

# Classroom Implementation of STEM Education through technology: advantages and handicaps

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## Abstract:

The Open STEAM Group investigations (<https://www.opensteamgroup.unican.es/>) in the last five years suggest that the classroom implementation of the STEM approach by means of technology has advantages and handicaps. 2056 high school students from six countries (Poland, Italy, Greece, Slovenia, Czech Republic and Spain) elaborated STEM activities as part of the STEMforYouth project (Horizon 2020), over a period of two years. The students, from 68 educational centers, worked in groups of 3-4 members supervised by at least one teacher; involving a total of 120 instructors (Diego-Mantecón & Ortiz-Laso, 2018). The analyses indicated that the STEM approach – with specific emphasis on the technological component – develops positive beliefs towards the usefulness of STEM disciplines, increasing learning motivation. We found however that the implementation of certain activities that require several sessions to be completed do not fit well within the schedule of the regular curricula, nor within the evaluation methods of the current educational systems. Another significant drawback of the STEM approach implementation is the lack of teachers' knowledge in the interdisciplinary component. The majority of teachers are subject specific; this generates fears and anxiety when professionals have to deal with interdisciplinary activities (Diego-Mantecón, Arcera, Blanco, & Lavicza, 2019). The fact that there is no continuous training also produces teacher's insecurities when using new technologies. The low communication and collaboration between teachers from different areas, in some countries, does not benefit the STEM approach implementation. Although, to a lesser extent, the lack of resources (e.g. materials and laboratories) also makes it difficult to develop certain STEM activities in the educational centers. The ongoing investigations carried out within the framework of the EAMARE-STEAM project reinforce the conclusions described above (Blanco et al., 2018).

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