

3. *LESSONS FOR EDUCATORS*

AT in education



Assistive Technology

Assistive Technology Personalizes Learning Environment

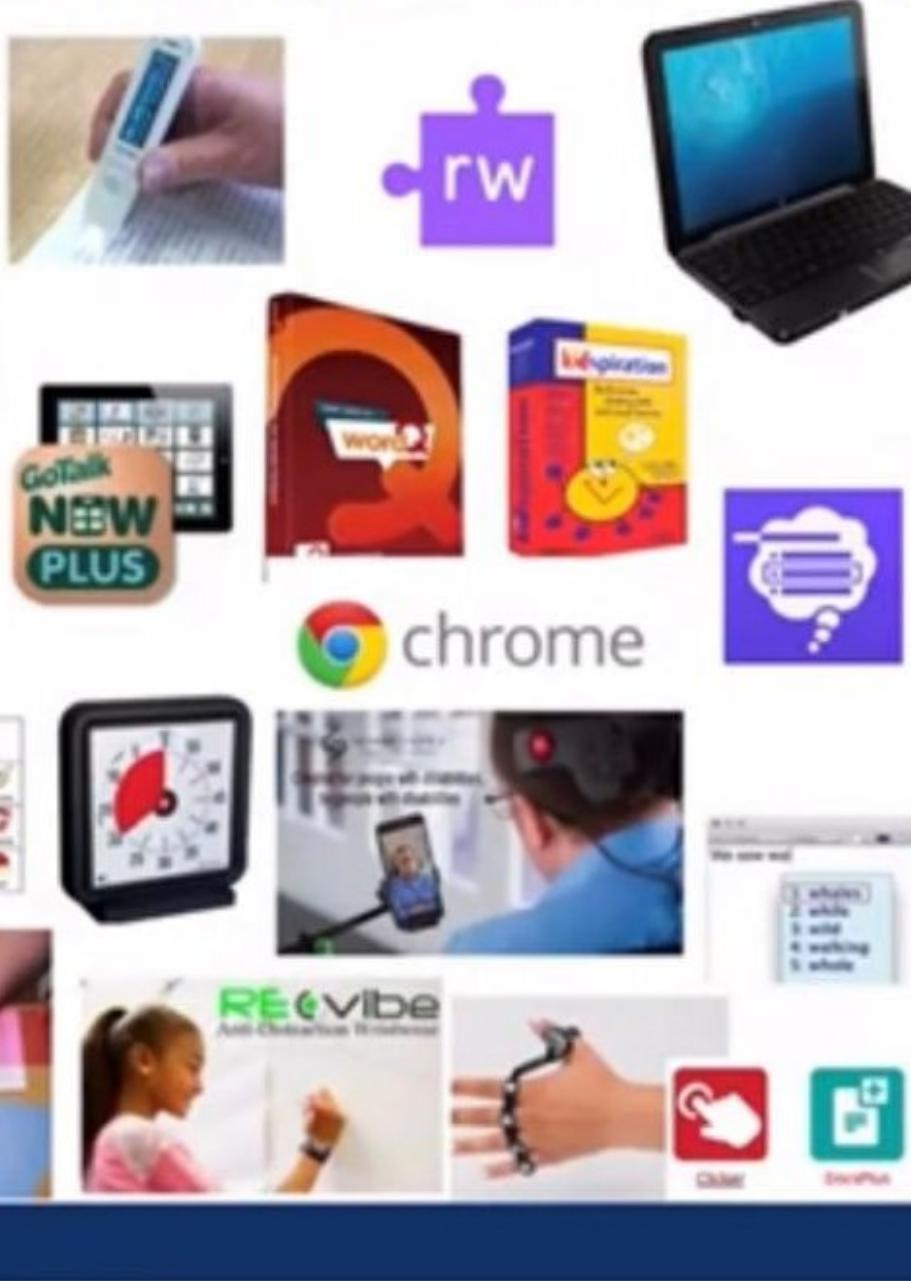


Assistive Technology (AT) concerns the practical tools that can support the functional needs of people who experience difficulties linked to disability or ageing (National Disability Authority's).



Assistive Technology

These technologies play a crucial role in enabling the rights of people with disabilities under the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) such as access to independent living, education and employment.

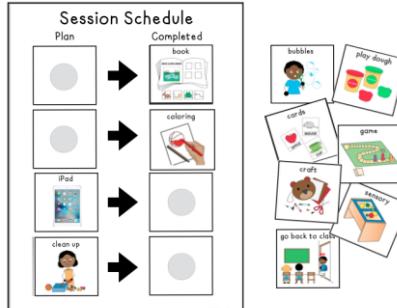


Assistive Technology in Education

Assistive technology is a very broad field and may range from the very simple to the very complex.

It may be divided into

- high,
- medium and
- low-tech categories



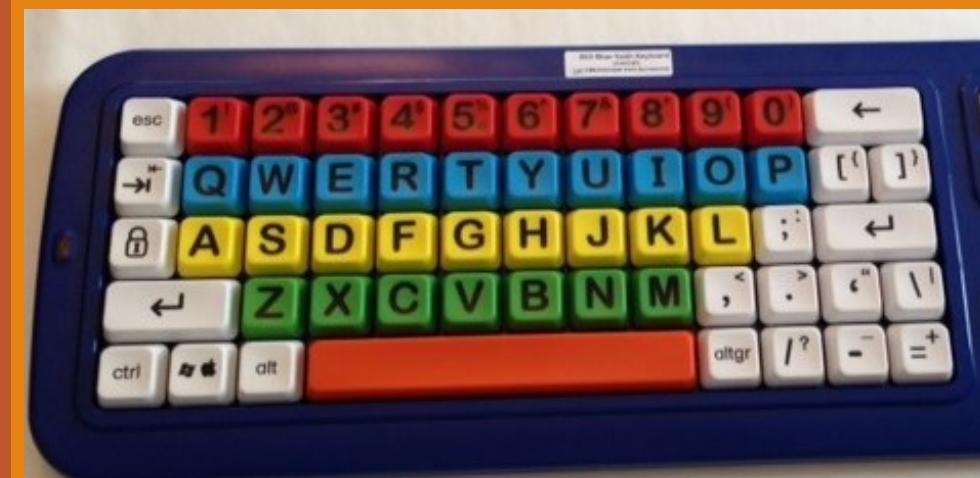
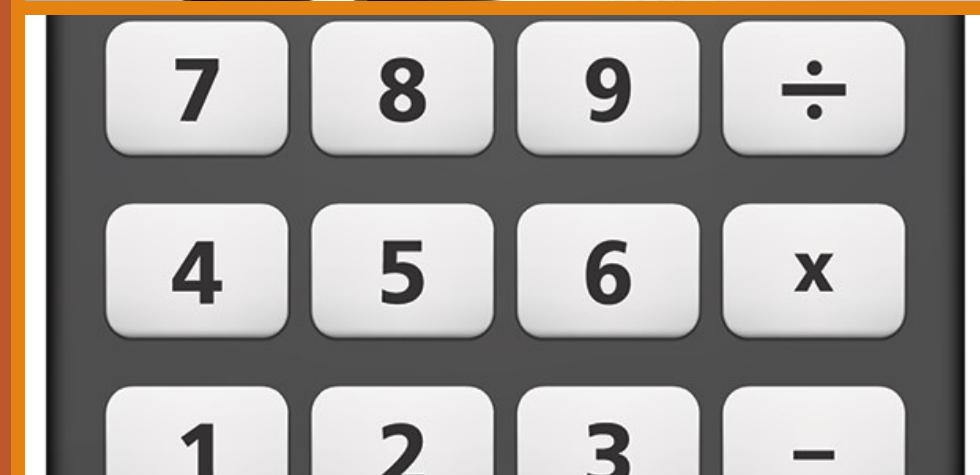
Low-Tech

- Refers to unsophisticated and largely non-electronic devices.
 - Most of these are present in most classrooms and we are unaware that we even provide these accommodations.
 - Examples include;
 - Visual schedules
 - Pencil grips
 - Slant boards
 - Squishy ball
 - Graphic organisers



Medium-Tech

- Least common form of technology.
- Examples are;
 - Screen magnifiers
 - Adapted key boards
 - Calculator
 - Electronic speller
 - Word prediction software



