

# STEMpath Calls an Educator Back to Teaching; Students “come alive” in STEM Lab and Maker Space

## INTRODUCTION

After almost a decade, Anna Kwan stopped teaching. She left the Denver Public Schools District (DPS), gave all her teaching materials away, and let the teaching license she'd worked so hard for expire. She took a job traveling across the globe, but it didn't last. She missed her students and the classroom.

This case study details Anna's journey back to teaching. It describes how MindSpark Learning's STEMpath program brought her back to the classroom, how the Couragion platform transformed the school where Anna teaches, Crawford Elementary School -- and its students.

## CHOOSING STEMPATH

In May 2018 Anna read an article that changed everything for her. It would subsequently change the lives of many students, too. The article called on educators to fill a growing gap in the education landscape, pointing out the need for qualified Computer Science (CS) educators. The way to achieve that goal? STEMpath. MindSpark developed STEMpath 5 years ago to address this need for qualified CS educators by upskilling educators and filling schools with qualified CS teachers. Anna signed up to be part of the inaugural 2019 STEMpath cohort, and this once-in-a-lifetime decision led to her exponential growth as an educator.



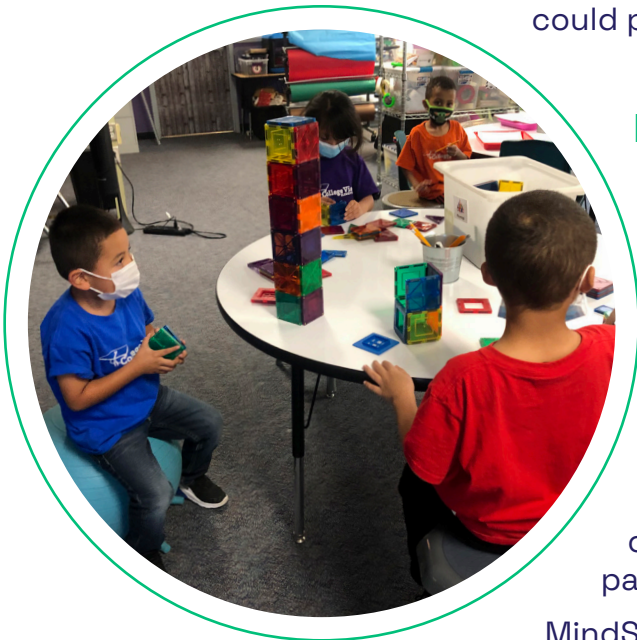
## ANNA'S STEMPATH JOURNEY

STEMpath is a year-long program, with one of its most important and effective elements being the externship. These externships provide real-world experiences of the problems students will solve in the workplace, and a demonstration of what skills they'll need to succeed. Anna's externship was at Angi.com, a digital marketplace that connects homeowners with local service professionals.

STEMpath bridges industry and education, but Anna took it a step further. Through the connections she built due to her externship, Anna hosted industry professional guest speakers in her classroom, to motivate and inspire her students.

Each time I shadowed someone [new], I asked myself, "How do I bring this experience back to my students?" and "What skills will they need to learn for this job?" I saw examples of the employability skills every day in real-world situations. - Anna Kwan, STEMpath Alum

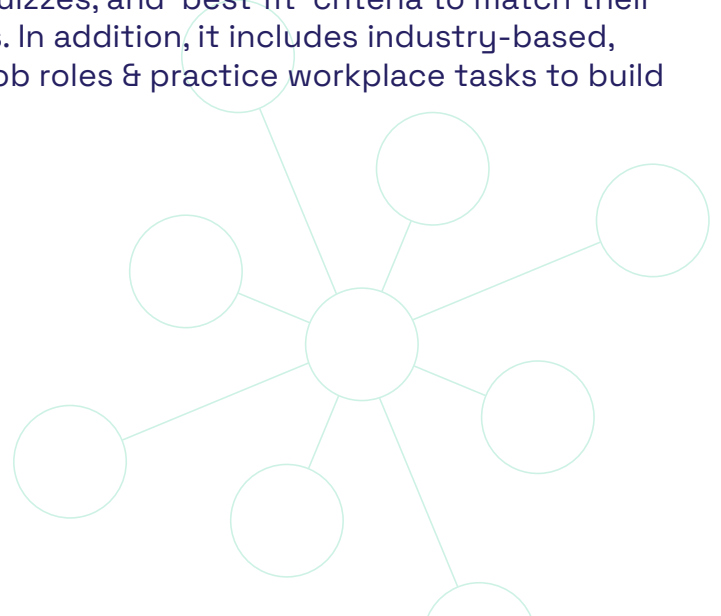
By bringing ideas from her time in STEMpath to her students, Anna them meaningful experiences, and it changed how they saw STEM, including how it could play a role in their lives.



