Teaching with AAC: A Pedagogical Guide

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Plural Words

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Plural Words is a European project started in October 2023 and co-funded by the Erasmus+ Programme of the European Commission, within the framework of school education.

The Project stands as a beacon **for democratising the learning and teaching of Augmentative and Alternative Communication (AAC)** in early childhood and primary school establishments. The mission is to universalise innovative communication through creative tools grounded in visual factors, ensuring inclusion and equality in learning conditions for all students.

The following document has been developed by the Plural Words Consortium, composed by a group of 6 organisations, coming from 6 different European countries (France, Belgium, Italy, Croatia, Poland and Romania) and joined by a Swiss associated partner. This Pedagogical Guide on AAC aims to support, valorise, and encourage teachers in the seamless implementation of inclusive pedagogies of AAC within their classrooms.

The Pedagogical Guide is not just a manual; it is a cornerstone in establishing a reference work that contributes to the creation of tailored and creative resources. These resources are designed to guarantee inclusion in both expression and understanding. The guide will serve as a compass for **educators and teachers**, providing them with practical insights, best practices, and visual tools to create an inclusive learning environment where every student's voice is heard and understood.

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The PLURAL WORDS project is co-financed by the ERASMUS+ programme of the EU. Its content reflects the views ofthe authors, and the European Commission cannot be held responsible for any use which may be made of theinformation therein. (Project code: 2023-1-FR01-KA220-SCH-000155095).

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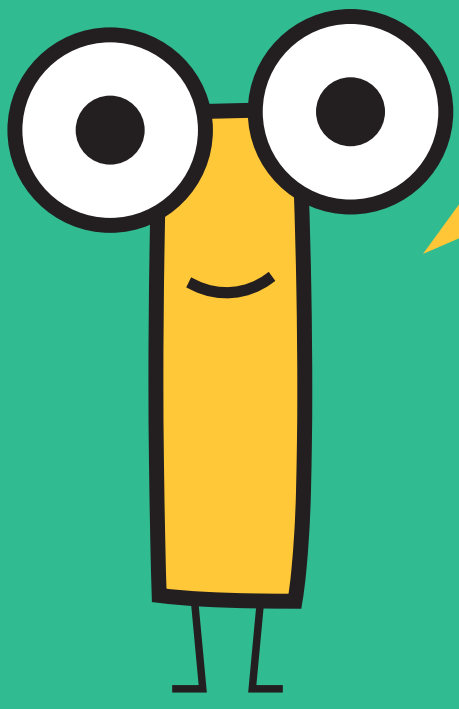

What is AAC?

Augmentative and Alternative Communication (AAC) is a **multifaceted approach** designed to support individuals with communication difficulties or impairments.
It encompasses a wide range of tools, strategies, and techniques that aim to enhance or replace conventional forms of communication.

At its core, AAC involves the **use of various methods to supplement or replace spoken language**, allowing individuals to **express themselves, convey their needs**, and engage in **meaningful interactions**. It is a field that continually evolves as technology advances and our understanding of communication diversity deepens. AAC serves as a vital resource for individuals with conditions such as autism spectrum disorder, cerebral palsy, speech disorders, and other communication challenges. The primary goal is to empower these individuals by providing them with effective means of communication, **fostering independence, and facilitating social interaction**.

In recent years, the field of education has witnessed a growing emphasis on inclusive practices to ensure that every child has the opportunity to thrive in learning environments.
Augmentative and Alternative Communication (AAC) is a crucial aspect of inclusive education, especially for children with communication difficulties.

AAC is crucial for children for several reasons. Firstly, it provides access to communication for those who face challenges in verbal expression. By offering alternative means of communication, AAC ensures that every child can participate in social interactions, engage with peers, and access educational content. Secondly, AAC supports language development by allowing children to practice and reinforce communication skills, including vocabulary, sentence structure, and overall language proficiency. This lays the groundwork for effective communication in various settings. Additionally, AAC contributes to creating inclusive learning environments by enabling children with communication challenges to actively participate in classroom activities, discussions, and collaborative projects. Finally, AAC plays a vital role in supporting social interaction. Beyond transmitting information, communication is essential for building social connections. AAC empowers children to engage in relationships with peers, teachers, and family members, thus contributing to their emotional and social well-being.

The European context of communication troubles

Despite a disparity within the policies related to AAC, Europe is concerned with communication troubles considering that approximately 5.8 million[1] children and adolescents have **Developmental Language Disorder** and face communication difficulties. Understanding the specific context of Augmentative and Alternative Communication (AAC) within the European landscape is crucial for educators and professionals working with these children.

Regional variations in AAC implementation are influenced by linguistic diversity, with numerous languages spoken across the continent. AAC solutions must address the challenges posed by multilingual environments, ensuring that communication tools and resources are available in various languages to meet the needs of diverse populations.

Additionally, different European countries may have distinct approaches to AAC implementation, shaped by cultural, educational, and healthcare systems. Understanding these variations is essential for tailoring AAC interventions to the specific needs of children in each region.

Policy frameworks and legislation also vary across Europe. Many countries prioritise inclusive education, reflected in policies that support the integration of AAC tools and strategies into mainstream educational settings. For instance, countries like Sweden and Denmark have robust policies promoting inclusive education, ensuring that AAC tools are integrated into everyday classroom activities. Germany and the Netherlands also emphasise inclusive education, providing funding and resources for AAC devices and services. However, the availability of funding and resources for AAC can vary widely, necessitating an exploration of funding mechanisms and accessibility policies in each region.

Cultural considerations play a significant role in AAC acceptance and integration. Attitudes toward disability vary, impacting the implementation of AAC in educational settings. Exploring cultural norms and beliefs related to communication and disability provides insights into creating culturally sensitive interventions. Collaboration is emphasised in European cultures, necessitating partnerships between educators, parents, healthcare professionals, and community organisations to create a supportive network for children with communication challenges.

Europe is a hub for research and innovation in AAC, with diverse initiatives and technological advancements. Staying informed about the latest research findings and technological trends informs best practices in supporting children with communication difficulties.

Professional development opportunities for educators and speech-language pathologists should address regional nuances in AAC implementation. Training programs should equip professionals with the skills and knowledge needed to navigate the specific challenges and opportunities within the European context.

By considering these aspects of the European context, educators and professionals can develop informed and culturally sensitive approaches to AAC implementation, ensuring that children across the continent have equitable access to effective communication support. This awareness contributes to the overarching goal of fostering inclusive education and empowering children with communication challenges to reach their full potential.

