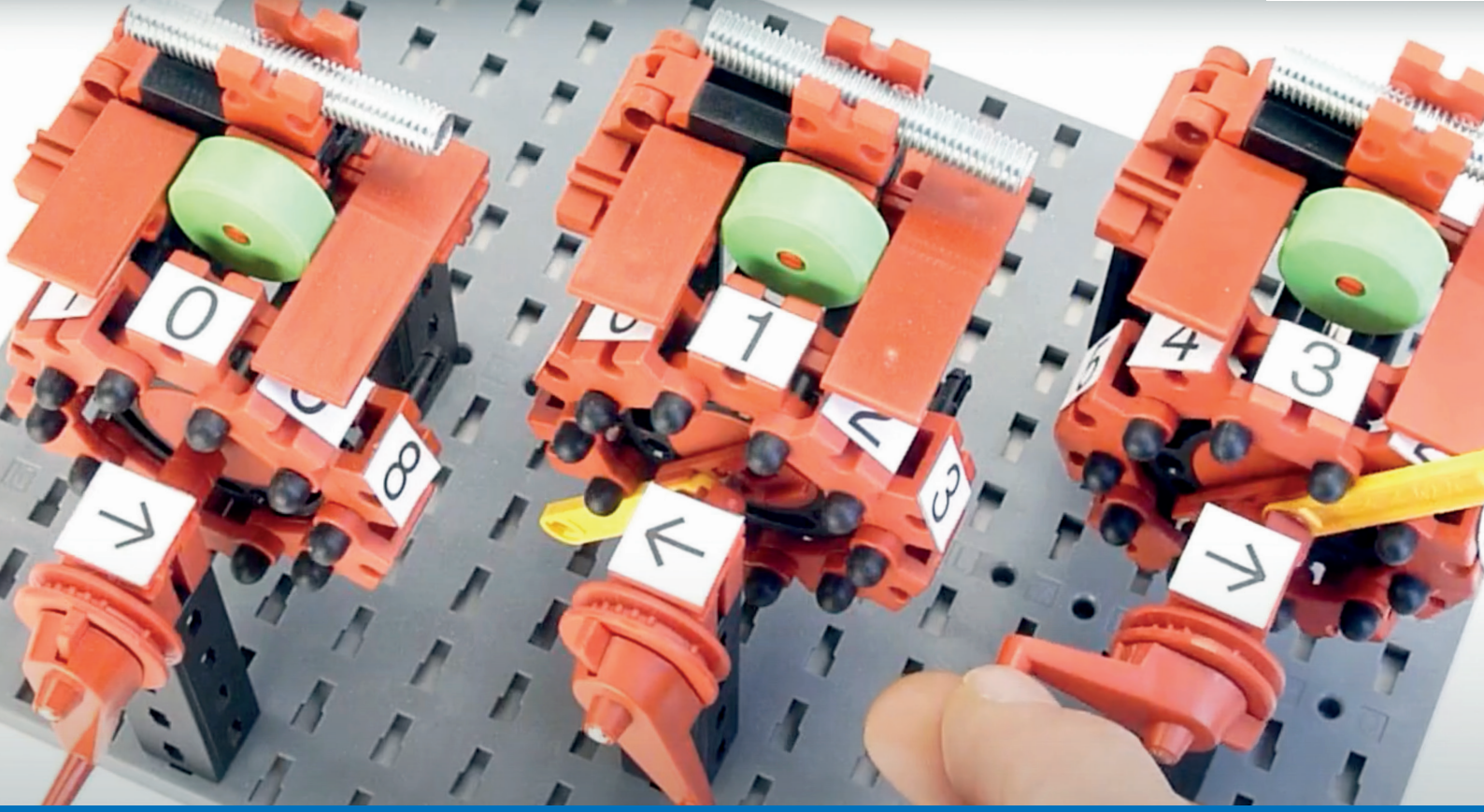


Schickard calculating machine: 400 years old and still highly topical

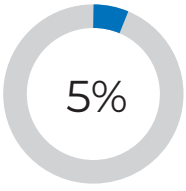
Seminar ‘Mathematical Instruments and Machines’ for student teachers at the Ruhr University Bochum / Nordrhein-Westfalen (Germany)

Research / Application area: Primary school maths lessons | Deployment period 2023

THE CHALLENGE

German schools regularly receive mediocre to poor grades in the PISA tests. There is an acute need for action, particularly in the STEM subjects. Prof. Dr. Thomas Püttmann sees the need to give children a sensory and playful approach to mathematics. Maths should not only take place in the head, but should also be experienced through seeing, hearing and touching.

The results of the latest PISA study show that the proportion of high-achieving students in maths has decreased significantly. With an average score of 475 points, this is the lowest level since the PISA survey began in 2000.



Source: See PISA study 2018 vs. 2022, Federal Statistical Office

> Every child needs this calculator: Its look, sound and feel entice children to explore it. These features, combined with children‘s creativity and curiosity, create a new world of learning.

Prof. Dr. Thomas Püttmann, Lecturer

THE SOLUTION

School lessons have long since moved away from purely frontal teaching. But how can students be introduced to mathematical content and tasks while working alone and in teams? Prof. Thomas Püttman sees fischertechnik construction sets as the ideal tool for this challenge. In his book 'Understanding mathematics with fischertechnik', Prof. Püttmann invites students on an exciting journey through the world of mathematics using 28 models to build and experiment with. With the help of the counting, calculating, drawing and measuring devices, children and young people learn about core mathematical concepts from a new, fascinating perspective. The models include a calculating machine invented by the researcher and scholar Wilhelm Schickard (1592-1635). Prof. Thomas Püttmann set about recreating this machine using fischertechnik components. The mathematician put together the 238 parts needed to build the calculating machine from various construction kits. After successful tests, Prof. Püttmann also assembled the calculating machine in various workshops with teams of enthusiastic students. In addition, assembly videos with parts lists encourage students to rebuild the calculating machine.

THE RESULT

Building the calculating machine promotes children's intellectual and motor skills. Students are inspired in a creative and playful way for STEM subjects and the curious and creative use of components and tools. The fun factor is not neglected.

HANDS-ON LEARNING CONCEPTS FOR REGULAR CLASSROOM INSTRUCTION

fischertechnik offers innovative digital and analog learning concepts for interdisciplinary use in preschools, primary and secondary schools, as well as in universities and vocational education. Based on hands-on learning, STEM (Science, Technology, Engineering, Mathematics) subjects are made easily accessible and tangible, fostering important future skills such as problem-solving abilities, creative thinking, and emotional and social competencies.

All learning concepts include thematic construction sets, technical components like motors, sensors, and controllers, as well as freely accessible educational support and training materials such as building and programming instructions, lesson plans with tasks and solutions, curriculum references, and professional development opportunities.

"Regular use of the calculator in as many schools as possible would be highly desirable."

Prof. Dr. Thomas Püttmann, Lecturer

Would you like to learn more?
Then contact us directly at **info@fischertechnik.de**
or visit us at **www.fischertechnik.de/en/schools**

fischertechnik
Klaus-Fischer-Str. 1 , DE - 72178 Waldachtal
Tel. +49 74 43 / 12-43 69, Fax +49 74 43 / 12-45 91