Atollo Project

Breaking barriers, building futures

Framework for common categorization of programme levels

WP2 Program Analysis and Framework Development for Inclusive Digital Education

14/06/2024 | ANNA MAGNEA HREINSDÓTTIR

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About the Atollo - DigiEdu4SEN project

DigiEdu4SEN (Digital Education for Special Educational Needs) is a pioneering new EU-funded project focused on enhancing the learning experiences of people with disabilities all over Europe.

The main objective of the project is to develop high-quality, accessible, and inclusive digital materials tailored for learners with various disabilities — increasing learners' engagement and participation and improving their overall performance. The international initiative takes a scientific and professional approach to creating innovative digital learning content that addresses a broader range of needs, making it a versatile and inclusive educational solution.

This document represents D2.4 Framework for common categorization of program levels deliverable of the Building Digital Education Environment for Learners with Special Education Needs (DigiEdu4SEN) project no. 101132759, financed under ERASMUS-EDU-2023-PI-FORWARD call, topic: ERASMUS-EDU-2023-PI-FORWARD-LOT1.

Framework for common categorization of program levels describes learning and teaching support for each difficulty in different program level, suggest digital content suitable for different program levels, agrees on the competences that the pilot digital content will address, regardless of their program level or country of origin.

This Framework document will be a useful tool for the development of digital educational content that is tailored to the specific needs and requirements of learners with disabilities at different levels of the programmes. In this document we will identify and suggest digital editable templates (components) appropriate to the different programme levels.

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	SKOLA 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	National Association of Resource teachers	NART	BG

No	Associated Partner in the process of joining the consortium	Acronym	Country
13	Terawe Technologies Limited	TERAWE	IE
14	Digital Technology Skills Limited	DTSL	IE

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Framework for common categorisation of programme levels

Introduction

From the program analysis, it is necessary to describe the programs by country, with an emphasis on similarities. This introductory section explains that based on the programme analysis, partner meetings, and ultimately the Think Tank workshop, it was decided that digital educational content will be developed for mathematical and digital competencies. It is important to highlight that the analysis showed comparability in learning mathematical competencies, while digital competencies are difficult to compare at the level of our countries. However, given the importance of digital competencies, it has been agreed that the development of materials will utilize the European Framework for Digital Competence (DigCompEdu).

Furthermore, the programme analysis has shown that all countries represented in the Atollo project have geared their policies towards inclusive education over the course of the last years. Thus, the product of the Atollo project should be an app that is suitable for inclusive as well as special education settings.

As shown in the programme report, a lot of countries struggle with funding of inclusive education settings, especially concerning personal resources. The analysis revealed as well that teachers struggle in most countries with one of the main aims of inclusive education (and of special schools), which is to provide individualized, differentiated learning environments that meet the needs of all learners – especially concerning different levels of cognitive abilities. However, in a lot of countries, students with intellectual disabilities seem to be a group under the umbrella term of students with SEN that is regarded as the most challenging in terms of fitting their learning needs.

As shown in the programme analysis report, SEN categories differ significantly across partner countries concerning learners with cognitive impairments. Thus, it seems to be hard to address precisely one group of learners across all countries.

This Framework is a flexible document that is built on the country analysis, questionnaire on learning competences in mathematics and digital learning within the participating countries and on feedback from teachers. This will be piloted in the countries and adapted to learners and teacher's needs.

Thus, the product of the Atollo project should be an app that helps teachers to provide individualized, differentiated learning environments for all students in inclusive (and special school) settings. Hence, the app should enable teachers to easily choose different tasks for students with varying cognitive levels to foster digital and mathematical competencies. However, foremost the app should meet the learning needs of learners with intellectual disabilities.

Inclusive Education

All learners of any age are provided with meaningful, high-quality educational opportunities in their local community, alongside their friends and peers (European Agency, 2021). To enable this the focus needs to shift from categories a learner may or may not fall into - to the barriers some learners experience within the education system that may marginalise or exclude them (European Agency, 2024). A 'design for all' or holistic universal design mindset is where everything is designed to be 'usable by all' without the need for adaptation (UNESCO, 2020). This preventative approach is an aspirational standard for implementing educational settings built for all learners. In Ensuring the right to equitable and inclusive quality education, UNESCO (2018) argues that there is a need for greater clarity around the principles underpinning a more holistic approach to quality education for all.

Universal design continues to be a leading vision in ICT design (Fisseler, 2020). There are technical or economic limits on universal design that cannot yet be overcome. As such, compensatory technologies (i.e. assistive technologies) are still required. Furthermore, even when technologies are implemented according to universal design principles, they may still provide different levels of interaction quality for different users. These differences in user experience may lead to or exacerbate discrimination. For example, using alternative interaction patterns to create inputs or capture content, such as using eye movements to position the pointer on a screen or audio output of screen content, requires different amounts of time. These differences can be decisive. For instance, in the educational context, there are usually time limits in assessment situations. Learners using alternative interaction patterns may be at a disadvantage if their interaction with software is more time-consuming or more tiring than for other learners (Cunningham & Lamond, 2021; Murchland & Parkyn, 2010).

The Digital Education Action Plan (2021–2027) states the need to advance digital technology as a given, while recognising the role of different stakeholders in achieving successful digital transformation in education: Digital technology, can fully support the agenda of high-quality and inclusive education and training for all learners. It can facilitate more personalised, flexible, and student-centered learning, at all phases and stages of education and training. However, the type and design of technological tools and platforms, as well as the digital pedagogy used, impact directly on whether individuals are included or excluded from learning. Students with disabilities, for example, need tools that are fully accessible if they are to benefit from digital transformation (European Commission, 2020).

Transforming education in a digital world to enable inclusive learning experiences requires recognition of the synergies and dependencies between inclusive education and digital solutions and developments (European Agency, 2022)

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The following recommendations for the product of the Atollo project were made after a thorough program analysis was done in each country:

- the product should help teachers to practice mass-tailored education – both in inclusive as well as special school learning settings
- the product should be able to offer differentiated tasks for a heterogeneous group of learners concerning cognitive abilities. Thus, the product should cover a spectrum of cognitive ability levels, ranging from learning levels often associated with intellectual disabilities to gifted children. Covering such a spectrum, students (or teachers for them) could choose a level and the app would not be limited to a category label
- the product should focus on the first four years of primary education
- the product should focus on mathematical and digital competences

The first four years of primary education in the participating countries are conceptualized as a cycle focused equipping learner with basic competences following a class teacher concept. These similarities are a point of focus reference in the framework.

All partner countries have geared their systems more strongly towards inclusive education over the last decade – also due to the obligations following the ratification of the Convention of the Rights of Persons with Disabilities. At the same time, many teachers and other practitioners complain about a lack of resources for inclusive teaching.

Students with cognitive impairments are the biggest group of learners with SEN. Teachers report that they have strong difficulties in providing inclusive learning environments that meet the needs of students labelled as having intellectual disabilities – due to a lack of personal resources and know-how. Thus, covering students with cognitive impairments, and especially students with intellectual disabilities, might help to fill the gap indicated above. In other words, there seems to be a growing demand for supporting teachers to cater to the educational needs of learners with cognitive impairments.

In all partner countries, there have been strong efforts to digitalize education systems. Numerous policies have been implemented to help equip schools with the necessary hardware and other parts of a digital infrastructure, to help teachers acquire the necessary skills and knowledge to prepare children and young people to become citizens of a digitalized world.

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Main target group of learners - Cognition and Learning

In this project the focus is on Learners in primary schools aged 5 - 10 years with Cognitive and Learning difficulties in Partner Countries.

The following definitions (Tutt & Williams, 2015) are the generally accepted definitions used to support the identification of needs of learners:

Moderate Learning Difficulties

Learners

Learners with moderate learning difficulties will have attainments significantly below expected levels in most areas of the curriculum, despite appropriate interventions. Their needs will not be able to be met by normal differentiation and the flexibility of the National Curriculum. They should only be recorded as MLD if additional educational provision is being made to help them to access the curriculum. Learners with moderate learning difficulties have much greater difficulty than their peers in acquiring basic literacy and numeracy skills and in understanding concepts. They may also have associated speech and language delay, low self-esteem, low levels of concentration and under-developed social skills (DfES, 2003). It is important to be aware that using MLD concerning individual pupils can have negative implications for their identity and status. MLD is in an uncertain area between severe learning difficulties and those not having SEN but having low attainment. It is used in contrast with specific learning difficulties and should be identified through specialist assessment. Learners with MLD have difficulties in learning across the curriculum, requiring support in all or most areas of the curriculum. This category can be used when a pupil's difficulties are seen and evidenced as being wide-ranging and with a significant impact on attainment. Attainment for these learners is well below that expected of their peers in all or most areas of the curriculum despite appropriate differentiation and intervention.

Learning

Learning is significantly more difficult for these pupils, who experience difficulties in acquiring skills and making progress in basic literacy and numeracy. These learners will also experience difficulties in learning in other areas

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of the curriculum. They are likely to have additional difficulties in speech and language development, this can be in expressive and/or receptive language and be apparent in spoken and written communication. They are also likely to have immature social skills, memory, and/or processing difficulties, with limited concentration and attention.

Support

Many of these learners' needs will be met within a school's delegated notional SEN Budget and by providing appropriate high-quality teaching, differentiation and intervention across most or all areas of the curriculum. Therefore, the needs of most learners with MLD can be met without the need for a statement or Education, Health, and Care Plan

Specific Learning Difficulties

Learners

Learners with SpLD are seen to have difficulties in one or more specific aspect of their learning, but not all of them. This category can include learners with a diagnosis of 'dyslexia', 'dyscalculia' and/or 'dyspraxia'. A diagnosis of these specific difficulties must be from the appropriate professional, schools must only use these terms to describe a learner's Special Educational Need if there is evidence of the diagnosis from a recognised professional. However, schools can use the category of 'SpLD' if it is felt the difficulties are specific in nature and differences across a child or young person's learning and development can be evidenced. SpLD can occur across the whole ability range. The severity of the difficulty can range from mild to very severe.

Learning

In addition to a specific area of need, learners with SpLD may have memory and processing difficulties, difficulties in organisational skills and coordination difficulties. Specific Difficulties in Literacy (or diagnosed Dyslexia): The learner shows marked and persistent difficulties in acquiring the skills for accurate and fluent reading. The learner may have significant difficulties in learning to spell, and may have poor comprehension, handwriting and punctuation. Their performance in these areas is likely to be below their performance in other areas. These children may quickly gain skills in some subjects and not in others. West Berkshire uses the Rose Review Definition of Dyslexia in describing the profile of the learner with SpLD with a literacy difficulty. Specific Difficulties in Numeracy (or diagnosed Dyscalculia): Learner shows marked and persistent difficulties in grasping basic number concepts. The learner may have significant difficulties in learning number facts and calculation processes. Specific Difficulties in motor skills (or diagnosed Dyspraxia): Learner shows marked and persistent. For the vast majority of these learners their needs will be met within a school's delegated notional SEN Budget and by providing appropriate high-quality teaching, differentiation and intervention where the support and intervention is targeted on the specific area of need. Therefore, the needs of most learners with SpLD can be met without the need for a statement or Education, Health and Care Plan. 8 difficulties in their organisation of movement and may appear clumsy. The learner may have significant difficulties in gross and fine motor skill development, and may appear reluctant to engage in actions needing motor planning – skipping, hopping, catching a ball, etc. The learner may have poor balance and coordination. They may be late to develop language.