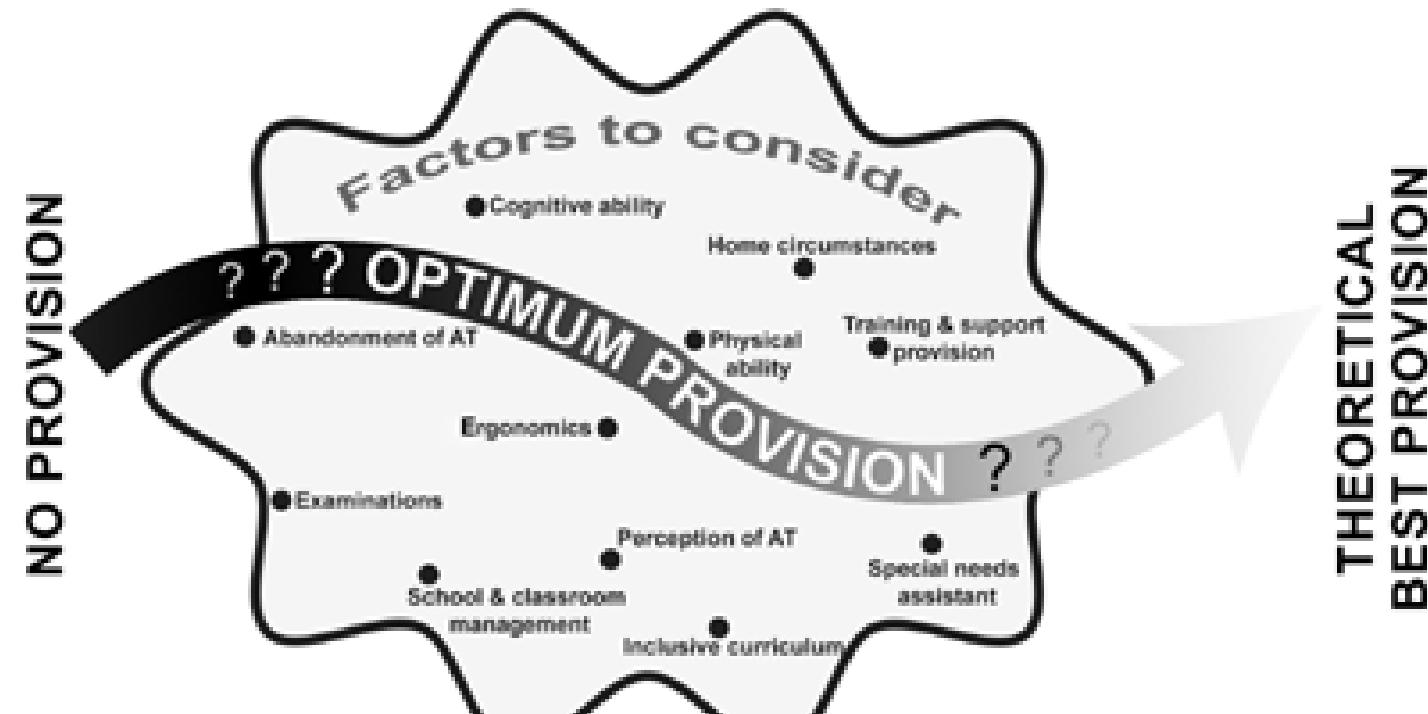
High-Tech

- This is the most intense and expensive form of technology.
- It's what we consider to be 'plug in'.
- Examples
 - Computer
 - Text to speech
 - Electronic tablet



The Irish National Council for special education factors to consider when deciding on AT

1. The pupil
2. Matching technology and the pupil
3. Home circumstances
4. Cognitive ability
5. Ergonomics
6. Inclusive curriculum
7. Other factors to consider





The pupil

AT should be viewed as just one part of an overall provision

High rate of abandonment of AT up to 30% in first 3 months (NCSE).

Maybe due to

- Too much emphasis on technology not enough on matching the pupil's characteristics (functional, cognitive ability, temperament, attitude, motivation) and circumstances with it.
- How does the pupil perceive the technology? Is it as an appendage to him or herself, or does it emphasize their differences.

The pupil must 'buy-in' to the process.

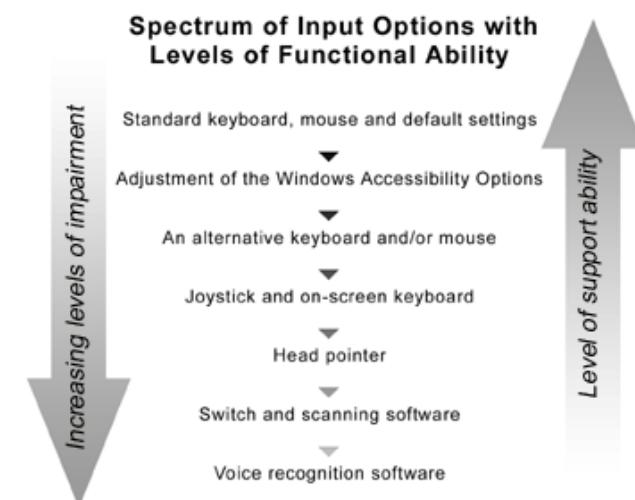
Matching technology and pupil

Determine what technology is needed, what is hoped to be achieved by using it?

How will the technology 'work around' the limitations to function created by the pupils impairment?

Team approach to deciding on AT devices such as;

- Pupil
- Parents
- Teacher
- Class room assistant
- Learning support teacher
- Clinically relevant person



Home Circumstances

AT should not just be for formal education in a school environment.

The need to read, write and communicate is also present at home.

Ideally the arrangements in school should be mirrored at home where possible.





Cognitive Ability

The cognitive ability of the student needs to be considered when examining AT solutions.

Pupils may have a combination of physical, sensory and cognitive difficulties.

The role AT might have with supporting the learning difficulties will need to be explored.

Ergonomics





Inclusive Curriculum

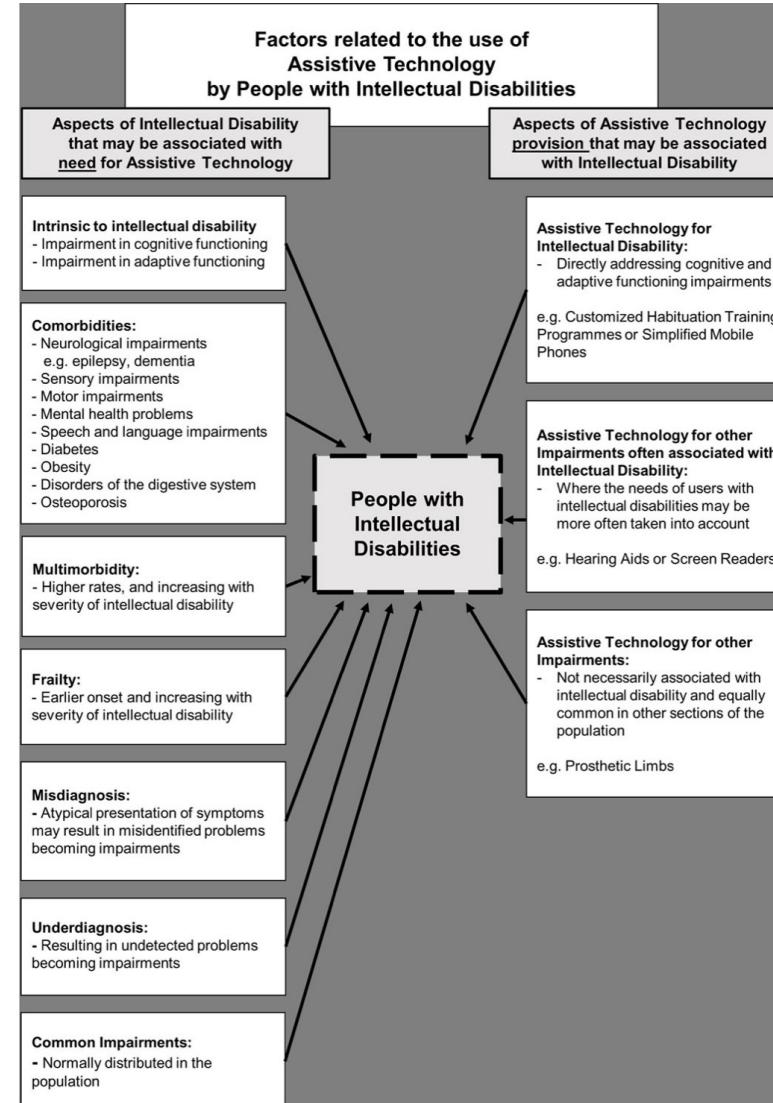
WILL AT CONTRIBUTE TO THE IDENTIFIED EDUCATIONAL GOALS OF THE CHILD?



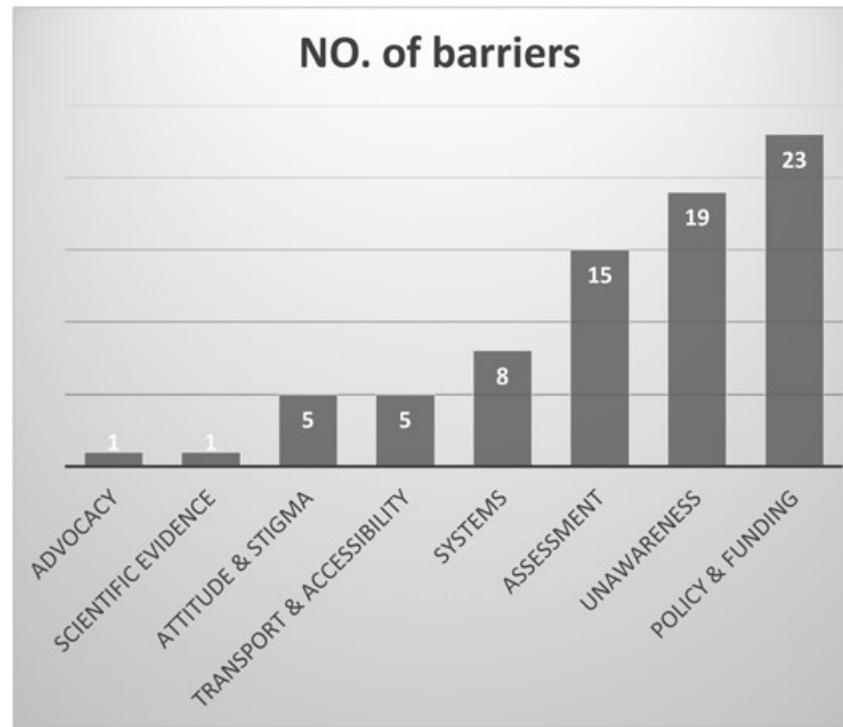
Other factors to consider

Has the pupil any other difficulties that need to be considered when picking their AT?

