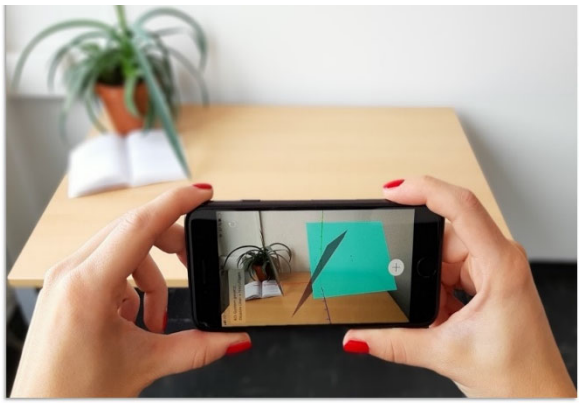
University of Education
Pädagogische Hochschule
karlsruhe

Press release
12 August 2025

Mathematics teaching: Bringing spatial geometry to life with augmented reality

The pARameter project, funded by the EU's Erasmus+ programme, will be launched in September. The aim of the nine project partners from five countries is to support teaching and learning in mathematics lessons. The focus is on the malAR app, which brings spatial geometry to life via live camera views and augmented reality.



Experience the three-dimensionality of mathematical objects in real environments with the malAR app. Photo: PHKA/Institute of Mathematics

Planes, points and lines – spatial geometry is often a difficult concept for schoolchildren to grasp. Learners with poor spatial awareness find it particularly challenging. But what if schoolchildren could experience the three-dimensionality of mathematical objects in their real environment using a smartphone app and augmented reality? This is precisely the aim of the new pARameter project. Five universities from four countries and other international partners have joined forces to make spatial geometry objects more vivid using an app and augmented reality, thereby supporting teaching and learning in mathematics lessons. At the heart of pARameter (Promoting Augmented Reality in mAtheMatics Education To Enhance student leaRning) is the app malAR (Mathematics Learning with Augmented Reality), which brings mathematical objects to life via a live camera view.

The project, which is funded by the EU's Erasmus+ programme for three years, will start in September. The project partners are the Karlsruhe University of Education (Germany; project management), Stuttgart Media University (Germany), Kore University Enna (Italy), Ben-Gurion University of the Negev (Israel), Charles University (Czech Republic), the umbrella organisation of Spanish mathematics teachers' associations (FESPM), one German, one Italian and one Czech school, and a software development company.

"Many three-dimensional objects are represented symbolically in school textbooks using equations. If you look at these on a 2D screen – if you look at them at all – you quickly lose your bearings," says project manager Xenia-Rosemarie Reit, junior professor of mathematics and mathematics education at the Karlsruhe University of Education (PHKA). "With malAR, learners can project three-dimensional objects onto the table in front of them, view them from different perspectives, look at them from above or walk around them, in other words, explore them live in their immediate environment," explains the mathematics educator. She developed the app together with a technical team.

The pARameter project now aims to expand the app's accessibility, optimise it for seamless integration into everyday school life, and develop supporting learning materials and teaching scenarios. These include a digital classroom function that enables interaction between teachers and students. A database of didactically structured augmented reality tasks is also to be created. The app and learning materials are being tested and evaluated at the three participating schools. "With the further development of malAR, we want to make it possible to experience the three-dimensionality of spatial geometric objects in secondary schools in a digitally realistic way," emphasises Reit.

Further information on the project is available on the English-language website https://www.parameter-project.eu. The current pilot version of malAR is available in the iOS App Store.

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