Support

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For most of these learners, their needs will be met within a school's delegated notional SEN Budget and by providing appropriate high-quality teaching, differentiation, and intervention where the support and intervention is targeted on the specific area of need. Therefore, the needs of most learners with SpLD can be met without the need for a statement or Education, Health and Care Plan.

Severe Learning Difficulty

Learners

Learners with SLD have significant and severe difficulties in learning across the curriculum, requiring support in all areas of the curriculum. This category can be used when learning is significantly more difficult for these pupils, who experience difficulties across the curriculum, and in developing wider life skills. The wider difficulties usually include weaknesses in the development of mobility Most of these learners will require direct and intensive intervention to support progress and development with learning, developing, and maintaining motor skills, self-help skills and independence. They are also likely to 9 child/young person's difficulties are seen and evidenced as being wide-ranging, complex, and with a very significant impact on attainment. Attainment for these learners is likely to be within the upper levels of P scales throughout their school career (that is P4-P8).

Learning

Learning is significantly more difficult for these pupils, who experience difficulties across the curriculum, and in developing wider life skills. The wider difficulties usually include weaknesses in mobility and coordination development, perception and development of self-help skills, and communication development. Most learners with SLD will use signs or symbols to communicate.

Support

Most of these learners will require direct and intensive intervention to support progress and development with learning, developing, and maintaining motor skills, self-help skills and independence. They are also likely to require specialist support in the use of signs or symbols as a means of communication. Most pupils with SLD will be known to a range of professionals. They are likely to have a statement or an Education, Health, and Care Plan and need specialist provision.

Profound and Multiple Learning Difficulty

Learners

Learners with PMLD have severe and complex difficulties in learning and development. They are likely to have additional significant difficulties with communication, sensory impairment, and/or physical difficulties. This category can be used when a child/young person's difficulties are seen and evidenced as being wide-ranging, very complex, and with a very significant impact on attainment. Attainment for these pupils is likely within the lower levels of P scales throughout their school career (P1-P4).

Learning

Learning and development for these pupils is significantly more difficult due to the severity and complexity of each pupil's needs. These pupils will have difficulties in developing and maintaining mobility. They will require significant intervention in all areas of development.

Support

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These pupils will require a very high level of specialist support to develop, including support to make progress in learning, mobility and personal care. They are likely to need sensory stimulation and a highly personalised curriculum. They are likely to communicate using gestures, eye pointing, symbols or for some pupils very simple language. Most children with PMLD will have been identified before they start school and will be known to a range of professionals. They are highly likely to have a statement, or an Education Health and Care Plan and their needs are usually best met in specialist provision

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Mathematical competences – suitable content

In primary education across partner countries, mathematical competences are systematically developed to equip students with essential skills for numerical literacy and problem-solving. While specific curriculum frameworks may vary, there are several commonalities observable across the partner countries:

Foundational concepts such as numbers, quantities, and basic arithmetic operations are introduced in the early years, laying the groundwork for numerical proficiency.

Students engage in hands-on activities, explorations, and practical applications to deepen their understanding of mathematical principles and develop fluency in counting, calculation, and measurement.

Furthermore, problem-solving is emphasized as an integral component of mathematical learning, with students encouraged to apply mathematical concepts to authentic scenarios and develop strategies for tackling complex problems.

As learners progress through primary education, their mathematical competences are further honed and expanded to encompass more advanced topics such as fractions, decimals, geometry, and data analysis.

Digital technologies play a significant role in enhancing mathematical learning experiences, providing interactive simulations, visualizations, and tools to support conceptual understanding and skill development.

Additionally, there is a strong emphasis on critical thinking, communication, and collaboration in mathematics, as students learn to articulate their reasoning, evaluate mathematical solutions, and engage in meaningful mathematical discourse.

Overall, these shared educational priorities underscore a collective commitment to nurturing mathematical curiosity, confidence, and competence in students from the earliest stages of their education, preparing them for success in further academic pursuits and everyday life.

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Digital competences – suitable content

Digital competences are intricately woven into the curriculum, reflecting a collective effort to equip students with essential skills for navigating and engaging with digital technologies effectively and responsibly. While specific curriculum frameworks may vary, there are several common themes observed across nations.

Firstly, students are systematically introduced to digital devices and systems, learning not only how to operate them safely but also understanding their basic components and functionalities and to express themselves, creating meaning using these devices.

Moreover, there is a pronounced emphasis on digital identity, encompassing the recognition of the distinction between digital and physical personas, alongside the practice of responsible online behavior to safeguard personal information and privacy.

Additionally, students are guided to master the management of digital information, including data organization, storage, and retrieval, while also exploring fundamental concepts of algorithms and basic programming to foster computational thinking and creativity.

Furthermore, there is a concerted effort to instill critical digital literacy skills, empowering students to critically evaluate digital content, discern reliable sources of information, and comprehend the societal implications of digital communication.

Collaborative and creative digital projects are frequently integrated into the curriculum, providing students with opportunities to actively engage in problem-solving, communication, and collaboration within digital environments.

Overall, these shared educational priorities underscore a collective commitment to preparing students to thrive in an increasingly digital world by nurturing their digital literacy, critical thinking, and responsible digital citizenship from the earliest stages of their education.

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Descriptions of LEARNING competences and outcomes

This project is based on the European Qualifications Framework (EQF) eight levels of competences, that are assets of descriptors indicating the learning outcomes relevant to qualifications at that level in any qualifications system.

The learning outcomes are defined in terms of:

Knowledge: in the context of EQF, knowledge is described as theoretical and/or factual.

Skills: In the context of EQF, skills are described as cognitive (involving the use of logical, intuitive, and creative thinking) and practical (involving manual dexterity and the use of methods, materials, tools, and instruments).

Responsibility and autonomy: In the context of the EQF responsibility and autonomy are described as the ability of the learner to apply knowledge and skills autonomously and with responsibility.

As the project´s target group is learners in primary education, aged 5 – 10 years the focus will be on four levels in mathematics and digital learning as follows:

- Level 1 relates to learners with Profound and Multiple Learning Difficulty
- Level 2 relates to learners with Severe Learning Difficulty
- Level 3 relates to learners with Specific Learning Difficulties
- Level 4 relates to learners with Moderate Learning Difficulties

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MATHEMATICS

Level 1 – Mathematics

Learning Objectives on Level 1:

- Develop and apply basic mathematical thinking.
- Gain an understanding of quantities, numbers, operations, and measurements within an established number range.
- Apply mathematical operations in real-life situations, in play, and in practical contexts.
- Acquire basic knowledge and skills for spatial orientation and spatial visualization.

Numbers and counting:

- Recognizes objects by certain properties (same or different color, shape, material, purpose).
- Recognizes whether an object belongs to a set or not.
- sort objects into sets with the same number of members (comparing quantities without counting).
- Shows sets that have more/fewer members (compares quantity without counting).
- Among the offered sets, selects two sets with an equal number of members.

Shapes and space:

- Expresses the position of objects in the environment concerning themselves; draws lines on templates (straight and curved, open and closed).

Measurements:

- From several objects with different properties, select the extreme (largest or smallest, thickest, or thinnest, longest, or shortest).
- Develop concepts by comparing, estimating, and measuring.
- Learn about various units of measurement from the children's everyday experiences (e.g., time, length, weight, money).

Problem-solving:

- Distinguishes between possible and impossible events, arranges simple puzzles, mazes, or inserts, and moves according to a given rhythm or pattern.

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- Orients themselves in space and relates to it (spatial experience)
- Recognizes geometric (basic) shapes, names, reproduces, and constructs them

Development of Natural Numbers:

- Develop fundamental mathematical skills by observing and manipulating objects.
- Work with quantities: arranging, ordering, and comparing them.
- Associate numbers with quantities and vice versa.
- Operate with quantities (numbers).
- Read and write digits.
- Develop the concept of numbers, including zero; count forwards and backward, possibly in steps of two or larger steps.
- Use the concepts of double and pair.
- Ensure understanding of numbers considering their cardinal, ordinal, arithmetic, and measurement aspects.
- Build and reinforce the number range up to 20, possibly extending beyond 20.
- Introduce the symbol for ten in connection with bundling.

Arithmetic Operations:

- Playful interaction with numbers and arithmetic operations combined with concrete actions and visual representations.
- Perform arithmetic operations in the additive range: adding and subtracting, decomposing, and completing.
- Possibly extend beyond ten.
- Introduce and develop the operations of doubling and multiplying.
- Introduce division and measuring as different operations.
- Introduce the concept of half.
- Work on multiplication tables within the established number range, possibly including their inverses.
- Solve practical problems from the immediate environment.

Geometry:

- Orient in space and understand spatial relationships through hands-on experiences; recognize and name properties of objects.
- Observe, order, and structure spatial relationships and shapes from the children's environment.
- Manipulate surfaces and solids.
- Introduce terms such as corner, edge, and face using geometric shapes.
- Experiment with rulers.

Level 2 – Mathematics

Learning Objectives on Level 2:

- Develop and apply basic mathematical thinking.
- Gain an understanding of quantities, numbers, operations, and measurements within an established number range.
- Apply mathematical operations in real-life situations, in play, and practical contexts.
- Acquire basic knowledge and skills for spatial orientation and spatial visualization.

Numbers and counting:

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- Counts objects (shows objects being counted, says number words).
- Recognise and write numbers according to the template, then independently.
- counts sets.
- Notice relationships among sets; add and subtract up to 5, 10, 20; recognise zero and understand its value.
- Compares numbers and determines the first and last number in a sequence.

Shapes and space:

- Identifies, differentiates, and names a cube, cuboid, sphere, and cylinder.
- Pairs and creates sets of identical objects.
- Recognizes and repeats patterns in sequences.
- Names relationships between objects (up-down, in front-behind, left-right).
- Distinguishes between straight and curved lines.
- Identifies, differentiates, and names geometric shapes (square, circle, and triangle).
- Recognizes and names relationships among objects (near-far, inside-outside).
- Names straight and curved surfaces, recognizes and draws points in or outside an object, and draws straight lines using a ruler or a triangle.

Measurements:

- Differentiates objects by length, height, and size.
- Differentiates between day and week as units of time.
- Recognizes the values of coins and banknotes (1, 2, 5, 10, 20 euros).
- Measures with non-standard units (e.g., step, cubit, span, thumb).
- Knows unit lengths for measuring and their relationships (meter and centimeters).
- Develop concepts by comparing, estimating, and measuring.
- Learn about various units of measurement from the children's everyday experiences (e.g., time, length, weight, money).

Problem solving:

- Solves everyday life problems (e.g., how much money you need to buy two items, which items you can buy with a certain amount of money).
- Recognizes which arithmetic operation to use in solving a simple word problem.
- Solves more complex puzzles or mazes; makes a simple cardboard model.
- Gains experience with different objects and quantities
- Sorts quantities by characteristics
- Gains experience with the invariance and representation of quantities
- Recognizes and distinguishes characteristics of objects, e.g., shape, color, size, and material properties, positional quality, and positional relationships.

Development of Natural Numbers:

- Develop fundamental mathematical skills by observing and manipulating objects.
- Work with quantities: arranging, ordering, and comparing them.
- Associate numbers with quantities and vice versa.
- Operate with quantities (numbers).
- Read and write digits.
- Develop the concept of numbers, including zero; count forwards and backwards, possibly in steps of two or larger steps.
- Use the concepts of "double" and "pair."

