Atollo Project

Breaking barriers through education

D3.1 45 ready-to-use digital units created with at least 5 digital editable templates /components

Online digital learning materials ready to use in classrooms. (Electronic, EN and localised into other partner EU languages.)

20/03/2025 | KRISTINA FERARA BLAŠKOVIĆ

Co-funded by the European Union

Table of Content

About the Atollo project

The Atollo project aims to empower learners with special educational needs (SEN) by creating inclusive digital materials. Through a consortium of partners from Croatia, Bulgaria, Austria, Germany, Iceland, Norway, Ireland and Australia, including an EdTech company, universities, schools for children with SEN, public authorities, and NGO, we will analyse and compare existing programs, develop innovative digital tools and create high-quality digital educational content. We will pilot and test the digital materials and evaluate their implementation and then focus on the improvement of developed digital materials based on the feedback from the learners, teachers and experts. The result of the scientific evaluation of the use of digital materials will be an inclusive digital education toolkit that will contain advice and instructions for everyone who works with it, and uses digital educational materials for children with SEN. We will use a user-centred design approach to ensure that the materials are accessible and inclusive for learners with various types of learning difficulties. This iterative process of improvement will help us create digital materials that are effective and engaging. Furthermore, the project will provide capacity building for teachers to use developed digital materials effectively. The expected results include a cutting-edge set of digital learning materials, capacity building for teachers and an inclusive digital education toolkit for policymakers and education institutions. We will share our findings and outcomes through various channels to reach a wider audience, including policymakers and education institutions, and create awareness about the importance of inclusive digital materials for learners with difficulties. The project will have a direct impact on the involved schools and their learners as well as a broader impact on the underrepresented group of children with disabilities, their educators and wider academic community through research paper derived from this project.

Work Package 3 of the Atollo project aims to develop a cutting-edge set of digital learning materials that are accessible, responsive and tailored to needs of learners with disabilities. Within WP3, 45 ready-to-use digital units were created with at least 5 digital editable templates/components. The creation of digital education materials involved developing a detailed content plan and storyboard for each digital unit (45 digital units with at least 5 digital editable templates/components), suggesting the multimedia editable templates (e.g., videos, images, animations, simulations) that will be used in the digital units, and suggesting interactive components (e.g., quizzes, games, surveys) to enhance learner engagement and participation. Throughout the digital content creation process, the authors worked closely with the digital team, including developers, editors, content managers, and others to ensure the final product is of high quality and meets the needs of learners with disabilities. Each digital learning unit also has evaluation elements, including an evaluation form where teachers and educators can give feedback based on the students' responses.

Besides creating the digital education materials (D3.1), Work Package 3 of the Atollo project also aims to equip teachers with the necessary skills and knowledge to effectively use the digital educational content created in the previous activity. We developed a Train-The-Trainer programme (D3.2) and package that provides teachers with step-by-step instructions and guidelines for using the digital content in their classrooms. We organised online training workshops and through the Train-the-Trainer programme, teachers learned how to integrate the digital content into their teaching practices and evaluate the learners' responses. Schools were equipped with necessary equipment to deliver lectures using digital education materials.

The Atollo project Consortium

The Atollo project consortium is an Erasmus Partnerships, bringing together 12 partners.

	Partner	Acronym	Country
1	PROFIL KLETT D.O.O.	PK	HR
2	SVEUČILIŠTE U ZAGREBU	UNIZG ERF	HR
3	HOGSKOLEN I INNLANDET	INN UNI	NO
4	REGIONALEN TSENTAR ZA PODKREPA NA PROTSESA NA PRIOBSHTAVASHTO OBRAZOVANIE SOFIA GRAD	RCSIE	BG
5	ŠKOLA ZA ODGOJ I OBRAZOVANJE PULA	STE PULA	HR
6	HASKOLI ISLANDS	UI	IS
7	MATRIX INTERNET APPLICATIONS LIMITED	MATRIX	IE
8	PADAGOGISCHE HOCHSCHULE OBEROSTERREICH	PH OOE	AT
9	MINISTARSTVO RADA, MIROVINSKOGA SUSTAVA, OBITELJI I SOCIJALNE POLITIKE	MRSOP	HR
10	STADT FRANKFURT AM MAIN DER MAGISTRAT, CHARLES HALLGARTEN SCHULE IN GERMANY	CHS	DE

No	Associated Partner	Acronym	Country
11	CENTRAL QUEENSLAND UNIVERSITY	CQU	AU
12	NATSIONALNA ASOTSIATSIA NA RESURSNITE UCHITELI	NART	BG
13	DIGITAL TECHNOLOGY SKILLS LIMITED	DTSL	IE
14	TERAWE TECHNOLOGIES LIMITED	TERAWE	IE

