The Importance of Science and Math Literacy: Empowering Your Child's Future

Alexandra Baldaque, baldaque@upt.pt
Paula Morais, pmorais@upt.pt

Abstract:

There is a recognized shortage of science, technology, engineering, and mathematics (STEM) professionals in many countries. The demand for individuals with expertise in STEM often outpaces the available supply. Therefore, education reforms and policies across Europe should focus on curricula, innovations and new teaching methods aimed at enhancing digital competences, critical and analytical thinking and problem solving.
STEM education is gaining wide attention among different stakeholders, and it is also important the parents involvement. This can be done by exposing their children to STEM education and experiences from a young age and provide support and encouragement along the way. This can include participating in STEM-related activities, like visiting science museums, and providing access to educational resources. This article presents some reasons why parents should engage and encourage their children to consider careers in STEM, particularly in the areas of science and mathematics, and how they can do it.

Keywords: Science literacy; Math literacy; STEM education; parents' involvement; STEM professional shortage

Introduction

The European Skills Agenda[1] includes 12 actions organised in 4 building blocks, among which is "increasing STEM (science, technology, engineering, and mathematics) graduates and fostering entrepreneurial and transversal skills". According to that agenda, only "one in five young people graduates from STEM in tertiary education" and only half as many women as man.
STEM alone misses some key components critical for children to thrive in the present and rapidly approaching future. According to a recent article published in the European School Education Platform (European School Education Platform, 2022), "STEAM is an integrated approach to learning that combines the arts with STEM and uses it as an access point for guiding student inquiry, creativity and problem-solving." STEAM is, therefore, an excellent vehicle to introduce the 21st skills in education (Euro STEAM, 2018).
STEAM multidisciplinary approach "promotes gender-inclusive learning by encouraging girls to explore scientific topics and making the arts more appealing to boys" (European School Education Platform, 2022).
In line with the priority in school education to promote interest and excellence in STEAM, one of educators' most important tasks is to encourage students to consider careers in STEAM.

[1] https://ec.europa.eu/social/main.jsp?catId=1223&langId=en

This article describes some of the main advantages and problems in STEAM education and presents some ideas how parents can engage and encourage their children to consider careers in these fields.

Why science and maths literacy matters

In a future that heavily relies on scientific and technological advancements, STEM literacy has become essential skills that can open many opportunities.

Science and math education develop critical thinking, problem solving abilities, and analytical skills. These are some of the 21st skills, considered fundamental for this century education, as figure 1, related to PISA 2022 mathematics framework shows (OECD, 2022). According to this project, technology change is also creating the need for students to understand the computational thinking concepts that are part of mathematical literacy.

Learning how to analyze information, evaluate evidence, and apply logical reasoning to find solutions to complex problems, students develop a systematic approach to understand the world around them, enabling them to make informed decisions and become active contributors to society.

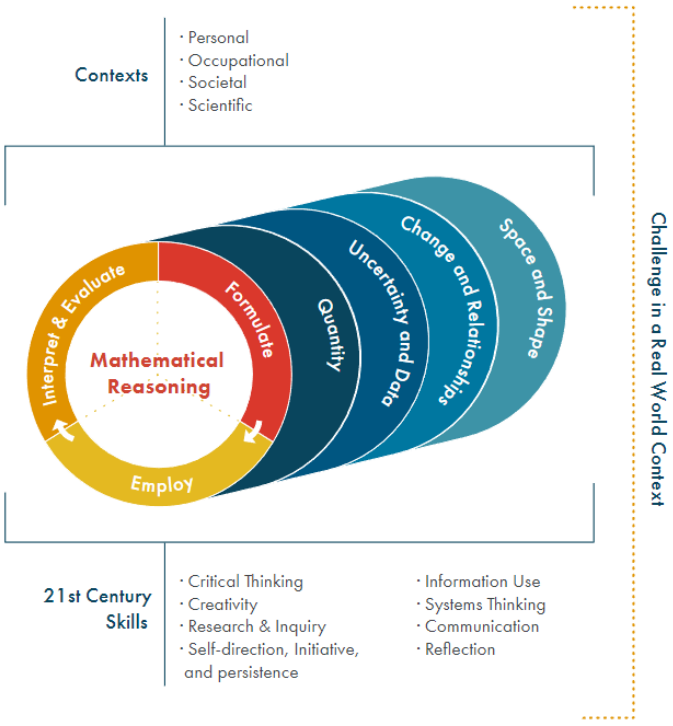

Figure 1: PISA 2022: the relationship between mathematical reasoning, the problem solving (modelling) cycle, mathematical contents, context and selected 21st century skills (Source: (OECD, 2022)

