

Equity in K-12 STEAM Education

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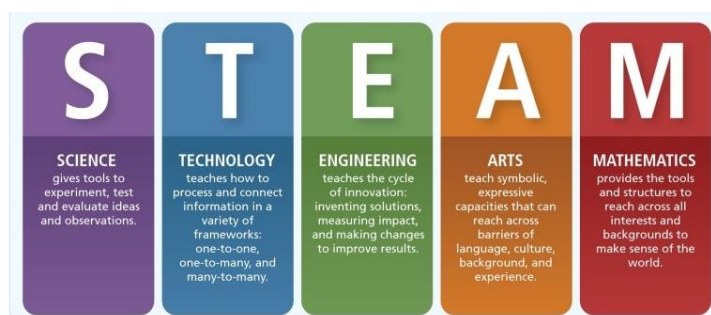
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Abstract

Access to K-12 STEAM (science, technology, engineering, arts and mathematics) is must needed by all students, yet it is still remains out of reach at many schools. STEAM education encourages discussion and problem solving in students. It develops both practical skills and encourage collaborations. STEAM integrates all five disciplines into a cohesive learning paradigm based on real-world applications. In these changes and complex world, out school going students must be trained to make sense of information, gathering and evaluating evidences for decision making, and to bring knowledge and skills to solve problems. To achieve this, it is important that issues like equity, accessibility, and inclusivity should be at the top of mind for educators in STEAM fields. The inequities, if exist in STEAM education, can impact diversity in STEAM careers. A lack of comprehensive STEAM curriculum can limit future career options for students. This article highlights the status and importance of Equity in K-12 STEM Education.



Keywords: STEAM, equity, accessibility, 21st century skills

Introduction

Governments and Boards worldwide putting their efforts in promoting STEAM Education and have launched various campaigns to motivate and inspire teachers and students for STEM education. STEAM education is crucial to meet the needs of a changing world. It not only fosters

creativity and critical thinking, but also encourage students to think critically in solving their problems by developing skills they need to thrive in rapidly changing world. The use of AI in education is day by day increasing and STEAM education is also not far away from the use of Artificial Intelligence. An AI driven education brings potential benefits and challenge for the students because it impacts how they learn, think and apply the information gathered by using AI in their learning and decision making. Excessive use of AI might create dependency and impact adversely in developing 21st century skills [1]. Accessibility, and equity in STEAM education is must require for developing a competent youth population for each country. All stakeholders at all levels of the education system should see themselves as decision-makers who can increase equity in STEAM education and should promote equity in STEAM Education.

Why STEAM Education

The demand of STEAM professionals will continue to grow, so the lack of equity in STEAM education can impact the workforce, and economy negatively. As per a report, millions of jobs are projected to go unified in the near future in STEAM [2]. Here is a list of STEAM statistics:

1. STEAM jobs are projected to grow 8.8%
2. Software development employment is projected to grow 22%
3. A computer science major can earn 40% more than the college average.
4. STEM occupations are projected to grow 10.8% between 2021-2031.
5. **In the next 10 years, it's estimated that there will be over 821,300 STEM job openings.**
6. Evidence suggests that by participating in STEM summer programs, underrepresented communities of students are more likely to graduate from high school, attend four-year colleges, and earn STEM degrees.

So, introducing STEAM at the early stage of school education will definitely close the opportunity gap and will provide a sustained STEAM learning.

Why Equity Matters in STEM Education

There are many students, families and educators who don't receive the holistic support in STEAM education. At many stages, students don't have the foundation comprehension in STEAM, minimal or no exposure to STEAM education, particularly in their early education, it might permanently exclude them from STEAM education. STEAM has become an integral part of day-to-day life; from the technology we interact with to the jobs we apply to. Inequity in STEAM

typically affects the most at-risk students and can set them behind for the rest of their lives. If students see themselves as excluded from or bad at STEAM subjects at an early age, they may cement that belief in their plans for the future, avoiding potential careers that involve studying or engaging with STEAM.

Why does equity in STEAM education even matter?