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- Ensure understanding of numbers considering their cardinal, ordinal, arithmetic, and measurement aspects.
- Build and reinforce the number range up to 20, possibly extending beyond 20.
- Introduce the symbol for ten in connection with bundling.

Arithmetic Operations:

- Playful interaction with numbers and arithmetic operations combined with concrete actions and visual representations.
- Perform arithmetic operations in the additive range: adding and subtracting, decomposing, and completing.
- Possibly extend beyond ten.
- Introduce and develop the operations of doubling and multiplying.
- Introduce division and multiplication as different operations.
- Introduce the concept of "half."
- Work on multiplication tables within the established number range, possibly including their inverses.
- Solve practical problems from the immediate environment.

Geometry:

- Orient in space and understand spatial relationships through hands-on experiences; recognize and name properties of objects.
- Observe, order, and structure spatial relationships and shapes from the children's environment.
- Manipulate surfaces and solids.
- Introduce terms such as corner, edge, and face using geometric shapes.
- Draw straight lines with a ruler.

Level 3 – Mathematics

Learning Objectives on Level 3:

- Further develop and apply mathematical thinking.
- Work within the number range up to 200; possibly extend to 1000.
- Develop proficiency in addition, subtraction, multiplication, and division, particularly within the number range up to 100.
- Gain an understanding of quantities, numbers, measurements, and sizes within the established number range.
- Understand the decade system and place value.
- Recognize and apply relationships in arithmetic operations and basic arithmetic laws.
- Estimate, measure, and compare sizes using appropriate units, and initiate unit conversions.
- Understand mathematical operations in play and practical situations.
- Find solutions for simple real-world problems.
- Learn about fractions.
- Encounter decimal numbers.
- Secure and expand knowledge and skills in spatial orientation and visualization.
- Distinguish, name, and understand forms of surfaces and solids; calculate the perimeter and possibly the area of rectangles and squares.

Numbers and counting:

- Reads and writes numbers up to 100.

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- Recognizes ordinal numbers and differentiates them from cardinal numbers.
- Distinguishes single-digit from multi-digit (two-digit and three-digit) numbers.
- Adds and subtracts tens.
- Names the components of addition and subtraction operations.
- Recognizes the values of coins and banknotes (1, 2, 5, 10, 20, 50, and 100 euros) and calculates using them.
- Recognizes multiplication as repeated addition of the same numbers.
- Recognizes division as repeated subtraction of the same numbers.

Shapes and space:

- Connects geometric shapes (circle, triangle, square, and rectangle) with the surfaces (faces) of geometric bodies (cube, cuboid, pyramid, and cylinder).
- Draws lines of given lengths and names the endpoints.
- Determines the membership of points to a line segment.

Measurements:

- Deepen understanding of previously introduced measurements.
- Establish measurement relationships and work with measurement sequences.
- Estimate, measure, and compare using known units; perform simple unit conversions (e.g., m to cm, kg to dag).
- Understand units and their differentiations (e.g., hour, minute, second; km, m, dm, cm).
- Apply units of measurement, possibly including area measures, in real-life problems.
- Represent fractions visually and read and write fractions.
- Apply decimal numbers in practical life examples (e.g., reading and writing price tags).
- Lists basic time units (hour, minute, second).
- Notices the relationships between time measurement units.
- Recognizes mass as a property of bodies; compares the masses of bodies.
- Names basic units for mass.
- Measures lengths and records the obtained number and unit.
- Draws lines of given lengths.
-

Problem-solving:

- Formulates a mathematical problem (determines what is known and unknown, predicts/investigates and chooses strategies, draws conclusions, and determines possible solutions).
- Uses acquired knowledge in solving various types of tasks (arithmetic tasks, word problems, and everyday life problem situations).
- Recognizes numerical representations and their meanings in their environment, e.g., bus number, house number.
- Understands and uses the decimal system.
- Forms a sequence of numbers.

Development of Natural Numbers:

- Reinforce number concepts and understanding within the familiar number range.
- Build, penetrate, and reinforce the number range up to 100.
- Explore the new number range through rough and fine structures.
- Visualize numbers.
- Arrange and decompose quantities.

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- Navigate within the number range: build up and break down number sequences, establish relations using known symbols, and round numbers.
- Expand and secure understanding of the decimal system.
- Differentiate between digits and their place value; understand the place value system.
- Develop context- and size-related concepts for large numbers (e.g., using monetary values, and lengths).
- Begin reading and interpreting data from graphical representations (e.g., tables).

Arithmetic Operations:

- Reinforce oral and written arithmetic operations within the established number range.
- Perform written addition and subtraction with place value carryover or borrowing.
- Strengthen and expand multiplication tables.
- Introduce written multiplication and division, particularly within the number range up to 100.
- Apply division and multiplication in illustrative situations.
- Reinforce the operations of division and measurement.
- Perform estimation calculations.
- Analise simple real-world problems and find solutions; potentially find real-life situations to apply arithmetic operations.
- Check and verbalize results.

Geometry:

- Strengthen spatial orientation: perceive and describe spatial positions, relationships, and directions and changes in direction.
- Discover and classify basic geometric shapes (surfaces and solids).
- Create with shapes and surfaces.
- Measure and draw lines.
- Use drawing tools.
- Learn about rectangles and squares as specific quadrilaterals; describe and draw them; understand right angles and equal sides as characteristics.
- Draw circles.
- Develop concepts of perimeter and area.
- Calculate the perimeter of rectangles and squares.
- Possibly introduce simple area calculations.

Level 4 – Mathematics

Learning Objectives on Level 4:

- Further develop and apply mathematical thinking.
- Work within the number range up to 200, possibly extend to 1000.
- Develop proficiency in addition, subtraction, multiplication, and division, particularly within the number range up to 200.
- Gain an understanding of quantities, numbers, measurements, and sizes within the established number range.
- Understand the decade system and place value.
- Recognize and apply relationships in arithmetic operations and basic arithmetic laws.
- Estimate, measure, and compare sizes using appropriate units, and initiate unit conversions.
- Understand mathematical operations in play and practical situations.
- Find solutions for simple real-world problems.
- Learn about fractions.

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- Encounter decimal numbers.
- Secure and expand knowledge and skills in spatial orientation and visualization.
- Distinguish, name, and understand forms of surfaces and solids; calculate the perimeter and possibly the area of rectangles and squares."

Numbers and counting:

- Records numbers in a place value table.
- Adds two-digit and single-digit numbers without and with regrouping.
- Subtracts a single-digit number from a two-digit number without regrouping.
- Multiplies and divides without remainder within the set of numbers up to 100.
- Performs written addition and subtraction of two-digit numbers without regrouping.

Shapes and space:

- Describes the vertices of a cube, cuboid, and pyramid as points, and edges as line segments.
- Describes perimeter as the length of the edge of any geometric shape.
- Recognizes and names acute, right, and obtuse angles.
- Uses a compass as part of geometric tools.
- Draws circles using a compass.

Measurements:

- Deepen understanding of previously introduced measurements.
- Establish measurement relationships and work with measurement sequences.
- Estimate, measure, and compare using known units; perform simple unit conversions (e.g., m to cm, kg to dag).
- Understand units and their differentiations (e.g., hour, minute, second; km, m, dm, cm).
- Apply units of measurement, possibly including area measures, in real-life problems.
- Represent fractions visually and read and write fractions.
- Apply decimal numbers in practical life examples (e.g., reading and writing price tags).
- Measures the lengths of the sides of triangles, squares, and rectangles (expressed in whole numbers).
- Adds the lengths of sides and explains their sum as the perimeter.
- Compare the volume of liquids by pouring.
- Names units for measuring the volume of liquids (liter, deciliter).

Problem solving:

- Formulates and analyses a simpler problem, plans its solution by choosing appropriate mathematical concepts and procedures, solves it, and checks the result.
- Solves arithmetic operations.
- Applies transitions in arithmetic operations, e.g., transition to the next ten.
- Uses arithmetic symbols for addition and subtraction, multiplication, and division appropriately
- Gains experience with and solves everyday math problems.

Development of Natural Numbers:

- Reinforce number concepts and understanding within the familiar number range.
- Build, penetrate, and reinforce the number range up to 200; possibly extend to 1000 (e.g., in steps of 100).
- Explore the new number range through rough and fine structures.

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- Visualize numbers.
- Arrange and decompose quantities.
- Navigate within the number range: build up and break down number sequences, establish relations using known symbols, and round numbers.
- Expand and secure understanding of the decimal system.
- Differentiate between digits and their place value; understand the place value system.
- Develop context- and size-related concepts for large numbers (e.g., using monetary values, lengths).
- Begin reading and interpreting data from graphical representations (e.g., tables).

Arithmetic Operations:

- Reinforce oral and written arithmetic operations within the established number range.
- Perform written addition and subtraction with place value carryover or borrowing.
- Strengthen and expand multiplication tables.
- Introduce written multiplication and division, particularly within the number range up to 200.
- Apply division and multiplication in illustrative situations.
- Reinforce the operations of division and multiplication.
- Perform estimation calculations.
- Analise simple real-world problems and find solutions; potentially find real-life situations to apply arithmetic operations.
- Check and verbalize results.

Geometry:

- Strengthen spatial orientation: perceive and describe spatial positions, relationships, and directions and changes in direction.
- Discover and classify basic geometric shapes (surfaces and solids).
- Create with shapes and surfaces.
- Measure and draw lines.
- Use drawing tools.
- Learn about rectangles and squares as specific quadrilaterals; describe and draw them; understand right angles and equal sides as characteristics.
- Draw circles.
- Develop concepts of perimeter and area.
- Calculate the perimeter of rectangles and squares.
- Possibly introduce simple area calculations.

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DIGITAL LEARNING

Level 1 – Digital

Learning Objectives on Level 1:

- Use information technologies safely and responsibly.
- Understand, follow, and create simple instructions.
- Use digital devices and the internet for learning.
- Create and design digital drawings and images.
- Experience self-efficacy by using digital technologies creatively and in various ways.

Information acquisition and processing:

- Select appropriate digital content with a significant level of support (browsing educational content, videos, and audio).
- Uses digital educational content as learning aids under guidance.

Technology and equipment:

- Properly turns on and off digital devices with support/guidance.
- Selects appropriate digital technology for a specific task and uses it with a higher level of support.

Digital skills:

- Follow the teacher's actions when using the internet.
- Perform basic actions in digital educational content at the level of connecting content from everyday life; select and enter their personal data.

Creation and communication:

- Create simple digital content with support/guidance.

Ethics and Security:

- Recognise their personal data.
- Describe using images (showing or behaving) that their personal data should not be shared with unknown persons.

- Apply healthy habits while working on a computer.
- Describe with the help of pictorial representation how much time they spend on the computer.
- Practice with various control devices for communication aids and uses them.
- Uses technical media such as camcorder, camera, mobile phone, entertainment media, PC, and notebook.
- Follow operating instructions when using new media.
- Utilise assistive and communication technology aids.

Level 2 – Digital

Learning Objectives on Level 2:

- Use assistive digital technologies in real life situations in a safe and responsible way.
- Understand, follow, and create simple instructions.
- Use digital devices and the internet for learning.
- Create and design digital drawings and images.