[1] https://www.sciencedirect.com/science/article/pii/S0891422221002882#fn0005


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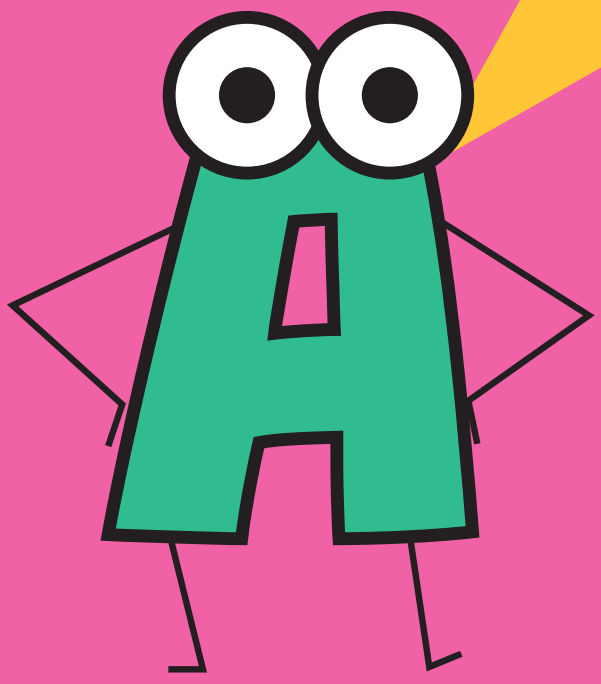
Benefits of AAC for kids with special needs



Fight against the prejudices on AAC

Stereotypes and prejudices are pervasive elements of societal knowledge, shaped by personal experiences, cultural messages, and information from others. One significant area where **misconceptions** persist is in the use of AAC (Augmentative and Alternative Communication). Common stereotypes include concerns that AAC might hinder a child's ability to speak, that it is only for children with severe disabilities, or that it is too complex for children to use effectively. These false beliefs do not reflect reality and unfairly target specific groups of individuals, particularly those with communication challenges.

Children are naturally receptive and unconditionally trusting, often learning by imitating their parents, teachers, and peers. This **natural inclination** can be leveraged to **dispel myths about AAC**. When adults and educators model positive attitudes towards AAC and incorporate it seamlessly into daily interactions, children learn to view AAC as a valuable and normal part of communication.

To effectively combat stereotypes about AAC, it is essential to:

- **Educate parents, teachers, and the broader community** about the benefits and functionality of AAC, emphasising that it supports rather than hinders speech development.
- **Showcase real-life examples** and success stories of children who have thrived using AAC.
- **Address and correct misconceptions** directly whenever they arise, providing clear, evidence-based information.
- **Highlight the positive outcomes** associated with AAC use, such as increased independence, improved social interaction, and enhanced learning opportunities.

Common prejudices about AAC, such as the belief that it prevents speech, are **unfounded**. Research shows that AAC can **promote speech development** by providing a foundation for language learning. Another stereotype is that AAC is only suitable for older children; however, evidence indicates that the earlier AAC is introduced, the better. Young children can use AAC to express their needs and feelings, which supports the development of self-expression and can facilitate speech development. Similarly, the notion that AAC is only for children with severe disabilities ignores the benefits it offers to a wide range of individuals with varying communication needs.

Our goal in the fight against prejudices and stereotypes is to **build awareness**, supplementing the **lack of knowledge** that exists in society about the duties and everyday tasks related to various types of disabilities. To achieve this, we:

- **Show** perspective by discussing our duties and daily activities.
- **Monitor** the messages addressed to people with special educational needs.
- **React** every time we hear a stereotypical message, communicating clearly and briefly.
- **Highlight** all the positive aspects of our work and the significant contributions we make.

By adopting these **strategies**, we can foster a more inclusive environment where AAC is understood and accepted as a beneficial tool for communication. This approach not only helps children develop good communication habits but also builds a society more aware of and sensitive to the needs of all its members. Through education and positive role modelling, we can diminish stereotypes and create a supportive atmosphere for AAC users.

The main advantages of key competences learning

Key competences are defined as "a combination of knowledge, skills, and attitudes needed by all for personal fulfilment and development, employability, social inclusion and active citizenship." (European Commission, 2018)

Recommendation of the Council of Europe identifies eight key competences essential to citizens:

1. Literacy
2. Multilingualism
3. Numerical, scientific and engineering skills
4. Digital and technology-based competences
5. Interpersonal skills, and the ability to adopt new competences
6. Active citizenship
7. Entrepreneurship
8. Cultural awareness and expression

Competence-oriented education involves a teaching and learning approach that aims at developing key competences including relevant knowledge, skills and attitudes, while **knowledge-based teaching** and learning is focused on the knowledge aspect only.

The teaching and learning environment in schools contributes to competence development. **Competence development** is best stimulated when taking place in a variety of learning environments, specially through learning environments that facilitate active learning.

Key competences learning provides a **stimulating and active learning experience** for students. Developing key competences helps students on various levels: work independently and in teams, be innovative, think creatively and critically, adapt to rapid and challenging changes in their environment and develop learning skills necessary throughout their school career, for lifelong learning and for integration into world of work[2].

Key competency-based learning allows the teacher to personalise the teaching or therapeutic intervention according to the children's needs. This is particularly relevant for students with disabilities or learning difficulties. The teachers define the specific learning outcomes and skills that students should attain, and they can provide regular feedback on the children's progress, strengths, and areas for improvement. This feedback enables the teachers to make timely adjustments, to offer additional support if needed, and actively engage the children in the learning process.

Developing the elements of key competences is **important for developing the communication skills** of children using AAC. The development of communication skills is essential for non-verbal children, but the use of AAC requires abilities that the child develops during therapeutic intervention or learning activities.

Linguistic and operational skills provide the child with the tools to communicate, the social and strategic domain skills are involved in using these tools in interactions with others.

Children who use AAC need to **develop competencies in using the linguistic code of the AAC system**, both in terms of content, form and use of AAC symbols (Beukelman & Light, 2020).

At the same time, children need to develop the skills to operate AAC systems or to produce gestures, signs, hand/body positions/movements or other forms of unaided communication.

The use of AAC also requires **digital skills**, for children using low tech systems, but especially high-tech systems. Light & McNaughton (2014) evoke the importance of these skills in developing the child's abilities "to select symbols, eye gaze, scan, navigate and operate assisted AAC systems appropriately".

Social skills, the development of pragmatic language, are important in the effective communication of children using AAC with persons around them. These skills involve both sociolinguistic skills, (taking turns, initiating and terminating interactions, maintaining and developing topics) and socio-relational skills, such as child's active participation in conversation, demonstrating interest in partners, projecting a positive self image. (Light, Arnold, & Clark, 2003; Light & McNaughton, 2014)

Strategic competence involves using available features to deliver messages efficiently and effectively, using word/phrase prediction to enhance effectiveness. (ASHA, 2024) The strategic

[2] https://www.oecd.org/pisa/definition-selection-key-competencies-summary.pdf

competencies help the children overcome the different limitations of AAC that negatively impact their communicative competence, due the environmental barriers or restrictions of AAC systems (Light & McNaughton, 2014). As communication needs and expectations have increased, children need effective coping strategies to ensure appropriate communication.

Learning based on competences should aim to reach the maximum potential for all children by providing quality education and by adapting the teaching strategies according to each child's abilities and needs.

Testimonial 1: Ovidia Moraru, primary school special education teacher

"The children will learn most if they have the opportunity to experience different abilities and skills by doing things themselves"

The competences that we, as teachers, aim to develop for children with hearing impairment in primary school are mainly those related to the development of language and communication, reading and writing, numeracy, environmental knowledge and protection, the development of personal and social autonomy and healthy living skills.

We develop all these skills both in the lessons provided in the national curriculum and in those proposed in the curriculum proposed by the school (optional), such as "World of words", "World of stories", "Words in pictures", "Maths is fun", "Friends of nature", "I want to live healthy", where we focus on applying knowledge in as many contexts as possible through many practical, interactive games and activities.