- Perception issues
- Visual issues
- Hearing difficulties
- **Non-verbal using alternative communication**
- Poor motor skills, muscle tone
- Medical issues ie. epilepsy



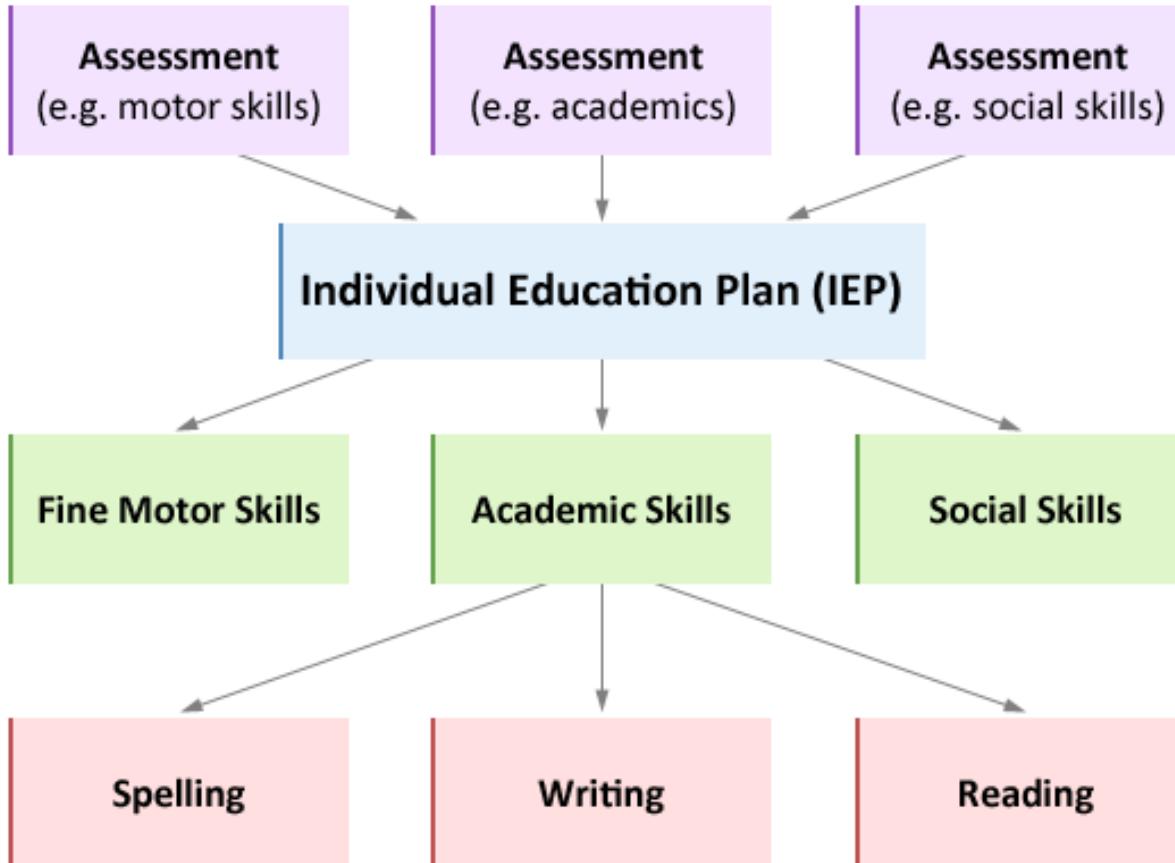
Access to assistive technology for people with intellectual disabilities: a systematic review to identify barriers and facilitators (Boot et al. 2018)



AT for autistic students (NASET)

- Overall understanding of their environment
- Expressive communication skills
- Social interaction skills
- Attention skills
- Motivation skills
- Organization skills
- Academic skills
- Self help skills
- Overall independent daily functioning skills

IEP is broken down into different categories



Individual Education Plan (IEP)

WERE DOES AT FIT IN?

Motor Skill training with AT for individuals with ID or autism

Motor skills

THEY ARE SKILLS THAT ENABLE THE MOVEMENTS AND TASKS WE DO
EVERY DAY.

Motor skills

They are divided into;

Fine motor skills which require a high degree of control and precision



Gross motor skills which allow for balance, coordination, and bigger movements such as walking, running, jumping.



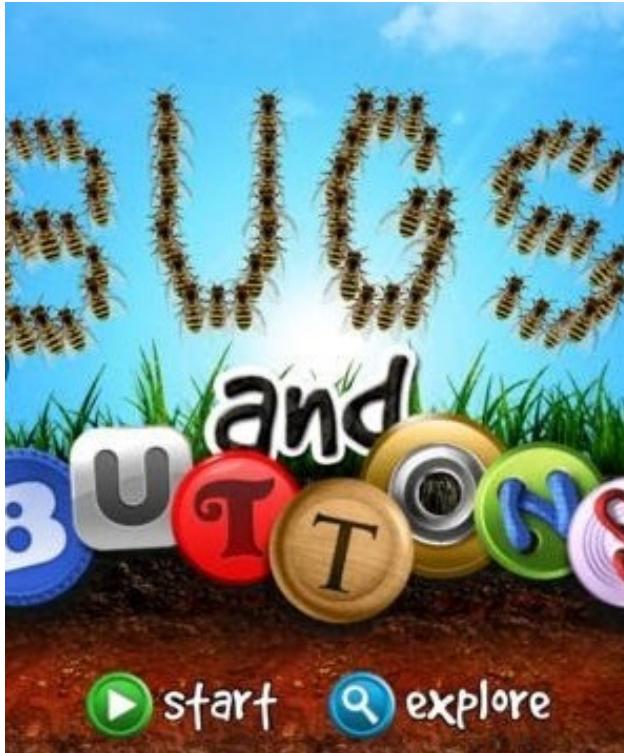
Motor skills

The motor skills of children with ID and autism have been reported to be significantly lower compared to their age matched peers (Rintala and Loovis, 2013, Zampella et al. 2021, Patterson et al. 2021)



‘Low tech’ methods of teaching fine motor skills (National Autistic Society)

- Picking small items (e.g. buttons, beads) out of play dough with the thumb and index finger. Race against peers!
- Playing with dough –squeeze, flatten, cut and roll with scissors, cookie cutters or a garlic press.
- Lacing cut up drinking straws or macaroni onto string, spaghetti, or pipe cleaners.
- Screwing/unscrewing nuts and bolts, using construction kits.
- Looping a rubber band around a pencil several times.
- Playing travel-sized games, such as Connect 4.
- Using chopsticks to eat popcorn, raisins, peas, etc.



'High tech' methods of teaching fine motor skills

APPS SUCH AS - BUG AND BUTTONS, DEXTERIA, LITTLE DIGITS, DEXTERIA JNR, CHALK AND WALK.

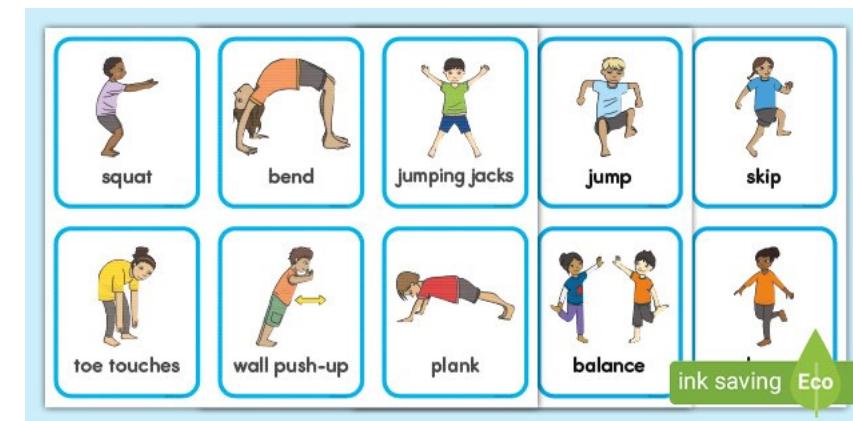
'Low tech' gross motor skill development



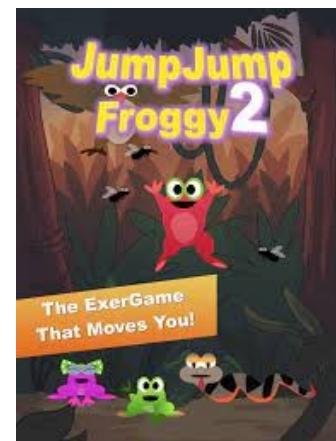
Playgrounds – see-saws, swings, slides, climbing frames etc.

Bicycles, balls, balancing boards, bean bags, skittles for obstacle courses, balloons

Visuals demonstrating exercise



'High tech' gross motor skill development



Videos demonstrating gross motor skill development exercises (Exercise buddy)

Apps such as jump jump froggy 2, dem dancing bones, sworkit kids, super stretch yoga.