## MAPPING STEMPATH: FOUNDATIONS, PURPOSE FOR STEM, CS EDUCATION

A K-12 STEM education is essential in meeting the modern workforce's needs and broadening access to, opportunities in, and participation in STEM fields. This positively influences students' decisions to choose one of these areas to study in the long term and/or choose a career in STEM. Achievement in all STEM (science, technology, engineering, and mathematics) areas...are the building blocks of technological innovation, economic growth, civic participation, national security, and quality of life (1).

MindSpark's Couragion platform provides STEM career literacy & workforce development solutions for educators, students, and advocates. Couragion is aligned to labor market needs & core academic and industry standards. It includes Quests which expose students to STEM-related careers via videos of diverse role models, self-reflection quizzes, and 'best fit' criteria to match their values, interests, and desired work characteristics. In addition, it includes industry-based, real-world Challenges in which students assume job roles & practice workplace tasks to build occupational and essential skills.



In a 5-year study which concluded in May 2020, K-12 students (63.7% students of color, 46.5% female) achieved the following after exposure to career literacy via Career Quests:

- 91% agreed that Couragion provided them with new career info
- 85% found one or more best fit careers
- 46% were more confident in their ability to pursue STEM careers
- 47% planned to sign up for a new STEM class or activity
- Student intention to pursue STEM careers increased by 6 to 19%
- (Student App Outcomes Data, Couragion, 2020)

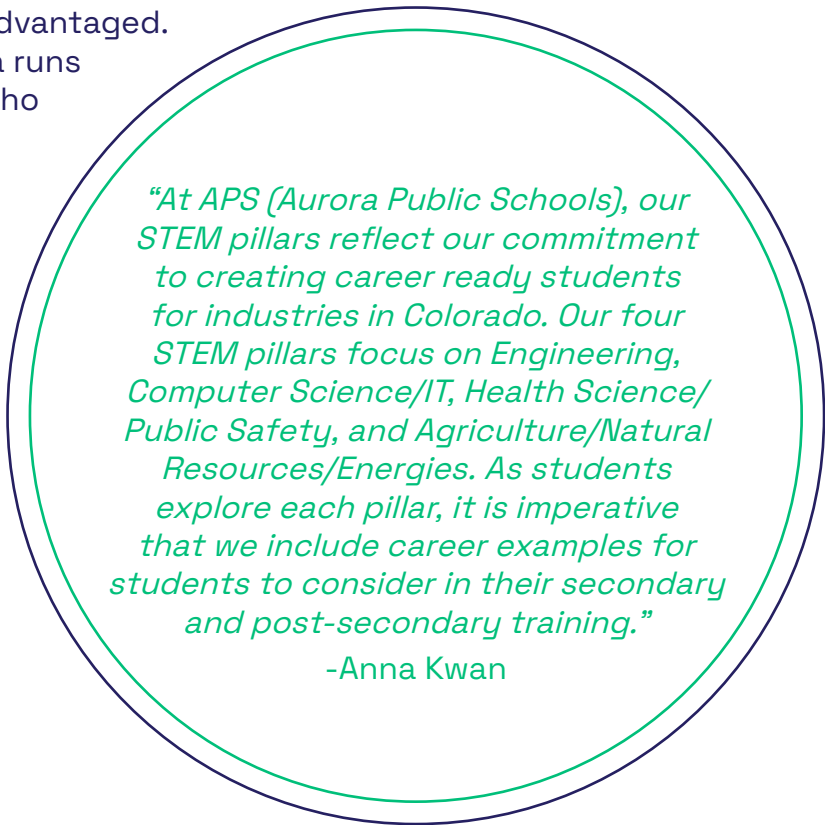
## IMPACT AND TRANSFORMATION AT CRAWFORD ELEMENTARY SCHOOL

Fortunately for Anna, her students, and the wider school community, STEMpath continued to have a positive impact and initiate change. After 3 years of hard work and determination, Anna's ideas finally became reality in the form of a maker space and STEM lab, which transformed Crawford Elementary and the student learning experience. This lab and maker space gave students the opportunity to explore, iterate, and be creative and collaborative.

