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## Augmented Reality (AR) in Education: Current Status

- AR as a potentially suitable means to support teaching and learning processes (Chen, Liu, Cheng, & Huang, 2017)
- Promising research results imply a positive effect of AR e.g. on student motivation, self efficacy and learning achievements (Ibáñez & Delgado-Kloos, 2018)
- A growing number of AR tools for classrooms (Ross, 2019)
- Lack of systematic evaluation approaches and multi-disciplinary research studies (Dünser, Grasset, & Billingham, 2008; Ibáñez & Delgado-Kloos, 2018)
- Need for research on the impact of AR on teaching and learning processes (Petrov & Atanasova, 2020)

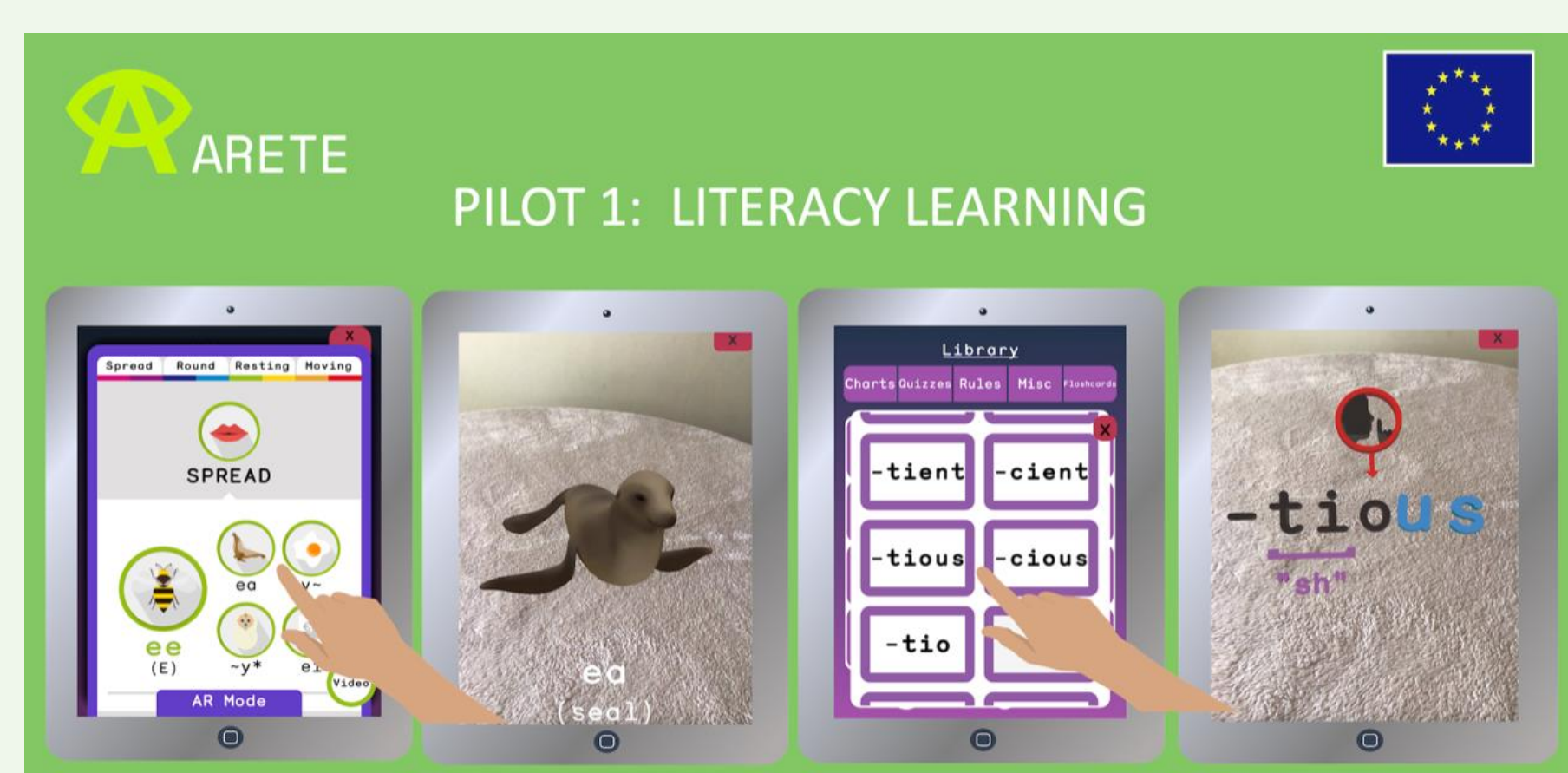
## Project ARETE: A Horizon2020 Project Focused on Augmented Reality in European Primary Schools

- Runtime: November 2019 – April 2023
- 10 partner institutions from 7 European countries (Universities, research institutions, NPO, SMEs)
- Piloting and evaluating the effectiveness of AR interactive technologies in European Primary Schools
- Development of an interactive AR toolkit for educational contexts
- Several Pilots for different pedagogical scenarios for AR in teaching and learning