Document Control Information

Project	Atollo
Project number	101132759
Document Title	D3.1 45 ready-to-use digital units created with at least 5 digital editable templates /components
Work Package Number	WP3
Deliverable Number	D3.1 45 ready-to-use digital units created with at least 5 digital editable templates /components
Lead Beneficiary	Profil Klett d.o.o.
Project Coordinator:	Profil Klett d.o.o.
Dissemination Level	Public - fully open
Authors	Kristina Ferara Blašković
Reviewers	Eva Smrekar, Steven Duggan, Ian Lumb, Abhishtek P C
Description	Description as per Grant Agreement
Status	**Final for Submission**
Delivery Date	31.03.2025 – indicate same as date of final deliverable ready for submission
Due date	31.03.2025 – indicated as per GA
SC Approval Date:	DD.MM.YYYY

Document history

	Date	Modified by	Comments
1	10.03.2025.	Kristina Ferara Blašković	First draft
2	15.03.2025.	Eva Smrekar	Final draft
3	27.03.2025.	Steven Duggan	QA review
4	27.03.2025.	Ian Lumb	QA review
5	27.03.2025.	Abhishtek P C	QA review

Introduction

Online digital learning materials (45 ready-to-use digital units) were created as part of the Atollo as part of the Atollo project no. 101132759, financed under ERASMUS-EDU-2023-PI-FORWARD call, topic: ERASMUS-EDU2023-PI-FORWARD-LOT1, with the goal of helping educators provide individualised, differentiated learning environments for students in inclusive settings. Our target group of learners within the project are students with learning difficulties and students with intellectual disabilities that learn at lower primary level. In mainstream classrooms, these would typically be learners aged 5-10. However, when appropriate, these digital education materials can be used regardless of the students' chronological age. This means that the content can also be used by chronologically older learners who have intellectual disabilities, as the digital materials can support them in reaching their own individualised learning outcomes. Based on the diverse abilities and learning needs of students, we aimed to provide multi-level content for students with difficulties ranging from Profound and Multiple Complex difficulties to Moderate Learning difficulties. Therefore, the digital education materials are offered at four different levels with the aim of supporting students in different inclusive settings, as well as in special schools.

The online Atollo IZZI Digital platform offers a learning experience with digital educational materials specifically designed to align with the core components of various national curricula for mathematics. These materials have adjusted expectations at different levels to cater to diverse learning needs and foster the development of digital and mathematical competencies among students. By providing digital tools, content, and accessible features, we aim to support meaningful learning experiences. The 45 digital learning units that were created should not be used as the sole teaching tool but rather as a complement tool for supporting learning, along with other textbooks or media.

Why We Chose Mathematical and Digital Competencies

As part of the Atollo Project, a comprehensive **Programme Analysis** was conducted between March and May 2024. The analysis focused on key aspects of education systems in the partner countries and provided an in-depth understanding of inclusive and special education practices.

The Programme Analysis was carried out through:

- **An online questionnaire** exploring various aspects of inclusive and special education systems, such as:
    - Curricular regimes
    - SEN categories and assessment practices
    - Inclusive and special education settings
    - Digital education policies
    - Barriers and challenges in implementing inclusive education
- **A literature review** on inclusive and special education in the partner countries
- **Insights from European organisations**, including the European Agency for Special Needs and Inclusive Education and Eurydice.

The findings of the Programme Analysis revealed significant similarities and differences across the education systems in the partner countries, as well as critical gaps in supporting learners with special educational needs (SEN). Based on these findings, the project steering committee identified **mathematical and digital competencies** as the focus areas for the project. The committee identified students with **difficulties** as target audiences for the project. The findings of the analysis, target learners and competencies were described in the Framework for common categorization of program levels, a document created as part of Work Package 2. The Framework document served as the base for the creation of 45 digital learning units.

Why Mathematical Competencies?

Mathematical competencies were chosen because:

1. **Universality**: Mathematics is a core subject in primary education across all partner countries and forms the foundation for numerical literacy and problem-solving skills.
2. **Challenges in Inclusive Education**: Research highlights the difficulty of teaching mathematics inclusively, especially to diverse groups of learners with varying intellectual abilities.
3. **Foundational Importance**: Early mathematical education introduces essential concepts like numbers, quantities, and basic arithmetic, which are critical for further academic success and daily life.

Across partner countries, mathematical learning emphasises hands-on activities, real-life applications, and problem-solving. These approaches help students build confidence and develop fluency in mathematical concepts, such as counting, measurement, and basic calculations.

Why Digital Competencies?

Digital competencies were identified as a priority because:

1. **Future Relevance**: Digital skills are essential for students to thrive in modern societies and economies.
2. **Gap in Accessibility**: Despite the importance of digital education, many students with learning and developmental difficulties lack access to tailored digital learning tools.
3. **Support for Inclusive Education**: Digital technologies can provide interactive, accessible, and engaging learning environments that address the specific needs of students with learning and developmental difficulties.

