

RESULTS

Insights and findings from the Pilot Phase of Digital Learning Materials



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AGENDA

1. About the Atollo project - current status
2. About WP 4 - evaluation
3. Insights and findings from the evaluation of the digital educational resources developed
4. Summary and recommendations for improving the digital learning resources



ABOUT THE ATOLLO PROJECT

An ERASMUS+ project that aims to empower learners with **special educational needs** by creating **inclusive digital educational materials**

- The focus is on students with learning and developmental difficulties
- The use of digital materials will be scientifically evaluated
- An inclusive digital education toolkit will be created with advice and instructions for everyone who uses digital educational materials for children with difficulties
- Consortium of partners from Croatia, Bulgaria, Austria, Germany, Iceland, Norway, Ireland and Australia



ABOUT WP 4 – PILOT TESTING AND EVALUATION REPORT

- WP 4 is coordinated by the University of Inland Norway and the University of Zagreb
- Main aim – analyse digital learning resources in order to enhance the educational experiences of children with special educational needs
- Pilot testing in 15 schools across Croatia, Bulgaria and Germany
 - multiple methods: Teacher and assistant questionnaires, focus group interviews, classroom observations, technical monitoring, process documentation reviews and letter-writing method
- Evaluation report
 - Addresses pedagogical and technical dimensions, examining how the materials support learning, accessibility, and inclusion, and ensuring that they are user-friendly, stable, and adaptable to diverse educational settings
 - Provides recommendations for improvement of the digital material based on the results of the pilot phase and the collective reflections from project partners



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Insights and findings from the evaluation of the digital educational resources developed



Bulgarian teachers about Atollo digital content (interviews)

2 schools participated in the pilot

Qualitative analysis:
Focusing on capturing teachers' in-depth
perspectives on the implementation of the digital
learning units

Focus group interviews in Bulgaria:
Two institutions participated in the piloting: 140
Ivan Bogorov School (inclusive) and the 6th
Lozenets Centre for Specialized Educational
Support (specialised)



Nb.	Sub-Dimension	Insight from Bulgarian Focus Groups	Implication for Analysis
1	Curricular Alignment	"The content aligns well with our lesson plans, which is beneficial."	Check for alignment with national or local curriculum
2	Interface Usability	"Some buttons are too small for children with fine motor difficulties."	Assess if design elements follow accessibility principles (WCAG, UDL)
3	Technical Functionality	"The application crashes frequently during use."	Evaluate technical stability and consistency across devices
4	Cognitive Load & Language	"Some tasks are too complex, particularly for children with significant disabilities."	Include readability and language complexity evaluation
5	Motivational Factors	"Engagement varies; some kids are very keen, while others lose interest quickly."	Assess multimedia effectiveness and engagement
6	Pedagogical Adaptability	"Tasks are not suited for all levels; children need tailored approaches."	Analyse scaffolding, progression, and learning objectives
7	Sensorimotor & Visual Feedback	"Visual prompts are often misleading, leading to confusion on tasks."	Evaluate sensory and visual feedback mechanisms

Table 13. Key Insights from Bulgarian Focus Groups

Insights from Bulgarian classroom observations

Pedagogical Adaptation: Teachers successfully integrated Atollo resources within existing lesson plans, adjusting language, pacing, and support levels to individual learners

Student Engagement: Students with SEN were highly responsive to visual and interactive tasks

Technical and Accessibility Issues: The main challenges were language inconsistencies and interface sensitivity during touch-based tasks. active participation of students with special educational needs



Croatian teachers about Atollo digital content

11 schools participated in the pilot

Focus group interviews

Classroom observations



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Croatian teachers about digital resources (interviews)

Nb.	Sub-Dimension	Insight from Croatian Focus Groups	Implication for Analysis
1	Curricular Alignment	"This content is in line with the school curriculum, which is great."	Check alignment with national or local curriculum
2	Interface Usability	"Some boxes are too small...", "No left/right understanding", "Lines should stay for visual feedback"	Assess if design elements follow accessibility principles (WCAG, UDL)
3	Technical Functionality	"Everything suddenly goes off screen", "No saving options", "Tasks don't resize"	Evaluate technical stability and consistency across devices
4	Cognitive Load & Language	"Too difficult for students with severe disabilities", "Language not easy enough"	Include readability and language complexity evaluation
5	Motivational Factors	"Very motivating for some children", "Videos were boring or complicating"	Assess multimedia effectiveness and engagement
6	Pedagogical Adaptability	"Good for repetition, not for learning new knowledge", "No gradual increase in difficulty"	Analyse scaffolding, progression, and learning objectives
7	Sensorimotor & Visual Feedback	"Hard to write numbers", "Tasks should go full screen", "Visual feedback lacking"	Evaluate sensory and visual feedback mechanisms

Table 17. Review of content and accessibility in Croatian schools

Insights from Croatian classrooms (observations)

Category	Key Points
1. Introduction of digital resource	Teacher introduces tasks, reviews prior knowledge. Proper guidance on using the digital resource. Sometimes no intro → students start independently.
2. Student Engagement	Students interested, focused (in line with their abilities), actively solve tasks. Raise hands, answer, comment, participate. Attention maintained; different level of support needed.
3. Interaction with Digital Resource	Mostly confident in use; frequent users show ease. Some need guidance, especially in task selection, further explanation and clarification.
4. Teacher/Advisor Support	Organizes lesson flow, motivate students. Explains tasks step by step, encourages discussion. Provides feedback, praise, and technical help. Explanation, redirection, positive reinforcement.
5. Adaptation of Digital Material	Simplified instructions & vocabulary. Adjusted pace, volume, and explanations. Individualized approach.
6. Pedagogical Strategies Used	Group work, individual work, pair work. Occasional peer support. Strongly individualized 1:1 approach.
7. Student Learning Out-comes	Visible according to students' abilities. Understanding achieved with varying levels of support. Students mostly connect content and demonstrate success.
8. Technical Issues	Mostly no technical issues. Some slow video loading (possible weak internet). Occasional internet connection problems.
9. Spontaneous Student Feedback	Students - curious, happy, motivated. Positive reactions, satisfaction with tasks. Respond well to praise; solving tasks is fun.