From my experience as a teacher, I believe that in order to succeed in developing the proposed competences, several aspects are very important: the use of total communication in the activities with children (oral language - written language - mime-gesture language - image), an effective adaptation of the contents to be transmitted, as well as the use of augmentative and alternative communication (AAC) strategies such as Widgit, PECS,... and, of course, the use of auxiliary support materials created by us teachers specifically for the children we work with.

Testimonial 2: Gabriela Chirteș, Romanian language teacher & special education teacher

"From academic competences to life skills"

New theories about learning, especially in today's socio-economic and cultural context, have changed the priorities for the education system and the profile of graduates. Competence-based learning is seen as a success factor of school education, but also as a foundation for lifelong learning as it fosters the transfer of learning to life situations. Thus, the graduate profile includes two sets of competences: some cross-curricular at the level of each discipline, and others cross-curricular, with high practical applicability, directly supporting life skills. Taking into account these strands, but also the limited developmental potential of hearing impairment, the teacher is obliged to constantly rethink the targeted set of competences so that graduates are actively involved in their own learning and become independent lifelong learners.

A good teacher, in traditional terms, wants their students to master information or skills in order to perform. Traditional teaching strategies mainly favoured pupils with above-average learning potential, stimulating competition and performance, specifically a certain type of performance (good results in familiar situations), but at the same time neglected preparing pupils for unfamiliar situations, where they became vulnerable, often discouraged by failure, tending to drop out of training, and resistant to innovation.

New conceptions of learning, but especially the current socio-economic context, are changing the priorities for more and more teachers in the education of students with disabilities, the major concern being to help these students become adaptable, resourceful and creative in solving practical, life problems. In this context, **the competency-based and differentiation approach won the day immediately**. Teachers who were aware of these issues were interested in precisely these qualities of their pupils and were concerned to develop in pupils the ability to be creative and flexible when faced with change. The development of competences (curricular or cross-curricular) of pupils with disabilities requires a very finely negotiated mediation by the teacher.

Competence (including its various components such as knowledge, skills, values and attitudes), not being an immediately observable skill, requires the learner to apply it in a particular educational or life context. Thus, **it is not the accumulation of knowledge but the application of knowledge**. Neither performance rankings nor isolated assessments will help the learner move forward, but only **guidance and observation** followed by **constructive feedback** can make competency-based learning more effective. Teachers will not over-correct 'mistakes', as this deprives pupils of the chance to spot and to analyse them themselves. In terms of the immediate, concrete ends of learning tasks, teachers will not insist that everything is completed.
The "product" of an activity sequence is only one of the outcomes of the main task of learning to learn. Of course, completion is also necessary, when subordinate to the main task, but also because it provides the satisfaction of a tangible result and encourages further work. That is the aim of educational action based on competence development.

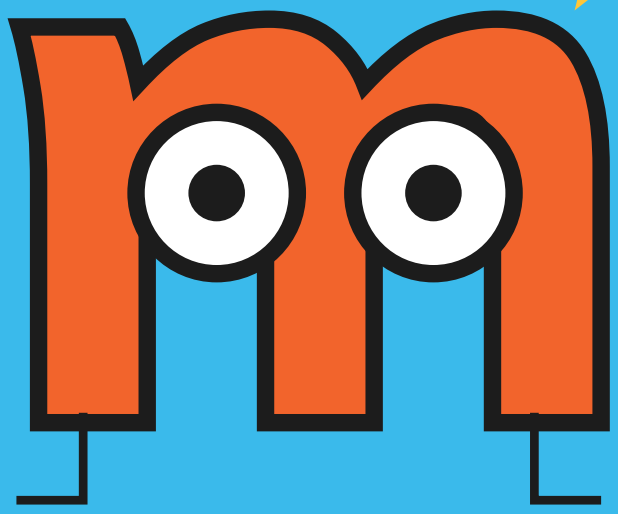
Metacognitive skills are an important set of skills that only a few teachers' pay attention to. It is true that developing these skills in the context of disabilities is extremely difficult, but **not impossible**. Not all students may be able to master them, but it is the teacher's job to put them on the list of long-term goals. The key to success in developing these skills is to combine traditional teaching specific to teaching for pupils with hearing impairment with more modern, up-to-date techniques, underpinned by the goal of 'learning to learn', which ensures that learning becomes more effective. For instance, in Romania, the problem remains that teachers' tasks (curriculum structure, external assessment methodology, national examinations, etc.) push them in the opposite direction, imposing a form of education that sometimes works against the aims of effective learning. The teacher must constantly put the pupil in the position of being able to estimate their own answer to the questions: How interested am I in what I am learning? How much time will I spend learning it? What things distract me? Do I have the right circumstances to do everything successfully? Do I have a plan? Does the plan include my previous experiences?

Thus, the cognitive/metacognitive skills of the teacher largely determine the cognitions/ metacognitions of the students, who acquire not only expert knowledge, but also an effective way of using it, ensuring the development of life skills.

In this context, I would like to mention an example of a generation of students whose Roman language teacher, headmaster and educational counsellor I was for 8 years. I have started working with these students when they were 11-12 years old and continued until graduation, until my students were 19-20 years old. The most important aspect in this context was that **we spent a lot-a lot of time together and I used different ways and strategies of communication**, depending on the needs of each student and the specific content.

In my first year of study, I used reading and personal journals as tools for self-discovery of the students' receptive and expressive communication potential, for self-awareness and development of self-confidence, but also for the development of imagination and creativity. I therefore focused on the application components of competence: skills and abilities. In the following years I worked with them following the 'snowball' teaching model, increasing both volume and difficulty. I have combined teaching activities with extra-curricular ones, using non-formal learning methods, aiming at developing key European competences: entrepreneurial, civic, democratic, intercultural communication skills, through participation in European or international projects and programmes (Junior Achievement; Erasmus+; Citizen Project; European Leader etc.).
At the end of secondary school, in 8th grade, with the advanced group of students, who had a good level of development of academic skills, but also of "learning to learn", I proceeded to the knowledge transfer stage, using standardised tests (which are used in national assessments). With the second level groups I used the same tests, adapting the contents and requirements, reporting to the average level of curricular standards. The results in the national (competency-based) assessment were very good. The majority of students continued their studies at high school. Other pupils came, with very different learning styles. For this reason, I have reintroduced the strategy used in secondary school, but in a differentiated way. In the first year of high school, I focused on developing the metacognitive skills of the students, but also on enriching life experience, using the experiential learning model in the study of literature. From the second year of high school (10th grade), we have been following the national curriculum, focusing primarily on the competences and content needed to prepare and pass the baccalaureate exam according to national standards. Through this approach, 70% of the students from this class passed the baccalaureate exam like any other student without disabilities, and 45% of them continued their studies at university level. I conclude with the idea that this competency-based curriculum model is effective if it is adapted to the realities of each group of students.

Implementation of the methodology



The potential of early implementation of these tools within the classroom

Implementation with children with disabilities/ communication troubles

Early communication is the arena in which the early stage of human development takes place. In that period, relationships are built, mental processes are learned and developed, abilities and skills are created. **Pre-linguistic and linguistic communication** are only a part of it, an especially important part considering human social nature and role communication in human society. The secret of early communication lies in its importance for all aspects of human development and in its characteristics that can be observed early and have predictive power for the child's emerging developmental profile.