Information acquisition and processing:

- Use digital educational content to assist learning with an appropriate level of help.
- Perform basic actions in digital educational content at the level of recognition and connection.
- With appropriate support, recognise forms of digital content (text, images, videos, and audios).

Technology and equipment:

- Recognise digital technology (devices) and use it with appropriate support.
- Properly turns digital devices on and off independently.
- With less support, select the appropriate digital device to perform a simple task.

Digital skills:

- Recognizes and uses simple e-services and learning management systems in education.
- Searches e-sources and opens recommended pages with support.
- Recognizes the computer as a device where data is stored.
- Understands that programs are necessary to work with a computer.

Creation and communication:

- Perform simple actions in a program to create simple digital content (using a mouse, keyboard, or touch screen).
- In a simple program with support, combine two known contents into a new digital product (poster, collage, comic strip...).

Ethics and Security:

- List their personal data.
- Recognise the importance of protecting personal data when using the internet.
- With the teacher's help, recognize healthy habits and behaviors while working on a computer.
- Recall and become aware of how much time they spend on the computer.
- With the teacher's help, list some dangers from unknown persons in the virtual world.
- Describe the consequences of prolonged computer use.
- Obtain information using new media.
- Exchange information using digital media, e.g., cameras, and social media.

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Level 3 – Digital

Learning Objectives on Level 3:

- Use information technologies safely and responsibly.
- Understand, follow, and create simple instructions.
- Use digital devices and the internet for learning.
- Create and design digital drawings and images.
- Experience self-efficacy by using digital technologies creatively and in various ways.

Information acquisition and processing:

- Perform a basic search for information on a predetermined topic with detailed instructions and guidance.
- With guidance, describe what needs to be done to find information.
- Records the found information with help.

Technology and equipment:

- Use a mouse, keyboard, and/or touch screen in the user interface.
- With guidance, save and find previously stored content (text, image).
- With help and guidance, select the most appropriate program for solving simple school tasks.

Digital skills:

- Recognise situations where learning needs to occur using digital programs and/or devices.
- Properly turn digital devices on and off; with support, launches and closes recommended ready-made digital educational content.
- Know the time limit for working with digital technology and stretching techniques.

Creation and communication:

- With guidance, apply basic skills of messaging and presenting content.
- Participate in brief collaborative communication activities with familiar people.
- Know the basic rules of communication in a virtual environment.
- Use basic pictorial representations for non-verbal expression of emotions; with help and guidance, shape existing works and ideas using simple editing programs.

Ethics and Security:

- Knows rules about acceptable behavior in familiar and secure digital environments.
- Describes strategies for proper selection and maintenance of passwords.
- With guidance, recognizes basic energy-saving options when working with computers and proper ways of disposing of electronic waste.
- With support, develops awareness of data permanence on the internet and the need to protect and respect personal data of themselves and others.

Level 4 – Digital

Learning Objectives on Level 4:

- Use information technologies safely and responsibly.

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- Understand, follow, and create simple instructions.
- Use digital devices and the internet for learning.
- Create and design digital drawings and images.
- Experience self-efficacy by using digital technologies creatively and in various ways.

Information acquisition and processing:

- Conduct a basic search for information on a predefined topic with clear instructions.
- With support, describe what needs to be done to obtain the information.
- Record the found information.
- With support, select information from among several (3-4) found based on search instructions.
- Explain why a certain piece of information was chosen over others found.

Technology and equipment:

- Recognise and name a device and describe its purpose.
- Uses a mouse, keyboard, and/or touchscreen in the user interface.
- Save and find previously stored content (text, image, link).
- With help, select the most suitable program for solving simple tasks.

Digital skills:

- Start and close recommended ready-made digital educational content.
- Select tools or devices that enable quality learning depending on the content.
- With guidance and help, solve simple problems using digital technology.
- With support/guidance, navigate learning management systems and educational social networks.
- With guidance, recognise ownership marks indicating someone else's intellectual property.

Creation and communication:

- Apply basic message exchange skills.
- With support, present content using digital technology.
- With help, shape existing works and ideas using simple design programs.
- Use basic visual representations for non-verbal expression of feelings.
- Under guidance and support, conduct simple research.
- With help and support, solve simple problems using digital technology.

Ethics and Security:

- Apply rules of acceptable behavior in known and secure digital environments.
- Use strategies for correct selection and maintenance of passwords.
- Recognise and describe basic energy-saving possibilities when working with computers and the correct way to dispose of electronic waste.
- Develop awareness of the permanence of data on the internet and the need to protect and respect personal and others' personal data.

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Teaching and learning support

The Profile for Inclusive Teacher Professional Learning aims to support all education professionals in committing to quality education for all learners (European Agency, 2022). Built upon the core values for inclusion and the associated areas of competence identified for teachers and other education professionals, competences are understood as complex combinations of attitudes, knowledge, and skills. A certain attitude or belief demands certain knowledge or a level of understanding, and then skills to implement this knowledge in practice (European Agency, 2012). None is sufficient on its own.

Attitudes, knowledge, and skills are referred to as:

• Attitudes and beliefs or the basic assumptions, the crucial ethical and moral dimensions of inclusion, and how these are shown in ways of working, discourse, communication, and relationships.

• Knowledge and understanding' or the essential knowledge and insights, the theoretical basis of the profession, the evidence, basic concepts, and principles underpinning quality education.

• Skills or the practical skills required to carry out the essential tasks, and the decision-making and efficacy to put knowledge into practice in varying situations and contexts, to assert basic assumptions, and to re-imagine practice for quality education.

Their listing within competence areas does not imply a hierarchical order or isolation of competences, as they are all closely interconnected and interdependent. Particular attention should be paid to the Profile's focus on the collaborative task of implementing inclusive practice, its value for a growing professional community involved in inclusion, and its use in work-based learning.

It is important to note that this wider perspective does not affect the Profile's value for teachers, who remain the first and most significant practitioners among all professionals involved.

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Digital editable templates

In June 2024 we organized project management team meeting (PMT) on the topic of using different digital editable templates that could be suitable for creating the content for 4 programme levels (4 levels of learning difficulty for children with special educational needs, intellectual difficulties). As mentioned above, the project´s target group is learners in primary education, aged 5 – 10 years and the focus will be on four levels in mathematics and digital learning as follows:

- Level 1 relates to learners with Profound and Multiple Learning Difficulty
- Level 2 relates to learners with Severe Learning Difficulty
- Level 3 relates to learners with Specific Learning Difficulties
- Level 4 relates to learners with Moderate Learning Difficulties

During the PMT meeting, we presented 22 different editable templates to the consortium. Our digital platform IZZI has more than 100 different templates, but our experts for creating digital content suggested starting with 22 components described in following chapter named Overview of digital editable templates. We have also submitted the deliverable D2.2 Overview of digital editable templates, where more detailed descriptions could be found for each template. It's important to mention that these 22 templates are just a suggestion and during the content creation we might use more templates.

One of the assignments for the consortium members during the meeting was to fill in the questionnaires. 4 questionnaires were conducted, one for each level of learning difficulty (profound, severe, specific, moderate). Every questionnaire had 6 general questions and 9 questions for each editable template, out of 22. The consortium experts filled in the questionnaires responding to 204 questions to help us better understand suitability of presented template when creating content. Findings and conclusions from the questionnaires can be found in chapter bellow,

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Overview of digital editable templates

Colouring book

Colouring is an enjoyable and therapeutic activity for people of all ages. IZZI tool enables the development of digital and pre-mathematical skills through creative expression. 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. Creative content creators use it for pre-mathematical skills. Benefits: encouraging creativity and self-expression, enhancing the digital and pre-mathematical skills.

Memory

Possibility of defining the number of cards. Options for content creation: match word with word, match word with image, match word with sound, match sounds, match image with sound. Benefits: cognitive development (memory enhancement, attention, and concentration), visual and spacial 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

Image puzzle allows creating an interactive object. 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. Options: Finding a path for numbers, finding a path for colors, finding a path for letters… 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. Options for content creation: with text answers, with images, with audios, possibility of one or more correct answers. 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. Options: lines, arrows. 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.

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Math Problem Solve

Math Problem Solve is the step-by-step process of solving mathematical exercises. Content creation options: addition, subtraction, multiplication, division. 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. Content creation options: subtitles, video description, video poster, full-screen view. Benefits: engagement and comprehension through the combination of visual and auditory stimulisation, 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. Content creation options: subtitles, video description, full-screen view, adding quizzes, questions, statements for discussion. Benefits: more immersive and effective learning compared to traditional video content.

Evaluation survey results

Level 1 Profound Evaluation Survey - Editable Digital Templates

According to research conducted by our consortium's work group on profound learning difficulties, it has been concluded that the most appropriate technologies for working with students are tablet, smartboard, smartphone and computer. Some researchers suggested that computers could be highly suitable if used with special input devices such as adaptive keyboards, switches, or joysticks to support students with mobility challenges, and smartboards are ideal for group interactions. Students with profound learning difficulties can independently use touchscreens on a tablet, smartphone or on a smartboard independently and a mouse and a keyboard with assistance. Touchscreen is the better option no matter of the device. Integrating a screen reader into educational materials is considered very important for these students. When presenting tasks, it is somewhat important that only the task is displayed in full-screen mode without visible instructions. It depends on the type and complexity of the task. It is very appropriate to include multisensory elements such as video, speech/sound, and colours in one task when creating the content. It is always necessary to provide additional assistance in the form of built-in assistance features within the platform if a student is unable to complete a task to ensure all students can succeed.

Analysis of components

Colouring Book

The colouring book component, while somewhat suitable for modifications, presents several challenges for learners with profound learning difficulties. It is considered complex and requires frequent assistance from a teacher, making independent use ineffective. Explaining the activity is time-consuming and detailed, and it fails to maintain student concentration, leading to quick distraction. Significant repetition is necessary for students to grasp the concepts, and the use of specific colours is required to enhance clarity and engagement. Audio support is essential for effective communication and to keep students engaged.

Draw

The drawing component is suitable for learners but also poses considerable challenges. Students often need one-on-one support and may struggle with the tasks, making it less effective for group learning. Instructions are complex and require detailed explanations. The component does not effectively maintain student concentration, as they tend to lose interest quickly. Significant repetition is needed for concept retention, and highly restrictive color combinations are necessary to ensure an appropriate learning experience. Audio recordings are crucial for effective communication and maintaining student engagement.

Memory

The memory component is somewhat suitable for teaching digital and mathematical competencies with some modifications. However, it remains challenging and requires frequent assistance from teachers, though it is ideal for group use. The complexity of explanations is moderate, requiring effort but manageable with brief instructions. Despite this, the component does not maintain student concentration effectively. Moderate repetition is beneficial, and specific colors are needed to enhance clarity and engagement. While audio support is somewhat necessary, it is not critical but can enhance understanding and engagement.

Image Puzzle

The image puzzle component is somewhat suitable for digital and mathematical competencies with modifications. It is challenging and not suitable for independent use, necessitating significant help from teachers. It is moderately complex to explain, requiring some time and effort, but can be understood with brief instructions. The component does not effectively maintain concentration, leading to quick distraction. Unlike other components, it requires minimal repetition to teach the concept effectively. Any colors can be used without affecting its usability, and audio support is not necessary for effective use.

Labyrinth

The labyrinth component is suitable for learners but presents considerable challenges. It is not suitable for independent use and requires frequent assistance, making it ineffective for group learning environments. Explaining the activity is complex and time-consuming. The component does not help maintain concentration, with students quickly losing interest. Significant repetition is needed for students to grasp and retain concepts, and specific colors are required to enhance clarity and engagement. Unlike other components, audio recordings are not necessary for effective use.

