



www.siemens-stiftung.org/en/projects/experimento/

Education for responsible societal involvement

Teaching, learning, and living science and technology

Quality education is a global prerequisite for individual development and participation in society. In a technology-driven world, understanding scientific and technological interrelationships is paramount for responsible societal involvement. That is why Siemens Stiftung is actively involved in forums and associations advocating for stronger science and technology education. The foundation's international education program, Experimento, provides educators with practical training and continuing education opportunities as well as high-quality teaching and learning materials. Both aspects help achieve a modern, experiment-based science and technology curriculum. The materials are digitally accessible free of charge to ensure equal opportunities for all pupils. The Siemens Stiftung's engagement bundles discovery-based learning with value-building actions, helping to shape a socially-oriented, strong character.

»Giving young people the best preparation for the future«

Dr. Filtzinger, why is science and technology education so important?

Like a good education in general, learning about STEM is paramount for individual opportunity and participation in society. Science, technology, engineering, and mathematics shape our world: how we see it, understand it, and exist within it. In the future, STEM will play an even bigger role in influencing our thoughts and actions. That includes private and professional aspects of our everyday lives, but also demographic development, resource efficiency, or climate change.

Does STEM education today need to be better than in the past?

Yes, our times require basic knowledge and expertise that go beyond what is simply reproducible. It is now important for pupils to find their footing in a world that is rapidly changing. They need to pick up technological knowledge to thrive in the digital present and the digital future; they need to learn skills for social cohesion in a pluralistic society, and to prepare for jobs that we have not yet even considered.

How does Siemens Stiftung tackle these challenges?

With our international education program, Experimento, we work toward an impact-oriented science and technology curriculum in Latin American and African countries, as well as in Germany. We emphasize discovery-based, value-building, and hands-on learning. Teachers and children shape the classroom lessons together. The pupils learn with each other and from each other. To anchor STEM education institutionally, we work with associations and networks.

Are there measures that demonstrate the effectiveness of Experimento?

Evaluation is essential if we want to successfully educate. It does not help to have Experimento in a hundred classrooms if no children can understand the simplest science and technology concepts. We check if we're doing the right things, if we are implementing them correctly, and how they can be adjusted or developed further. Classic measures of quality assurance, such as feedback analysis or monitoring, give us key guiding messages. To remain as impact-oriented as possible, we've been conducting a three-year evaluation with the Technischen Universität München and Munich's Ludwig Maximilians Universität.

Are the first results in?

Yes, and they happily show a particularly high curricular relevance in the subjects covered by Experimento. The operating conditions for Experimento were also given positive reviews. Background expertise among the teachers was ranked from good to very good in 100 percent of cases. According to the study, all the experiments support a cumulative build-up of knowledge. The results show we're on the right path, but we're not even close to the goal.

What is the goal?

We want to do our part to make sure as many children as possible have the best chances for good science and technology education, and that they receive the opportunity to develop their character and to freely shape their lives.



Dr. Barbara Filtzinger is head of the education working area at Siemens Stiftung.

The international education program

Experimento

With the international education program Experimento for educators and teachers, Siemens Stiftung is committed to value-oriented science and technology education that starts in kindergarten and continues all the way through graduation. The program focuses on independent experimentation, exploration, and comprehension of natural phenomena pertaining to energy, environment, and health. By addressing value-shaping issues and using socially-relevant teaching and learning formats, the lessons are meant to teach attitudes and behaviors that are socially-aware and conscientious. The lesson materials created for this purpose are available digitally and free of charge to allow as many people as possible around the world access to high-quality education.

METHODOLOGY: LEARNING THROUGH DISCOVERY – SERVICE LEARNING – APPLYING TECHNICAL KNOWLEDGE

TOPICS: ENERGY – ENVIRONMENT – HEALTH

LANGUAGES: GERMAN – ENGLISH – SPANISH – PORTUGUESE – ARABIC

MATERIALS



Instructions
for teachers



Student
worksheets



Materials kit



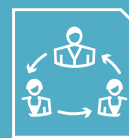
Online shop

COUNTRIES

Argentina
Bolivia
Brazil
Chile
Colombia
Ecuador
Germany
Kenya
Mexico
Nigeria
Peru
South Africa



SEMINARS AND NETWORKING FOR EDUCATORS



DIGITAL AND INTERACTIVE MEDIA



Online platform with
additional materials

<https://medienportal.siemens-stiftung.org>

Shaping education together and without borders



»We're playing electricity,« says the teacher, Oscar Calderón. The primary school pupils in Guanajuato, Mexico, eagerly gather in a circle. Shortly after, a soccer ball is passed from one set of hands to the next, with a flashlight pausing the game each time it is switched on. The circle represents an electrical circuit when the ball is moving from one pupil to the next. The experiment is causing plenty of giggles – this physics lesson is fun.

Around the world, excitement and curiosity are the best foundations for teaching children and youths about science and technology interrelationships. Since 2010, Siemens Stiftung's international educational program Experimento has provided the opportunity to teach and engage Latin American, African, and German pupils in science and technology education.