Theoretical and innovative practical concepts of educational approaches to children with developmental disabilities are increasingly **finding solutions in AAC**. The complex communication needs of children with motor and intellectual disabilities, autism spectrum disorders and speech apraxia are the result of the inability to use spoken language and/or the presence of language comprehension difficulties. **Augmentative technology**, as part of assistive technology, **creates a wide range of possibilities for developing services** for children with complex communication needs. Their use requires a highly structured approach to auditory, visual, and kinetic support for children with complex communication needs.[1]

Nowadays, there are more students with special needs included in the regular education system and who have difficulties communicating with the environment. To provide them with the highest possible quality of education and facilitate schooling, AAC can play a key role in this. AAC includes various methods and strategies used to facilitate communication and assist people with communication difficulties. Depending on the type of difficulty, non-technological or low-tech means of AAC can be applied or high-tech means that require the use of complex electronic and computer equipment. It is important to emphasise that AAC is an individualised approach, which means that the form of AAC is selected and adapted to the individual needs and functioning of the individual. Classroom teachers play a key role in identifying and choosing the appropriate form of AAC in the context of education. This research's purpose was to gain insight into the attitudes and knowledge of classroom teachers about assisted and alternative communication and the possibilities of their application in the teaching process. The online survey provided feedback

[1] https://www.croris.hr/crosbi/publikacija/prilog-skup/715762

that classroom teachers have positive opinions about AAC, but insufficient knowledge and experience in using it. Given the increasing need for AAC in the educational process, in addition to the possible conditions for using AAC in primary schools, it is also important to educate and train teachers so that together with parents and the school's professional team, they can ensure optimal educational conditions for students with disabilities.[2]

Integrating AAC in Montessori Education

Maria Montessori developed a new pedagogy at the beginning of the XX century called "**psychopedagogy**". This means that it is part of the natural psychological and motor development of the child to adapt the form and content of their pedagogy.

Maria Montessori's objective is to give "a help to life" for a harmonious development at the rhythm of the child, the aim is a **successful social integration**. In 1906, at the beginning Maria Montessori worked with children with disabilities in San Lorenzo in Italia.

Maria Montessori's observations on human trends, sensitive periods and 4 development plans help us understand **how important it is to implement AAC tools as early as possible** within the classes to be effective according to the child's inner development. Human tendencies such as exploration, physical and social orientation, work, repetition are hereditary and do not change. These tendencies help us to have a mark for the children and can be a starting point to develop our boxes and tools to implement AAC. The main one is order, especially for young children because with order comes the need for communication and that is what we want with AAC tools: help communication.

Maria Montessori has identified sensitive periods in children that characterise moments of acquisition ideal for the child as a psychic passion for the child. In our Montessori classes, we see in children aged 4 years the sensitive period of reading develops and we encourage it with adapted material such as sandpaper letters, drawing letters in the sand, association of a real object in the environment with the word. Sensitive periods such as order, movement and language will be developed along the childhood.

For our project Plural Words, we can focus on the two first plans that lead from 0 to 12 years old and see how the Montessori material helps children to grow up. According to the development of the skills, we can understand how important it is to implement AAC tools as early as possible.

During the 1st plan, **from 0-6 years old**, the child says "Help me to do it alone". Maria Montessori calls it the absorbent mind, characterised by a **physical independence-birth of the mind**. It is a time of **adaptation, autonomy, and creative mind**. Between 3 and 6 years, children collect in the environment and through all sensory experiences the elements necessary for the construction of their order and personality. Thanks to the activities, the child learns how to range all the perceptions like sounds (sound boxes, bells), forms (geometric cabinet and solids),

[2] https://zir.nsk.hr/islandora/object/foozos:1927

sensitive impressions by comparing intensity and degree. For example, the colour boxes which invite the children to classify the colours from clear to dark or the pink tower helps the young child to visualise 3D progression and to learn the vocabulary from big to small. In Montessori classes, the material leads to **extended vocabulary and communication**.

The environment and all activities encourage the movement, for example the child learns how to wash a textile with their hands, replace a chair properly, walk with a tray. In a Montesssori class, the children always use real and beautiful materials such as porcelain cups, a padlock to lock/unlock with a key, a needle to sew, glass vase to transfer water etc. These exercises also help to **refine perception and fine motor skills**.

It is a wisdom of life that pushes us to have a clear vision of our environment in order to be able to act. This sensitivity makes the child create a very detailed collection of mental images, with great intensity, a kind of dictionary of their environment. The **assimilation of images** continues throughout life. If the child can collect images and objects that surround them, they are later able to translate them into art, writing. It's a creative process. Creativity means using what's been recorded in your environment to turn it into something else. That is why it is truly necessary to early implement AAC tools to the child.

Between 6-12 years, during the second plan, the child asks, "Help me to think for myself". They are entering the **reasoning mind** which means **building intellectual independence and social personality**.

To elaborate our AAC boxes, we have to keep in mind that the child of 6, becomes the **explorer of ideas and facts**. They seek moral sense, justice, the cult of heroes, hard work, abstraction and gregarious spirit. They have a wide fabulous imagination, physical strength and high capacity of memory. In a Montessori class, they work with their peers on long projects. The "blue solids" in geometry lead the child to the notions of volumes. The grammar boxes give symbols to the different parts of language: verb, adjective, noun, adverb...

The wide panel of Montessorian activities and material gives tools and helps to create the content of our AAC boxes. Maria Montessori's observations on children enables us to work with a specific material that may help both children with disabilities and without disabilities.

The importance of including all groups of children

The advantages of multi-age classes

A key feature of the Montessori educational system is that it is **organised in multi-age classes**, where pupils of different age levels are grouped together in the same classroom. The age mix is carefully chosen to take into account the learning style of each age group, so that **learning takes place as naturally as possible**.

For example, to take advantage of their absorbing minds, children aged 3 to 6 are grouped together.

To take advantage of their reasoning mind and gregarious instincts, children between 6 and 12 are grouped together in the same class (or grouped into 6-9 and 9-12 year-olds).

This defined age mix enables children to develop a wide range of qualities. To enable multi-age play to unfold its full potential, **children must also be given the opportunity to choose their activity** independently of what another child is doing (different activities must therefore be able to be worked on simultaneously). Last but not least, it's also essential that children can **move around the classroom**, to allow for observation.

The environment, thus prepared, enables younger children to freely observe and model the positive behaviours of their older peers, and leads them, through observation, to exercise the same neurons that their elders activate when faced with a task, thanks to the phenomenon of mirror neurons.

Older children consolidate their skills in an area, since to be able to explain a piece of work, you need not only to have understood it, but also to have mastered it.

Younger children are **inspired by the successes** of their older peers, while the latter benefit from the opportunity to **consolidate their self-confidence** by playing a mentoring role. This helps to boost self-esteem and motivation to engage in learning.

By helping the younger children, the older ones also **develop mutual aid skills**, as happens naturally in a family where the children are of different ages.

Multi-age learning allows for a flexible pedagogical approach to meet the varied needs of each student. It enables **individualised learning**, where each pupil progresses at their own pace,

and where pupils are actors in their own development and that of their peers. The fact that younger children imitate their elders, and are guided by older ones, **frees up the teacher's time to work with one or more pupils**, which is invaluable when it comes to learning to read, as this is much more serene one-to-one. The teacher's work is more precise and focused on the specific needs of the child they are working with.

