The role of the temporal sequences in the Augmentative and Alternative Communication Systems for the Autism Spectrum Disorders

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Abstract
The Augmentative and Alternative Communication systems (AAC) represent a promising integration for more effective models of special education specifically developed for the special educational needs of children with Autism Spectrum Disorders. In this paper the historical foundations of the approach are presented, and its implications on the promotion of functional spontaneous communication skills based on the temporal sequences approach are discussed.

Keywords: augmentative and alternative communication, autism spectrum disorders, special education, developmental disabilities, inclusion

Abstract
I sistemi di Comunicazione Aumentativa Alternativa (CAA) rappresentano una promettente integrazione per modelli più efficaci di educazione speciale sviluppati in specifico per i bisogni educativi speciali dei bambini con disturbi dello spettro autistico. In questo articolo vengono presentati i fondamenti storici dell'approccio e vengono discusse le sue implicazioni nella promozione di competenze di comunicazione funzionale spontanea basate sull'approccio di sequenza temporali.

Parole chiave: comunicazione aumentativa alternativa, disturbi dello spettro autistico, educazione speciale, disabilità dello sviluppo, inclusione

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Introduction

The Autism Spectrum Disorders

The *Autism Spectrum Disorders* (ASD) are one of the most complex developmental disabilities, and depending on the child's impairment of function and adaptive capacity, they dictate the need for specific renovations in the learning contexts in which the process of inclusion of the child occurs. The contextual enhancement underlying the various special educational modalities enables us to consider the Autism Spectrum Disorders as an effective example of the changes of learning contexts depending on the characteristics of the cognitive and social profile commonly associated with the disorder, according to the inclusive perspective proposed by the *International Classification of functioning, Disabilities and Health* (WHO, 2001).

The first scientific descriptions of the disorders related to Autism Spectrum are represented by the contributions of Kanner (1943) who noted the presence of impaired sociability and behavior in a group of eleven children. In particular, Kanner noted the presence of an inability to make contact with the environment, associated with narrowing of interests and repetitive behaviors. The kids did not seem interested in socializing, and they all had total or partial impairments of their linguistic skills. Their cognitive profile was characterized by generalized intellectual disabilities, but some children had islands of advanced capabilities with visual and auditory memory retention. The children were able to perform advanced mental calculations and to repeat a melody that they had listened to for the first time (Kanner, 1943).

Kanner's observations gave rise to the great approach to research on Autism Spectrum Disorders, which currently represent one of the most studied Developmental Disabilities (Cohen & Volkmar, 1997).

Despite the difficulty of identifying the specific gene that can guide the development of neurodevelopmental alterations to the autism spectrum, it is now widely assumed that its causes are to be attributed to genetic factors (Betancur, 2011).

For this reason, the psychodynamic interpretations of the disorder, initially dominant in the search for etiological components, have been progressively abandoned in favor of an approach that considers the Autism Spectrum Disorders as a generalized developmental disorder on a genetic basis, which requires specific answers based on the principles of *Evidence Based Education* (Schreibman, 2005).

The psychoeducational intervention, especially in the teaching contexts of nursery schools or Primary Schools, is the model of choice for the treatment of the disor-

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der, by virtue of the experiences of socialization and learning of adaptive skills (see Cottini, 2011 for a review).

Such contexts are characterized by extreme simplicity and the presence of typically developing peers, who may represent valid models of social and communicative behavior for the child with Autism Spectrum Disorders.

The naturalness of the learning context is in fact a common denominator to the most effective models of intervention (Schreibman, 2005), such as those represented by *Applied Behavior Analysis* approach, (Loovas, 1993), by *SCERTS System* (Prizant, Wetherby, Rubin & Rydell, 2006) and by *Pivotal Response Training* (Koegel, 2000; Koegel, Koegel & McNerey, 2001).

This paper aims at highlighting the opportunities promoted by the Augmentative and Alternative Communication Systems in the programs of Special Education intervention aimed at children with ASD, especially those with massive impairment of language functions associated with complex cognitive disabilities.

The teaching of basic communication skills through the AAC systems, in other words, represents an appropriate response to the educational needs of the child with severe ASD, whose profile has a marked deficit in cognitive and communicative skills (NRC, 2001; Beukelman & Mirenda, 2013).

The characteristics of AAC systems, and particularly those by low technology, make these systems particularly suitable to be used in the Primary School, which is an educational context characterized by high levels of naturalness in educational interventions (Cottini, 2002; 2011).

The same guidelines underlying the AAC systems can in fact move towards a possible involvement of the support teacher as the initial communicative partner of the child with ASD, in view of the teaching of communication based on symbols with all his peers (Beukelman and Mirenda, 2013).