Pathfinder

The Pathfinder component is deemed suitable for learners but poses considerable challenges. It requires frequent assistance, making it unsuitable for independent or group learning environments. The complexity of explaining the task is significant, necessitating detailed instructions. While it generally helps maintain student concentration, occasional redirection is necessary. Significant repetition is needed for concept retention, and the use of highly specific color combinations is crucial to ensure effective learning. Audio recordings are essential for effective communication and maintaining engagement.

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What's Missing

The "What's Missing" component is somewhat suitable for mathematical and digital competences with modifications. It is challenging, requiring frequent teacher assistance and is unsuitable for independent use but can be effective with multiple students. The task explanation is complex and time-consuming. It does not effectively maintain student concentration, leading to quick distraction. Significant repetition is necessary for grasping the concept, and highly restrictive color choices are required to ensure an effective learning experience. Audio recordings are crucial for effective communication and engagement.

True/False

The True/False component is somewhat suitable for mathematical and digital competences with modifications. It presents challenges requiring frequent teacher assistance and is not suitable for independent use but can be ideal for multiple students. The task explanation is complex and time-consuming. This component fails to maintain student concentration effectively, leading to quick distraction. Significant repetition is necessary for concept retention, and specific colors must be used to enhance clarity and engagement. Audio recordings are essential for effective communication and maintaining engagement.

Multiple Choice

The Multiple-Choice component is somewhat suitable for mathematical and digital competences with modifications. It has a manageable complexity, requiring minimal guidance but generally effective. Students need one-on-one support, making it ideal for multiple students. The task explanation is moderately complex, requiring some effort but understandable with brief instructions. It generally maintains student concentration with occasional redirection. A moderate amount of repetition is helpful, and specific colors are necessary for clarity and engagement. Audio recordings can enhance understanding and engagement but are not critical.

Matching

The Matching component is highly suitable and very easy for students to use without assistance. It supports complete independence and is straightforward to explain, with students understanding its use almost immediately. The component generally maintains student concentration with occasional redirection. Minimal repetition is needed to effectively teach the concept, and any colors can be used without affecting usability. Audio recordings are not required for effective use of this component.

Matching Connection

The Matching Connection component is somewhat suitable for mathematical and digital competences with modifications. It has manageable complexity, requiring minimal guidance but generally effective. Students can use it independently, making it ideal for multiple students. The task explanation is moderately complex, requiring some effort but understandable with brief instructions. It significantly aids in keeping students focused and engaged throughout the task. A moderate amount of repetition is helpful, and any colors can be used without affecting usability. Audio recordings are important for effective communication and engagement.

Drag and Drop

The Drag and Drop component is somewhat suitable for teaching mathematical and digital competencies with modifications. It has manageable complexity, allowing students to use it with minimal guidance. It supports

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complete independence and is ideal for group learning. The task requires a moderate effort to explain but is generally understandable with brief instructions. It significantly aids in maintaining student concentration throughout the task. Moderate repetition is helpful for solidifying understanding, and specific colors are necessary to enhance clarity and engagement. Audio recordings are important for effective communication and engagement.

Drag and Drop Order

The Drag and Drop Order component is somewhat suitable for mathematical and digital competencies with modifications. It is challenging, requiring frequent assistance, yet students can use it independently, making it ideal for group settings. The task is straightforward to explain, and students quickly understand its use. It effectively maintains student concentration. Significant repetition is needed for students to grasp and retain the concept, and specific colors are required for clarity. Audio recordings are crucial for effective communication and engagement.

Dragonator

The Dragonator component is somewhat suitable for mathematical and digital competencies with modifications. It is challenging and requires frequent assistance, but students can use it independently or in group settings with adjustments. The task is simple to explain, with students understanding its use quickly. It generally maintains concentration, though some students may need occasional redirection. Significant repetition is required for concept retention. Unlike other components, any colors can be used without affecting usability. Audio recordings are essential for effective communication and engagement.

Clickable

The Clickable component is suitable for teaching digital competencies but not for mathematical ones. It is challenging and requires frequent assistance, yet supports complete independence, making it ideal for group learning. The task is complex to explain, necessitating detailed instructions. It generally helps maintain concentration, though occasional redirection is needed. Significant repetition is required for concept retention. Any color can be used without affecting usability. Audio recordings are important for effective communication and engagement.

Clickable Word Position

The Clickable Word Position component is suitable for teaching digital competencies but not for mathematical ones. It is challenging, requiring frequent assistance and one-on-one support, making it ideal for group use. The task explanation is complex and time-consuming. However, it is highly effective in maintaining student concentration throughout the task. Significant repetition is needed for concept retention. Any color can be used without affecting usability. Audio recordings are crucial for effective communication and engagement.

Symmetry

The Symmetry component is somewhat suitable for teaching mathematical and digital competences with some modifications. It has manageable complexity, requiring minimal guidance but still needs one-on-one support from a teacher. The component is straightforward to explain, and students quickly understand its use. While generally maintaining concentration, occasional redirection may be necessary. Significant repetition is required for students to fully grasp and retain the concept. Specific colors are needed to enhance clarity and engagement, and audio recordings are important for effective communication and engagement.

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Number Liner

The Number Liner component is suitable for teaching both mathematical and digital competences. It is manageable in complexity, requiring minimal guidance but needing one-on-one support from a teacher, with possible adjustments for group settings. The task is straightforward to explain and quickly understood by students. It generally maintains student concentration with occasional redirection. A moderate amount of repetition is helpful for solidifying understanding. Any colors can be used without affecting usability, and audio recordings are important for effective communication and engagement.

Scales

The Scales component is suitable for teaching both mathematical and digital competences but is challenging. It requires frequent assistance and one-on-one support from a teacher, although adjustments can be made for group settings. The task explanation is complex, necessitating detailed instructions. However, it is highly effective in maintaining student concentration throughout the task. Significant repetition is needed for students to fully grasp and retain the concept. Any colors can be used without affecting usability, and audio recordings are crucial for effective communication and engagement.

Math Problem Solve

The Math Problem Solve component is suitable for teaching both mathematical and digital competences. It is challenging and requires frequent assistance, making it unsuitable for independent use but ideal for multiple students. The task is simple to explain and quickly understood by students. It is highly effective in maintaining student concentration throughout the task. A moderate amount of repetition is helpful for solidifying understanding. Any colors can be used without affecting usability, and audio recordings are important for effective communication and engagement.

Video

The Video component is suitable for teaching mathematical competences but not appropriate for digital competences. It is very easy to use, requiring no assistance, and supports complete independence, making it ideal for group settings. The task is simple to explain and quickly understood by students. However, it is not effective in maintaining concentration, as students quickly lose interest or become distracted. A moderate amount of repetition is helpful for solidifying understanding. Specific colors are necessary to enhance clarity and engagement, and audio recordings are important for effective communication and engagement.

Interactive Video

The Interactive Video component is suitable for teaching both mathematical and digital competences. It is very easy to use, requiring no assistance for students to understand and use it independently or with multiple students. The task is straightforward to explain and quickly understood by students. It generally maintains student concentration, though some may require occasional redirection. A moderate amount of repetition is helpful for solidifying understanding. Any colors can be used without affecting usability, and audio recordings are crucial for effective communication and engagement.

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Conclusion

Based on the previously written, several conclusions can be drawn regarding Level 1 profound learning difficulty:

1. Preferred Technologies: Tablets, smartboards, smartphones, and computers are identified as the most appropriate technologies for students with profound learning difficulties. These devices can be adapted with special input devices to support various needs.
2. Independence Levels: Students with profound learning difficulties can independently use touchscreens on various devices, but they may require assistance with mouse and keyboard use. Screen readers are deemed crucial for accessibility.

3. Content Creation Considerations: Educational materials should incorporate multisensory elements such as video, speech/sound, and colors to enhance engagement and understanding. Providing built-in assistance features within the platform ensures all students can succeed.

4. Component Analysis:

- Coloring Book, Draw, Memory, Image Puzzle, Labyrinth, Pathfinder, What's Missing, True/False, Multiple Choice: These components are somewhat suitable but require frequent teacher assistance and may not effectively maintain student concentration.
- Matching, Matching Connection, Drag and Drop, Drag and Drop Order, Dragonator, Clickable, Clickable Word Position, Symmetry, Number Liner, Scales, Math Problem Solve: These components are suitable for teaching mathematical and digital competencies, with various levels of complexity and independence.
- Video, Interactive Video: These components are suitable for teaching specific competencies but may not effectively maintain student concentration without additional engagement strategies.

5. Instructional Considerations: Complex tasks should be explained with detailed instructions, and repetition is often necessary for concept retention. Specific color choices and audio support are important for clarity and engagement.

Overall, the survey indicates a strong preference for tablets among students with specific learning difficulties, with other technologies like smartboards, smartphones, and computers also being considered suitable. The components evaluated offer diverse opportunities for engagement and learning, with multisensory elements playing a significant role in effective communication and engagement. Also, incorporating built-in assistance features within educational platforms is essential to support these students' diverse needs.

Level 2 Severe Evaluation Survey - Editable Digital Templates

According to research conducted by our consortium's work group on severe learning difficulties, it has been concluded that the most appropriate technologies for working with students are tablets and smartboards, while smartphones are deemed least appropriate. Some researchers suggested that computers could be highly suitable if used with special input devices such as adaptive keyboards, switches, or joysticks to support students with mobility challenges, and smartboards are ideal for group interactions. Students with severe learning difficulties can independently use touchscreens on tablets or smartboards, but require assistance with mice, keyboards, and

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smartphones. Integrating a screen reader into educational materials is considered too important for these students. When presenting tasks, it is crucial that only the task is displayed in full-screen mode without visible instructions. Incorporating multisensory elements such as video, speech/sound, and colors into tasks is highly appropriate. Additionally, it is necessary to provide built-in assistance features within the platform to ensure all students can complete tasks and succeed.

Analysis of components

Coloring Book

For learners with Severe Learning Difficulty, the Coloring Book component presents challenges. While somewhat suitable for teaching mathematical and digital competencies, it often requires modifications. Its complexity is considered challenging, necessitating frequent assistance for effective use. Student independence is questionable, with most students needing one-on-one support from a teacher. The component's explanation complexity is moderate, requiring detailed instructions and significant time for comprehension. Student concentration is moderately effective, with occasional redirection necessary to maintain focus. Considerable repetition is needed for students to grasp and retain concepts. Specific colors are required to enhance clarity and engagement, and audio, while somewhat necessary, is not critical but could aid in understanding and engagement.

Draw

The Draw component, for learners with Severe Learning Difficulty, is somewhat suitable, possibly requiring modifications. Its complexity is manageable, although some students might need minimal guidance for effective use. Independence is limited, as students generally need one-on-one support, making it moderately suitable for group settings with adjustments. The explanation complexity ranges from moderate to complex, demanding time and effort for understanding. Student concentration is moderately effective, occasionally requiring redirection. Some repetition is needed to solidify understanding. Color requirements vary; while specific colors may sometimes be necessary, in most cases, any color can be used. Audio recordings could enhance engagement but are not critical for comprehension.