Including children with communication troubles

There is an increasing number of children who are born with neuro-risky factors or who are diagnosed with certain developmental disabilities early on. A pilot study was performed from January 1, 2007 until August 31, 2008 and included data on 170 children at high neuro-risk born at the University Department of Gynecology and Obstetrics, Zagreb University Hospital Center (Petrova).[3] Further in 2022, 2.3 million (3.2%) children and adolescents aged ≤17 years had ever received a diagnosis of a concussion or brain injury. Diagnosis of a concussion or brain injury increased with age, from 1.0% among those aged 0–5 years to 2.3% among those aged 6–11 years, and 5.9% among those aged 12–17 years. Percentages were higher for boys than girls overall (3.7% versus 2.6%), among those aged 6–11 years (3.0% versus 1.6%), and those aged 12–17 years (6.9% versus 4.9%) but were similar by sex among those aged 0–5 years (1.0% versus 1.1%).[4]

The early intervention system should support these children and their families. Many children with developmental disabilities show **difficulties in communication and language-speech development**. The development of speech production is often delayed, which makes it difficult for parents and experts to establish communication with the child.

Who needs it? When to start using AAC? Should the child have any pre-skills for using it? Which technique to use? These are just some of the questions that are frequently asked even today and are the **basis of numerous prejudices** related to AAC. There are also difficulties at the level of laws that do not contain the term AAC at all or do not describe it well enough. **Users of AAC are a diverse group** who, due to certain reasons (motor disabilities, intellectual difficulties, difficulties in socio-cognitive development), do not develop speech production as a means of communication. It is necessary to offer these children a certain means of communication **as early as possible** to achieve adequate **acquisition of knowledge, language development, literacy, and inclusion** of the child and their family in everyday social activities. Important groups of users are younger children who benefit from the introduction of AAC at an early age. The child should be given **the opportunity to use several different techniques**, with and without aid, because some will be more effective in certain situations. An important role in the use of AAC is also played by the team of experts for AAC, especially the speech therapist who assesses the ability of potential users of AAC, discovers the needs and interests of the user, introduces a multimodal approach to the child's communication, connects the knowledge of other team members, constantly monitors

[3] https://hrcak.srce.hr/74333

[4] https://www.cdc.gov/mmwr/volumes/72/wr/pdfs/mm7233-h.pdf

how a certain language is used technique and makes the necessary changes in the process of its use.

AAC and the second language acquisition

Many studies show that knowing **more than one language in children has a positive effect on cognitive development** and raises the level of metalinguistic awareness, which is also reflected in the mastery of the mother tongue. If the basic conditions are met, such as a positive attitude of the child towards the foreign language and the culture of its speakers, appropriate content and methodology of the program and expert teachers, early foreign language learning programs can be of multiple benefits for children (Nikolov, Mihaljević Djigunović, 2006). By mastering a foreign language, children develop **cognitive and social skills**. By getting to know other countries and peoples and their cultures, children gain new experiences and develop tolerance.

During early and preschool education, children learn the language in a stimulating environment through various activities. Reading stories to children in a foreign language, however, is usually not appropriate as a glotto-didactic (skills that intertwine and complement each other in learning foreign languages. These are listening and reading skills (receptive skills) and speaking and writing) activity due to the disproportion between the spheres of interest and the intellectual abilities of child on the one hand and the level of knowledge of that language on the other. This disparity inevitably appears at the beginning of learning a foreign language. This gap could be successfully bridged by a technique used in working with people with special communication needs, which combines **the reading of stories with the simultaneous display of symbols** used in AAC. AAC symbol systems, on the contrary, cover all types of words (grammatical words, terms expressing tense, gender, number, verbs, adjectives, prepositions, and adverbs, and even articles in languages that have them) and are used in working with children from the earliest age.

Such a communication system within the framework of AAC becomes a language of its own, with which children and people close to them, mostly educators and parents, communicate together (Costantino, 2011). Although non-verbal, already entirely pictorial, it retains the structure and functions of the grammatical constructions of the verbal language it represents.

Reading the story with the simultaneous display of pictorial symbols enables children to **understand the text more clearly and directly**. In situations where an adult simultaneously shows them pictures and reads (tells) a story, children can more easily follow texts with a more complex language structure, and since they **receive the same concept simultaneously** in the form of a picture and in the form of a spoken word, understanding what is read to them requires less cognitive effort.

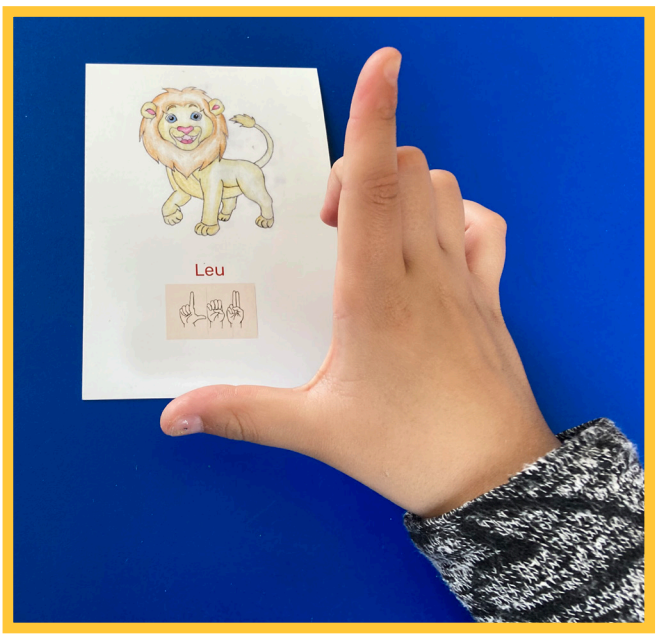
The system of images or symbols in this case is therefore not a "third foreign language" that children need to master additionally, but on the contrary - **a bridge by which the spoken foreign word is more directly** (naturally and effortlessly) connected to its meaning and easier

to remember. Thus, children could meet foreign texts that are more appropriate for their age and therefore more interesting. In support of the use of the AAC system in the learning of a foreign language by preschool children age, numerous researches in the field of memory can be cited, such as the theory of dual coding (Paivio, 1986), which indicates that we **better remember information that we have received simultaneously in two ways**, for example through words and images, because when storing information in the brain used several different codes (in this case verbal and visual).

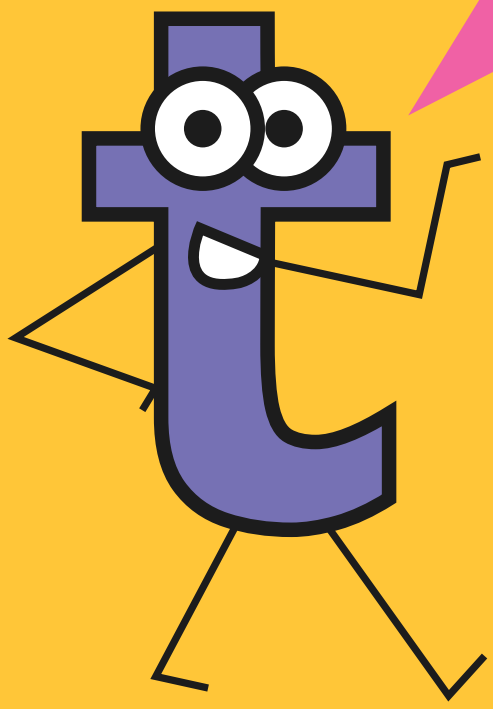
AAC symbolic systems are designed and organised so that every word in the language can be associated with its sign. The younger the children, the simpler the language structure should be, and the number of transparent and highly iconic symbols should be greater. The choice of a suitable symbolic system will allow children to gradually connect abstract concepts with pictures, thus creating new associative links that will facilitate their understanding of abstract concepts of the language they are learning to speak. Each symbol in the upper part should also contain the written form of a word in a foreign language.