Nineteen wii – such as the balance games



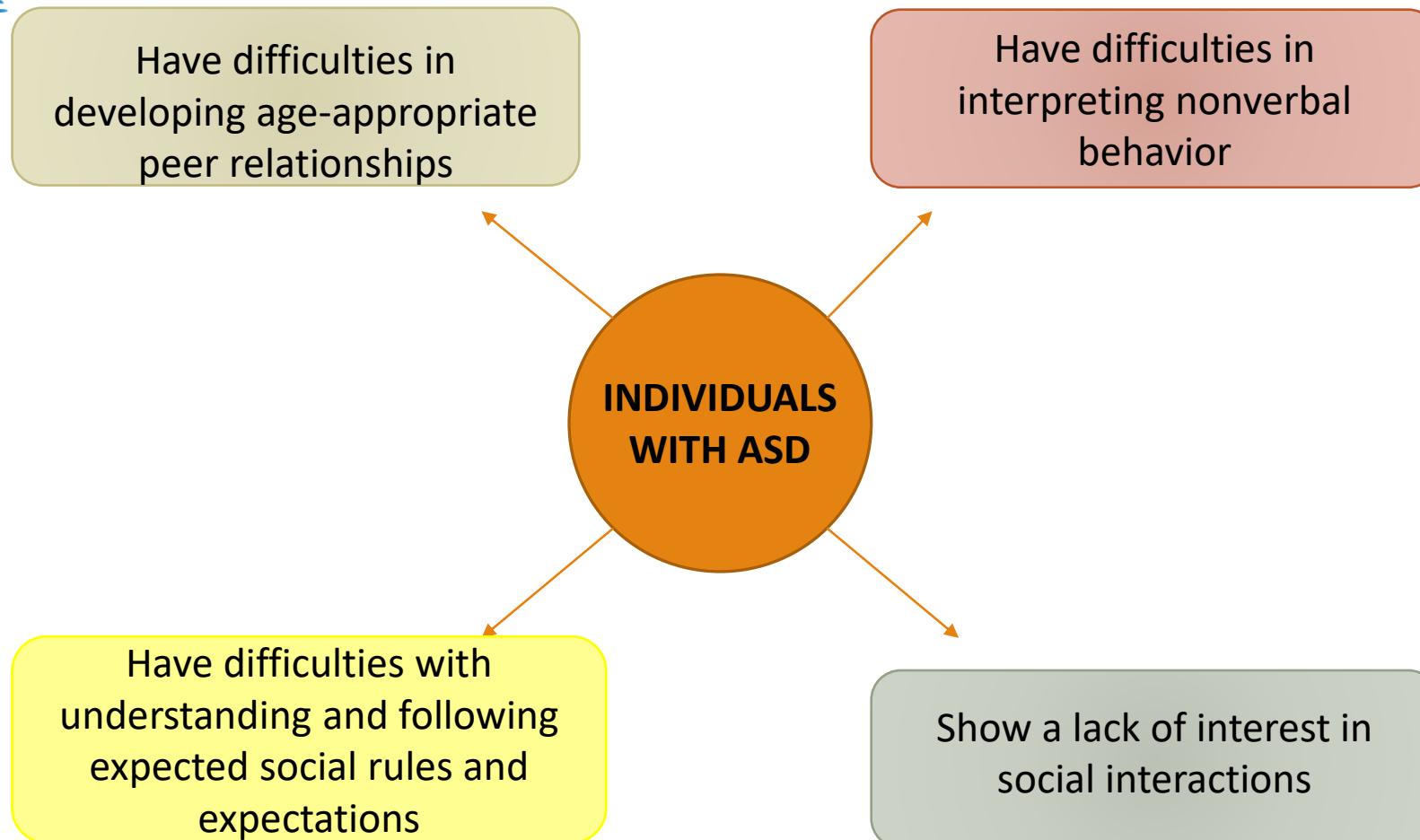
SOCIAL SKILLS TRAINING FOR INDIVIDUALS WITH AUTISM SPECTRUM DISORDER AND MENTAL DISABILITY

Content

- What is Autism Spectrum Disorder (ASD)?
- Characteristics of individuals with ASD?
- The importance of teaching social skills to individuals with ASD
- What are the evidence-based strategies for social skills training of individuals with ASD?
- What is Intellectual Disability (ID)?
- What are the characteristics of individuals with ID?
- The importance of teaching social skills to individuals with ID
- What are the evidence-based strategies for social skills training of individuals with ID?
- What are the assistive technologies that can be used in the social skills training of individuals with ASD and ID?

AUTISM SPECTRUM DISORDER

Autism Spectrum Disorder (ASD) is defined as a neurodevelopmental disorder that manifests itself with inadequacies in communication and interaction, restrictive and repetitive behaviors, interests, or activities that occur in social domain (APA, 2013).



These difficulties and deficits limit the opportunity to engage in social interactions and acquire social skills that are important for social competency.

The Importance of Teaching Social Skills to Individuals with ASD

Individuals with ASD cannot establish appropriate social interaction with their environment due to the behavioral problems and social skills deficiencies. This situation prevents them from living independently in their home, school and social environments and negatively affects the quality of life of both themselves and their close circles.

In order to promote an , social skills are required to be taught to individuals with ASD;

- to be able to live their independent lives in society,
- to improve the the life quality of them and their families.

METHODS USED IN EDUCATION OF SOCIAL SKILLS TO INDIVIDUALS WITH ASD



Evidence-based practices used in teaching social skills to individuals with ASD are as follows:

Peer Mediated Applications

Direct Instruction Method

Modeling / Video Modeling

Social Narratives/Stories

***Computer-Assisted/Technology
Aided Instruction and Intervention***

Discrete Trial Training (DTT)

Activity Based Teaching Method

Exercise and Movement (EXM)

Functional Communication Training

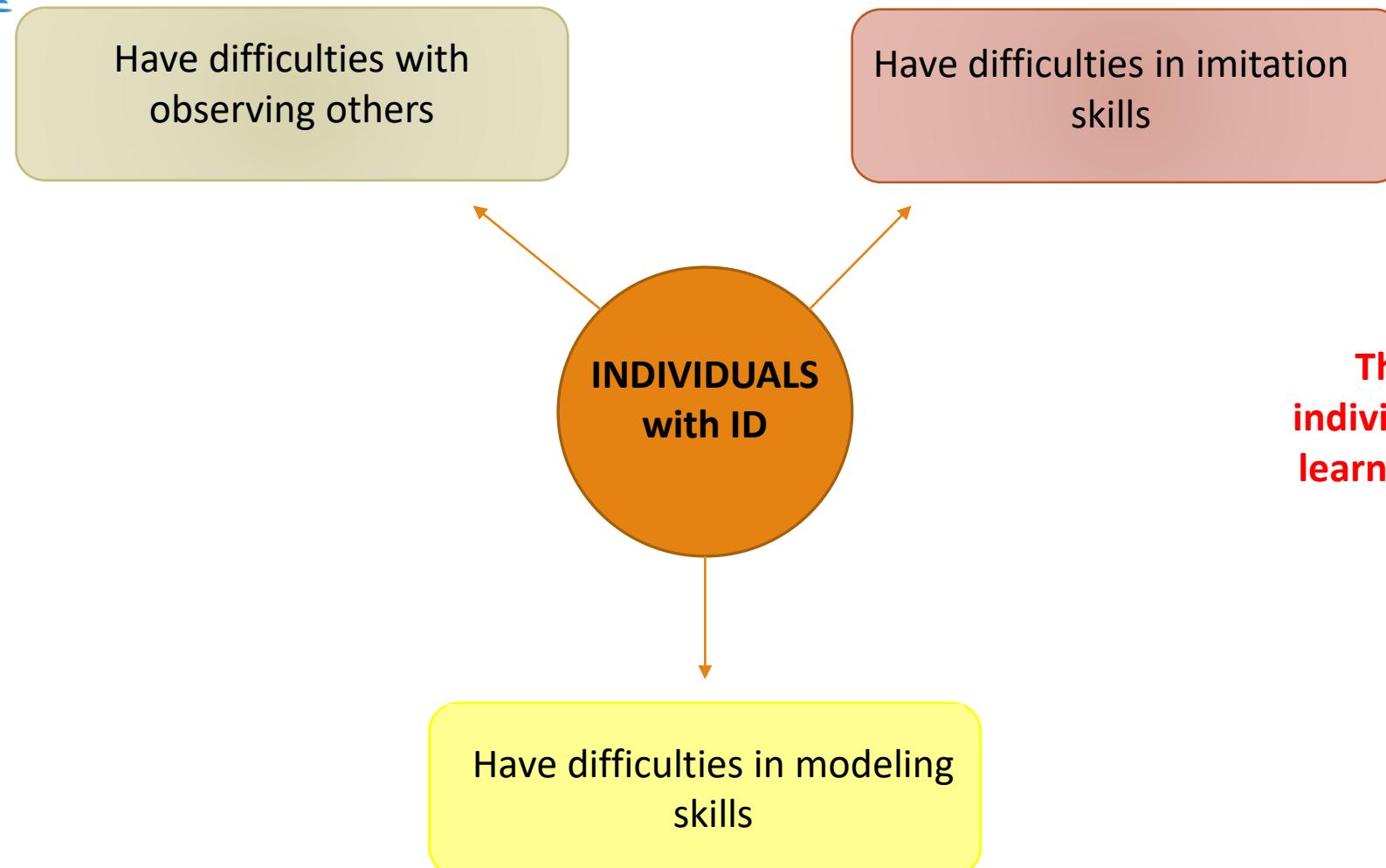
Music-Mediated Intervention

Naturalistic Intervention

Parent-Implemented Intervention

INTELLECTUAL (MENTAL) DISABILITY

Intellectual disability (ID) is a disability with onset before the age of 18, characterized as significant limitations in both cognitive functioning and adaptive behavior manifested in conceptual, social, practical, and adaptive skills (Eripek, 1998).



