PREFACE

Stories about the decline in American education are not new. For years we have been hearing that we are no longer competing globally in areas like engineering, science, and mathematics, and that our students are not graduating with the skills they need for 21st-century jobs. Places like the Silicon Valley in California are introducing some of the most creative, innovative ideas and technologies in the world, but they also draw on a large population of immigrants who received their education in other countries.

What is it about our education system that is falling short? Could it be that it has changed little since it its inception in 1893, while the world has changed dramatically many times over during that period? That the hierarchical student-teacher relationship takes away opportunities for students to explore different ways of learning—ones that they might need in the workplace?

Some notable facts:
- Eleven percent of employers—yet 96% of academic provosts—believe colleges are effective in preparing graduates for the workplace.
- Student engagement in school plummets as students get to the higher grade levels—from 80% in elementary school to just 40% by the beginning of high school.
- Of today's grade-school students, 65% will end up in jobs that have not been invented yet.
- Fifty-three percent of recent college graduates are under- or unemployed.
- Of today's high school students, 72% will want to start their own business.
- Over the last four decades the U.S. has become home to far fewer of the world's scientists and engineers, with the percentage dropping from 40% in the mid 1980's to 15% today.
- By 2020, it is anticipated that 1.3 million STEM jobs will be unfilled.

Unleashing Creative Genius

The need for reform in our education system is evidenced all around us. Yet change has been slow to emerge, due to the complexity of the issues, the inertia behind and size of our existing education system, and the need to educate more students with less funding.

STEAM Studio was created to offer students an alternative form of learning that would function as an overlay to more traditional classroom education. By bringing students into a professional setting that applies STEAM (science, technology, engineering, art, mathematics) skills every day—an architecture studio—and giving them hands-on STEAM projects where there are few limits and lots of room for experimentation, failure, and ultimately success, we hoped 1) to demonstrate that a more applied learning process could be highly effective, 2) to preserve the creative genius in our youth, and 3) to advocate for continued change in the way education is delivered.

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Where do you start with education reform?
If you look at a country the size of the United States, the numbers are daunting. There are 324 million people in the U.S. Of these, 27% (87 million) are under age 21. In the fall of 2016, roughly 50.4 million students entered public elementary and secondary schools, and 5.2 million attended private elementary and secondary schools. The size of our education system is enormous. How do we impact something this large?

STEAM Studio has chosen to start in our own community, working with schools throughout the Kansas City region and focusing on inner-city students. The work we have been doing and the lessons we've learned can both adapt to other communities and scale to their individual needs. It is a program that empowers kids, that celebrates their uniqueness, allows sparks to light fires of passion, and gives them hope in a fast moving world that can

be dislocating. It could significantly change the way our children's educations unfold and, hopefully, what they contribute to the world in their lifetimes.

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The Future of STEM is STEAM

While STEM as an acronym has been in active use for several years now, the addition of the A to make STEAM is really important to us. Beyond making an overt message about the importance of creativity in the STEM disciplines, the A represents taking risks and not approaching a problem as if there were a predetermined answer. It also implies a more interdisciplinary nature to the act of solving problems, and acknowledges that every successful scientist, engineer, or mathematician has used creative thought to achieve their success.

While there are many excellent STEM programs, many of the approaches tend to include modules for each discipline: science is separate from technology, which is separate from engineering, and so on. Our goal in including the A is to offer a program that excites students about the creativity and entrepreneurialism inherent in solving problems from many angles and using many different skills. STEAM Studio is designed to develop well-rounded skills in our students and build self-confidence in their own thought processes and abilities. It is a program designed to instill passion and curiosity, using STEM topics as the practical foundation upon which to do so.

Students who are at first intimidated by the STEM disciplines individually are often more willing to explore them when the A component is added in. After all, there are no wrong answers in art! Often they find, once they are immersed, that they actually *enjoy* (and redefine for themselves) the STEM disciplines—and that they are good at them. We like to

consider the A as an "on-ramp" to STEM for students who are otherwise intimidated or disinterested in these challenging subjects.

Considering that many students are developing pre-dispositions for their future career choices as early as middle school—often encouraged by schools, parents, and society—it is also important that STEAM communicate possibilities of future career paths that are actually fun. Very few middle school students would tell you they want to grow up and work in a cubicle, yet this is often the perception of STEM careers for these impressionable youth.

Art and design go hand in hand. It is imperative that we integrate experiences for our youth that enable to them to take a break from screens, and offer them a real opportunity to build and create. Students are able to analyze and apply when they are acting on the knowledge they are gaining. The A component of STEAM provides *opportunities* to be fearless, which then builds the *confidence* to be fearless. Art also brings enjoyment and connects people with others. Through those interactions, students develop not only an understanding of one another, but also a healthy sense of themselves.

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Why this book?
Our goal in writing this book is to substantiate and fight for more development of "soft skills" in today's students. Almost every business recruiter we talk to repeats the same message: today's graduates need more emotional intelligence. Their needs are becoming increasingly less about IQ and GPA.

Soft skills are sometimes called life skills, or workplace-readiness skills. Regardless of the labels, this book lays out a case for how the application of these skills support cognitive

development and correlate with improved academic performance—the bottom line that school administrators, school board members, and parents consistently use as the benchmark of successful education.

We also want to illustrate the academic and personal benefits of after-school and summer enrichment programs, not just as a way to keep kids' idle hands busy, but rather as significant contributors to students' overall learning capacity and rate of academic growth throughout their school years. Whether these programs are directly tied to classroom curriculum or entirely different from what kids are learning at school, it is so important to ignite children's passion for learning and reinforce their belief that they can become whatever they want as adults. Exposing them to more opportunities gives them a greater chance of discovering what truly lights their fire.

To take the efficacy of our programs beyond the label of "trendy national fad," we have laid out meaningful linkages between scholarly research on the topic of learning and the methods used in STEAM Studio. This book validates that results from our own learning laboratory, STEAM Studio, have significant and meaningful connections to scholarly research that is underway across multiple research institutions. Through a literature review and internal research, we have been able to translate what would otherwise be compelling anecdotal observations into substantive outcomes of our process.

We feel this substantiation is important and necessary to support the generosity and faith that many generous partners have invested in our new startup, helping it get off the ground in the last three years. The popularity of STEAM Studio has grown tremendously as a result of these supporters, and we are grateful to them. In addition, as we see early examples of how the potential for this program will be realized, we want to show other communities the possibilities and excite them enough to give their young people similar opportunities. This book shows that a grass-roots program like STEAM Studio can make a tremendous impact, very quickly.