STEMpath empowered Anna to go beyond just having a vision, giving her the confidence to ask for resources and support to make that vision a reality. Anna advocated for a shift at her school and got both the administration and school district to support her. What convinced them? They saw how 'alive' the students became whenever they entered a space where grades didn't matter, where standardized testing didn't exist and where they could experiment, fail, and try again. Research has shown that elementary students form occupational identities at a young age (Berwick, 2019), and this maker space inspires Anna's students to see possibilities in STEM careers.

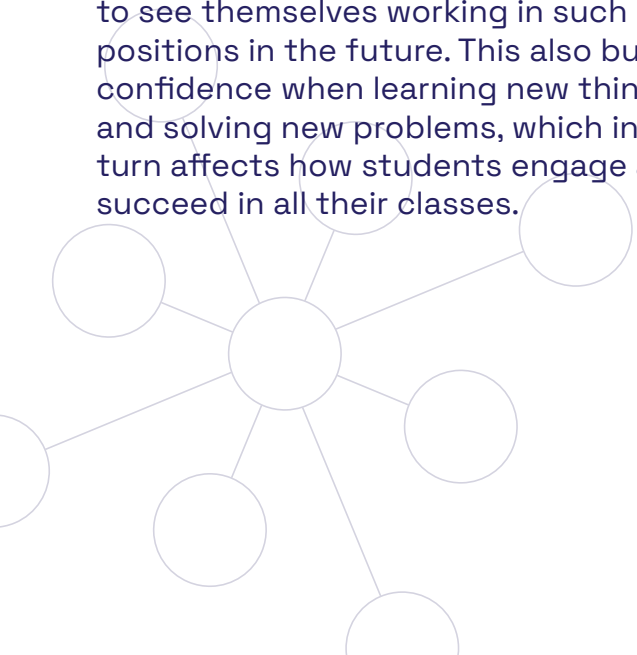
This gives students access to career-relevant skills and knowledge that they might never have had before. Crawford Elementary School is a PK-5 public school located in a large city that caters to a population whose student enrollment is 97% minority, and 94% economically disadvantaged.

A space such as the STEM lab which Anna runs at Crawford, therefore, allows students who are underrepresented in STEM-related career paths, to get exposure to STEM-related work from an early age and to see themselves working in such positions in the future. This also builds confidence when learning new things and solving new problems, which in turn affects how students engage and succeed in all their classes.



*"At APS (Aurora Public Schools), our STEM pillars reflect our commitment to creating career ready students for industries in Colorado. Our four STEM pillars focus on Engineering, Computer Science/IT, Health Science/Public Safety, and Agriculture/Natural Resources/Energies. As students explore each pillar, it is imperative that we include career examples for students to consider in their secondary and post-secondary training."*

-Anna Kwan



The STEM Lab also gave Anna’s students the chance to use Couragion. Couragion creates personalized pathways to trigger new content and programming for students which drives them to seek new skills, work-based learning activities, and volunteer and extracurricular experiences to support their continued exploration. Pathway progression is a measure of the desire to pursue new STEM experiences. For example, in a Title I school that is 96% ethnically diverse, 83% of students of color were motivated to register for a new STEM class or activity (Broader Impact, Couragion, 2019).

By using Couragion in classrooms, educators give their students the ability not only to see how they can thrive in careers that they might not have thought of pursuing, but also to understand the relevance of what they are learning and begin to imagine how they can use the knowledge and skills in their daily lives.

*“We have found Couragion to be an extensive tool that allows students to explore various career pathways within all four pillars. Each career pathway showcased interviews with industry experts regarding their jobs on both a micro and macro level. This included a broad overview of what they do, some day-to-day tidbits about their jobs, and some specifics on what kind of education and training they will need to pursue such careers. Students enjoyed the freedom and flexibility in exploring jobs that interested them and trying out aspects of each career through the interactive quests.”*

-Anna Kwan

## CONCLUSION

83% of STEMpath alumni expressed “strong” confidence in an ability to teach CS, and in certain instances, these educators have received promotions and/or a raise. To date, 19,000 students have been positively impacted by STEMpath-trained educators - students like those in Anna’s STEM lab, who are benefitting from a quality CS education and are even more encouraged to enter the STEM workforce.

This is the work that STEMpath, alongside Couragion sets out to do – empower educators who will in turn equip their students with the skills and tools to solve real-world problems and enter the workforce with all the relevant skills that a CS and STEM education provides. By combining information science, work-based learning through industry externships, and professional learning focused on career literacy and equity-centered design thinking, STEMpath is a one-of-its-kind program that not only benefits educators, but students as well.

