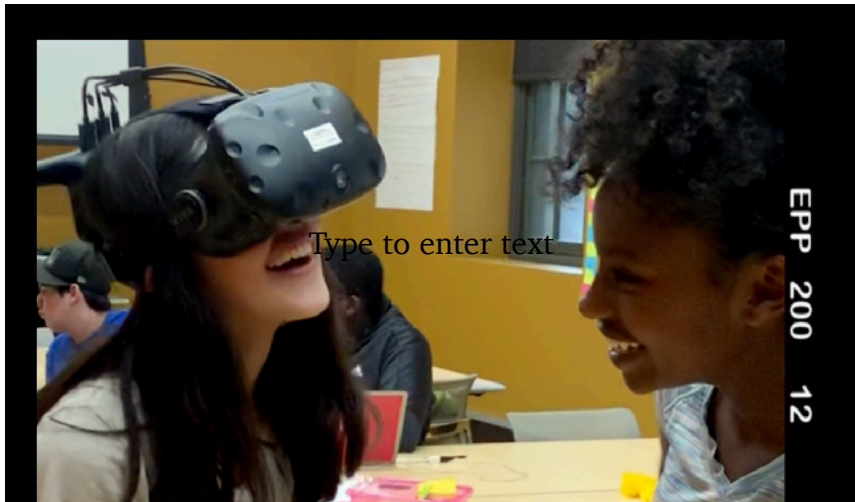


Executive Summary

STEAM Initiative Habits of Mind Study



Overview

Youth in Cambridge, MA live alongside one of the most dynamic regions in the world for cutting-edge biotechnology, science, arts and academia. Yet, Cambridge students are not typically on an academic and workforce pathway for jobs in the local industry. Barriers in access and opportunity persist. The Cambridge STEAM (Science, Technology, Engineering, Arts, Math) Initiative believes that habits of thinking and learning lead to career pathways and preparedness for life. The Initiative identified six *STEAM Habits of Mind* that are critical to developing this readiness, and in Spring 2021, launched a study to explore the development of these habits in classrooms and youth programs. This study offers a way to amplify existing efforts to create STEAM-minded students, who are prepared and ready to engage in our technology-focused society, and be visionaries for the future. The strategies and recommendations here emerged from our study.

Research Design

Initial research was conducted via zoom interviews from March-June, 2021. We incorporated data from eleven interviews with teachers, program leaders and innovators working with middle and high school youth in Cambridge, MA.

“It’s always trial and error for the young people.” And when they do get it, “it’s just like lightning.”

KEY RECOMMENDATIONS



Expand Representation

Students learn to engage from what they know and who they are. Connect students to others like them who can guide and inspire.



Expand Investment

Habits take time to build. Increase and nurture human and financial resources to support programs, organizations, and partnerships for the short and long-term.



Codify Best Practice

Excellent practice with youth cannot be taken for granted. It needs to be supported, protected and projected within the field and beyond.

“Everything we do...we want them to build some form of it beforehand so they can...visualize it, before they bring it to life.”

Habits of Mind

In the study, three of the six STEAM habits of mind were mentioned most often, listed below along with common strategies:

1. ENGAGE AND PERSIST

Staff create intentional environments for youth to develop curiosity and thinking skills by using inquiry, reflection and feedback. Collaboration is nurtured by focusing on goals and making time to work through conflict. Staff expect to hear multiple perspectives and see many attempts on the way to an end product.

2. STRETCH AND EXPLORE

Programs invite youth to jump right in - to get started right away on their ideas, pausing for cycles of reflection. Youth are expected to tinker and test their projects, and then learn from reflecting on their own mistakes and their peers’.

3. DEVELOPING CRAFT

Youth have time to explore, create, present and continue to iterate. Projects are set in real-world environments, and youth are connected to peer



mentors, college students, and professionals in STEAM fields who share similar backgrounds and life experience. Youth learn how choices are made to complete and present a project or pursue a STEAM pathway.

Engagement, Identity & Self-efficacy

We also examined program practices that encourage engagement, identity development and the building of skills towards youth independence and self-efficacy. Across our interviews, programs described how staff facilitate youth in discussions about current events, and how youth make connections between themselves, their work and each other. Students are given time and space to think and make meaning about who they are and their contributions to their community and to the world.

CONCLUSION

The STEAM Habits of Mind study revealed common approaches to engaging youth across very different learning environments. Young people are learning about ancient cultures, building leadership identities, finding new planets, mimicking rocket launches, making solar ovens, mentoring younger peers and innovating new pathways between elected officials, educators, youth and the corporate community in Cambridge. These programs are developing youth who are self-aware, collaborative, and able to understand and address challenges. By learning STEAM habits in their school classrooms and community programs, Cambridge youth can be prepared to not only enter work and higher education, but they will have the skills and confidence to tackle some of the most pressing challenges facing their communities.

