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The Need for Teaching Innovation and Creative Thinking in K-12 Schools

Over the last year, the world has faced a myriad of local and global "wicked" problems – the COVID-19 pandemic, inequality and social injustice, climate change, and economic distress (Maxwell & Miller, 2020; Seale, 2020). Our shared memories of schools, desks in neat rows with the teacher at the front of the class instructing the standardized curriculum annual state testing, are being quickly replaced by uncertainty and new narratives of sudden and drastic change.

In this new learning environment an opportunity presents itself: will we return to the old models of instruction that benefitted the few or will we embrace a redesign of education that which focuses on what all students will need to be successful in a post-COVID-19 world.

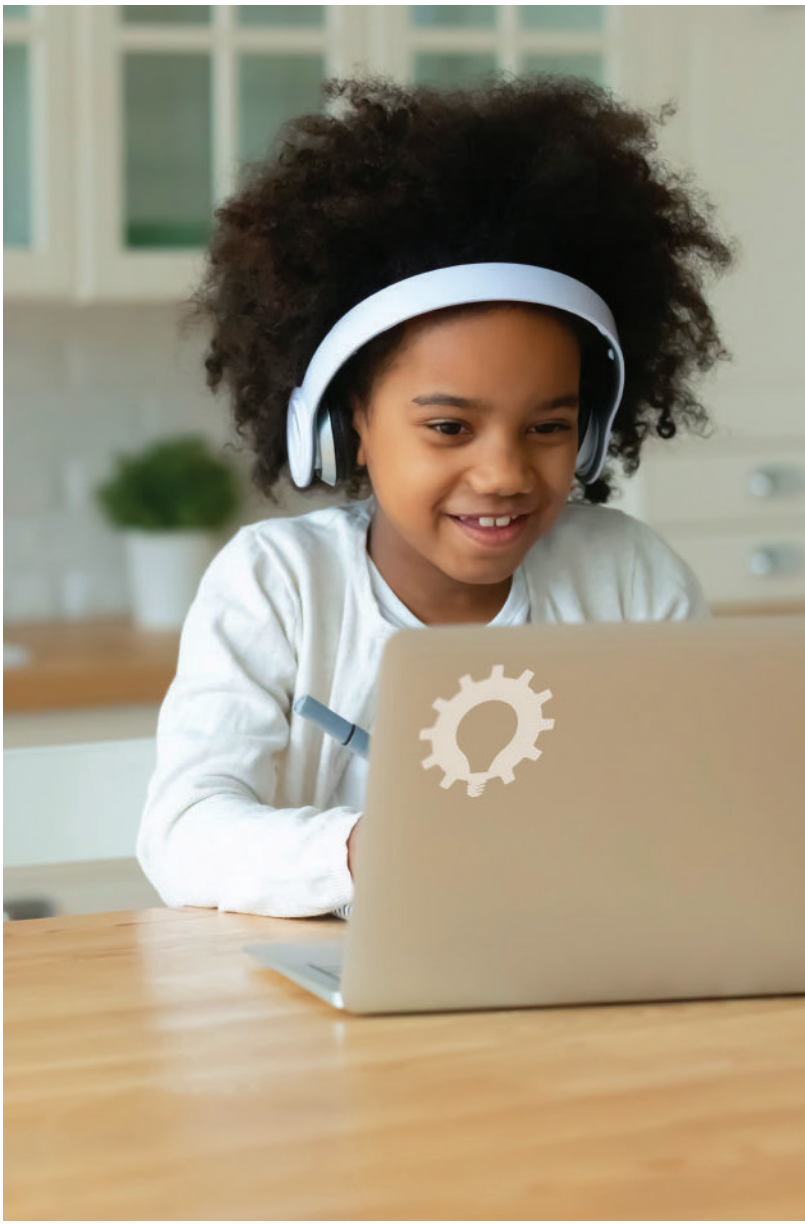
The necessity of problem-solving skills has never been more apparent than it is today as we face entrenched, wicked problems connected to economics, education, social injustice, and healthcare.

Despite ample evidence that innovation, creativity, and entrepreneurship are essential skills for successful problem-solving (Aspen Youth Entrepreneurship Strategy Group, 2008; Darling-Hammond, 2010; Robinson & Aronica, 2015; Salkowitz, 2010; Seale, 2020; TNTP, 2018; Zhao, 2012, 2015), research shows that American schools are suppressing creativity and innovation (Gardner, 1982; Wagner, 2008; Zhao, 2012).

This fact is not surprising given that schools were designed to produce workers who will be good employees—those who will work hard and follow orders (Zhao, 2012). As Linda Darling-Hammond (2010) describes, "[m]ost of today's schools were designed when the goal of education was not to educate all students well but to batch process a great many efficiently, selecting and supporting only a few for 'thinking work'" (p. 237).