These features make it difficult for individuals with intellectual disabilities to learn social skills (Sucuoğlu and Çiftçi, 2003).

Importance of Teaching Social Skills to Individuals Diagnosed with ID

Providing social skills training to individuals with ID;

- makes people's lives easier,
- increase their social acceptance,
- help them gain their independence,
- supports their involvements to education, workforce and social environments
- promotes more inclusive society.

METHODS USED IN TEACHING SOCIAL SKILLS TO INDIVIDUALS WITH ID



Evidence-based practices used in teaching social skills to individuals with ID are as follows:

Cognitive Process Approach

Direct Instruction Method

Self-Management Approach

Cooperative Learning

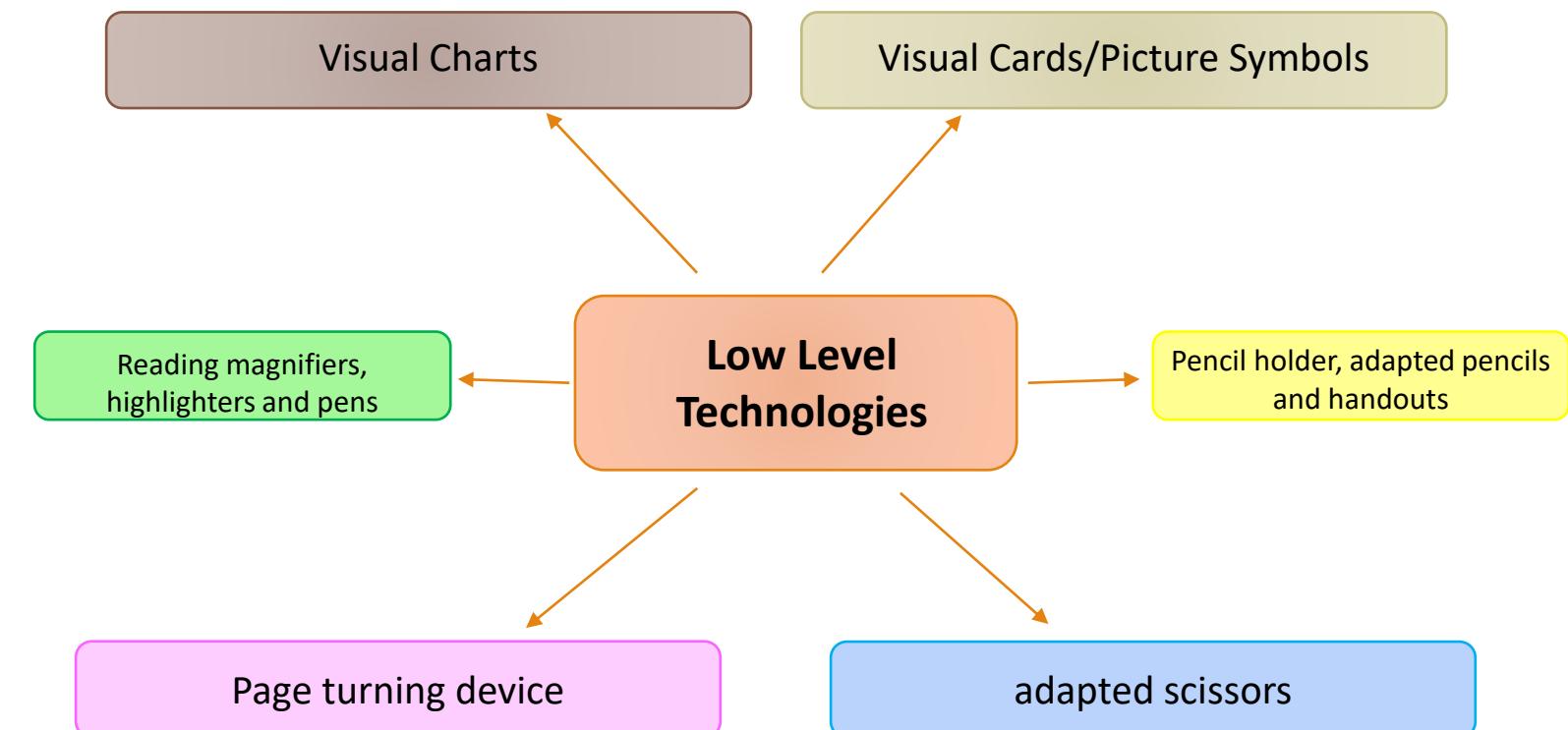
Teaching with Video Modeling

Social Story Apps

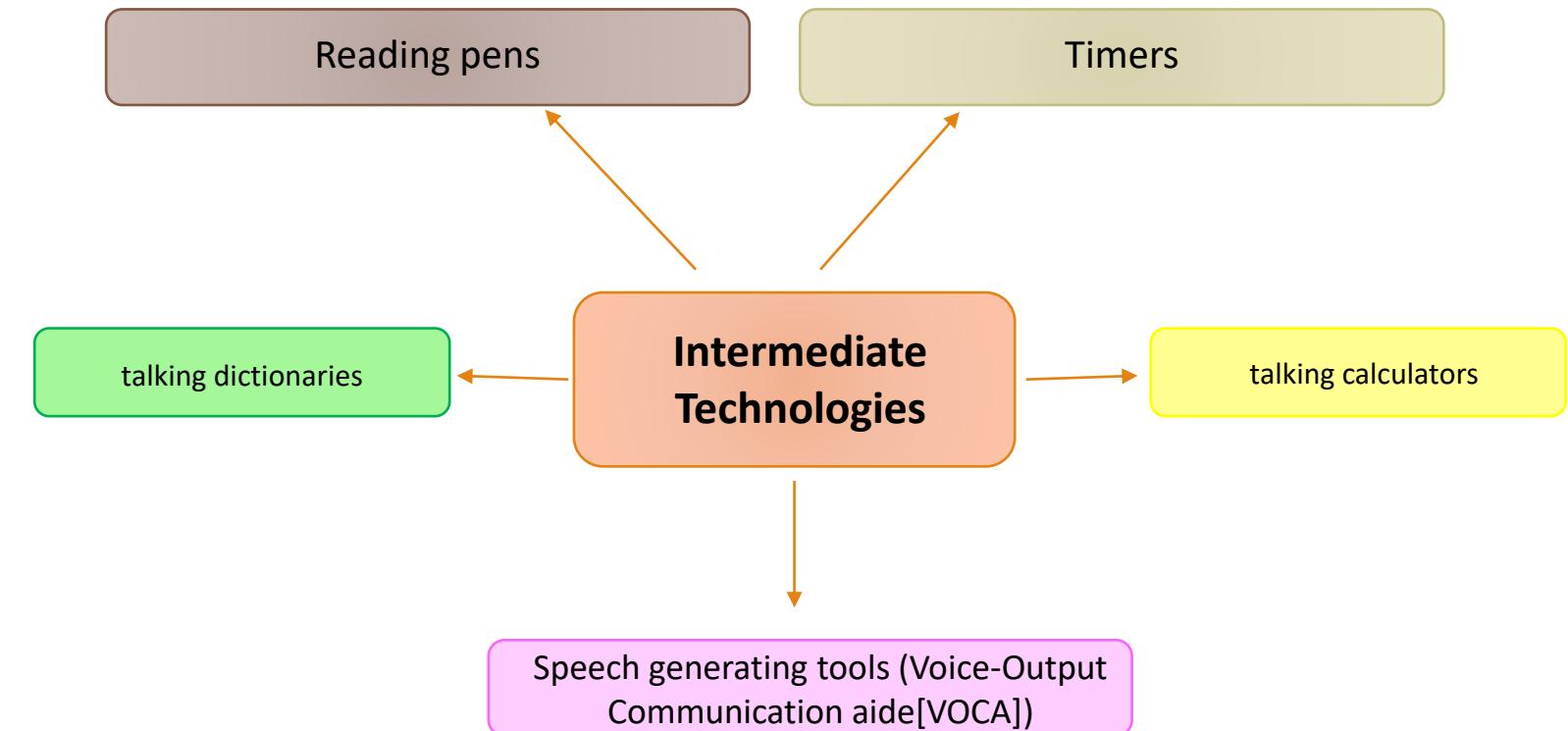
Peer Mediated Applications

Assistive Technologies in Teaching Social Skills to Individuals with ASD and ID.

