

Mathe Connect: Students as Citizen Scientists to (Re-)design math education



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Introduction

The Sparkling Science project *MatheConnect* is a governmental founded citizen science project that places students at the center of educational research. In collaboration with the Alpen-Adria University of Klagenfurt and two classes (6A and 7A) from BG | BRG Villach St. Martin, the project explores how mathematics can be meaningfully connected to real-life, socially relevant topics.

By involving students directly in the research process—from generating ideas to collecting and analyzing data—the project values their unique insights and everyday experiences. Their contributions shape the development of authentic math tasks and help bridge the gap between academic research and the realities of young people's lives.

Research Questions

Which interdisciplinary, socially relevant topics students of different school levels consider interesting and relevant for integration into mathematics lessons, how this can best be assessed across school levels, how these topics can be linked to appropriate mathematical content (= task creation) and what feedback on created tasks students and teachers give?

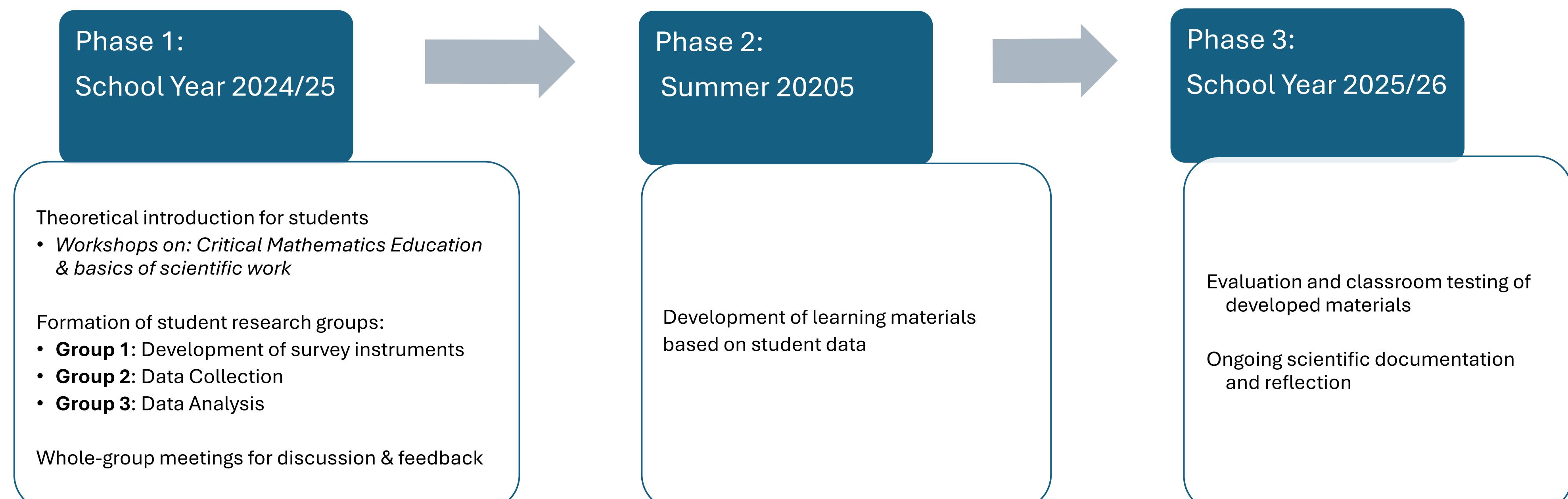
What challenges and learnings do students have when they work on a research project?

Which methods or instruments do students choose to identify students' interests?

Methodology

MatheConnect launched in September 2024, running through June 2028. The project is structured in three phases, as shown in figure 1.

Prior to Group 1 developing the survey, students were introduced to critical mathematics education and basic research principles through workshops. After these sessions, students were assigned to three groups. Through collaborative brainstorming and feedback, students refined the survey tools. Once completed, Group 2 began collecting data, while Group 3 is responsible for analyzing the results.



Results and Conclusions

Survey Instrument development

Survey Instruments

For the societal survey, students used stickers, flyers, and street interviews. At school, they applied a two-step process: first collecting ideas via a "future box," followed by group interviews with selected classes.

Challenges and learnings

Students learned to adapt survey tools to different age groups and target audiences. They gained insight into tool selection, teamwork, and compromise. Key challenges included group dynamics and choosing appropriate methods.



Data Collection



Challenges and learnings

Students realized that the design and presentation of survey tools strongly influence responses. Stickers and flyers, though creatively designed, were less effective—many participants ignored them or didn't engage deeply. In contrast, personal interviews at the University of Klagenfurt led to valuable insights and more reliable data. A key learning was that different age groups (lower vs. upper secondary) reacted very differently, requiring sensitivity and adaptability. Students also saw the importance of staying objective and that repeated surveys help improve data quality and processes.

Data Analysis

Challenges and learnings

The most important lessons learned by the data analysis group was that you need a strategy and guidelines before you can start an evaluation. A key challenge was identifying patterns across diverse responses. They created 9 main categories.



Figure 2:
Created categories