The iniquitous problems we face today are demanding the opposite of this approach; schools must shift to a holistic, student-centered learning environment wherein all students must be thinkers, innovators, creators, and entrepreneurs.

To solve these persistent and complex global challenges, our future leaders must learn a different set of skills than those traditionally taught in the K-12 public education system. Gallup (2019) recently shared, "today's students must master essential problem-solving and critical thinking skills to be successful in the future despite likely economic disruption. Future jobs—many of which have not been imagined yet—will require individuals who can develop new, creative ways to address problems." (p. 2).



A Shift from Teaching to the Standards to Teaching for Innovation

This call for change is not new. Esteemed researchers, global organizations, and world leaders have proclaimed the urgent need to revamp our approach to public education. Since A Nation at Risk (1983) was first published, American schools have chased reform by mobilizing around standards-based instruction and high stakes testing with little actual change in learning and critical thinking skills (Payne, 2008; TNTP, 2018; Tyack & Cuban, 1995; Zhao, 2015). While the intentions were good and anchored in closing the achievement gap, schools focused on rote memorization and test preparation instead of teaching students how to think, problem solve, invent, and create (Darling-Hammond, 2010; Gallup, 2019; Wagner, 2012).

Complicating the lack of creativity and innovation is the persistent inequities that plague our public schools, resulting in the assiduous failure to educate students of color and those experiencing poverty to the same level as their White, some Asian, and non-poor counterparts (Darling-Hammond, 2010; Howard & Gay, 2019; Noguera, 2008; Payne, 2008). These long-standing inequities led researchers to offer a new vision for education wherein educators shift from teaching to the test to teaching for innovation.

Learning organizations today must challenge the antiquated curriculum of K-12 public education and work tirelessly to achieve the "elusive goal of equity" by providing all students with a rigorous, high-quality learning experience that focuses on preparing the workforce "to solve complex prob - lems, to collaborate, and to innovate" (Garza, 2020, p. 1).

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The World Bank estimates one billion young people will enter the job market in the next decade but only 40% will find jobs that currently exist, an urgent shift in education is needed to foster job creation and the corresponding skills of innovation and entrepreneurship (U.S. Dept. of Labor, 2020; World Bank, 2015; Zhao, 2012).

HOW THE UNIVERSITY OF STANFORD MOVED FROM THE GENERAL PROPOSITION TO OFFER STUDENTS A COURSE OF STUDY THAT WAS INNOVATIVE:

1 **Engage students in the search for knowledge**

and the excitement of that search from the moment they arrived on campus.

2 **Provide many more opportunities for students to work with faculty in small-group settings**

that would allow faculty members to share their intellectual passions.

3 **Enable undergraduate students to be able to take advantage of Stanford's preeminence as a research institution**

by becoming involved in the search for new knowledge.

4 **Broaden the range of intellectual pursuits they offered students**

to help them find their interests and let them experience different ways to learn.

> "The illiterate of the 21st century, will not be those who cannot read and write, but those who cannot learn, unlearn and relearn."

ALVIN TOFFLER
American writer, futurist, and businessman

Sourced from Embracing the Need to 'Learn and Relearn'
https://stanfordmag.org/contents/embracing-the-need-to-learn-and-relearn

The Aspen Institute Youth Entrepreneurship Strategy Group (2008) described what is missing in public education as the "entrepreneurial mind - set – a critical mix of success-oriented attitudes of initiative, intelligent risk-taking, collaboration, and opportunity recognition" (p. 5). Researchers at elite universities, such as Stanford, stressed the importance of "embracing the need to 'learn and relearn'" to be prepared for the 21st century (Hennessy, 2002, p. 1). Notwithstanding this call to change the typical curriculum utilized by schools does not yield the desired results.

Teaching critical thinking and innovation rarely occur and some even argue that it is a "luxury good" with only 1 in 10 educators teaching these vital skills.

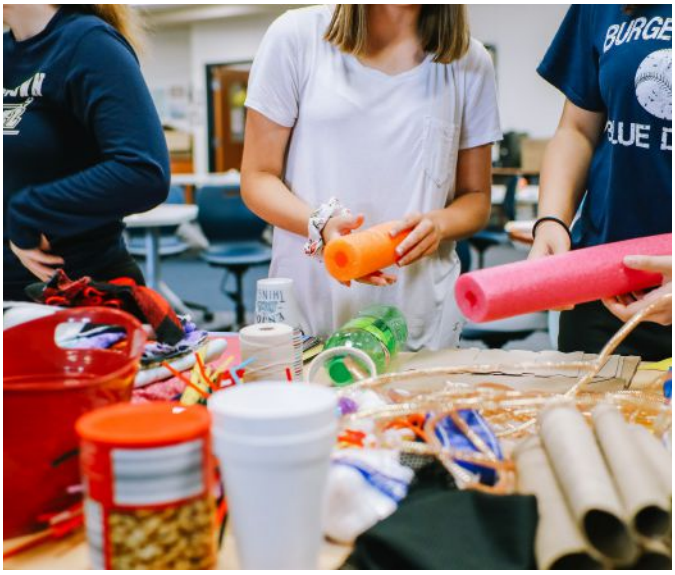
These skills are only taught at select schools or to a select segment of the student population, leading to even greater inequity in our schools (Seale, 2020; TNTP, 2018). In fact, Harvard educator Tony Wagner (2012) argues that "our country has produced innovators more by accident than by design.