Digital Educational Content

The digital educational content was written by professional authors, experienced teachers and special education experts to ensure alignment with diverse students' needs. The authors developed a detailed content plan and storyboard for each digital unit following the Framework for common categorization of program levels and digital editable templates. The authors suggested multimedia editable templates and interactive components to enhance learner engagement and participation.

The authors worked with the digital team, which included also editors, developers and content managers. Proofreaders and translators and project partners supported the development of units through checking the languages to ensure high quality.

Therefore, the created digital educational content follows curricula to reach mathematical and digital learning objectives and competencies for students at the lower primary level. It enables teachers to easily choose differentiated tasks for students with varying learning levels to support inclusive education.

Links to 45 ready-to-use digital learning units in 6 partner languages

Atollo EN https://atollo-en.izzi.digital/

Atollo HR https://atollo-hr.izzi.digital/

Atollo BG https://atollo-bg.izzi.digital/

Atollo DE https://atollo-de.izzi.digital/

Atollo NO https://atollo-no.izzi.digital/

Atollo IS https://atollo-is.izzi.digital/

45 Digital Units and Learning Levels

As part of Work Package 3, **45 ready-to-use digital units** were created. The units are distributed across four levels, designed to meet diverse student needs. All units are available in **six different partner languages** (Bulgarian, Croatian, English, German, Icelandic, Norwegian) with each language having its own dedicated "bookshelf" (individual page).

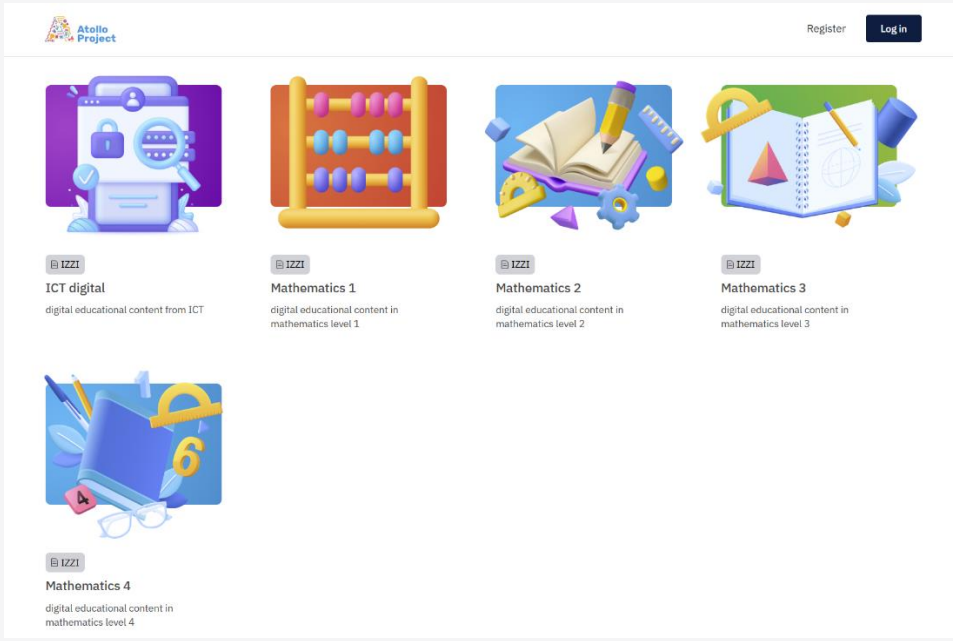
Each **bookshelf**/page contains five publications (Picture 1):

1. **Mathematics Level 1**
2. **Mathematics Level 2**
3. **Mathematics Level 3**
4. **Mathematics Level 4**
5. **ICT** – a standalone publication covering all four levels

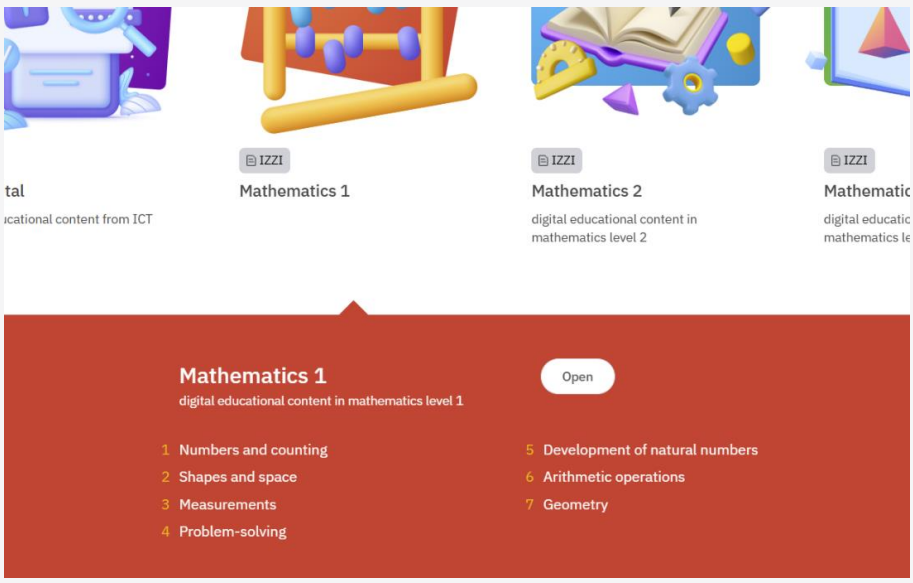
Each of the **four Mathematics** publications includes **7 modules** (Picture 2) with **10 units**, while the **ICT publication** comprises **five units:**