Close collaboration with research and education institutes, economic experts, politicians, civil society stakeholders, and other local partners is a crucial aspect of Experimento. These cooperative partnerships help us to meet the unique teaching and learning requirements of each individual country. Additionally, they form a foundation for further developing strategic partnerships and for strengthening networks and alliances. Through engaged collaboration, such as the National STEM Forum in Germany and the Foro Nacional STEM in Peru, or with strong partners in Colombia and Chile, we create synergies and bundle individual initiatives. We work together to develop systematic recommendations for action to improve STEM education, which can be institutionalized and integrated into national curricula. As an example, Experimento seminars in South Africa have been certified as an official continuing education tool in accordance with the guidelines set out by the South African Council for Educators (SACE). Teachers who attend Experimento seminars at the University of Cape Town and successfully pass the exam

receive credit points that serve as proof of qualification to be submitted to SACE.

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Associated Boards and Forums

Education and Digitalization Forum

National STEM Forum

plus-MINT

STEM Forums in Latin America

Stiftung Bildungspakt Bayern

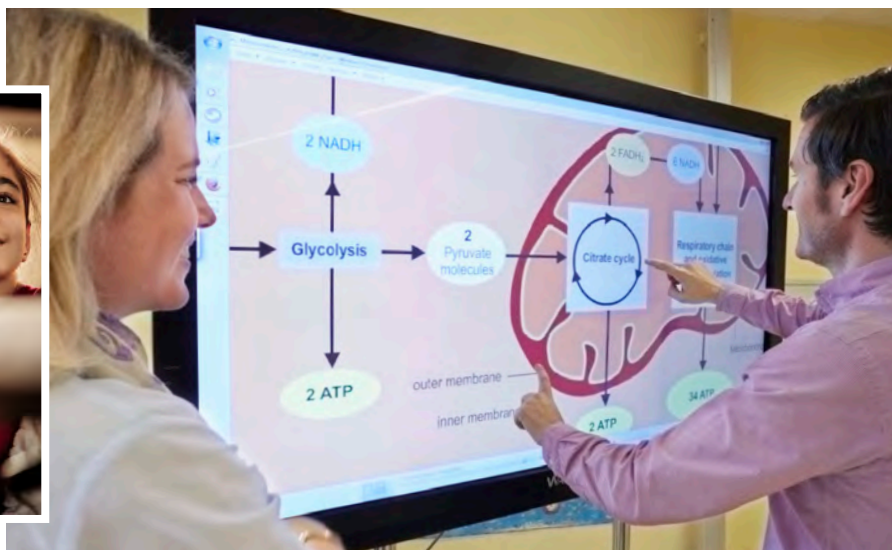
Little Scientists' House

MINTEC

Wertebündnis Bayern

Knowledge Factory

Skills and knowledge for a changing world



What knowledge and abilities will we need in the future? Digitalization and heterogeneity offer opportunities for personal development. A modern education that strengthens digital and character-building skills in addition to basic knowledge is needed to take advantage of these opportunities.

Openness, the ability to take responsibility, and a high degree of social intelligence are skills that enable young people to constructively take part in a pluralistic society. Teaching values in schools is therefore gaining in importance. This can best be achieved in processes that allow pupils to personally experience and understand the meaning of values. The methods behind science and technology education are particularly suited to this task. Skills are taught that promote societal participation based on responsible, discerning, and socially-oriented character traits.

Siemens Stiftung supports value-building science and technology education. By participating in networks and developing our own expert events, we aim to anchor the subject of »STEM and value building« in policy and in practice. In operational projects, we work with partners to develop teaching and learning materials for children aged 8-13 years that enable an examination of value-building issues through experimentation. At the same time, we provide educators with exemplary experimental materials for inclusive STEM lessons. In addition, to make socially-relevant values easy to grasp in terms of concrete application, we have adapted Experimento to the Service Learning teaching and learning method.

Modern education also means preparing children and youths for the challenges of an increasingly digitalized and connected world. This has less to do with what is technically possible and more to do with what is educationally meaningful. »Learning about digital media,« »Learning with digital media,« and »Creative development from and with digital media« – these approaches carry the promise of success and have an impact on societal participation. Siemens Stiftung supports modern teaching and learning processes through countless collaborative efforts. This includes participation in alliances such as the Education and Digitalization Forum, but also with quality-controlled digital materials for science and technology lessons. Around 5,500 teaching and learning materials are available for download, free of charge, in the Siemens Stiftung Media Portal. The Media Portal is being reformed as an OER platform, allowing Siemens Stiftung to provide the materials as Open Educational Resources (OER). This means teachers can do more than simply download the materials; they can also be adapted and shared. With free access to high-quality teaching and learning materials under an open license, Siemens Stiftung supports the corresponding UNESCO mission of enabling as many people as possible to have access to modern education.

<https://medienportal.siemens-stiftung.org>

www.siemens-stiftung.org/en/projects/stem-and-values

As a non-profit corporate foundation, we promote sustainable social development, which is crucially dependent on access to basic services, high-quality education, and an understanding of culture. To this effect, our project work supports people in taking the initiative to responsibly address current challenges. Together with partners, we develop and implement solutions and programs to support this effort, with technological and social innovation playing a central role. Our actions are impact-oriented and conducted in a transparent manner.



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