Table 20. Key points from observation of digital units use in Croatian schools

German teachers about Atollo digital content

2 schools participated

Focus group interviews

Classroom observations



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German teachers about digital resources (interviews)

Nb.	Sub-Dimension	Insight from German Focus Groups	Implication for Analysis
1	Curricular Alignment	Some math tasks did not follow German conventions (e.g. unfamiliar division formats and terminology issues)	Verify national curriculum alignment, create country specific variants where needed.
2	Interface Usability	Teachers described screens as visually overloaded; some elements were cut off; drag-and-drop actions were unclear.	Check whether UI follows accessibility principles (WCAG, UDL); simplify layouts and reduce cognitive load.
3	Technical Functionality	Wi-Fi instability, login restrictions, and occasional language mismatches disrupted learning sessions.	Evaluate technical stability; introduce offline mode; simplify login structures.
4	Cognitive Load & Language	Many tasks used story-based instructions that were too linguistically complex for SEN learners.	Assess language complexity; include read-aloud, pictograms, and simplified instructions.
5	Motivational Factors	Gamified elements were motivating, but complex tasks caused frustration; some older students found tasks boring.	Assess motivational design; add micro-feedback, shorter videos, and frustration-reducing features.
6	Pedagogical Adaptability	Teachers requested individual learning paths and progression control for each student.	Analyse adaptive sequencing, scaffolding, and teacher dashboards.
7	Sensorimotor & Visual Feedback	Students struggled with fine motor tasks; some drifted to non-learning apps accidentally.	Evaluate sensorimotor usability; enlarge touch targets; strengthen visual feedback.

Table 21. Content and accessibility school 1 Frankfurt

Insights from German classrooms (interviews)

Nb.	Sub-Dimension	Insight from Germany	Implication for Analysis
1	Device Suitability	iPads were preferred; laptops unsuitable for SEN learners.	Optimise Atollo specifically for iPad/tablet use.
2	Equity of Access	Parents rarely engaged at home due to login difficulties; students struggled to differentiate learning devices from entertainment.	Introduce simplified at-home login; provide visual cues for educational mode.
3	Potential for AI Adaptation	Teachers suggested voice-responsive avatars and AI guides.	Explore AI-driven avatars, audio prompts, and personalisable assistants.

Table 26. Availability of devices and infrastructure school 2 Frankfurt

Recommendations for improvement

- Pedagogical design
- Accessibility and usability
- Infrastructure readiness
- Feedback, monitoring and collaboration
- Learning environments

Pedagogical design

– what teachers in all three countries recommend

- Stronger one-task-per-screen structure with predictable sequencing to reduce cognitive load
- Age-differentiated aesthetics and narratives
- Expanding the approach to other subjects besides mathematics
- A closer alignment with national and local methods for solving arithmetic problems would help learners transfer what they do in the app directly to what they encounter in their textbooks and examinations
- The leading role of the teachers remains crucial



Accessibility and usability

– teachers recommend the following

- Implementing a universal text-to-speech control
- For parents, a way to log in and follow their child's work at home to be able to support continuity between school and home
- Touch-based interfaces are better suited than traditional keyboard and mouse input in special education contexts



Infrastructure readiness – what teachers strongly recommend

- Offline capability and data-light modes as preconditions for equitable implementation
- Clear guidance for schools on how to plan device allocation, classroom organisation, and technical support when integrating Atollo into regular lessons



Feedback, monitoring and collaboration – teachers recommend the following

- A better tool to monitor learners' work and coordinate support
- A unified teacher dashboard that allows for differentiated assignment ("this is your folder; please complete A before B"), progress tracking, and simple reporting
- Guidance and micro-courses for teaching assistants on how to scaffold tasks, how to communicate with parents about learners' progress
- Involving families more systematically, for example through optional home access to selected units

Localization and cross-cultural adaptation – what teachers recommend

- National adaptation that adjust terminology, examples, and sequencing to local curricula and teaching traditions
- Ensuring that representations of mathematical procedures reflect how they are taught in each country
- Examples and storylines resonate with learners' cultural contexts

Learning environments – what teachers recommend

- Relevant and effective use of resources depends on learning environments that promote equality, inclusion, and diversity
- Shared understanding among teachers, assistants, and school leaders on how the units fit with broader pedagogical strategies
- More systematic classroom observations and child-centered research designs
- From a “one-size-fits-all” understanding of special educational needs – to universal design

Summary and recommendations for improvements

- Maintaining strong alignment with national curricula while teaching with Atollo digital educational units
- Use digital educational resources if pedagogically appropriate
- Adopt one-task-per-screen scaffolding with clear, predictable navigation to lower cognitive load and support independent work
- Introduce age-differentiated visual and narrative profiles
- Implement universal text-to-speech, larger interaction areas, and an optional “simple visuals” mode to support diverse sensory and motor needs
- Short training modules and guidance materials for teachers and assistants on how to use
- Create optional avenues for parental involvement, fx home access to units and progress overviews



**Thank you for
your attention!**