- Information acquisition and processing
- Technology and equipment
- Digital skills
- Creation and communication
- Ethics and Security

The structure ensures that **every module** is available at **four distinct levels**, tailored to accommodate students' needs and **address their learning difficulties**, ranging from Profound and Multiple Learning Difficulties to Moderate Learning Difficulties. The content and activities are thoughtfully adapted at each level to align with the identified needs, ensuring accessible learning and engagement for learners. As levels progress from 1 to 4, expectations rise, and learning outcomes become more advanced.



Picture 1 Four mathematics and one ICT publication



Picture 2 Seven modules within each mathematics publication

Learning Competencies and Objectives

At each level, the learning objectives represent **adjusted expectations** compared to the mainstream curriculum. Level 1 outlines fundamental objectives, progressively increasing in complexity as levels rise. Therefore, Level 4 contains the most complex activities and objectives. The mathematical objectives are defined for different areas of knowledge that learners should attain – Numbers and Counting, Shapes and Space, Measurements, Problem-Solving, Development of Natural Numbers, Arithmetic Operations and Geometry. The digital areas of knowledge are Information Acquisition and Processing, Technology and Equipment, Digital Skills, Creation and Communication, Ethics and Security.

Digital Editable Components / Templates

As previously stated, the digital educational content is organised into four publications / levels for mathematics and one ICT publication. Each mathematics level contains seven modules covering main topics in mathematics. Each level of mathematics contains 10 digital learning units, and 5 units were created for ICT. At the top of each digital learning unit there is first a list of learning outcomes (what the student will be able to do). Each of the 45 units contains at least five different digital editable components, which were analysed as most suitable for the level of difficulty. The choice of which digital components would be used was made in agreement with the consortium partners, through questionnaires and discussions. Often professional authors and content creators opted for more than five digital editable components in a unit to better support students in reaching their learning outcomes. Units often contain more than 10 digital editable components, and animations were also included in many units that were not initially planned.

The digital learning activities in units offer instant feedback to students and the evaluation of their answers (students immediately see if they answered correctly).

The most used digital activities / components on the platform include:

Colouring Book - Colouring is an enjoyable and therapeutic activity for people of all ages. Benefits: encouraging self-expression, developing pre-mathematical skills, developing digital skills.

Draw - Drawing is encouraging activity that fosters creativity, boosts self-esteem and enhances cognitive skills. Benefits: encouraging creativity and self-expression, enhancing the digital and pre-mathematical skills.

Memory – Memory activities include various types such as matching words with words, words with images, words with sounds, sounds with sounds, and images with sounds. Benefits: cognitive development (memory enhancement, attention, and concentration), visual and spatial skills (pattern recognition, spatial awareness), language and communication (vocabulary building, instructions following), emotional regulation (patience and self-control, confidence building), motivation and engagement (fun, interactive, engaging way of learning).

Image Puzzle - Student needs to put the pieces in the right places until they form a complete picture. Benefits: enhancing cognitive skills, and problem-solving abilities, while also providing a fun and engaging way to improve focus and patience.

Labyrinth - Labyrinth offers a rich and engaging activity that appeals to children's natural curiosity, desire for challenge, and love for play. Benefits: improves spatial awareness, problem-solving skills, and hand-eye coordination, while also fostering patience and concentration in a fun, engaging way.

Pathfinder - Pathfinder games provide a stimulating and rewarding experience that combines elements of challenge, exploration, problem-solving, and creativity. Benefits: promotes precoding skills, enhances literacy skills and vocabulary expansion.

What`s Missing - The "What's Missing" game presents a visual display where a child observes a set of images, one of which is then removed, challenging them to identify the missing item. Benefits: enhances visual perception, memory retention, and attention to detail.

True False - The True or false digital quiz game presents players with a series of statements or questions, challenging them to discern whether each statement is true or false by selecting the corresponding option. Benefits: helps improve critical thinking skills, and comprehension of visual information in an engaging way.

Multiple Choice - The Multiple Choice presents variety of questions or prompts, offering several answer options from which student must select the correct one. Benefits: offers structured learning, reinforces comprehension and accommodates different learning styles through varied response options.

Matching - The Matching presents players with pairs of related items or concepts, challenging them to match each item with its corresponding counterpart. Options for content creation: matching pairs of words, images, videos, audios, defining the number of objects. Benefits: enhances memory retention, improves cognitive skills, and promotes pattern recognition.

