

C. The importance of STEM education in 21st century world

BY ALJOŠA PAŽIN

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What does STEM stand for?

Science



Systematic study of the physical world through observation and experiment

Technology



Techniques, skills, methods, and processes used in production

Engineering



Application of scientific knowledge and mathematical methods for practical purposes

Mathematics



Science studying axiomatic abstract structures using mathematical logic

STEM overview

- „Department of commerce” is a part of the United States government concerned with promoting economic growth
- In 2015, there were 9.0 million STEM workers in the United States
- About 6.1 percent of all workers are in STEM occupations
- Growth of 5.5 percent from five years earlier



STEM overview

- Employment in STEM occupations grew much faster than employment in non-STEM occupations over the last decade: 24.4 percent versus 4.0 percent
- STEM occupations are projected to grow by 8.9 percent from 2014 to 2024, compared to 6.4 percent growth for non-STEM occupations.



STEM overview

- Nearly three-quarters of STEM workers have at least a college degree, compared to just over one-third of non-STEM workers
- STEM degree holders enjoy higher earnings, regardless of whether they work in STEM or non-STEM occupations
- A STEM degree holder can expect an earnings premium of 12 percent over non-STEM degree holders



[source](#)

Integrated STEM education

- The National Academy of Sciences is a private, nonprofit organization of the United States' leading researchers
- Teaching STEM in a more connected manner, especially in the context of real-world issues, can make the STEM subjects more relevant to students and teachers
- This can enhance motivation for learning and improve student interest, achievement, and persistence



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Integrated STEM education

Goals for Students:

- STEM literacy
- 21st century competencies
- STEM workforce readiness
- Interest and engagement
- Ability to make connections among STEM disciplines



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Twenty-first century competencies

- A blend of cognitive, interpersonal, and intrapersonal characteristics that may support deeper learning and knowledge transfer
- Cognitive competencies include critical thinking and innovation
- Interpersonal attributes include communication, collaboration, and responsibility
- Intrapersonal traits include flexibility, initiative, and metacognition.



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Integrated STEM education

- The program includes structured interactions between the participating students and IT professionals
- Research has found that these interactions encourage students' interest in IT careers



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Horizon 2020 (Work Programme 2016 – 2017)

- Horizon 2020 is the biggest EU Research and Innovation programme ever with nearly €80 billion of funding available over 7 years (2014 to 2020)
- Europe faces a shortfall in science-knowledgeable people at all levels of society
- Collaboration between formal, non-formal and informal education providers, enterprises and civil society should be enhanced
- Gender and geographical differences should be considered.



Horizon 2020 (Work Programme 2016 – 2017)

- Promote "Open schooling",: schools, in cooperation with other stakeholders, become an agent of community well-being
- Families shall be encouraged to become real partners in school life and activities
- Professionals from enterprises and civil society should actively be involved in bringing real-life projects to the classroom.



[source](#)