Memory

In the context of Severe Learning Difficulty, the Memory component is somewhat suitable, potentially requiring modifications. Its complexity is manageable, although it can be challenging, with students often requiring frequent assistance. Independence is limited, as students typically need one-on-one support, making it moderately suitable for group activities. The explanation complexity is moderately complex, requiring time and effort for comprehension. Student concentration is moderately effective, with some redirection occasionally needed. Considerable repetition is necessary for concept retention. Specific colors are required for clarity and engagement, and audio recordings are necessary for effective communication and engagement.

Image Puzzle

For learners with Severe Learning Difficulty, the Image Puzzle component is somewhat suitable, with possible modifications. Its complexity is manageable, requiring minimal guidance for effective use. Independence varies, with some students able to use it independently and others needing assistance. Explanation complexity is

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moderately complex, demanding time and effort for comprehension. Student concentration is highly to moderately effective, aiding in focus and engagement, although occasional redirection might be necessary. Repetitiveness depends on the expert's perspective, with varying opinions on the need for repetition. Color requirements also vary, with some experts suggesting specific colors for clarity. Audio recordings are deemed necessary for effective communication and engagement.

Labyrinth

In the context of Severe Learning Difficulty, the Labyrinth component presents challenges. It is somewhat suitable, possibly requiring modifications. Its complexity is challenging, requiring frequent assistance for effective use. Independence is limited, with students unable to use it independently and needing significant help. Explanation complexity varies, ranging from moderate to complex, demanding detailed instructions. Student concentration is not effective, with students quickly losing interest or becoming distracted. Considerable repetition is needed for concept retention. Specific colors are required for clarity and engagement, and audio recordings could enhance understanding and engagement, though not critical.

Pathfinder

For learners with Severe Learning Difficulty, the Pathfinder component presents challenges. It is somewhat suitable, but modifications may be necessary. The complexity is considered challenging, requiring frequent assistance and potentially being too difficult for some students. Independence is limited, as students need one-on-one support from a teacher, though adjustments can be made for group settings. Explaining the component is complex, requiring detailed instructions and time. Student concentration is not effective, as they quickly lose interest or become distracted. Considerable repetition is needed for concept retention. Specific colors are required for clarity and engagement, and audio recordings are necessary for effective communication and engagement.

What's Missing

The component is suitable for Level 2 learners, although it presents manageable to challenging complexity. It's not suitable for independent use, requiring significant assistance and adjustments for group settings. The explanation complexity is high, demanding detailed instruction. Student concentration is moderately effective, with considerable repetition necessary for concept retention. Specific colors are required for engagement, and audio recordings are crucial for effective communication and engagement.

True False

True False is somewhat suitable for Level 2 learners, with challenging complexity. It's not suitable for independent use and requires significant assistance, ideal for group settings. While moderately complex to explain, it maintains moderately effective student concentration. Considerable repetition is necessary for concept retention. Specific color requirements are not necessary, and audio recordings are essential for communication and engagement.

Multiple Choice

Multiple Choice is somewhat suitable but presents challenging complexity. It's not suitable for independent use, requiring significant assistance and is ideal for group settings. The explanation complexity is high, demanding detailed instruction. Student concentration is moderately effective, with considerable repetition needed for

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concept retention. No specific color requirements exist, but audio recordings are essential for communication and engagement.

Matching

The Matching component is suitable for Level 2 learners, with manageable complexity. It requires some assistance and is ideal for group settings. While moderately complex to explain, it significantly aids student concentration. Moderate repetition is helpful for understanding, and specific colors are required for clarity and engagement. Audio recordings could enhance understanding and engagement but are not critical.

Matching Connection

The Matching Connection component is somewhat suitable for Level 2 learners, presenting challenging complexity. It requires frequent assistance and is ideal for group settings. The explanation complexity is high, demanding detailed instruction. Student concentration is moderately effective, with considerable repetition necessary for concept retention. Specific colors are required for engagement, and audio recordings are important for communication and engagement.

Drag and Drop

This component is suitable for Level 2 learners, with challenging complexity. Students may struggle and require frequent assistance, but it's ideal for group settings. The explanation complexity is moderately complex, and student concentration is moderately effective, with considerable repetition needed. Specific colors enhance clarity and engagement, while audio recordings are not necessary.

Drag and Drop Order

Suitable for Level 2 learners, this component has manageable complexity. While assistance may be needed, it's ideal for group settings. The explanation complexity is high, but it significantly aids student concentration, requiring considerable repetition for concept retention. Specific colors are required for engagement, and audio recordings could enhance understanding.

Dragonator

This component is suitable but presents challenging complexity for Level 2 learners. Assistance is needed, making it ideal for group settings. The explanation complexity is high, with moderately effective student concentration and considerable repetition needed. Specific colors enhance engagement, and audio recordings could aid understanding.

Clickable

Suitable for Level 2 learners, Clickable has manageable complexity. While assistance may be needed, it's suitable for group settings. The explanation complexity is moderately complex, significantly aiding student concentration. Some repetition is helpful, and specific colors are not required, while audio recordings could enhance understanding.

Clickable Word Position

Not suitable for Level 2 learners due to challenging complexity, frequent assistance needed, and lack of effectiveness in maintaining student concentration. Significant repetition is required for concept retention, and while specific colors aren't necessary, audio recordings are crucial for effective communication and engagement.

Symmetry

Suitable for Level 2 learners, although it presents challenging complexity and requires frequent assistance. Not suitable for independent use, it's ideal for group settings. The explanation complexity is high, and while student concentration is moderately effective, considerable repetition is needed. Specific colors enhance engagement, but audio recordings are not necessary.

Number Liner

Suitable for Level 2 learners, presenting challenging complexity and requiring frequent assistance. Not suitable for independent use, it's adaptable for group settings. The explanation complexity is high, with moderately effective student concentration and considerable repetition necessary. Specific colors aren't required, but audio recordings could enhance understanding.

Scales

Suitable for Level 2 learners, though challenging, requiring frequent assistance and not suitable for independent use. The explanation complexity is high, with highly effective student concentration and considerable repetition needed. No specific color requirements, but audio recordings are crucial for communication and engagement.

Math Problem Solve

Not suitable for Level 2 learners due to challenging complexity, lack of effectiveness in maintaining student concentration, and high dependency on assistance. Significant repetition is required, and highly restrictive color choices impact the learning experience. Audio recordings are necessary for effective communication.

Video

Not suitable for Level 2 learners, presenting challenging complexity and dependency on assistance. Unsuitable for independent use, it's moderately effective in maintaining student concentration, with considerable repetition needed. Specific colors are required for engagement, and audio recordings are crucial.

Interactive Video: Not suitable for Level 2 learners due to challenging complexity and dependency on assistance. Not suitable for independent use, it moderately maintains student concentration with significant repetition needed. Specific colors enhance engagement, and audio recordings are important for effective communication.

Conclusion

Based on the previously written, several conclusions can be drawn regarding Level 1 profound learning difficulty:

1. Preferred Technologies: Tablets and smartboards are identified as the most appropriate technologies for students with severe learning difficulties. Computers can be suitable with special input devices, while smartphones are considered least appropriate.

2. Independence Levels: Students with severe learning difficulties can independently use touchscreens on tablets or smartboards, but they require assistance with other devices like mice, keyboards, and smartphones.

3. Accessibility Features: Integrating a screen reader into educational materials is considered somewhat to very important. A full-screen mode without visible instructions is crucial for task presentation. Built-in assistance features within the platform are necessary to ensure all students can complete tasks and succeed.

4. Component Analysis:

- Coloring Book, Draw, Memory, Image Puzzle, Labyrinth, Pathfinder, What's Missing, True/False, Multiple Choice: These components present varying levels of suitability for teaching, often requiring modifications and significant assistance due to their complexity. Considerable repetition and specific color requirements are common.
- Matching, Matching Connection, Drag and Drop, Drag and Drop Order, Dragonator, Clickable, Symmetry, Number Liner, Scales: These components are generally suitable for Level 2 learners, with manageable complexity and varying degrees of assistance required. They often necessitate considerable repetition for concept retention and may benefit from specific color choices and audio recordings for engagement.
- Clickable Word Position, Math Problem Solve, Video, Interactive Video: These components are deemed unsuitable for Level 2 learners due to their challenging complexity, dependency on assistance, and lack of effectiveness in maintaining student concentration. Specific color choices and audio recordings are often crucial for comprehension and engagement.

5. Instructional Considerations: Explanation complexity ranges from moderate to high across components, demanding detailed instructions and considerable time for comprehension. Student concentration varies, with some components requiring significant redirection to maintain focus. Considerable repetition is often necessary for concept retention.

Overall, the survey highlights tablets and smartboards as preferred technologies for students with general learning difficulties, with an emphasis on touchscreen capabilities for independent use. The evaluated components offer diverse opportunities for engagement and learning, with multisensory elements playing a crucial role in effective communication and engagement. Also, incorporating built-in assistance features within educational platforms is essential to cater to these students' needs.

Level 3 Specific Evaluation Survey - Editable Digital Templates

According to research conducted by our consortium's work group on specific learning difficulties, it has been concluded that the most appropriate technologies for working with students are tablets (100% of responds). On the second place as the moderately appropriate technologies stand smartboard, smartphone and computer. Only 25% of respondents find computers the least appropriate technology. Other technologies suggested by respondents are Smart clocks and small robots like the Bee Bot. Tools that can be independently by such students are touchscreen on a tablet and touchscreen on a smartphone. Touchscreen on a smartboard is rated 2nd best, using a mouse is 3rd. Other suggested technologies are robots and Chat GPT. Integrating a screen reader into educational materials is considered very important for these students. When presenting tasks, displaying the task in full-screen mode, without visible instructions was rated very differently, from very important to not so important. Incorporating multisensory elements such as video, speech/sound, and colors into tasks is very appropriate, according to 66% of participants. Additionally, it is necessary to provide built-in assistance features within the platform to ensure all students can complete tasks and succeed.

Analysis of components

Coloring Book

The Coloring Book component is deemed suitable for mathematical and digital competencies, reflecting its versatility in educational contexts. While it presents manageable complexity, requiring minimal guidance, it leans towards needing assistance, particularly in group settings, to cater effectively to learners with specific learning difficulties. Although moderately complex to explain, it remains understandable with brief instructions. In terms of student concentration, it maintains a moderately effective level, although occasional redirection may be needed. Notably, significant repetition is crucial for reinforcing concepts, aligning with the learning needs of students with specific difficulties. The requirement for specific colors to enhance clarity and engagement highlights the importance of sensory considerations in instructional design. Moreover, audio recordings are deemed essential for effective communication, ensuring accessibility for all learners, particularly those with additional learning needs.

Draw

The Draw component exhibits suitability for mathematical and digital competencies, offering diverse educational applications. With manageable complexity, minimal guidance is required for effective use, although it leans towards needing assistance, particularly in group settings, to cater to learners with specific learning difficulties. While moderately complex to explain, students can grasp its concepts with brief instructions. Regarding student concentration, it maintains a moderately effective level, although occasional redirection may be necessary. Notably, significant repetition is vital for reinforcing concepts, aligning with the learning needs of students with specific difficulties. The requirement for specific colors to enhance clarity and engagement underscores the importance of sensory considerations in instructional design. Additionally, audio recordings are indispensable for effective communication, ensuring accessibility for all learners, particularly those with additional learning needs.