Matching Connection - The Matching Connection presents players with a series of items or concepts that student needs to match based on logical connections. Benefits: promotes cognitive development, logical reasoning, and understanding of relationships between concepts.

Drag and Drop - In Drag and Drop students categorize elements by dragging them to their correct locations or groupings. Benefits: Enhances engagement, facilitates interactive learning experiences, accommodates different learning styles, and provides immediate feedback, promoting better comprehension and retention of information.

Drag and Drop Order - Drag and Drop Order is a component that requires arranging given elements in the specified order by dragging and dropping them. Benefits: promoting cognitive skills such as sequencing, organization, and spatial reasoning in a visually engaging and interactive manner, enhancing their comprehension and learning experience.

Dragonator - Dragonator is a digital activity where students drag and drop image items directly onto the background image, fostering engagement and spatial understanding while solving tasks. Benefits: promoting spatial and pre-mathematical skills, facilitating comprehension and engagement while accommodating diverse learning needs.

Clickable - Clickable allows students to interact with content by selecting or tapping on specific elements. Options for content creation: click on image, click on text, click on audio. Benefits: enhances concentration and attention to detail by offering interactive features that engage multiple senses and allow for focused exploration of content.

Clickable Word Position - A Clickable Word Position enables students to interact directly with individual letters. They need to identify the position of the letter in the word (at the beginning/in the middle/at the end). Benefits: reinforces letter recognition and word formation skills, provides a supportive environment for practicing spelling and language comprehension, enhancing literacy development.

Symmetry - Symmetry prompts students to explore and create symmetrical designs by manipulating elements such as shapes, lines, or images across an axis. Benefit: helps develop spatial awareness and cognitive abilities, fostering visual processing and understanding of geometric concepts in a structured and engaging manner.

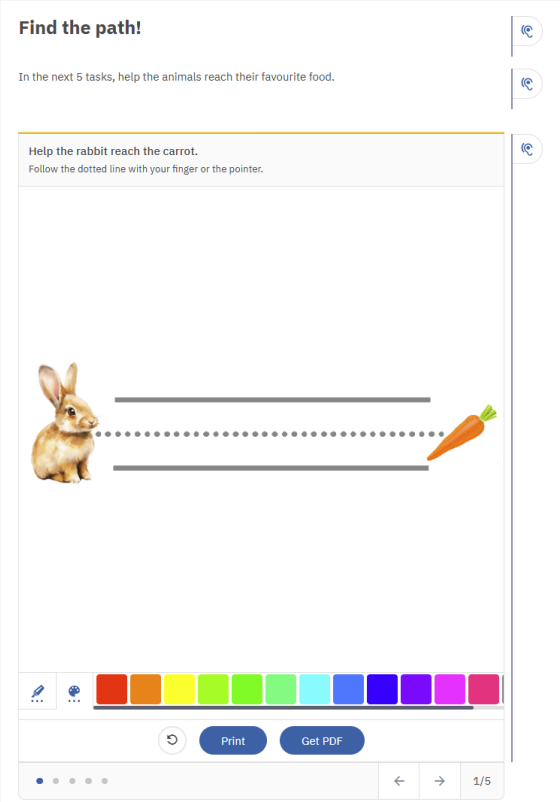
Number Liner - A Number Liner provides a visual representation of numbers along a line, allowing interactive exploration of numerical relationships, practice of counting, and understanding concepts such as addition and subtraction. Benefits: tangible and visual representation of numerical concepts, helps understand and reinforce, mathematical skills (counting and addition).

Scales - Scales is a virtual scale that students use to compare and measure objects, quantities, or concepts, allowing for hands-on exploration of mathematical principles such as equivalence, proportionality, and measurement. Benefits: fosters critical thinking, enhances problem-solving skills, and conceptual understanding.

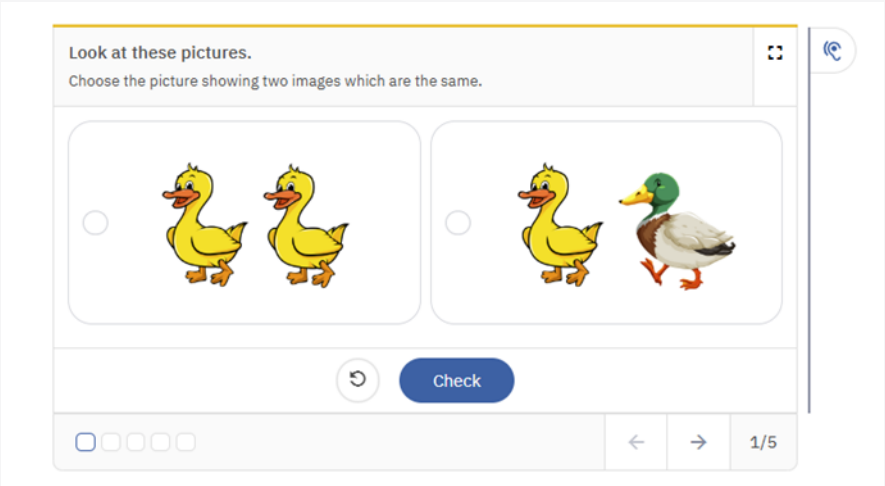
Math Problem Solve - Math Problem Solve is the step-by-step process of solving mathematical exercises. Benefits: understand and apply mathematical concepts, enhancing problem-solving skills, confidence, and comprehension in mathematics.