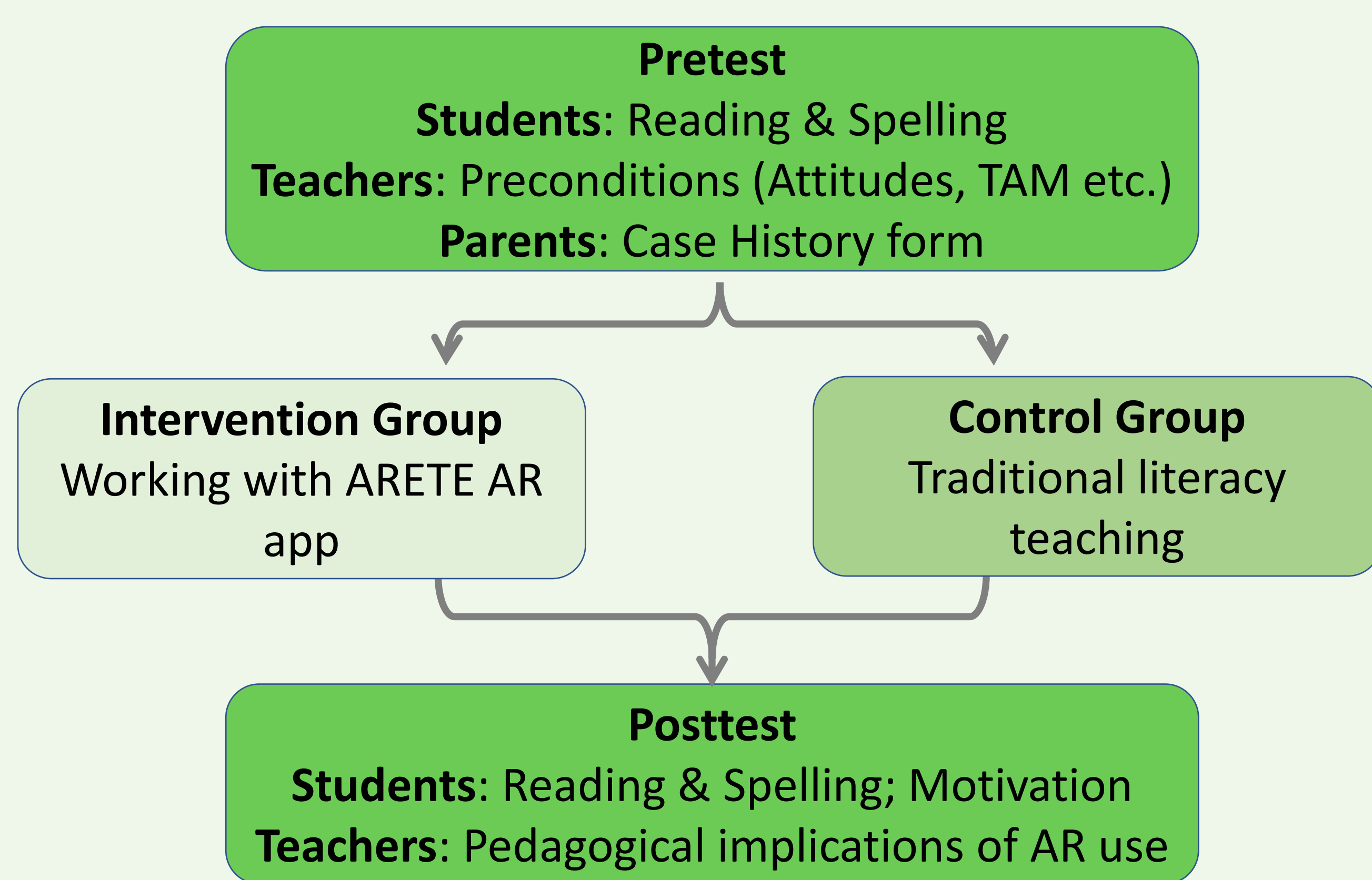
### Pilot 1: English Literacy Acquisition

Can an Augmented Reality app help advance primary students' English literacy learning?

- **App:** WordsworthLearning AR Program for English Literacy Learning



- **Sample:** n=20 Teachers & 93 Students from 4 Countries  
Students are underperforming in standardized school literacy tests
- **Intervention Approach:**
  - Teachers work with small groups (approx. 5 students)
  - They advance their students' literacy skills using the app (intervention group) or their traditional methods (control group)
  - Duration: one school term, about 15 minutes daily
- **Evaluation Methodology:**
  - Pretest-posttest design with intervention & control group
  - Students:** Standardized reading and spelling tests; motivational scale
  - Teachers:** Interviews and surveys focusing on pedagogical implications of AR use
  - Parents:** Case History form on student comorbidities etc.



