



HOW TO ENCOURAGE AN INNOVATIVE MINDSET

While educators share the common goal of preparing their students to become innovative members of our increasingly complex society, achieving this can be difficult.

Incorporating technology into the classroom, once seen as a way to both simplify a teacher's life and universally improve learning outcomes, has at times produced the opposite effect. In fact, research from the Organization for Economic Cooperation and Development (OECD) found that an "overexposure to computers and the internet causes educational outcomes to drop."¹

Districts that simply purchase new technology and expect increased student performance have been left disappointed. "If you give kids a tool and don't show them how to effectively use it, then it's not going to make much of a difference," Lan Neugent, Interim Executive Director of the State Educational Technology Directors Association, said in response to the OECD findings. "Why would people think that just putting a computer in front of a kid is going to change that?"²

Investing a vast amount of capital to improve educational outcomes also has been unsuccessful. Despite over \$1.5 billion in investment from the U.S. Department of Education to fund innovative education nationwide, a 2018 federal report found that only 18% of those programs actually improved student achievement.³

The situation is even more troubling considering that countries around the world continue to outperform the United States while allocating far less money toward education.⁴ In fact, the most recent Programme for International Student Assessment (PISA) rankings place the United States 36th in mathematics and 13th in reading proficiency scores out of 79 countries and regions worldwide. Since this global proficiency test was first administered in 2000, scores for the United States have flatlined.

It has become increasingly clear that as a nation, we cannot simply spend our way to improved student outcomes. Similarly, while including technology in the classroom can be an effective way to boost engagement,⁵ this alone will not guarantee student success. Instead, research suggests that educators and policymakers alike should focus on leading students to develop an innovative mindset – fostering an outlook that is curious and embraces challenging situations.

DEVELOPING AN INNOVATIVE MINDSET

Lasting change begins with a shift in mindset. It was with this crucial insight that Stanford psychologist Carol Dweck began exploring the effects of how we view ourselves and our personalities. In her groundbreaking book, "Mindset: The New Psychology of Success," she identifies two distinct modes of thinking.



Two Camp Invention® participants sketch a design of their invention.

FIXED MINDSET:

The belief that one's abilities are static and cannot change in any significant way. Success is simply a reflection of inborn traits, and avoiding failure becomes a way of maintaining the perception of competence.

GROWTH MINDSET:

The belief that improvement is possible through hard work and perseverance. Failure is not a reflection of inadequacy, but rather an opportunity for growth and development.⁶

1. Kesling, B. (2015, September 15). Technology in Classrooms Doesn't Always Boost Education Results, OECD Says. Retrieved from <https://www.wsj.com/articles/technology-in-classrooms-doesnt-always-boost-education-results-oecd-says-1442343420>

2. Ibid

3. Barshay, J. (2018, December 17). The 'dirty secret' about educational innovation. Retrieved from <https://hechingerreport.org/the-dirty-secret-about-educational-innovation/>

4. Barshay, J. (2019, December 16). What 2018 PISA international rankings tell us about U.S. schools. Retrieved from <https://hechingerreport.org/what-2018-pisa-international-rankings-tell-us-about-u-s-schools/>

5. Use of Technology in Teaching and Learning. Retrieved from <https://www.ed.gov/oii-news/use-technology-teaching-and-learning>

6. Popova, M. (2018, September 23). Fixed vs. Growth: The Two Basic Mindsets That Shape Our Lives. Retrieved from <https://www.brainpickings.org/2014/01/29/carol-dweck-mindset/>

Supported by two decades of research, in “Mindset” Dweck explains that the mindset a person adopts for themselves can have a profound impact on their everyday lives, especially when it comes to confronting hardship.

For example, if someone with a fixed mindset attempts a challenge but falls short of succeeding, they are likely to respond negatively and take the setback personally. In this scenario, rarely will the person take the opportunity to learn from the failure; instead, they will resign themselves to the outcome and try to find other ways in which they can prove themselves.