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Memory

The Memory component demonstrates suitability for mathematical and digital competencies, indicating its adaptability in educational settings. With manageable complexity, minimal guidance suffices for effective use, although it tends towards needing assistance, particularly in group settings, to cater to learners with specific learning difficulties. Despite being moderately complex to explain, students can grasp its concepts with concise instructions. In terms of student concentration, it maintains a moderately effective level, although occasional redirection may be necessary. Notably, significant repetition is crucial for reinforcing concepts, aligning with the learning needs of students with specific difficulties. The requirement for specific colors to enhance clarity and engagement highlights the importance of sensory considerations in instructional design. Moreover, audio recordings are deemed necessary for effective communication, ensuring accessibility for all learners, especially those with additional learning needs.

Image Puzzle

The Image Puzzle component is deemed suitable for mathematical and digital competencies, indicating its versatility in educational applications. With manageable complexity, minimal guidance is required for effective use, although it leans towards needing assistance, particularly in group settings, to cater to learners with specific learning difficulties. Despite being moderately complex to explain, students can understand its concepts with brief instructions. Regarding student concentration, it maintains a moderately effective level, although occasional redirection may be necessary. Notably, significant repetition is essential for reinforcing concepts, aligning with the learning needs of students with specific difficulties. The requirement for specific colors to enhance clarity and engagement underscores the importance of sensory considerations in instructional design. Additionally, audio recordings are indispensable for effective communication, ensuring accessibility for all learners, particularly those with additional learning needs.

Labyrinth

The Labyrinth component showcases suitability for mathematical and digital competencies, offering diverse educational opportunities. With manageable complexity, minimal guidance suffices for effective use, although it tends towards needing assistance, particularly in group settings, to cater to learners with specific learning difficulties. Despite being moderately complex to explain, students can understand its concepts with concise instructions. In terms of student concentration, it maintains a moderately effective level, although occasional redirection may be necessary. Notably, significant repetition is vital for reinforcing concepts, aligning with the learning needs of students with specific difficulties. The requirement for specific colors to enhance clarity and engagement highlights the importance of sensory considerations in instructional design. Moreover, audio recordings are deemed necessary for effective communication, ensuring accessibility for all learners, especially those with additional learning needs.

Pathfinder

The Pathfinder component is considered suitable for mathematical and digital competencies. However, it presents a challenging level of complexity, with students requiring frequent assistance and possibly struggling to use it effectively. It leans towards needing assistance for independent use, making it highly suitable for group activities. While it is moderately complex to explain, students can understand it with some time and effort. In terms of concentration, it maintains a moderately effective level, with occasional redirection possibly needed. Significant

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repetition is crucial for students to fully grasp and retain the concept. Specific colors are required to enhance clarity and engagement, and audio recordings are necessary for effective communication and engagement.

What's Missing

This component is suitable for mathematical and digital competencies and offers manageable complexity, with minimal guidance needed for effective use. Surprisingly, it's deemed completely independent, making it highly suitable for group activities as well. However, it's complex to explain, requiring considerable time and detailed explanation for student comprehension. Unfortunately, it's not effective in maintaining student concentration, with students quickly losing interest or becoming distracted. Like other components, significant repetition is necessary for students to fully grasp and retain the concept. Specific colors are required for clarity and engagement, and audio recordings are deemed essential for effective communication and engagement.

True False

Suitable for mathematical and digital competencies, the True False component poses a challenging level of complexity, necessitating frequent assistance for effective use. It requires detailed explanation, taking a considerable amount of time for student understanding. While moderately effective in maintaining student concentration, occasional redirection may be necessary. As with other components, significant repetition is required for students to fully grasp and retain the concept. Specific colors are essential for clarity and engagement, and audio recordings play a vital role in effective communication and engagement.

Multiple Choice

This component is suitable for mathematical and digital competencies but poses a challenging level of complexity, requiring frequent assistance for effective use. Students may struggle with its complexity or find it too difficult. It requires some time and effort to explain but can be understood with a brief explanation. The component maintains a moderately effective level of student concentration, with occasional redirection possibly needed. Significant repetition is essential for student comprehension and retention. Specific colors enhance clarity and engagement, and audio recordings are crucial for effective communication and engagement.

Matching

The Matching component is suitable for mathematical and digital competencies, with manageable complexity requiring minimal guidance for effective use. However, it leans towards needing assistance, particularly in group settings, and requires some time and effort to explain. While moderately effective in maintaining student concentration, occasional redirection may be necessary. As with other components, significant repetition is needed for student comprehension and retention. Specific colors are required to enhance clarity and engagement, and audio recordings are essential for effective communication and engagement.

Matching Connection

Suitable for mathematical and digital competencies, the Matching Connection component offers manageable complexity, with minimal guidance needed for effective use. However, it leans towards needing assistance, particularly in group settings, and requires some time and effort to explain. It maintains a moderately effective level of student concentration, though occasional redirection may be necessary. Significant repetition is crucial for

student comprehension and retention. Specific colors are required for clarity and engagement, and audio recordings are important for effective communication and engagement.

Drag and Drop

Suitable for mathematical and digital competencies, the Drag and Drop component offers manageable complexity, requiring minimal guidance for effective use. However, it leans towards needing assistance, particularly in group settings, and is moderately complex to explain, necessitating some time and effort. It maintains a moderately effective level of student concentration, although occasional redirection may be necessary. Some repetition is beneficial for solidifying understanding. Specific colors are required to enhance clarity and engagement, and audio recordings are deemed necessary for effective communication and engagement.

Drag and Drop Order

This component is suitable for mathematical and digital competencies, offering manageable complexity with minimal guidance needed for effective use. However, it requires assistance, particularly in group settings, and is moderately complex to explain, necessitating some time and effort. It maintains a moderately effective level of student concentration, though some may require occasional redirection. Considerable repetition is necessary for students to fully grasp and retain the concept. Specific colors enhance clarity and engagement, and audio recordings are important for effective communication and engagement.

Dragonator

Suitable for mathematical and digital competencies, the Dragonator component offers manageable complexity, with minimal guidance needed for effective use. However, it leans towards needing assistance, particularly in group settings, and is moderately complex to explain, requiring some time and effort. It maintains a moderately effective level of student concentration, although occasional redirection may be necessary. Considerable repetition is required for students to fully grasp and retain the concept. Specific colors enhance clarity and engagement, and audio recordings are essential for effective communication and engagement.

Clickable

The Clickable component is suitable for mathematical and digital competencies, with manageable complexity and minimal guidance needed for effective use. However, it requires assistance, especially in group settings, and is moderately complex to explain, demanding some time and effort. It maintains a moderately effective level of student concentration, although some may need occasional redirection. Considerable repetition is necessary for students to fully grasp and retain the concept. Specific colors enhance clarity and engagement, and audio recordings are important for effective communication and engagement.

Clickable Word Position

Suitable for mathematical and digital competencies, the Clickable Word Position component offers manageable complexity, with minimal guidance needed for effective use. However, it leans towards needing assistance, particularly in group settings, and is moderately complex to explain, requiring some time and effort. It maintains a moderately effective level of student concentration, although occasional redirection may be necessary. Considerable repetition is required for students to fully grasp and retain the concept. Specific colors enhance clarity and engagement, and audio recordings are important for effective communication and engagement.

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Symmetry

Suitable for mathematical and digital competencies, the Symmetry component offers manageable complexity, with minimal guidance needed for effective use. However, it requires assistance, especially in group settings, and is moderately complex to explain, demanding some time and effort. It maintains a moderately effective level of student concentration, although some may need occasional redirection. Considerable repetition is necessary for students to fully grasp and retain the concept. Specific colors enhance clarity and engagement, and audio recordings are essential for effective communication and engagement.

Number Liner

The Number Liner component is suitable for mathematical and digital competencies, but it presents manageable complexity, requiring minimal guidance for effective use. However, it leans towards needing assistance, particularly in group settings, and is complex to explain, demanding considerable time and detailed explanation. Unfortunately, it doesn't effectively maintain student concentration, with students quickly losing interest or becoming distracted. Some repetition is helpful for solidifying understanding. Specific colors are necessary to enhance clarity and engagement, and audio recordings are important for effective communication and engagement.

Scales

Suitable for mathematical and digital competencies, the Scales component offers manageable complexity, with minimal guidance needed for effective use. However, it requires assistance, especially in group settings, and is moderately complex to explain, requiring some time and effort. It maintains a moderately effective level of student concentration, although some may need occasional redirection. Considerable repetition is necessary for students to fully grasp and retain the concept. Specific colors enhance clarity and engagement, and audio recordings are crucial for effective communication and engagement.

Math Problem Solve

The Math Problem Solve component is suitable for mathematical and digital competencies, with manageable complexity requiring minimal guidance for effective use. However, it leans towards needing assistance, particularly in group settings, and is moderately complex to explain, demanding some time and effort. It maintains a moderately effective level of student concentration, although occasional redirection may be necessary. Considerable repetition is required for students to fully grasp and retain the concept. Specific colors enhance clarity and engagement, and audio recordings are important for effective communication and engagement.

Video

Suitable for mathematical and digital competencies, the Video component offers manageable complexity, with minimal guidance needed for effective use. However, it requires assistance, especially in group settings, and is moderately complex to explain, requiring some time and effort. It maintains a moderately effective level of student concentration, although some may need occasional redirection. Some repetition is helpful for solidifying understanding. Specific colors enhance clarity and engagement, and audio recordings are essential for effective communication and engagement.

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Interactive Video

The Interactive Video component is suitable for mathematical and digital competencies, with manageable complexity requiring minimal guidance for effective use. However, it leans towards needing assistance, particularly in group settings, and is moderately complex to explain, demanding some time and effort. It maintains a moderately effective level of student concentration, although occasional redirection may be necessary. Considerable repetition is required for students to fully grasp and retain the concept. Specific colors enhance clarity and engagement, and audio recordings are important for effective communication and engagement.

Conclusion

Based on the evaluation survey for Level 3 specific learning difficulties and the analysis of components, we can infer the following:

1. Preferred Technologies: Tablets are unanimously considered the most appropriate technology for students with specific learning difficulties. Smartboards, smartphones, and computers follow closely behind, with only a quarter of respondents considering computers as least appropriate. Other suggested technologies include smart clocks, small robots like Bee Bot, and Chat GPT.
2. Independence Levels: Students with specific learning difficulties can independently use touchscreens on tablets and smartphones. Touchscreens on smartboards are rated second best, while using a mouse is rated third. Other suggested technologies like robots and Chat GPT may require assistance.

3. Accessibility Features: Integrating a screen reader into educational materials is considered very important. The importance of presenting tasks in full-screen mode without visible instructions varies among respondents. Incorporating multisensory elements such as video, speech/sound, and colors into tasks is considered appropriate by most participants. Built-in assistance features within the platform are deemed necessary to ensure all students can complete tasks and succeed.

4. Component Analysis:

- Coloring Book, Draw, Memory, Image Puzzle, Labyrinth, Pathfinder, What's Missing, True/False, Multiple Choice, Matching, Matching Connection, Drag and Drop, Drag and Drop Order, Dragonator, Clickable, Clickable Word Position, Symmetry, Scales, Math Problem Solve, Video, Interactive Video: These components are generally deemed suitable for mathematical and digital competencies, with manageable complexity. They require varying levels of assistance and explanation but are effective in maintaining student concentration. Specific colors and audio recordings are often necessary for clarity, engagement, and effective communication.
- Number Liner: While suitable for mathematical and digital competencies, this component presents challenges in maintaining student concentration. It requires assistance and is complex to explain, but repetition, specific colors, and audio recordings are still deemed important for effectiveness.