Children would not pay attention to it at first, but, as in the case of assisted communication, they would unconsciously associate it with the symbol below, distinguishing it by its shape from other words, even before they mastered reading.

The experience of working with children in integrated kindergartens has shown that reading stories supported by the AAC sign system, i.e. double coding, benefits all children, regardless of whether they have communication difficulties or not, because it is clearer and more direct (Raimondi, 2010), improves the ability to understand (Sevcik and Romski, 2002), encourages the earlier development of prerequisites for learning to read and write (Bishop, Rankin and Mirenda, 1994) and helps children create new associative connections (Schnotz and Horz, 2010).
All the above effects of reading stories while simultaneously showing the AAC symbol are of course beneficial to children within the framework of learning a foreign language.



The potential of illustrations



The role of images and visual elements and nonverbal communication in AAC

AAC's potential lies in its capacity to rely on visual communication to offer an alternative to spoken exchanges. Yet, when talking about communication, "we frequently assume that verbal communication is carried by sound, and that gestures only carry non-verbal communication" (Perin: 2023). However, verbal communication can resort to non-spoken words such as written texts and sign language, which has its own grammar and vocabulary. This type of communication remains symbolic, although not oral. Consequently, non-verbal communication encompasses gestures, facial expressions and other cues that are not symbolic.

One of the various strengths of AAC is its desire to **abolish hierarchy between the communication tools and methods**. Although it distinguishes assisted and non-assisted communication, AAC focuses on the importance of enabling each user to borrow the tools and support necessary to their communication needs (Romski & Sevcik, 2005). In this way, it promotes the use of visual supports that encompass various visual items, such as an object, photograph, sign or picture, that will function as a communication assistant. Visual tools provide an alternative solution and can be used alongside other communication methods.

Furthermore, AAC also advocates for a multimodal approach that can evolve through time, echoing the idea that the child's development also requires an evolution of the visual support they are confronted with. Their understanding of visuals evolves in the following order:

1. Real Objects
2. Small World Objects
3. Photographs
4. Pictures/Symbols
5. Black and White Line Drawings
6. Words
7. Phrases
8. Sentences

Plural Words project has at heart to demonstrate that **AAC can be beneficial for all children** and is not only restricted to pupils with speech impairments. In fact, we are all using visual supports in our daily lives, whether it takes the form of calendars, symbols in the street, on packaging etc.

In AAC, these visual items often take the form of pictograms, signs and communication tablets. Relying on the visual nature of these tools has proven to be useful on various levels: to express needs and wants towards some independence, to enter faster in reading through sign-word association (Romski & Sevcik, 2005), but also to build social closeness and develop friendships where the interaction matters even more than the message itself (Beukelman & Light, 2020).

Visuals in AAC are varied, but also need to be adapted to the child's understanding and perception. Therefore, visual items are multiple because they need to fit their different users and their needs. Based on Mangan and Willcox list for the Perkin's school (2022):

- Real photos: these are the most easily understood, they offer a great transition from recognising a real object to recognising a photo of that item. This method is often used in alternative pedagogies, such as Montessori.
- Realistic colour illustrations: they provide colour cues to support visual recognition enabling the key features of an item to be clearly visible. Examples: PCS Thin-line, PCS In-context
- Abstract colour illustrations: these provide colour cues to support visual recognition, but require greater reliance on salient feature knowledge to recognise the item. Examples: PCS, SymbolStix
- Realistic black and white illustrations: they provide realistic context for the key elements, but do not include any colour cues to help recognition. So far, there are no known examples currently used in AAC, but they are used in various children's picture books.
- Abstract black and white line drawings: they rely solely on knowledge and use of significant visual features. Examples: Pictogram Ideogram Communication Symbols (PIC), Picsyms

Additionally, when offering visual support to enter literacy, it is important to think of **the type of learner** we are facing. Indeed, AAC states a **multimodal approach**, which is also relevant for visual elements. For instance, if the pupil is a visual learner primarily, but a tactile learner secondarily, it can be interesting to present a visual learning first, associated then with tactile information. This functioning appears also with the "sight-word" approach, in which children are learning some words associated for instance with an image, which is possible through e-books noticeably (Mandak, Light & McNaughton, 2018). In this sense, images and visual items offer a certain flexibility in the sense that we can choose which type of visual is the most relevant for our target group, but it does not exclude associating it with tactile or auditory learning. Plus, it does not prevent teachers or educators from using engaging illustrations, it requires them to adapt to the level of visual comprehension of the pupil.

How to implement in classroom

To align with Plural Words project's belief that AAC can benefit all pupils, we believe that visual learning has its place in the classroom and the school curriculum. Visuals can be used for various reasons and to develop specific routines, behaviours or learning. The importance is to be consistent to ensure a proper association of the action/ word/ information with the visual. Here are some tips on how to implement visual items with your pupils based on the Irish NCSE:

1. Introduce the visual and explain what it will be used for;
   - Note that it can also encompass signs and objects
2. Explain when and where the pupils will encounter the visual. It requires that you have previously imagined in which activities and situations it will useful;
   - e.g. in our AAC boxes, you can find some visual to develop some school routines, as well as some visuals for very specific reading activities
3. Visuals can also resort to objects, consequently they need to be meaningful and motivating for the pupil. You can use photos/pictures alongside the object to support the child to transition from object to picture recognition
4. Be consistent in your use of visuals:
   - Repeat as many times as necessary, pupils need to see visuals several times to understand their use
   - Don't mix the visuals: use the same visual for the same thing
5. Where is the visual? Make sure the visuals are clearly visible for the pupil
6. If using them with a child with special needs, make the visual accessible for everyone supporting the child

If you're interested in implementing further visual items to teach literacy, numeracy and daily life concepts, you can look at our AAC boxes that gather ready-to-use resources. They aim to transmit key competences through AAC tools, to enable children to learn basic skills, but also to become familiar with AAC tools. In this sense, the visuals developed for the Plural Words project seek to equip children with pictograms, basic signs, tactile and visual letters and numbers, and plenty of other resources that stimulate their literacy skills through a visual approach.

How to create tools: resources and guidelines to make teachers able to develop their own materials

Illustrations, such as symbols, icons, and pictures, **play a crucial role in AAC** as they represent concepts, actions, objects, and emotions visually. They help users of AAC **bridge the gap** between their desire to communicate and their difficulty expressing themselves. Thanks to illustrations, **many abstract concepts can be made tangible** and easier to understand. They are also useful

to **accelerate the communication process**. Indeed, by using visuals, AAC users can convey a message more fluently than when they have to spell out words. On top of improving fluency, using visuals also reduces the cognitive demands placed on AAC users by providing clear and recognisable symbols.