The discovery of the *Power of Communication* (Light, 1997) by the child with ASD is strongly related to its ability to influence the environment through the mediation of one or more communication partners. This awareness plays a decisive role in reducing the discomfort commonly experienced by the child in social situations, and seems to be related to the decrease of problematic behaviors typically associated to the behavioral profile of the disorder (crying, aggression, stereotypical behavior).

In other words, the child learns how to make his requests or express his desires using the intuitive channel of AAC, instead of using problem behaviors.

The possibilities of teaching communicative codes based on symbols, which is a condition underlying all the perspectives derived from the approach, also represent an adequate sample of the most recent developments in the approaches to inclusive education, characterized by the shift of the focus of the intervention from the child with disabilities to the whole group of his peers (Booth & Ainscow, 2002;

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Calvani, 2012).

Deficits in social behavior in Autism Spectrum Disorders

Deficits in the social behavior disorder had already been noted by Kanner (1943), who had included them in the diagnostic criteria for the attribution of the restricted diagnosis of Infantile Autism.

The subsequent redefinition of the criteria allowed the definition of a cognitive profile and social disorder described by Wing and Gould, with the introduction of the concept of the *Autistic Triad* (1979). The concept is due to Kanner's observations according to which children have a disorder of affective contact highlighted by the lack of the instinctive search for sociality.

The model considers the deficits of sociability central to the genesis of the disorder, which is characterized by deficits in social interaction, communication and imaginative social activity (Wing & Gould, 1979). The indifference towards social interaction and the major communicative indices (eye contact, facial expression) is observable both in low functionality forms and in those with preservation of cognitive skills.

This figure is confirmed by the occurrence of deficits in social behavior in the major diagnostic repertoires. In DSM 5, a repertoire that in recently has experienced a marked restructuring of the criteria for the issuance of a diagnosis of ASD (APA, 2013), the criteria are more stringent than those used in the previous edition (APA, 1994).

The current diagnostic criteria confirm the central role of social deficits in Autism Spectrum Disorders (Volkmar, Reichov & McPartland, 2012). These deficits are also evident in subjects with preservation of linguistic and cognitive ability (Schreibman, 2005).

In the profile of child with ASD the development of language is also similarly compromised: the most reliable estimates indicate that at least 50% of the subjects do not reach adequate levels of development of verbal language.

These data explain the presence of common objectives in the major indexes for the treatment and educational intervention (NRC, 2001; SINPIA, 2005; SIPES, 2008), attributable to teaching of communicative methodologies in naturalistic contexts (SIPeS, 2008; Cottini, 2011).

In this perspective, the approach of Augmentative and Alternative Communication could represent a promising area of intervention for the facilitation of verbal learning and teaching communicative codes in cases of global impairment of language competences (Schreibman, 2005; Cafiero, 2005; Cottini, 2011; Beukelman and Mirenda, 2013).

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The key features of the approach make it particularly promising for its correspondence to the special educational needs of the child with ASD: the centrality of the role of image-based communication, common to all forms of AAC, presents points of contact with memory and visual analysis, areas usually conserved in typical cognitive profile of children with ASD.

Similar considerations can be expressed about the systems of communication based on the exchange of symbols with the communicative partners, like the PECS System (*Picture Exchange Communication System*, Bondy & Frost, 2002; Bondy, 2012).

For these reasons, references to the historical evolution of the approaches of CAA, whose diffusion is now appreciable even in our country, are to be considered relevant. More frequent interventions of this order are included in the individualized educational planning for the child with ASD (SIPeS, 2008; Cottini, 2011).

General characteristics of the approach CAA

Although the AAC does not represent an approach specifically developed for the educational intervention in ASD, its effectiveness is confirmed by contributions that highlight its opportunities for the facilitation of communication in children and adults with marked impairment of linguistic components (Cafiero, 2005).

Referring to the AAC we should consider it as an integrated approach rather than a specific technique, due to the variety of models of inspiration and application areas in which, after World War II, it has developed.

One of the most promising definitions is that provided by Beukelman (Beukelman & Mirenda, 2013) according to which the approach of the AAC can be considered as a form of assistive technology developed to compensate for the difficulties of communication through the presentation of alternative communication codes. The basic goals of the approach concerning the child's verbal stimulation of the initiative and the resulting increase in his communicative possibilities (Schlosser, 2003).

The increase induced by AAC verbal initiative has positive effects on the development of functional communication skills, practice-oriented to environmental changes due to the mediation of a communicative partner (Sigafoos, 1999; Schlosser, 2003).

In this perspective, the term *Augmentative* connotes the possibility of facilitating and supporting the learning of verbal language and the development of the awareness that is possible to change the physical environment by making requests to the communication partner (Beukelman & Mirenda, 2013).