If STEAM opportunity gap exists at any level, it makes hard for students to catch up it, and, once they are left behind, they're less likely to embrace STEAM and pursue careers in related industries. So, we can encourage STEAM education by providing students of all backgrounds and abilities, an equal opportunity to learn STEAM, by doing so, we can nurture a next generation of successful professionals, bold thinkers, and passionate leaders [3]. Benefits of equity in STEAM education include:

1. By establishing STEAM literacy and identity at a young age, students will be more empowered as they grow up that will address the cultural issues.
2. When students from diverse backgrounds establish a love of STEAM, they may eventually pursue a career in STEAM, which can close the critical gaps in representation in those fields and enhance diversity in STEAM education.
3. If students are left behind due to their race, gender, or other identity, they will be unlikely to succeed in STEAM careers, and those fields will miss out on potential talent. By STEAM equity we can attract top talent.

By providing high-quality STEAM education early and consistently, educators can disrupt the pattern of educational inequity. This equitable education increases STEAM literacy and builds STEAM identity to underserved students.

How to Achieve Equity in STEAM Education

STEAM education has the power to shape the future, driving innovation, scientific advancements, and technological breakthroughs. But it has been plagued by a persistent equity gap, due to certain barriers that limit their access and participation. Such disparities are not only detrimental to individual students but also to society as a whole, which keeps untapped potential unexplored. Some barriers are:

- Socioeconomic barriers especially for the students belonging to low economic status.

- Gender Stereotypes that STEAM fields are male-dominated can discourage females from pursuing these subjects.
- Students from racial and ethnic minorities often face systemic barriers that limit their engagement in STEAM.
- A lack of diverse role models in STEAM fields can hinder students' aspirations.
- Students with learning disabilities or English language learners may not receive the necessary accommodations and support.

So, providing access to STEAM education and promoting equity is very important. To create an inclusive STEAM environment, it requires intentional efforts from school leaders [4].

- Ensure adequate support and cultivate a growth mindset for students, teachers, workers, and communities to participate in and contribute to STEAM in their lifetimes
- Offer Professional Development to address STEAM teacher shortage with diverse teacher pipeline. It will diversify the STEAM role models.
- Provide access to technology and close the funding gap and develop long-term investment plans for historically underfunded communities.
- Implement inclusive curriculum and address implicit biases. Create solutions to address bias, discrimination, and harassment in classrooms, labs, and workplaces
- Establish mentorship program and promote accountability in STEAM education.

Equity in STEAM education is not merely an aspiration, but it is a moral imperative also. Working on mitigating the barriers and fostering inclusivity, we can unleash the full potential of all students, regardless of their background. It is mental detox to the students who are suffering from lack of resources and feeling stressed due to negative thoughts coming from their racial, economical or other disparities [5]. Fostering their true potential and making to feel confident will contribute to economy of the country.

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About Author:

Dr Simran Mehta is currently working in ICERT and managing the Account and Finance Division as Director and Head, and also leading the Core Committee ICERT as Chief Executive Officer. She has over 11 year's professional experience in school teaching, higher education and leadership. During this time, she has gained extensive experience in teaching, team motivation, inspiring young minds, material development and curriculum development. She has completed masters from Maharishi Dayanand University. Under her dynamic leadership the ICERT family is working with enjoying the work culture. She is a passionate & enthusiastic lady. Being a keen learning attitude, she has attended more than 50 National & International seminars/conferences/webinars. As an innovator, his academic interest lies in education, human resource management, team development and finance management. She strongly believes in self-learning habits and continuously strive to add more as per contemporary challenges. She is connected with various organizations and also worked as an honorable member in various NGO, Social and educational organizations. She has been honored & awarded with Nari Asmita Award, Education Expo Best Principal Award, Guru Samman Award, Global Excellence Award in Education, Teacher Innovation Award, CV Raman Award, Best Principal Award etc.

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Dr Sandeep Kumar have more than one decade experience in teaching, research, curriculum development, counselling and leadership. His areas of interest are chemical education, research, behavioural science, teacher education and practices. As resource person, he has conducted more than 225 training programs for the school and higher education teachers. He has been awarded with numerous prestigious National and International Awards. He has participated and presented research articles in more than 200 National and International conferences. He has been invited as keynote speaker, guest of honour, conference chair, and resources person in various National and International Conferences. He is associated with various National and International Organizations.