The survey results and component analysis indicate that while tablets are universally preferred, other technologies like smartboards, smartphones, and computers also have their place in supporting students with specific learning difficulties. Instructional materials should incorporate multisensory elements, provide built-in assistance features, and ensure accessibility through screen readers. Components should be designed with

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manageable complexity, require varying levels of assistance, and include specific sensory elements like colors and audio recordings for effective communication and engagement.

Level 4 Moderate Evaluation Survey - Editable Digital Templates

According to research conducted by our consortium's work group on moderate learning difficulties, it has been concluded that the most appropriate technologies for working with students are tablets and smartboards. The computer is considered as moderately appropriate, and the least appropriate is smartphone. Tools that can be independently used by such students are touchscreens on tablets, smartboards and smartphones. The keyboard is rated as moderately useable. Integrating a screen reader into educational materials is considered very important for these students. When presenting tasks, displaying the task in full-screen mode, without visible instructions was rated differently; 50% of respondents suggest that only the task should be displayed in full-screen mode, without visible instructions. The other 50% consider instructions should be visible alongside the task. Incorporating multisensory elements such as video, speech/sound, and colors into tasks is very appropriate, according to 100% of participants. Additionally, it is necessary to provide built-in assistance features within the platform to ensure all students can complete tasks and succeed according to 50% of respondents, the other 50% consider it moderately necessary.

Analysis of components

Coloring Book

The coloring book component is considered suitable for developing mathematical and digital competencies. Its very easy complexity allows students to engage effortlessly, promoting independence in usage, even in group settings with adjustments. The component's simplicity to explain ensures quick understanding, maintaining moderate student concentration with occasional redirection. Minimal repetition is needed for effective learning, and its flexibility regarding color and audio requirements allows for versatile usage without compromising effectiveness.

Draw

Primarily suitable for digital usage, with modifications enabling adaptation for mathematical competencies, the Draw component shares similarities with the Coloring Book in terms of ease of use, independence, and simplicity to explain. It maintains moderate student concentration, requiring occasional redirection. Like the Coloring Book, it doesn't require excessive repetition and offers flexibility in color and audio usage.

Memory

Deemed suitable for mathematical and digital competencies, the Memory component aids cognitive development with manageable complexity. Its independence in usage allows for both individual and group activities, despite its moderately complex explanation requirement. Highly effective in maintaining student concentration, it requires

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minimal repetition for effective learning. While audio recordings could enhance engagement, they are not crucial for its effectiveness.

Image Puzzle

Suitable for mathematical and digital competencies, the Image Puzzle component offers problem-solving opportunities with very easy complexity. It promotes independence in usage, suitable for both individual and group settings. Like the preceding components, its simplicity in explanation ensures quick understanding, maintaining moderate student concentration with minimal repetition needed for effective learning. Flexibility in color and audio usage further enhances its versatility.

Labyrinth

Similarly suitable for mathematical and digital competencies, the Labyrinth component fosters spatial reasoning with very easy complexity. While promoting independence in usage, it's noted as less suitable for group work. Like the previous components, it's straightforward to explain, maintaining moderate student concentration with occasional redirection. Minimal repetition is required for effective learning, and its flexibility in color and audio usage allows for versatile implementation.

Pathfinder

The Pathfinder component is deemed suitable for mathematical and digital competencies with very easy complexity, allowing students to engage effortlessly. It promotes complete independence in usage, although it's noted as less suitable for group work. The component is straightforward to explain, maintaining moderately effective student concentration with minimal repetition needed for effective learning. Like the other components, it doesn't have specific color or audio requirements.

What's Missing

Suitable for mathematical and digital competencies, the What's Missing component offers very easy complexity, fostering independent engagement and is highly suitable for group work. It's straightforward to explain and significantly aids in maintaining student focus throughout the task. Like other components, minimal repetition is needed for effective learning, and it offers flexibility in color and audio usage.

True False

Suitable for mathematical and digital competencies, the True False component offers manageable complexity, though some students might need minimal guidance. It promotes complete independence in usage and is ideal for use with multiple students. While moderately complex to explain, it significantly aids in maintaining student focus. A moderate amount of repetition is helpful for solidifying understanding, and it doesn't have specific color or audio requirements.

Multiple Choice

The Multiple-Choice component, suitable for mathematical and digital competencies, offers manageable complexity and promotes complete independence in usage. It can be adjusted for group settings and requires some time and effort to explain, though students can understand it with a brief explanation. Like other components, it

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maintains moderately effective student concentration with moderate repetition needed for effective learning. It also doesn't have specific color or audio requirements.

Matching

Suitable for mathematical and digital competencies, the Matching component offers very easy complexity, promoting complete independence in usage. It's suitable for group settings with adjustments and is straightforward to explain. It maintains moderately effective student concentration with minimal repetition needed for effective learning. Like other components, it doesn't have specific color or audio requirements.

Matching Connection

The Matching Connection component is suitable for mathematical and digital competencies with manageable complexity. Although some students might need minimal guidance, it requires one-on-one support from a teacher for effective usage, and it can be adjusted for group settings. Moderately complex to explain, it maintains moderately effective student concentration with moderate repetition needed for solidifying understanding. It doesn't have specific color or audio requirements.

Drag and Drop

The Drag and Drop component are considered somewhat suitable for mathematical and digital competencies, although it may require modifications. It offers very easy complexity, enabling students to engage effortlessly. Students can use the component independently, but it may be less effective for group learning environments. With a very simple explanation, students understand its usage promptly. It maintains moderately effective student concentration, with minimal repetition needed for effective learning. Like other components, it doesn't have specific color or audio requirements.

Drag and Drop Order

Suitable for mathematical and digital competencies, the Drag and Drop Order component offers manageable complexity, requiring minimal guidance for effective usage. Students can engage with it independently, although it's less suitable for group work. With moderately complex explanation requirements, students can understand it with some effort. Similarly, it maintains moderately effective student concentration, with minimal repetition needed for effective learning. It doesn't have specific color or audio requirements.

Dragonator

Suitable for mathematical and digital competencies, the Dragonator component offers manageable complexity but may require one-on-one support from a teacher for effective usage, with adjustments possible for group settings. With moderately complex explanation requirements, students can understand it with some effort. It maintains moderately effective student concentration, though some redirection may be needed. A moderate amount of repetition is helpful for solidifying understanding. It doesn't have specific color or audio requirements.

Clickable

Suitable for mathematical and digital competencies, the Clickable component offers manageable complexity, enabling students to engage with minimal guidance. Students can use it independently and it's ideal for use with multiple students. With a very simple explanation, students grasp its usage immediately. It maintains moderately

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effective student concentration, with some repetition needed for solidifying understanding. While audio recordings could enhance engagement, they're not critical for effective usage.

Clickable Word Position

Somewhat suitable for mathematical and digital competencies, the Clickable Word Position component offers manageable complexity but may require modifications. It may need one-on-one support from a teacher for effective usage, with adjustments possible for group settings. With moderately complex explanation requirements, students can understand it with some effort. It maintains moderately effective student concentration, with some redirection needed. Some repetition is helpful for solidifying understanding. While audio recordings could enhance engagement, they're not critical.

Symmetry

The Symmetry component is deemed suitable for mathematical and digital competencies, offering manageable complexity. While students may need minimal guidance, they can generally use the component effectively. It promotes complete independence in usage, although it's noted as less suitable for group work. With moderately complex explanation requirements, students can understand it with some effort. It maintains moderately effective student concentration, with some repetition needed for solidifying understanding. As with other components, it doesn't have specific color or audio requirements.

Number Liner

Suitable for mathematical and digital competencies, the Number Liner component offers very easy complexity, enabling students to engage effortlessly. They can use it independently, and adjustments can be made for group settings. With a very simple explanation, students grasp its usage immediately. It maintains moderately effective student concentration, with minimal repetition needed for effective learning. Like other components, it doesn't have specific color or audio requirements.

Scales

The Scales component is suitable for mathematical and digital competencies, offering manageable complexity. Students can use it independently, with adjustments possible for group settings. With moderately complex explanation requirements, students can understand it with some effort. It maintains moderately effective student concentration, with some repetition needed for solidifying understanding. It doesn't have specific color or audio requirements.

Math Problem Solve

Suitable for mathematical and digital competencies, the Math Problem Solve component offers manageable complexity. While students may need minimal guidance, some one-on-one support may be required for effective usage, with adjustments possible for group settings. With moderately complex explanation requirements, students can understand it with some effort. It maintains moderately effective student concentration, with some repetition needed for solidifying understanding. While audio recordings could enhance engagement, they're not critical.

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Video

The Video component is suitable for mathematical and digital competencies, offering very easy complexity. Students can use it independently, and it's ideal for use with multiple students. With a very simple explanation, students grasp its usage immediately. It significantly aids in maintaining student focus and engagement throughout the task, with some repetition needed for solidifying understanding. While it doesn't have specific color requirements, audio recordings are necessary for effective communication and engagement.

Interactive Video

Similarly suitable for mathematical and digital competencies, the Interactive Video component offers very easy complexity, enabling students to engage effortlessly. They can use it independently, and it's ideal for use with multiple students. With a very simple explanation, students grasp its usage immediately. It significantly aids in maintaining student focus and engagement throughout the task, with some repetition needed for solidifying understanding. While it doesn't have specific color requirements, audio recordings are necessary for effective communication and engagement.

Conclusion

Based on the evaluation survey for Level 4 moderate learning difficulties and the analysis of components, we can derive the following insights:

1. Preferred Technologies: Tablets and smartboards are considered the most appropriate technologies for working with students with moderate learning difficulties. Computers are rated as moderately appropriate, while smartphones are considered the least appropriate. Tools that can be independently used by such students include touchscreens on tablets, smartboards, and smartphones, with keyboards rated as moderately usable.

2. Accessibility Features: Integrating a screen reader into educational materials is considered very important for these students. However, there is a split opinion regarding the presentation of tasks in full-screen mode, with 50% of respondents suggesting only the task should be displayed, while the other 50% prefer visible instructions alongside the task. Incorporating multisensory elements such as video, speech/sound, and colors into tasks is deemed very appropriate by all participants. Regarding built-in assistance features within the platform, opinions are divided, with 50% considering it necessary and the other 50% considering it moderately necessary.

3. Component Analysis:

- Coloring Book, Draw, Memory, Image Puzzle, Labyrinth, Pathfinder, What's Missing, True/False, Multiple Choice, Matching, Matching Connection, Drag and Drop, Drag and Drop Order, Dragonator, Clickable, Clickable Word Position, Symmetry, Number Liner, Scales, Math Problem Solve, Video, Interactive Video: These components are generally suitable for mathematical and digital competencies, with varying levels of complexity. They promote independence in usage, with some requiring adjustments for group settings. Most components are straightforward to explain and maintain moderate student concentration with minimal repetition needed for effective learning. Flexibility in color and audio usage is noted across these components.

The survey results and component analysis indicate a preference for tablets and smartboards among students with moderate learning difficulties. The components evaluated provide varying levels of complexity but generally promote independence and engagement, with multisensory elements playing a crucial role in effective communication and engagement. Additionally, there is a need for flexibility in presenting tasks and providing built-in assistance features within educational platforms to cater to the diverse needs of these students.

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