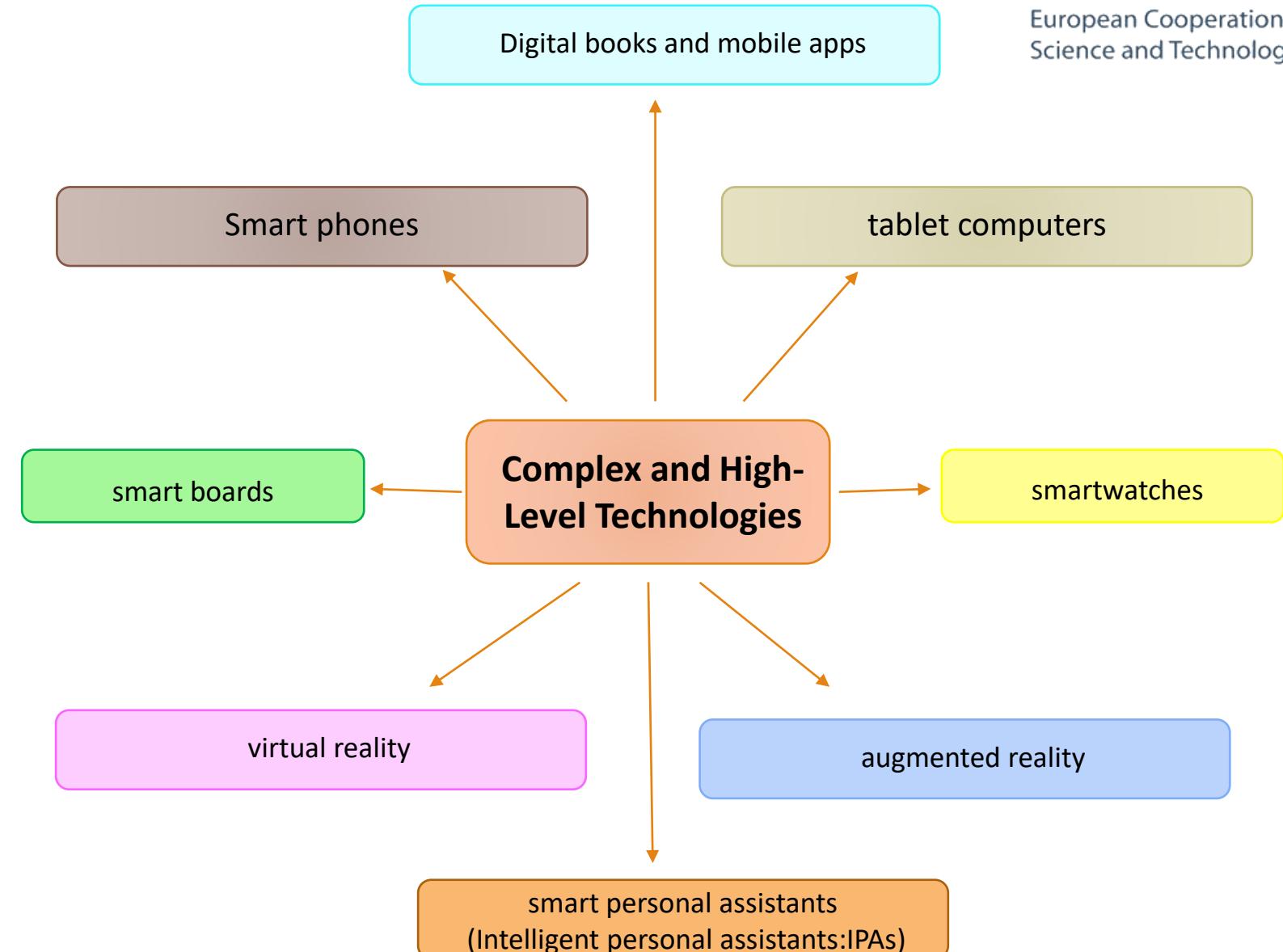
Assistive Technologies in Teaching Social Skills to Individuals with ASD and ID.



Assistive Technologies in Teaching Social Skills to Individuals with ASD and ID.



Assistive Technologies in Teaching Social Skills to Individuals with ASD and ID.



Examples of Assistive Technology Use for Different Disability Groups

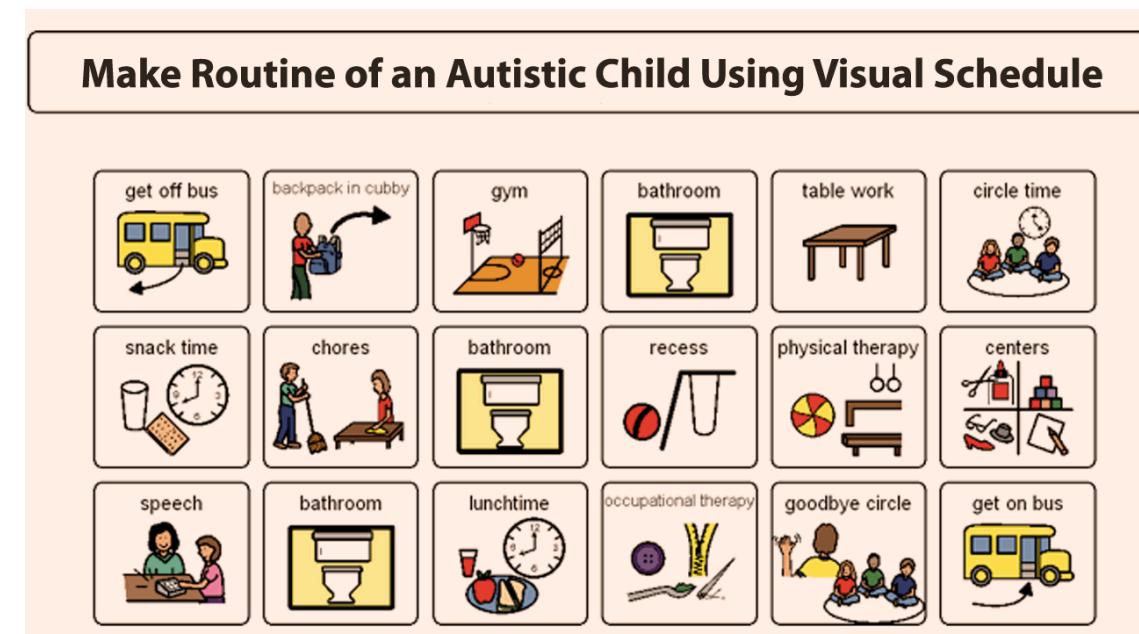


Autism Spectrum Disorder, Mental Deficiency, Learning Disability	Visual schedule, reminders, audio books, digital assistant, robots
Visual Disability	Digital screen magnifiers, remote viewing magnifiers, screen reader, audio alarm system, Braille keyboard and printer, optical character reader: OCR, smart glasses, touchscreen watches
Hearing impaired	In-ear hearing aids, visual and physical stimuli, voice recognition equipment, speech device
Speech and Language Disorder	Digital and synthesis devices (producing recorded sound and artificial sound), text to speech: TTS
Motor Disability	Switch and scan solutions, KinectRom System : environmental control with audio, head, foot, mount and eyes.

Assistive Technologies Used for Individuals with ASD and ID

Visual charts are the charts that can be prepared in different ways, with pictures or in writing, and which enable the organization of a certain time period..

- For example, Visual charts consisting of pictures and symbols can be used in teaching home-class-school routines or rules for reading and writing skills for individual with ASD and ID...



Assistive Technologies Used for Individuals with ASD and ID

Intelligent personal assistants (Intelligent personal assistants:IPAs) are applications that communicate with the learner, respond, make suggestions or perform certain activities by making use of inputs such as the learner's voice, image, and contextual information (Hauswald, 2015).

- technologies that can be used in the processes of supporting or improving the speaking skills of individuals who have problems especially in speaking skills.
- Easily can be used with smartphones or other mobile devices.



Assistive Technologies Used for Individuals with ASD and ID

Mobile apps are applications that can incorporate many technologies.

- The ability to use mobile applications in the special education process, to offer accessibility options according to the characteristics of individuals with different special needs, to update the application quickly, to allow different types of interaction, and most importantly can be used with a natural user interface.



Adapted function: Communication,
Cognition, Autonomy, Social area, Motor
area

Adapted function-
Communication,
Cognition, Autonomy,
Social area, Motor
area

"INTELLIGENCE IS NOT A FIXED
QUALITY, DETERMINED FROM BIRTH,
BUT A VARIABLE THAT CAN BE
DEVELOPED DURING ANY STAGE OF
LIFE"

Feuerstein, 1980

Cognitive Education

It constantly seeks psycho-pedagogical practices and techniques in the field of education, training, therapy, and rehabilitation

It studies tools, methods, and procedures for improving cognitive processes

Modification of cognitive structures

Time-stabilized modification of the cognitive structure that goes beyond the genetic and neurophysiological characteristics of the subject

Intellectual abilities can be developed throughout the life cycle and not only during the developmental age