Video - Educational videos are a vital component of digital educational content due to their ability to engage students, improve comprehension, offer flexibility, and support diverse learning styles. Benefits: engagement and comprehension through the combination of visual and auditory stimulation, making complex information more accessible and easier to understand.

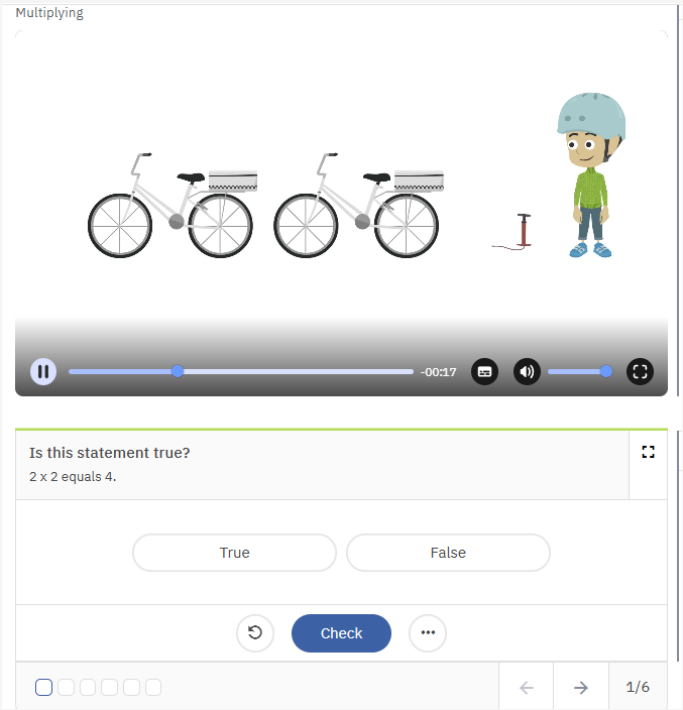
Interactive Video - Dynamic and engaging educational content that incorporates interactive elements allowing viewers to interact with the video. Benefits: more immersive and effective learning compared to traditional video content.