An increasingly popular visual support among AAC tools are Visual Scene Displays (VSDs). VSDs are contextual images that represent activities or events in their natural, contextual environments, whereas traditional grid-based AAC systems use decontextualised images (Beukelman et al., 2021). Indeed, it seems that grid layouts make more sense to adult AAC users who are used to information formatted in rows and columns than to children who lack meta-linguistic knowledge (Light & Drager, 2002). However, VSDs sometimes include grid-based displays to combine the best of both systems.

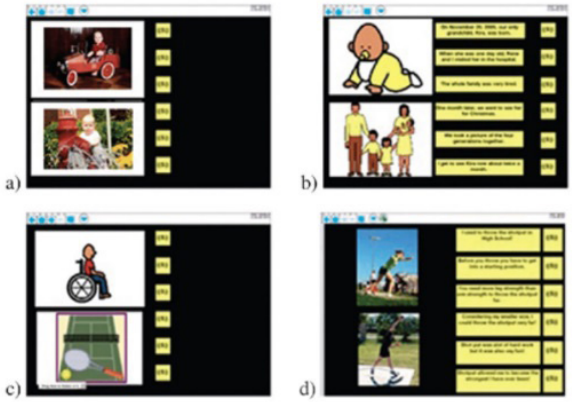


Fig. 1 – Example of VSD layouts .

So, how can you make your own materials? For grid layouts, the first step is to collect your visuals: pictures, pictograms, photos, symbols, drawings, etc. Depending on your pupils' needs, you can browse different types of resources, databases, and image banks. Here are a few examples:

- **Open Symbols** – a collection of more than 50.000 open-licensed symbols and icons from multiple databases. Use the search bar to type what you are looking for and search through the databases.

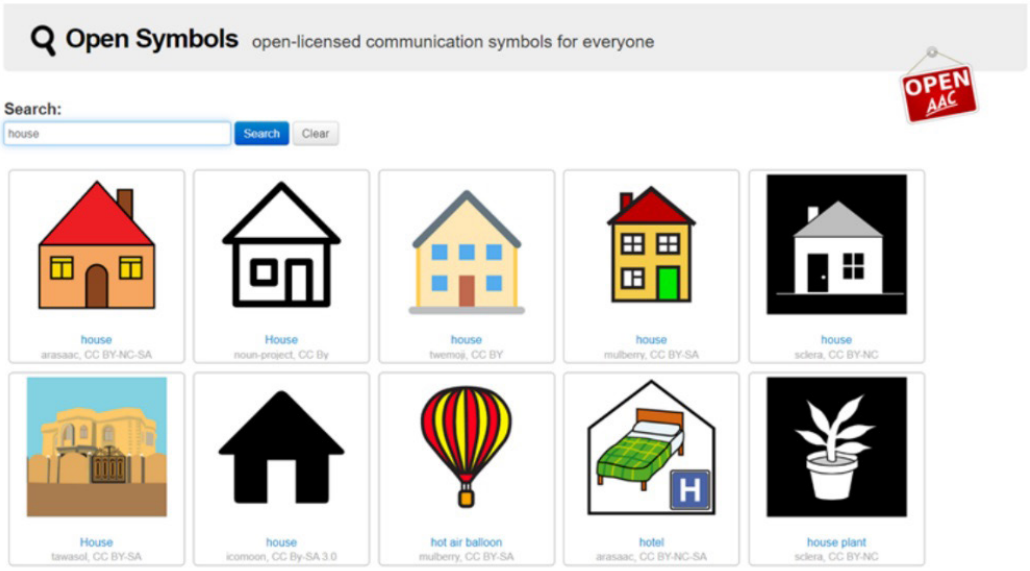


Fig.2 – Open Symbols Interface

- **Picto-Selector** – a free tool to create communication boards containing more than 34.000 pictograms. Create a new sheet, customise it and then print it.
- Image banks such as Unsplash, Pixabay, Freepik, Pexels, Canva, etc.

For VSDs, experts recommend using **personalised photographs** of relevant people and activities in the pupils' lives. Apps like Snap Scene (free and paid versions) help you add text to your own pictures. This also highlights the importance of involving children in the design process to ensure the materials will appeal to them. Do not hesitate to use **participatory design** and **involve children** in developing low-tech tools (Light & Drager, 2002).

Once you have chosen the type of visuals you want to use, the second step is to make decisions related to the display's visual appearance (Thistle & Wilkinson, 2015). **Consistency** is key to keeping the pupils from getting confused. In fact, organising your visuals on the display in a consistent manner may support motor planning (Thistle & Wilkinson, 2015). Besides using the same illustration for a particular concept each time it appears, keep the same layout and background colour. If you decide to sort your symbols by categories and attribute a particular colour to each category, be consistent with your colour code. We also recommend you to **always put the words** that are included in all your grid displays **in the same spots**. For instance, the symbol for "I" could always be placed on the upper left corner of the grid so that pupils get used to it.

If pictures are not enough to attract the attention of your pupils, we encourage you to try using videos, as motion is a powerful attractor of visual attention (Light et al. 2019). In a VSD, you can easily incorporate (personalised) videos that will appeal to children and make the communication process more dynamic.

Testimonies

We interviewed speech therapists about their use of illustrations in AAC tools.

When we asked them how they proceeded to evaluate the children's communication needs to decide which types of visuals to use in AAC tools, they mentioned DAGG-3 by Tobii Dynavox, a free self-assessment tool to help professionals (teachers included) develop AAC goals. The ones who do not use ready-made questionnaires develop their own to target the lacking communication skills or those that can lead to challenging behaviours.

They take into account the following factors when selecting illustrations for their AAC tools to ensure that they are adapted to the children's needs: sight, hearing, motor skills, things that the child likes, people who are frequently in contact with the child, etc. They insist on the **need for multimodality** in AAC tools.

Another key element to boost the efficiency of visual AAC tools is to **integrate them in all aspects of the child's life**. In order to achieve that, the speech therapists recommend creating AAC grids that can be used at home. For instance, grids for each room of the child's home and the objects that they interact with on a daily basis. They also remind that **parents' involvement is crucial** and that they need to be trained properly to use AAC. Lack of training and lack of concrete use in the child's daily life (at home and at school) are the most challenging elements to the successful implementation of AAC tools.

Despite the challenges they face, the speech therapists that we interviewed also reported positive results from the use of visual AAC tools, such as non-speaking children with ASD who were able to develop communication skills or speaking children who increased their vocabulary thanks to AAC grids.

Conclusion and Recommendations

How Plural Words resources can support teachers in their daily practice

In light of the lack of information/ current gaps in AAC, Plural Words aims to raise awareness among teachers, educators, and education professionals about the importance of inclusion through alternative communication (AAC) and its potential impact on the **acquisition of key competences**, as well as **reducing learning inequalities**. Our goal is to create an **entry point into the field of AAC** and dismantle stereotypes associated with it. We want to emphasise that AAC is not an obstacle to language acquisition and is designed for anyone who may benefit from it.

To achieve this, we will produce workshops, trainings, and a collection of good practices. Additionally, we will develop sets of posters to combat stereotypes surrounding AAC. Our efforts seek to address the current lack of materials and references in AAC across partner countries.