Equipping students with strong skills in science and math gives them a competitive edge in the job market and sets them up for success in their chosen

careers. These skills are essential in almost every field and play a fundamental role in various aspects of our lives, from technological advancements and innovation to healthcare, economics, and environmental sustainability to data analysis. Some concrete examples are presented below:

Computer programming, software development, artificial intelligence, and robotics, need a strong understanding of science and math to drive innovation and contribute to the rapidly evolving technological advancements.

Many of the world's most pressing challenges, such as climate change, healthcare disparities, and resource scarcity, require scientific and mathematical knowledge for effective solutions. Educated individuals in these fields can contribute to finding sustainable solutions and making informed decisions that impact society.

Science and math also have practical applications in everyday life. Understanding basic scientific principles can help individuals make informed decisions, for instance, about their health and personal finances. Additionally, math skills are necessary for managing budgets, understanding statistics, and making informed financial decisions.

Although there are so many opportunities for STEM skilled students, STEM talent is difficult to find. According to Beamer (Beamer, 2023), only in the US, as many as 3.5 million STEM-related jobs will need to be filled in by 2025.

To address the shortage of STEM professionals, efforts should be made to:

- Provide quality STEM education at all levels, from primary school to higher education.
- Encourage individuals from underrepresented groups, including women and minorities, to pursue STEM careers. The underrepresentation of women in STEM is a persistent issue that needs to be addressed. While progress has been made in recent years, there are still significant barriers that contribute to the lack of women in STEM. Gender representation in STEM differs by field. Women often outnumber men in biological fields. However, men far outnumber women in physics, computer science, and engineering (National Gographic).
- Establishing mentorship programs and providing opportunities for students to interact with STEM professionals can inspire and guide young individuals (Kupersmidt, Stelter, Garringer, & Bourgoin, 2018).
- Develop a better collaboration between academic institutions and industry practitioners to improve outcomes for industrial businesses and the schools, teachers, and students they depend on (Rhinehart, 2022). This can include internships, apprenticeships, and research partnerships that bridge the gap between theory and practice.

How parents can encourage their children to consider careers in STEM

Parents can play a crucial role in shaping children's attitudes towards science and math. By fostering a positive mindset and emphasizing the relevance of these subjects, they can inspire genuine interest and curiosity in their children. They can do it, encouraging their natural sense of wonder and exploration by incorporating fun and engaging science experiences into everyday life, showing them how science and math are integrated into their favorite activities, from everyday life to sports.

There are many different online resources, educational apps, and books that parents may refer to their children as a support to conversations about scientific and math concepts and as supplementary materials to extend their knowledge beyond the classroom.

Parents can also search for opportunities to offer hands-on experiences that promote scientific exploration and mathematical thinking: visit science museums, planetariums, and interactive exhibits. Engage in DIY (Do It Yourself.) science experiments or math-related games and puzzles. These activities make learning enjoyable and help children understand the practical applications of science and math.

Furthermore, speaking regularly with teachers, parents can stay informed about their children's progress and identify areas where additional support may be beneficial.

In some cases, parents can also lead by example and demonstrate their own interest and enthusiasm for science and math.

Conclusion

Science and math literacy are not just academic requirements; they are essential skills that shape children's future.

The goal is to make science and math engaging, relevant, and enjoyable for children, and help them understand the real-world relevance of science and math.

By fostering a positive attitude, providing support, raising awareness, and emphasizing the relevance and excitement of these subjects, parents can empower their children to thrive in a world driven by technology and innovation, where science and mathematics play an important role.

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