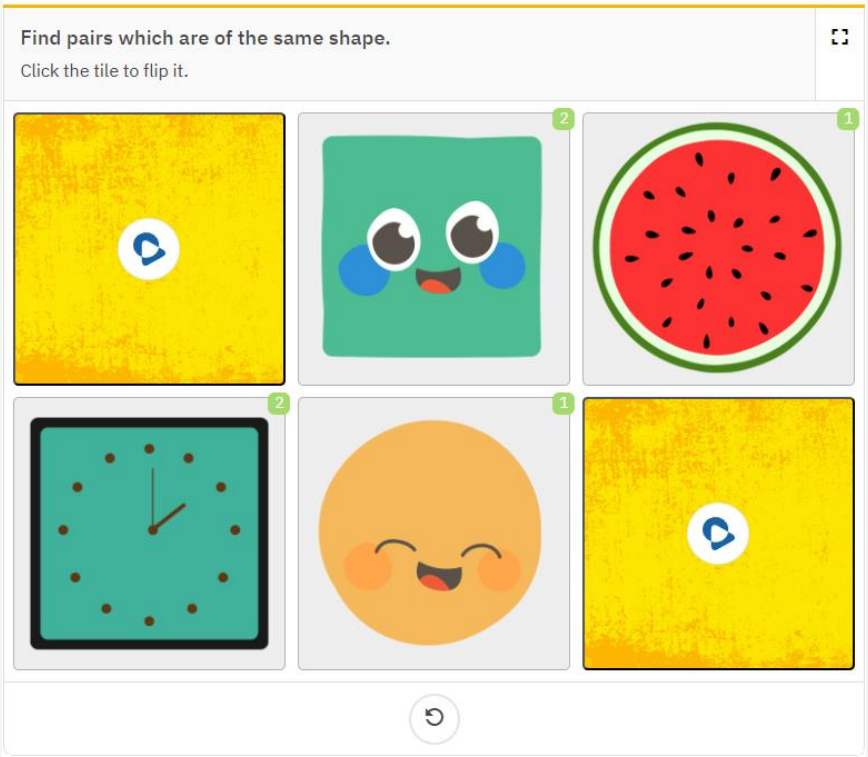
Picture 3 Example of a Drawing Activity



Picture 4 Example of a Quiz



Picture 5 Examples of an Animation and True or False activity



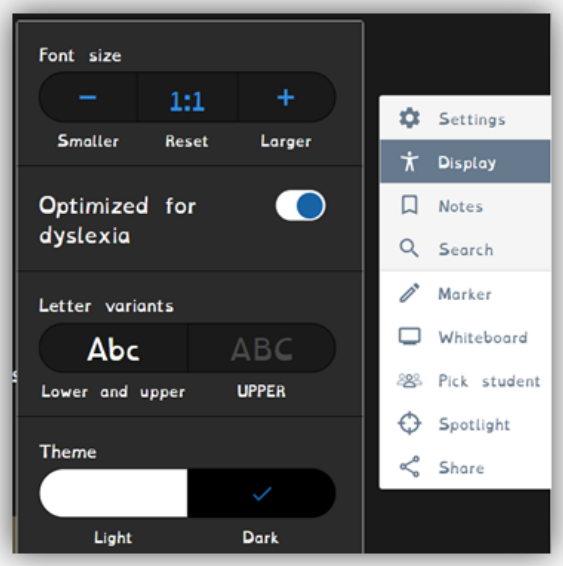
Picture 6 Memory

Accessibility Features and Languages

Ensuring digitally accessible educational content is essential for students with special educational needs (SEN). Digital accessibility means that content is designed and developed in a way that enables all users, including those with difficulties and disabilities, to access, interact with, and benefit from it. For students with SEN, digital accessibility is not just a convenience – it is a necessity. Accessible content allows these students to fully participate in learning activities.

The IZZI platform is committed to meeting all mandatory accessibility requirements and continually strives to exceed them by enhancing accessibility features (Picture 7). Regular updates and improvements ensure that it remains in line with the latest accessibility standards and guidelines.

Therefore, IZZI provides alternative inclusive versions of the same content (e.g. regular and adapted version of the text, audio recordings, alt descriptions of images, videos, and video titles, etc.). Besides there is a toolbar with several options for students to personalise content: bookmarks, notes, highlights, drawings, stresses, change of font size or case, light and dark theme, optimisation for students with dyslexia.