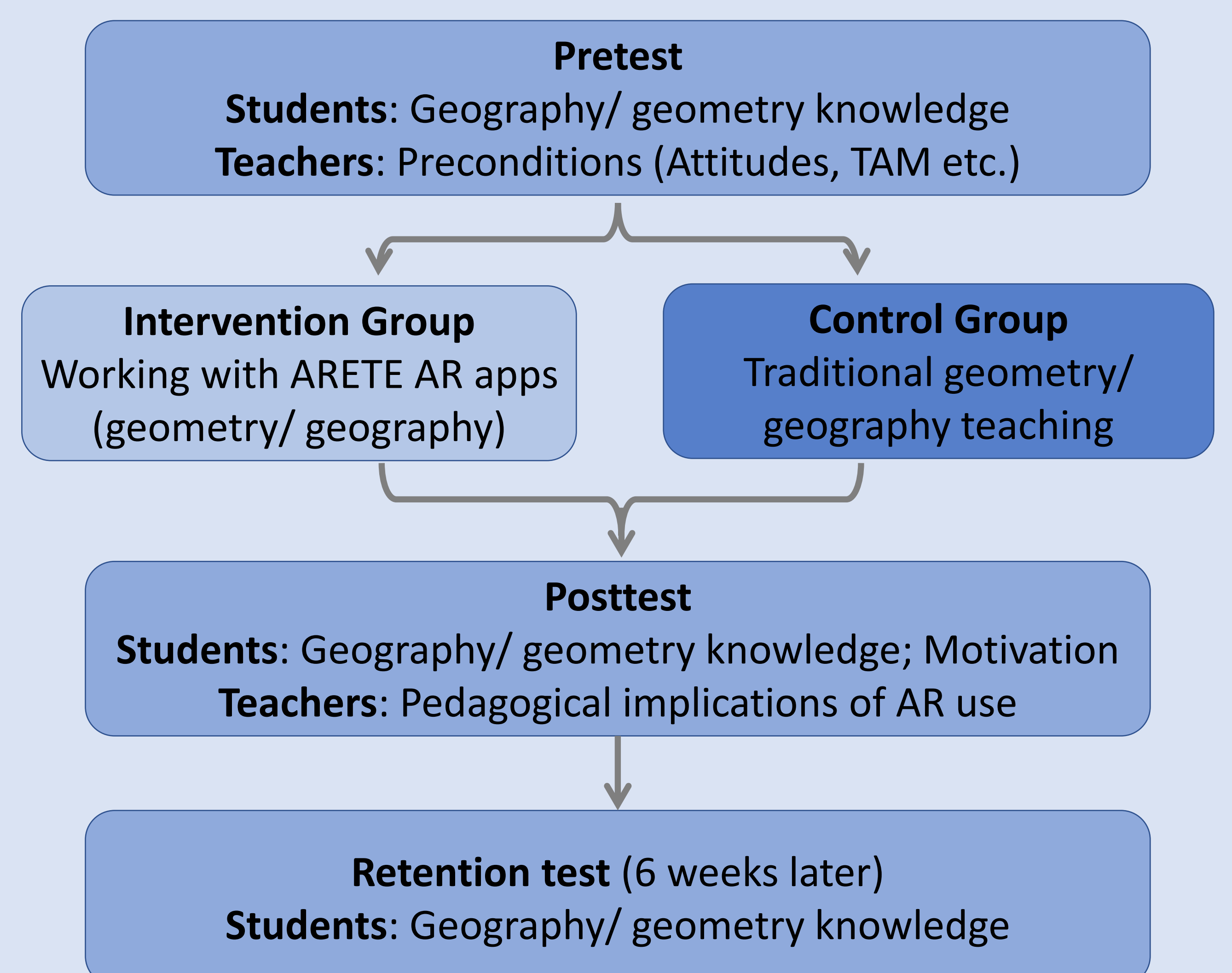
### Pilot 2: STEM Learning (Geometry & Geography)

Can Augmented Reality apps help primary students improve their STEM test scores?

- **Apps:** Cleverbooks AR apps for geometry and geography



- **Sample:** n=156 Teachers & 3,653 Students from 12 countries  
Students do not show irregular learning requirements
- **Intervention Approach:**
  - Teachers integrate an AR app (geometry or geography) into their regular teaching (intervention group) or go on with their traditional lessons (control group)
  - Duration and extent of the intervention is flexible, in accordance with teachers' pedagogical concepts
- **Evaluation Methodology:**
  - Pretest-posttest-retention test design with intervention & control group
  - Students:** Standardized knowledge test; context data; motivational scale
  - Teachers:** Interviews and surveys focusing on pedagogical implications of AR use



## Outcomes Targeted

- Conclusions on the usefulness of Augmented Reality apps for English literacy / STEM learning
- Findings concerning pedagogical implications of AR use in teaching & learning processes (barriers, problems, facilitators, ...)
- Policy recommendations on a European level

## Sources

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 Dünser, A., Grasset, R., & Billingham, M. (2008). A survey of evaluation techniques used in augmented reality studies. *ACM SIGGRAPH ASIA 2008 courses*, Singapore, 1–27.  
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