Policy Brief 3 - October 2024

Open Schooling Science learning projects foster students' interest in science, ownership of their learning and science career awareness

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The MULTIPLIERS project builds on the strengths of an international consortium of eight beneficiaries and aims to initiate a process that helps schools to transform themselves into innovative hubs for new ideas, practices and scientific approaches. The project aims to create spaces in the communities where the beneficiaries promote open, inclusive and inquiry-based learning on complex socio-scientific issues that impact citizens' daily lives. This has been achieved by establishing partnerships ("Open Science Communities") that bring together schools, families, civil society organizations, informal education providers, policymakers, media, industry and a wide range of scientific institutions across six diverse EU countries— Cyprus, Germany, Italy, Slovenia, Spain and Sweden—each with different geographical and economic contexts.

The aim of the MULTIPLIERS project was to evaluate implemented methodologies and approaches. The policy brief summarizes the main outcomes of two implementation phases based on the MULTIPLIERS common approach described in Policy Brief 2. In this sense, this policy brief describes the main results, successful methodologies and approaches gained from the MULTIPLIERS educational activities to foster students' interest, self-efficacy and career awareness in science for all participating countries. Declining interest in science careers among young people is a growing problem. Interest in STEM careers declines with age, with motivation to pursue such careers influenced by factors such as interest, pay and the variety of career opportunities. Conversely, the barriers to STEM careers are often lack of interest or alternative career plans. The analysis of OECD results from PISA shows that students perform better in science when teachers use strategies such as teacher support or inquiry-based teaching. This is also reflected in career decisions, as students' future expectations in science are positively related to their performance and enjoyment of the subject (1,2).

Interest in science

The MULTIPLIERS project has identified several successful methodologies and approaches for fostering students' interest in science by experiencing and engaging in scientific activities conducted at the OSC-partners' sites. Key findings show that the

Students showed interest in science:

"I definitely recommend it. It was a lot of fun, and it's just completely different from a regular lesson." (Student, Germany)

"To visit professional labs where scientist are working is something that students usually remember even long after." (Teacher, Spain)

"The students found the research very exciting, and they asked if we could visit them again to see more of their research." (Teacher, Sweden)

"Usually there are a few girls who never participate in the class debates and explain their own ideas, surprisingly today, most of them contributed with their ideas." (Teacher, Cyprus)

project enabled a consistent emphasis on hands-on and inquiry-based learning in authentic and real-world contexts, on involving experts and the community, on allowing space for student autonomy and responsibility, on working in groups, and on interdisciplinary and creative approaches to stimulate and sustain student interest.

Self-efficacy

The project also identified several successful methodologies and approaches for fostering self-efficacy among students. The project used a multifaceted approach that incorporates autonomy, authentic learning experiences, peer interactions and inquiry-based methods. These strategies not only build students' confidence in their abilities of being knowledge multipliers and how they should position themselves among other, but also prepare them to actively participate in addressing real-world challenges in their communities.

Science career awareness

The common strategies employed by the different partners emphasize the importance of direct interaction with professionals, experiential learning and exposure to very relevant, societal challenges in real-world work environments. Students get to meet or know experts that are contributing to face pressing complex socio-scientific issues. Together, these approaches enhance students' understanding of different careers, particularly in the sciences. These strategies not only inform students about possible careers, but also inspire and motivate them to explore these paths further.

Conclusion

As part of the MULTIPLIERS project, various partners have implemented a range of methodologies and approaches to foster students' interest, self-efficacy and career awareness in science. The common thread across these diverse initiatives is the engagement of students with real-world, local socio-scientific issues, experts and authentic information, which collectively contribute to the development of these essential skills such as critical thinking and argumentation. This improves students' ability to make informed decisions in different contexts.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Commission. Neither the European Union nor the granting authority can be held responsible for them.

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This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 101006255.

Students showed Self-efficacy

"I liked many things about the project, but most of all: expressing my knowledge to someone I don't know and conveying my passion." (Student, Italy)

"Working with the software was a bit difficult at first, but once we understood it, it was quite good." (Student, Germany)

"I was amazed at the students' poise in explaining the activities to people both younger and older than themselves." (Teacher, Slovenia)

Science career awareness

*"What I liked most about the expert was to see how interested she was in this area and how she explained it with a sparkle in her eyes. She encouraged me to pursue a career." (*Student, Slovenia)

"Contact with the working world gives me a greater understanding of what attracts me as a post-high school pathway." (Student, Italy)

"I had a different picture of science careers. I thought that being a scientist meant being cooped up in a lab and doing experiments all day which I found very boring, but it has nothing to do with reality. It is interesting!" (Student, Cyprus)