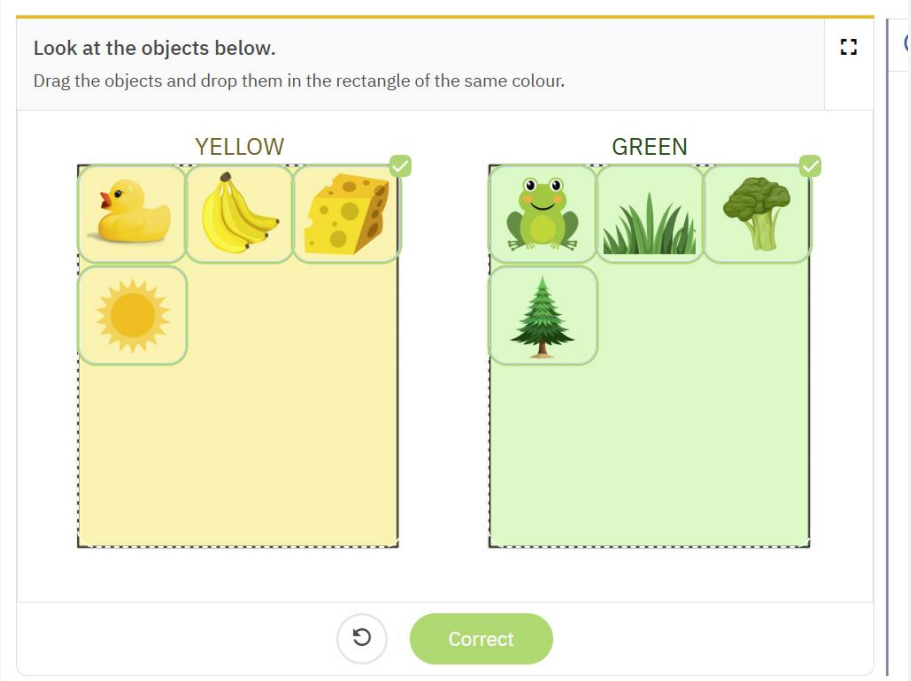


Picture 7 Accessibility Features

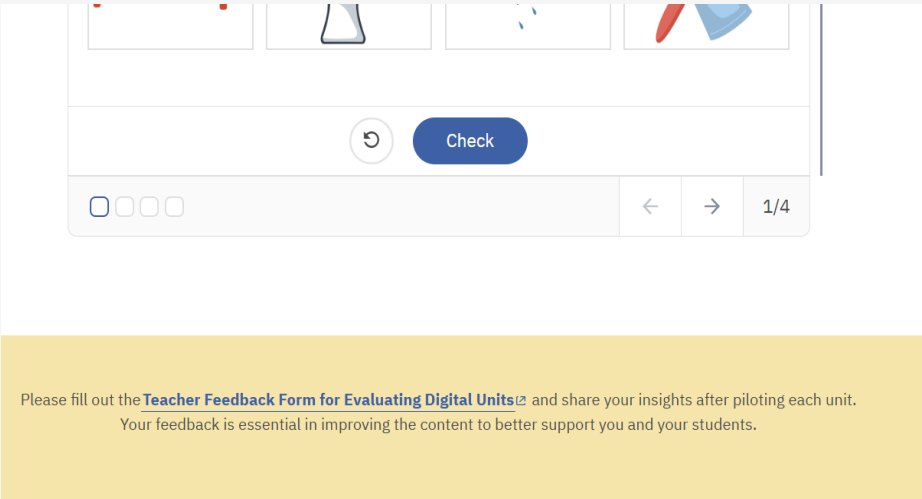
The 45 digital learning units were translated into six partner languages. The partners on the project conducted quality checks to ensure that the language is correct. Proofreaders were contracted to ensure correct language. To further to support accessibility in understanding content, animations were used in many units. Animations are short videos with diverse characters that help paint a better understanding of mathematical and ICT concepts using real-life examples and visuals. The voices in animations were recorded with AI in certain languages, while for other languages native speakers were recorded when it was noted that AI would not offer an adequate solution.

Evaluation Elements in a Unit

Each digital unit also has evaluation elements that allow teachers to provide feedback on how learners respond to each component (Picture 8). Connected with Work Package 4, each unit at the bottom contains a link to a questionnaire where teachers evaluate learners' responses to the content and activities in the unit (Picture 9).



Picture 8 Activity's Feedback to Students



Picture 9 Evaluation Element for Teacher Feedback

Ensuring Content Readiness for Classroom Use

The digital units on the platform support blended learning, which means that one unit can be used across multiple lessons, and the digital materials should be combined with other teaching resources, materials and methods. Therefore, the activities on the Atollo IZZI platform aim to be a flexible and additional support material to the learning process. The digital units contain various activities that can be used to introduce a concept, spark the students' interest or reinforce a concept. These activities can also be used as a quick starter, a closing activity or a digital break from paper textbooks.

The activities often provide practical illustrations and visuals using real-life examples. This approach aims to help students learn more effectively by making the material more concrete and relatable. The occasional use of animations or videos further supports understanding, as it allows students to connect sometimes abstract ideas with tangible, real-world applications. Most activities are interactive so that the students can practice mathematical calculations or concepts. Students can do these activities as a whole-class or individually, based on the availability of technology in classrooms, individual student' s learner profile and abilities. Alternatively, students can solve exercises individually on their own devices and receive feedback. Learners at level 3 and 4 may be able to work individually on certain tasks, while learners at levels 1 and 2 most likely need adult support.

When choosing a level for students, educators should use the descriptions of target learners for each level only as general guidelines to inform their decisions. They can select levels based on the desired learning objectives, as well as the individual needs and learning profiles of each student. Alternatively, teachers may decide to start all students at the most basic level, allowing them to advance through the levels as they demonstrate mastery and skill development. The digital education materials aim to offer flexibility and support a personalised learning experience for students.

Teachers participating in the pilot testing across three countries which started as part of Work Package 4 at the beginning of March 2025 were trained with the Train-the-Trainer Programme (D3.2). The pilot testing will serve as an additional quality check to ensure readiness for widespread use. Throughout the pilot testing and after the evaluation feedback, further improvement of the digital education content will be conducted to better support students and teachers.

Conclusion

Within Work Package 3 of the Atollo project, 45 ready to use digital learning units were created. Each unit was created with than 5 digital editable templates, often the number surpasses 10 templates and includes animations. The digital educational content was written by professional authors, experienced teachers and special education experts to ensure alignment with diverse students' needs. The authors developed a detailed content plan and storyboard for each digital unit following the Framework for common categorization of program levels and digital editable templates. The authors suggested multimedia editable templates and interactive components to enhance learner engagement and participation.

The digital team which included editors, developers and content managers supported the creation of the digital education content. All 45 units were translated into six partner languages and all are available online. Proofreaders and project partners further helped the development of units through checking the languages to ensure high quality.

In order to begin using and testing digital learning units, a Train-the-Trainer programme was created and conducted (D3.2). The pilot testing has officially started at the beginning of March in three pilot countries and many schools. This means that the project is now progressing further into the next stage, which is testing and evaluation within Work Package 4. During this piloting phase, digital learning units will be constantly updated based on the feedback provided by schools testing the materials. Narrations are currently available only in the English bookshelf but are planned for other languages, as an additional accessibility feature that had not been initially planned.

Atollo Project

Breaking barriers, building futures

Legal Disclaimer

The European Commission's support to produce this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Project: 101132759 — DigiEdu4SEN — ERASMUS-EDU-2023-PI-FORWARD-LOT1

Co-funded by the European Union