In contrast, an individual who possesses a growth mindset will likely respond to the same setback as a chance to learn and get better. Because the pressure to constantly prove themselves is gone, they develop a fundamentally different worldview. As Dweck explains in her book,

“There’s another mindset in which these traits are not simply a hand you’re dealt and have to live with, always trying to convince yourself and others that you have a royal flush when you’re secretly worried it’s a pair of tens. In this mindset, the hand you’re dealt is just the starting point for development. This growth mindset is based on the belief that your basic qualities are things you can cultivate through your efforts. Although people may differ in every which way – in their initial talents and aptitudes, interests, or temperaments – everyone can change and grow through application and experience.”⁷

Because today’s students will likely find work in jobs that do not yet exist and will confront challenges that have not yet arisen, it’s clear that having a growth mindset is crucial. What then can both teachers and parents do to foster this type of outlook? Perhaps surprisingly, praising positive outcomes is not the answer.

THE PARADOX OF PRAISE

While praising a child for a good grade or positive outcome might seem like the best way to boost their self-esteem, Dweck warns that this can contribute to a fixed mindset within the child. Additionally, it is similarly unproductive to simply praise the effort a child invests in what they’re doing. Instead, in an interview with The Atlantic, Dweck recommends that adults are more selective, and praise effort only when there is purpose and strategy behind it.⁸

This technique can prove difficult for parents and educators who seek to help the children in their care feel confident about themselves. Again, the natural reaction to a student who performs poorly on a project or assessment might be to remind them that they are good at other subjects. However, this has the potential to reinforce the idea in a student’s mind that their abilities in a challenging area are fixed.

Dweck suggests that parents instead reframe the “failure” as an opportunity to improve:

“If the parent reacts to a child’s failure as though it’s something that enhances learning, asking, ‘Okay, what is this teaching us? Where should we go next? Should we talk to the teacher about how we can learn this better?’ that child comes to understand that abilities can be developed.”⁹



National Inventors Hall of Fame® Inductee Sumita Mitra visits with young innovators at Camp Invention.

7. Dweck, C. S. (2017). Mindset (Pg. 6-7). London: Robinson

8. Gross-Loh, C. (2016, December 16). Don't Let Praise Become a Consolation Prize. Retrieved from <https://www.theatlantic.com/education/archive/2016/12/how-praise-became-a-consolation-prize/510845/>

9. Ibid

Research from psychologist Eddie Brummelman, the Marie Skłodowska-Curie Fellow at the University of Amsterdam, supports Dweck's advice. According to a recent study conducted by Brummelman and his colleagues, parents who gave "inflated praise" to children with lower self-esteem levels reduced their self-esteem even further. Though this appears paradoxical, Brummelman argues that "non-inflated praise" can better establish realistic standards that actually boost levels of self-esteem.¹⁰

INNOVATING IN THE CLASSROOM

In order to best prepare students for an unknown future, we must continue to evolve our approach to education. No longer are passive learning techniques sufficient. Instead, educators should encourage students to actively uncover different ways to solve a problem. Similarly, if a question can be easily answered, then perhaps it could be more beneficial to introduce a more complex one, and trust that a student's natural curiosity will lead them to exciting and unexpected answers.

In an article for Edutopia, Alyssa Tormala, vice principal of professional development and innovation at Jesuit High School in Portland, Oregon, recommends that in order for educators to become more innovative, they should seek "respected leaders or colleagues for direction," and that "those individuals must be willing to visibly engage in the innovation cycle when no one else will."¹¹

This is sound advice and is a strategy the National Inventors Hall of Fame® has been using throughout its education programs since 1990. As a way of honoring the world's most revolutionary innovators, the Hall of Fame develops all its STEM (science, technology, engineering and mathematics) curricula using lessons inspired by Inductees' lives and inventions, sharing their stories with students and educators alike. Because children are more likely to innovate if exposed to inventors and invention from a young age, the sooner we can introduce students to an innovative role model, the sooner they can begin developing their innovative mindset.



National Inventors Hall of Fame Inductee Jacqueline Quinn interacts with instructors at Camp Invention.

10. Brummelman, E. (2018, June 3). The Praise Paradox. Retrieved from <https://behavioralscientist.org/the-praise-paradox/>

11. Tormala, A. (2016, October 24). Discomfort, Growth, and Innovation. Retrieved from <https://www.edutopia.org/blog/discomfort-growth-and-innovation-alyssa-tormala>