Mediator

MEDIATION

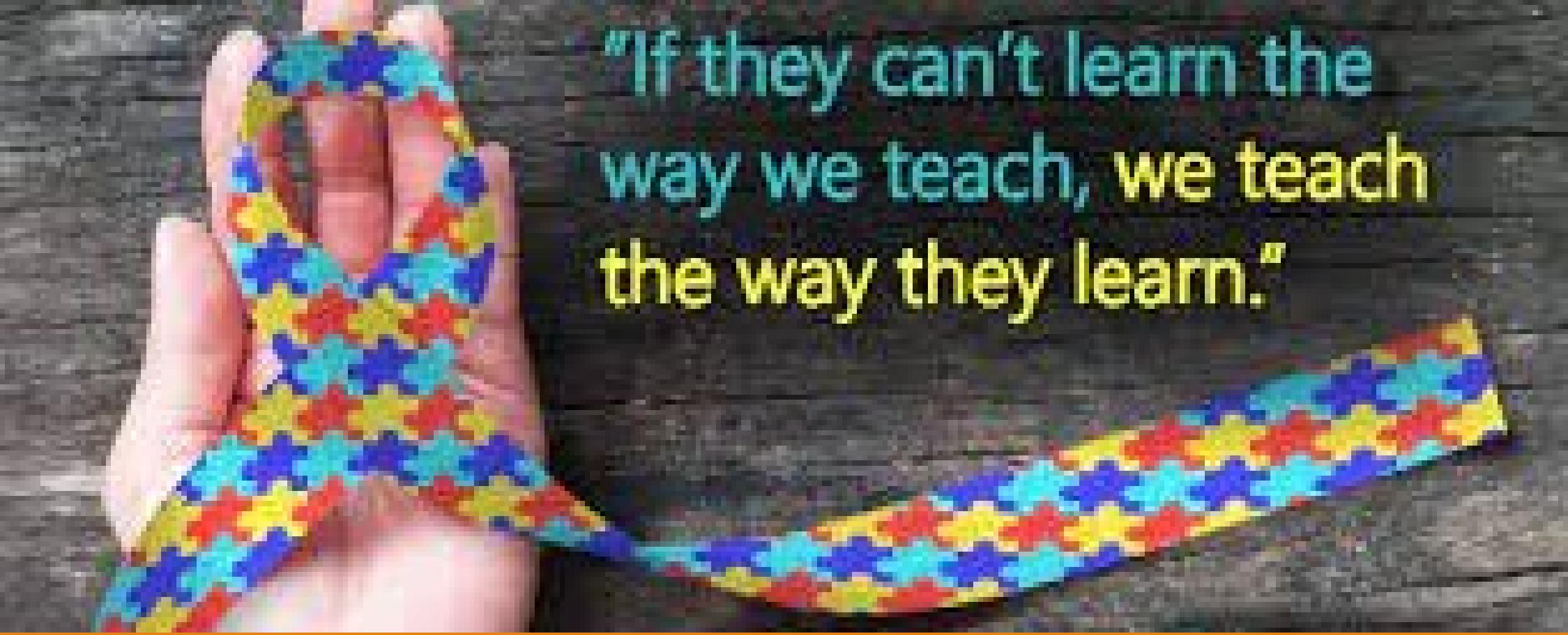
The action of every object that appears between the individual and the surrounding environment is mediation, and the object that makes mediation possible (the principal) takes the name of "MEDIATOR"

COGNITIVE MODIFICATION

EVERY PERSON CAN BE STIMULATED
TO START HIS JOURNEY TO DEVELOPMENT

The mediator

- 1 - The mediator encourages the child to reflect in a systematic and motivating way about the strategies he is using
- 2- The CHILD becomes aware of himself as a THINKING BEING and about the characteristics of his own thought
- 3- Identifies cognitive functions that help solve the task
- 4- It identifies which cognitive functions need to be activated more



"If they can't learn the way we teach, we teach the way they learn."

THE INTERMEDIATE ADULT is not a repository of KNOWLEDGE but an intermediary of PROCESSES

The process of thinking

Input - how to collect the necessary information

Processing refers to how we use the information we collected

Output communication through expression

Cognitive function - input

Perception – using all the senses (sight, hearing, taste, smell, touch)

Systematic exploration – using an observation tool not to skip any important element or return to it twice

Naming – giving a name to the observed elements so that they are easily remembered and recalled

Time/space relationship - description of objects and events based on time and space

Output

“Every individual, starting from any condition and at any age, can undertake a journey of improvement”

Feuerstein

Impulse control – counting to at least 10 so you don't do or say something you might regret later

Impulse control to act according to the trial-error model - to reflect well before responding, avoiding immediate reactions and correcting possible errors as a result of random attempts

Self-focus – putting yourself in the role of listener to ensure that the response is well understood during communication

Schematization - the mental construction of a certain map of points

Clarity – using clear and precise language to ensure there is no doubt in the listener

Overcoming emotional blocks - if you are not able to answer, there is no reason to worry or be afraid. Pause for a moment and try again to give an answer using a different strategy that might solve the problem

Limitations in cognitive function at the input level

- Limitations in clear and accurate perception
- Limitations in systematic and planned exploratory behaviors
- Limitations on verbal instruments that influence discrimination Constraints on stable reference systems of the spatial and temporal logical types
- Controlling multiple sources of information has limitations.

Limitations in cognitive function at the level of elaboration

Limitations in the mental field in the understanding of reality

Constraints on the spontaneous comparative behavior

Limitations in the perception of the problem and its definition

Limitations on hypothetical thinking

Limitations in strategies to test hypotheses

Constraints with planning behaviors

Limitations in cognitive function at the output level

Egocentric modes of communication

Difficulty in designing virtual relationships

Blockage

Trial answer - error

Limitations on the need for clarity and precision in
communicating responses

Impulsive behavior

INSTRUMENTAL ENRICHMENT PROGRAM

THE GOAL IS TO
MODIFY THE PERSON'S
BEHAVIOR IN A
SUSTAINABLE WAY, SO
AS TO ENABLE THEM TO
ACTIVELY RESPOND TO
ENVIRONMENTAL
STIMULUS

OBJECTIVES

- Correction Of Missing Cognitive Functions
- To Develop Verbal Instruments And Logical Operations Necessary For Learning And Communication
- Stimulating The Acquisition Of Positive Cognitive Habits
- Mediate Reflective Thinking And Insight
- Encourages Internal Motivation For The Task
- Mediate The Change Of Role In The Subject: From The One Who Passively Receives And Reproduces Information To The One Who Actively Generates New Information

Feuerstein's Instrumental Enrichment Program

Feuerstein's Program of Instrumental Enrichment (FIE) is a series of tasks that focus directly on developing thinking skills.

Implementation of the instruments effectively requires a different teaching style called

Mediated Learning Experience (MLE).

The aim is to improve students' social adaptability which ultimately contributes to real-life problem-solving skills (as opposed to just content areas).

INSTRUMENTAL ENRICHMENT PROGRAM

- The difference between the Common Core Standards and Feuerstein's program is that students will essentially develop thinking skills above and beyond the contexts of specific learning areas, thereby creating broader transfer.
- It is not the teacher who formulates the students' answer, but rather builds on the process of how the student arrives at the conclusion.
- FIE "facilitates" the systematic fostering of critical thinking, the development of student responsibility, and students' understanding and understanding by empowering them to take ownership of their learning.

Organization of Dotts

- Definition of the problem.
- Selection of points related to the required picture.
- Planning behavior.
- Hypothetical thinking.
- Use of logic.
- Comparison of the projected image with the model.
- Summary behavior

Organization of dotts

- Dotting provides students with practice in designing virtual relationships through tasks that require a student to identify and outline given figures within a cloud of dots.
- Projecting a potential relationship requires students to seek meaning between separate phenomena.
- Through repeated practice and successful completion of progressively more difficult exercises, the instrument encourages intrinsic task motivation and activates a range of cognitive functions

Comparisons

- ☒ Ability to keep in mind a large number of parameters during the process.
- ☒ Making a plan that will take into account the complexity of the tasks.
- ☒ Using hypothetical thinking and testing hypotheses to evaluate alternative response

- Comparisons enhance students' ability to distinguish parameters of comparison and develop the critical thinking involved in comparative behavior. The instrument provides concepts, labels and operations to describe similarities and differences.
- Through Comparisons students learn to organize and integrate separate and distinct pieces of information into coordinated and meaningful systems.
- The instrument helps build students' feelings of competence and independence by enriching the repertoire of attributes with which they compare objects and events.

Spatial Orientation

- Determining the problem when no instructions are given.
- Hypothetical thinking: "If . . . then."
- Using logic to solve tasks for which information is not given directly.
- Comparison as a strategy to control one's work.
- The internality of the relationship between the elements of the reference system.

Spatial Orientation addresses the poor articulation, differentiation, and representation of space that can result from an inability to disassociate from one's own body position as a reference.

It deals with a relative reference system for locating objects in space and in relation to each other.

As a result of their experience with these tasks, students discover why there are different perspectives in the perception of an object or experience and how to take into account an opinion that is different from their own.

Analytical perception

- Comparison with the model.
- Establishing relationships between parts and between parts and the model.
- Categorizing parts according to their shapes and colors.
- Visual transport of parts in the model.

Analytical perception increases students' ability to differentiate (separate a whole into its parts) and integrate (join the parts into a whole).

Adapting to the world depends on the flexibility to alternate between these two perceptual processes.

As a result of their experiences with the tasks in this instrument, students begin to distinguish between internal and external sources of reference.

They are then able to form and discriminately use internal referents to process information and to structure and restructure their various life experiences.

Categorization

- ☒ Comparing certain similarities and differences.
- ☒ Selection of relevant information.
- ☒ Summary behavior.
- ☒ Designing relationships.
- ☒ Definition of cognitive categories.

Categorization is based on successful comparison, differentiation and discrimination.