We aim to provide a basis in AAC through the provision of good practices, ready-to-use materials, and training opportunities, thereby promoting visual communication. Plural Words intends to **support teachers in delivering competence-based teaching through AAC practices**, ultimately enhancing student learning and inclusion, leading to improved academic achievements. Access to a qualitative and inclusive education is a fundamental right, necessitating the training of professionals to achieve this goal.

Concrete outcomes of our initiative include pedagogical sheets, a pedagogical guide, and an e-learning module. We plan to implement AAC tools in elementary and primary schools, teaching children these communication methods to integrate them into their daily lives. By incorporating AAC into the school curriculum, we anticipate enhancing the teaching and learning of key competences and transversal topics.

Furthermore, we will collaborate with teachers to develop a series of ready-to-use AAC boxes. These resources will support teachers in their daily practice by providing practical tools and strategies for implementing AAC in the classroom effectively. Overall, Plural Words aims to **empower educators and professionals to create inclusive learning environments** where every student can thrive.

Plural Words resources are designed to provide practical support and guidance to teachers in their daily practice, particularly in integrating AAC methods into the classroom. Here's how our resources can support teachers:

1. **Collection of Good Practices**: Our collection of good practices showcases real-world examples of successful AAC implementation in educational settings. Teachers can draw inspiration from these examples and adapt strategies to suit their own classrooms and students' needs.

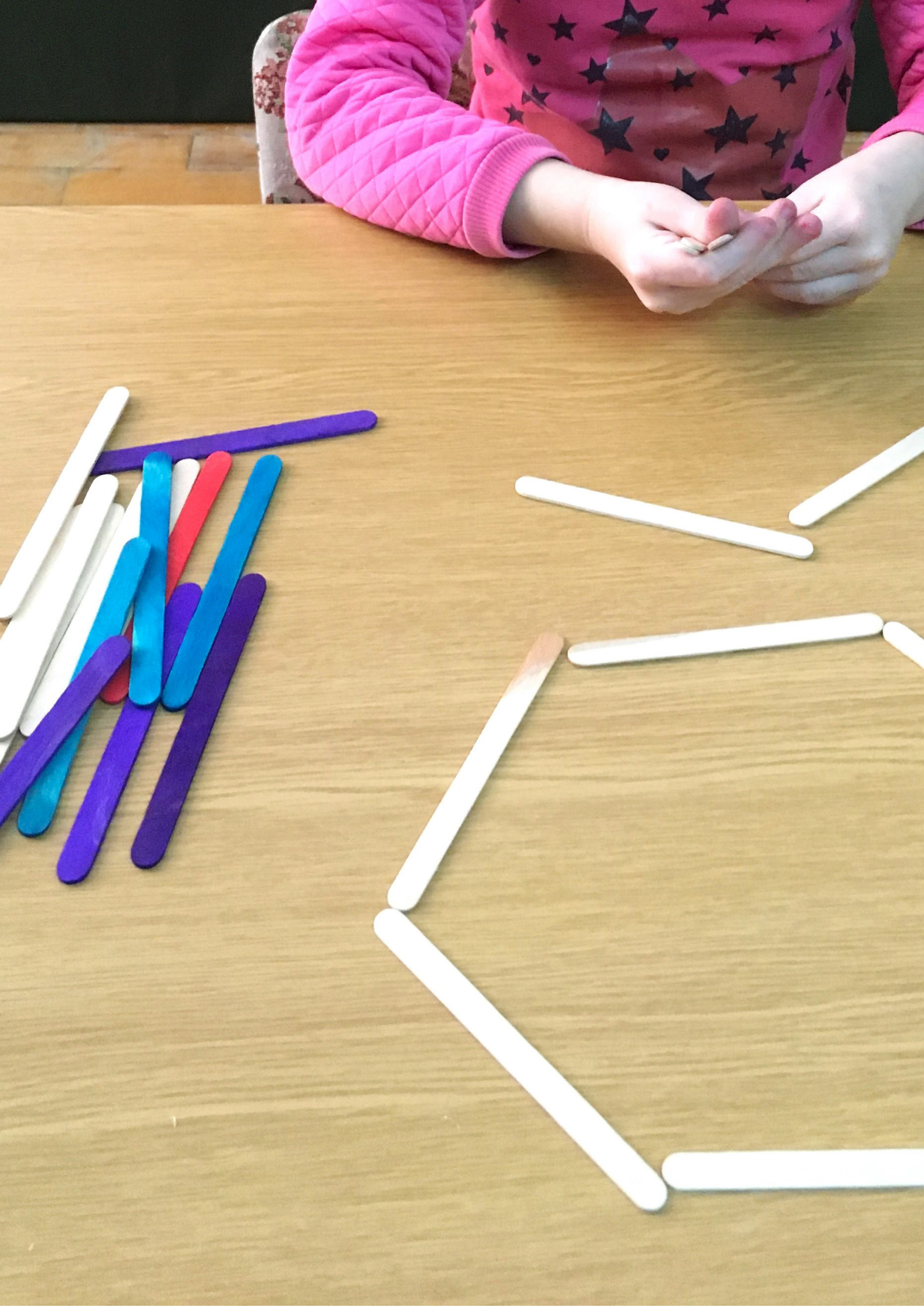
2. **Posters to Combat Stereotypes**: Plural Words provides sets of posters to raise awareness and combat stereotypes surrounding AAC. These posters can be displayed in classrooms and common areas, fostering a positive and inclusive environment that promotes understanding and acceptance of AAC.

3. **Pedagogical Sheets and Guides**: Our pedagogical sheets and guides offer practical tips, lesson plans, and instructional strategies for incorporating AAC into teaching practices. These resources provide step-by-step guidance on how to effectively integrate AAC tools and techniques into various subject areas and activities.

4. **E-Learning Module**: The e-learning module offers flexible and accessible training for teachers, allowing them to learn at their own pace and convenience. This module covers topics such as AAC basics, implementation strategies, and best practices, empowering teachers with the knowledge and skills they need to support AAC users effectively.

5. **Ready-to-Use AAC Boxes**: Plural Words collaborates with teachers to develop ready-to-use AAC boxes containing materials and resources for implementing AAC in the classroom. These boxes provide teachers with convenient access to AAC tools and support materials, making it easier to incorporate AAC into daily teaching practices.

Overall, Plural Words resources aim to empower teachers with the knowledge, skills, and tools they need to effectively support AAC users in their classrooms. By providing practical support and guidance, we help teachers create inclusive learning environments **where all students can thrive and succeed**.



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Project Code: 2023-1-FR01-KA220-SCH-000155095

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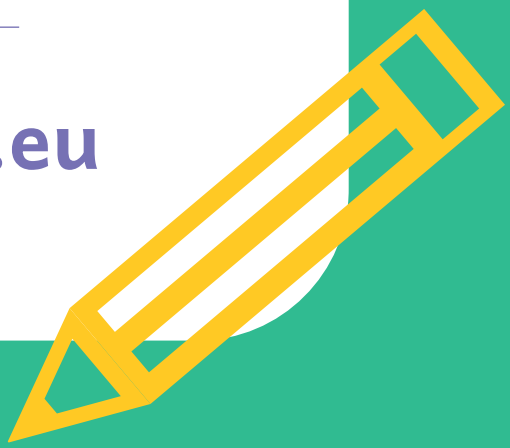

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