rolling. I need to head off for work now, but we can touch base soon to discuss further.

PARENT 1: Sounds good – talk soon!

As illustrated in the above conversation, parents often think and even worry about the educational experiences their children will encounter. The good news is the kinds of possibilities mentioned in the example are

certainly within reach. Moreover, there are potentially even more promising possibilities yet to be discovered. This is not intended to downplay parents' doubts or concerns. Instead, exploring the realm of possibility is not simply an exercise in cold logic; it often involves a range of emotions.

Although engaging with uncertainty can be an uncomfortable experience, this book invites us to step boldly into the uncertainty surrounding how we might better prepare young people to navigate the unknowns they encounter in their own learning and lives. Indeed, we all have a vested interest and shared responsibility to provide young people with meaningful educational experiences. That interest becomes activated whenever we face the increased uncertainty of a rapidly changing world.

When we face the unknown, we find ourselves at a crossroads. We can choose a path aimed at avoiding, downplaying, or minimizing uncertainty. Or we can choose to approach that uncertainty with a spirit of the possible. Doing so requires a blend of both imaginative and principled thinking to generate new and promising possibilities and, of course, the willingness to act on those possibilities.

Rapid advances in technology serve as an instructive example of how quickly change can be upon us and propel us into considering new possibilities for how we approach education now and into the future. In fact, the above conversation between parents was not written by me (the author of this book), but rather by an artificial intelligence (AI) text prediction model. More specifically, it resulted from a collaboration with AI, using the GPT model in OpenAI's playground.

By the time you read this book, the use of GPT models to generate text likely will have become somewhat commonplace. However, when I set out to write this book, GPT models were not widely available to the public (as they are now). Consequently, the increased availability and use of such models illustrate how quickly technologies can come onto the scene and change the way people think about what is possible in education, learning, work, and life.

Indeed, AI tools mark what might be considered a significant shift in the possible. Much of what was once only "doable" by humans (and impossible by machines) can now be done more quickly, easily, and, arguably, even better by machines. When used judiciously, AI can serve as a digital partner that can help extend our imaginative capacity to generate and think through new possibilities. Such technologies can also be thought of as "possibility thinking partners" for students, helping them explore and test out new ideas.

The use of AI in education can also intensify debates surrounding what should be taught in schools and how it should be taught, given the

accessibility of "ready-made" information and the increasing availability of digital tools that can produce meaningful products and artifacts based on that information. Of course, as with any innovation, AI can be misused and has its limits.

Consequently, the use of AI chatbots raises serious questions about what such tools mean for student learning now and into the future: *Should they be used by students on assignments and to assist them in their learning? If so, how? If not, why not?* We should not approach such questions out of fear of the new or with unchecked optimism, but rather from a principled approach.

Although this book is not about new technologies, advances in AI serve as an example of the kinds of rapid change that can move us to consider new possibilities for education from a principled perspective. As will be discussed throughout this book, any new and transformative possibility or innovation should be approached with a blend of hope *and* active consideration of potentially negative outcomes. Indeed, this book stresses the importance of helping students learn how to take a principled approach to their own creative efforts, by being supported in actively considering and monitoring the benefits and potential costs of the creative contributions they develop and share with others.

In sum, this book invites you to think about and, most importantly, start acting on new possibilities for how we might design transformative educational experiences for young people. In some cases, these possibilities will complement existing educational designs. In other cases, these possibilities will replace current designs. This book is therefore not just about generating new ideas but putting those ideas to the test through action.

As such, each chapter is followed by an "Application" section, which provides protocols and examples that can be used to support the development of actionable possibilities for how to design, test out, and refine new approaches aimed at preparing young people to productively navigate current and future uncertainties.

To that end, Chapter 1 opens with an exploration of the question, *What Do We Owe Students?* This question prompts us to actively consider possible futures and the implications for education. Chapter 2 builds on the themes presented in Chapter 1 and discusses educational designs that aim to reduce uncertainty and prepare young people for *likely futures*.

Next, Chapter 3 pushes our thinking forward by introducing a new model of education called, "uncertainty x design" (UxD), which provides an alternative to existing educational designs and is aimed at better preparing young people for *uncertain futures*.

Chapter 4 focuses on the role that uncertainty plays in generating new possibilities for thought and action and how it serves as a starting point for UxD educational experiences. This theme is further developed in Chapter 5, which focuses on the importance of structuring uncertainty for learning.

This leads to Chapters 6 and 7, which focus on how UxD learning experiences can help young people develop their confidence and competence, producing and acting on new possibilities in the face of uncertainty. Finally, Chapter 8 describes how students can learn how to take a principled approach when acting on uncertainty to help ensure that they are making a positive contribution to their own and others' learning and lives. The book closes with a brief "Avanti," highlighting how the possibilities presented in the book serve as a starting point, which can be carried forward by educators, students, researchers, and anyone interested in working toward more promising educational futures.

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