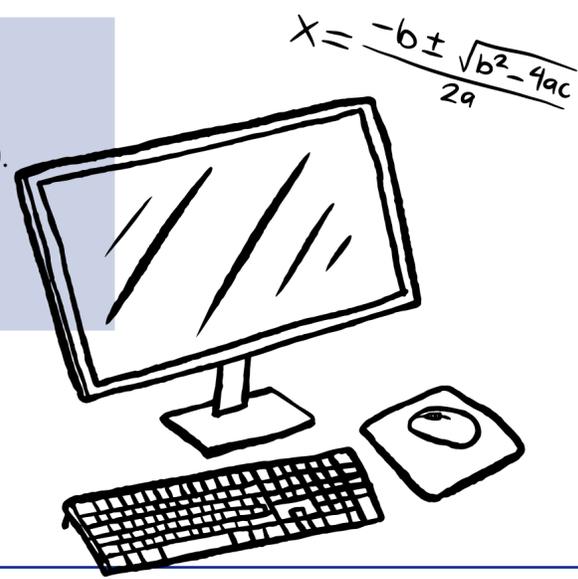


HOW DIGITAL TOOLS SHAPE BI-/MULTILINGUAL DISCIPLINARY LITERACIES (BMDLS) IN CLIL MATHEMATICS

This study compares two CLIL mathematics classrooms—one in Spain and one in Ireland—to examine how teachers use digital tools to support bi-/multilingual disciplinary literacies (BMDLs). The findings highlight how technology can powerfully support learning, but also how its impact depends on teachers' ability to integrate pedagogy, content, language, and technology in purposeful ways.



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THEORETICAL FRAMEWORK

TPACK (Technological Pedagogical and Content Knowledge) (Mishra and Koehler, 2006) is a framework that explains the kinds of knowledge teachers need to integrate technology effectively into their teaching.

It highlights that good digital teaching isn't just about knowing the subject (content) or how to teach it (pedagogy), but about how to integrate them in discipline specific ways.

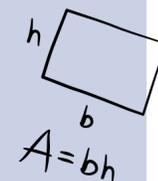
In CLIL Classrooms, the language factor (**TPACKL**) is also a consideration for teaching and learning in Maths CLIL contexts.

METHODOLOGY

A comparative case study explored two CLIL mathematics teachers—one in Spain and one in Ireland.

Data came from semi-structured interviews and resource-stimulated recall sessions where teachers discussed digital tasks they had designed.

Using thematic analysis, the study examined how their technological, pedagogical, content, and language knowledge shaped digital tool use.

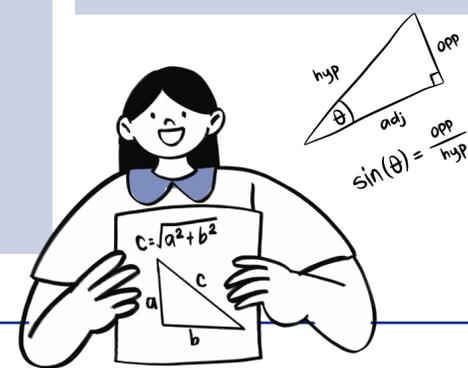


FINDINGS

- Digital tools supported the development of BMDLs in mathematics
- Teachers' technological, pedagogical, content, and language knowledge (TPACKL) shaped how tools were used
- Digital tools mediated language in contrasting ways
- Digital tools strengthened the multisemiotic dimension of mathematics but critical disciplinary literacies were less developed
- Digital tools increased engagement but required careful orchestration
- Monolingual design of digital tools limits potential in multilingual CLIL contexts

DIGITAL TOOLS USED

GeoGebra
Microsoft OneNote
mathigon



IMPLICATIONS FOR TEACHING CLIL MATHEMATICS

1. Plan through a TPACKL lens

Design mathematics tasks where content goals, language demands, and digital affordances are aligned from the outset, rather than treating language or technology as add-ons.

2. Prioritise disciplinary literacy, not just engagement

Use digital tools to prompt mathematical reasoning, justification, and explanation, ensuring learners articulate how and why, not only what.

3. Scaffold multisemiotic meaning-making

Explicitly link visuals, symbols, graphs, gestures, and mathematical language, modelling how learners move between representations.

4. Mediate language use across monolingual tools

Actively scaffold mathematical language and strategically connect learners' languages, compensating for the monolingual design of many digital tools in multilingual CLIL contexts.