Rarely do entrepreneurs or innovators talk about how their schooling or their places of work—or even their parents—developed their talents or encouraged their aspirations" (p. 22). This leads one to wonder, what would school look like if it were designed to nurture creativity, innovation, collaboration, autonomy, and persistence?

Research suggests positive results when a shift away from the typical standards-based instruction is made to one focused on innovation and creativity. Instead of preparing students for standardized tests by following lock-step pacing guides and standardized curricula, schools teach students how to identify problems, understand and harness the entrepreneurial spirit and creative thinking by fostering the critical skills of autonomy, leadership and collaboration (Darling-Hammond, 2010; Wagner & Dintersmith, 2016; Zhao, 2012). The results are promising, schools engaged in this type of work improve student outcomes with deeper engagement and increased motivation. Successful schools achieve this shift by focusing on a well-structured design that attends to students' social, emotional and academic needs (Hernández, Darling-Hammond, Adams, & Bradley, 2019). These schools prove effective by building strong partnerships within their school community, supporting teachers and school leaders with strong professional learning systems, and continuing to improve their designs to ensure improvement and equitable student outcomes.

Improving Student Outcomes through Design Thinking and Inquiry-Based Learning

This frustration with America's standards-obsessed schools and high stakes testing led some researchers to declare a "creativity crisis" and encourage schools to adopt an inquiry-based, student-centered approach to learning (Kim, 2011; Buchanan, Harlan, Bruce & Edwards, 2016).
One particular approach was to incorporate design thinking into K-12 settings and institutions of higher education, such as Stanford's Hasso Plattner Institute of Design, also known as the d.school (Diefenthaler, Moorhead, Speicher, Bear & Cerminaro, 2017).



Moreover, design thinking models are gaining in popularity in countries such as Australia and Singapore (Australian Curriculum, 2016; Koh, Chai, Wong & Hong, 2015). By incorporating innovation and creative skills into the curriculum, design thinking can be infused across subject matters and is found to be particularly useful in solving "wicked" problems (Goldman & Kabayadondo, 2017). When connecting the design thinking process with Carol Dweck's (2006) concept of growth mindset (the belief that intelligence can be developed), some researchers argue that design thinking and using one's creative abilities can lead to a more human-centered and personalized approach to learning, leading to greater skills in collaboration, problem-solving, and critical thinking (Diefenthaler, et al., 2017).

Another popular inquiry-based approach is problem-based learning ("PBL") and project-based learning ("PjBL"), which can be utilized across subject matters to deeply engage students and spark their out of the box thinking. This type of learning, praised by Michael Fullan and Maria Langworthy (2013) who argue that new pedagogical frames must be focused on deep learning, develops essential skills such as: character education, citizenship, communication, critical thinking and problem solving, collaboration, and creativity and imagination. Research shows that schools that focus on inquiry-based learning strategies utilized in PBL and PjBL improve student engagement and academic achievement (Buchanan, Harlan, Bruce & Edwards, 2016; Dole, Bloom, Doss, 2017). Specifically, this student-centered approach leverages student motivation and autonomy, as well as connects students' learning to the real world, which improves student engagement and better prepares students for today's challenges. Research further finds that this approach can raise student achievement in social studies for high-poverty communities by strengthening informational reading skills (Duke, Halvorsen, Strachan, Kim & Konstantopoulos, 2020).

While we are still realizing the academic achievement effects of adopting an inquiry-based learning approach, the failure to implement these strategies are dire (Wagner, 2012; Zhao, 2012). The world needs leaders and innovators who will use creativity to solve entrenched "wicked" problems and rise to the demands of our global businesses and industries. As educators, we need to allow students to find their passion, follow their interests, practice more autonomy, and design their own learning. If we can make this switch in the design of our curricula, our children can become more like Martin Luther King, Nelson Mandela, Steve Jobs, Thomas Edison, Ruth Bader Ginsburg, and Mahatma Gandhi—inventors and social disruptors who created new solutions and inspired others to innovate and collaborate to change the world.

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