This tool helps students develop the flexibility and divergent thinking needed to categorize and recategorize the same objects into different groups as the principles and parameters of categorization change with new needs and objectives.

In categorization, students move from establishing relationships between concrete items to projecting relationships between concepts.

Number progressions

- ☒ Use of relevant silent signals such as index (the place of a number in the progression).
- ☒ Finding relationships between progression elements.

Number progressions help students look for inferred and induced relationships between particular objects or events.

Students draw accurate conclusions about the rules and formulas of progressions as the tool enhances their ability to compare, infer and reason deductively and inductively.

This instrument mediates accuracy, discrimination, and willingness to defer judgment until all elements have been processed in determining a common rule for a progression.

Familial Relations

- Defining the problem to determine what is required to be done.
- Using only information that is relevant.
- Comparison between elements and relationships to determine similarities and differences.
- Given a number of distinct core elements and the relationships between them.
- Hypothetical thinking and using logical evidence to justify one's conclusions.
- Search for links and connections that unite separate entities.

Familial Relations requires students to use a system of relations to connect particular entities and categories and emphasizes the necessary and sufficient conditions for inclusion and exclusion from categories.

Family relationship exercises require the correct use of language in encoding and decoding relationships and require inferential thinking, analytical thinking and deductive reasoning to justify conclusions based on logical evidence.

Time relationships

- ☒ Comparison of temporal characteristics of events.
- ☒ Use of relevant signals.
- ☒ Hypothetical thinking and using logical evidence to support hypotheses.

Time relationships develop students' ability to use concepts of time to describe and order their experiences.

An adequate time orientation is important for relational thinking and is acquired through mediated learning experiences.

Without an awareness of the continuity of time and its ordered continuity and the rhythm of events, students use their past to anticipate, predict, plan and prioritize future events.

Temporal relations help mediate time relations (related to space) and the use of precise concepts and relations.

The illustrations

- Definition of the inferred problem.
- Using relevant signals as a basis for inference.
- Using comparative behavior.
- Using summary behavior.
- Hypothetical thinking and using logical evidence to support conclusions.
- Establishing relationships between individuals, objects and events presented in illustrations.

The illustrations present students with a summary of situations in which a problem can be perceived and recognized.

Students are mediated to provide appropriate solutions to identified problems.

This instrument mediates students' ability to perceive details, to use several sources of information and to exercise comparative behavior. Illustrations serve the development of vocabulary and verbal and written language; it is also very useful for generating intrinsic task motivation.

Used in conjunction with other instruments to reinforce or elaborate previously learned strategies.

Instruction

- Definition of the problem.
- Comparing the finished drawing with the verbal instructions.
- Using relevant signals to clarify ambiguities.
- Hypothetical thinking and using logical evidence to support hypotheses.

Instruction focuses on students' ability to encode and decode verbal and written information.

The task is not in the meaning of the words but in the meaning of the words and what they mean in context.

Through the knowledge gained about the reasons for their successes and failures, students become information generators, able and willing to interpret and transmit complex instructions.

Syllogisms

- Proper definition of the problem.
- Comparative behavior between the attributes of a group and those of group members.
- Selection of relevant data.
- Overcoming the episodic grasp of reality by establishing relationships.
- Expanding the mental field to simultaneously process information from several sources.
- Elaboration of cognitive categories based on conceptual criteria.
- Using summary behavior.
- Hypothetical thinking and looking for logical evidence

Syllogisms present students with formal, propositional logic. In syllogistic reasoning, the integration of information from two premises about the relationship between terms yields the deduction of an unknown relationship.

Through syllogism tasks, students acquire the ability to distinguish between valid and invalid conclusions and between possible and inevitable outcomes.

The instrument encourages inferential and abstract thinking.

Transitive relationships

- ☒ Definition of the problem.
- ☒ Selection of relevant information.
- ☒ Comparison and categorization.
- ☒ Hypothetical thinking.
- ☒ Planned and systematic behavior.

Transitive relationships require students to deal with the relationships that exist in ordered sets, which distinguish the members of the set and are described by the terms "greater than," "less than," and "equal to."

This instrument helps students to recognize the conditions that allow deductive and inductive reasoning.

Through the tasks in Transitive Relationships, students demonstrate their ability to engage in inferential thinking based on logical implications and relational thinking.

Representational template design

- ❑ Comparison.
- ❑ Summary behavior.
- ❑ Categorization.
- ❑ Creating time and space with their relationships.

Representational template design consists of tasks in which students must mentally construct a design.

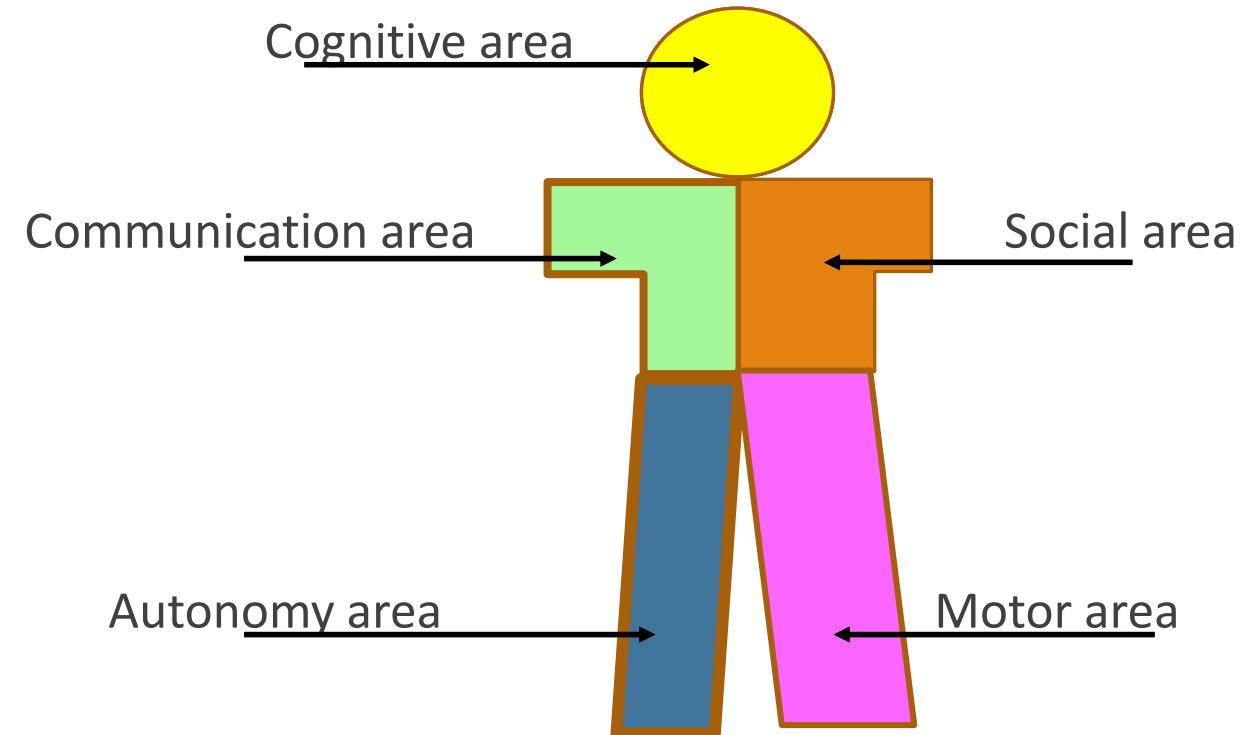
Completing tasks requires a complex series of steps. Identifying the whole through its overlapping parts requires an active, mental construction with the help of inferences and a prediction and representation of the result.

Answers are sought by affirming, denying and eliminating what is logically impossible.

Students must extrapolate from the known to the unknown and rely on logic to identify constructions.

Phases of school intervention

- 1- Observation of strengths and weaknesses
- 2- Relationship building
- 3- Structuring the environment in space and time
- 4- Promote, develop choices and motivation
- 5- Determining the content to be taught



Phase 1- Observation of strengths and weaknesses

Perspective

Global- consider the backlog in general

Analytical- analysis as skills and difficulties

Deficit skills - emergent - acquired

Phase 2- Building the relationship

- Emphasize the student's autonomy in achieving the objectives
- Avoid attitudes of excessive care
- Face and support moments of frustration
- Promotes motivation to learn

Phase 3- Structuring the environment in space and time

- Space: must be prepared and organized together with the student, trying to support memory and attention
- Time; we propose short activities that always lead to a conclusion, varying depending on the support function of motivation and attention

Phase 4 - Development of free choice and motivation

Choice; tries to train in every situation and aims to avoid passivity and opposition of the student, in order to improve the sense of self-efficacy

Motivation – the proposal of mental activities starting from concrete experimentation, and then moving to symbolic representation and ending in generalization in different contexts of learned competences (cognitive maps)

Phase 5 Determination of the content to be taught (task analysis)

Identify the prerequisites that the student must possess in order to master each of the sub-components that make up the task

To know about what

(in what specific capacity) is being worked on

Why

(to reach a specific objective)

Thank you for your kind attention!

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This education materials were developed by the help of
CA19104 – COST Action
Advancing Social inclusion through Technology and EmPowerment (a-STEP)
<https://www.cost.eu/actions/CA19104/#tabs+Name:Description>
<https://www.a-step-action.eu/>