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A dominant role is played by the concept of *Communicative Power* introduced by Light (1997), according to which the discovery of the possibility of an underlying learning communicative code exerts a highly motivating effect on the child with complex communication disabilities, associated with a correspondent decrease in discomfort and maladaptive behaviors.

The term *Alternative* refers to the possibility of learning of communication codes alternative to those based on verbal language, with the consequent possibility of using codes based on images and symbols (Schlosser, 2003).

This first definition of the approach demonstrates the possibility of promoting the learning of communication, based on symbols, which in addition to being a background for learning the skills of reading and writing, presents particular opportunities for the development of communication processes in children with Autism Spectrum Disorders.

The ability of joint attention and communicative competence based on symbols represent in fact predictors of positive developmental outcomes for patients with alterations of the Autism Spectrum (Wetherby & Prizant, 2000; Kasari, Freeman & Paparella, 2006).

The AAC approach tends to stimulate these skills, because of the possibility of sharing attention processes offered by a dual relationship with a communication partner.

Similar considerations can be developed on the possibility of learning symbol-based codes and images that are common to all AAC and make use of well defined sets of symbols which can be implemented in low- or high –technology systems.

In the last version, DSM 5 (APA, 2013), the category has been included in the macro category of Autism Spectrum Disorders, in which the severity of the disorder is a function of the level of support required from the environment.

The correspondence between the special educational needs of the child with ASD and the opportunities presented by the approach of the AAC can then witness the points of contact between the teaching of augmentative or alternative communication codes and the possibility of positive outcomes for the development of the child with ASD, regardless of his level of cognitive functioning.

For these reasons, given the complex communicative disabilities commonly associated with Autism Spectrum Disorders, the possibility of educational and teaching interventions based on this approach should always be considered in the development of educational programming.

Historical evolution of AAC approach

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The first applications of the approach of the AAC can be traced back in the U.S. in the early fifties, when American people started to register a gradually increasing awareness of the rights of minorities and persons with disabilities (Hourcade, Pilotti, West, & Parette, 2004).

A further shift towards intellectual disabilities was promoted by President Kennedy in 1961 through the *Intergovernmental Panel on Mental Retardation*, aimed at raising awareness among American people to instances of social integration of patients who had a marked mental retardation (Zangari, Lloyd & Vicker, 1994; Hourcade, Pilotti, West, & Parette, 2004).

In 1975, with the presentation of the *Education for All Handicapped Children Act*, the access of children with disabilities to public schools was promoted on the basis of a federal law (Hourcade, Pilotti, West, & Parette, 2004).

The legislative approach contained explicit references to the necessary adaptation of the school environment to the needs of children with intellectual and communicative disabilities by teaching them alternative communication codes, and sanctioned the possibility of using techniques based on AAC perspective (Beukelman & Mirenda, 2013).

Further impetus to the nascent perspective was determined by the increase in survival for patients with complex surgery and vascular lesions attributable to the increasing effectiveness of medical and pharmacological interventions (Hourcade, Pilotti, Parette & West, 2004). The first documented experiences of AAC, in particular, were conducted with adult subjects with impaired language derived from the results of infantile cerebral palsy.

These experiences are related to the use of tables of communication based on simple stylized symbols in the educational intervention for children with cerebral palsy who lacked the basic language skills and were hospitalized in the pediatric hospital of Iowa City in 1964 (Beukelman & Mirenda, 2013).

The symbols used were derived from the *Bliss Code* developed by C. Bliss in 1949 in the context of the development of a universal language based on graphical symbols of increasing complexity (Hourcade, Pilotti, Parette & West, 2004).

The code is characterized by high levels of abstraction and stylization; **as** this system was initially developed to overcome communication barriers between peoples, it was destined to subjects with typical development and not to pupils with disabilities. However, the Bliss Code remains the progenitor of symbolic languages used in AAC.

The first applications of the PCS system (*Picture Communication Symbols*), distributed by Mayer-Johnson, were instead noticed in 1980: they currently represent the most widely used code in the world.

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The code is not a structured system like the Bliss Code, and presents low levels of abstraction. It should rather be seen as a set of symbols strictly adhering to the image of the concrete actions or of the objects represented.

The drawings of the PCS code are in color and represent the words with a higher frequency of use. The set includes over 3,000 symbols, which represent the repertoire of reference for the *Boardmaker* system, which represents one of the internationally most widely used software for CAA.

The strict adherence to the symbol-meaning relationship, the use of intuitive but relatively detailed drawings and the use of colors can orient towards the use of this code in many cases of serious communication disabilities, such as those associated with Intellectual Disabilities and with Autism Spectrum Disorders (Glennen & DeCoste, 1997; Beukelman & Mirenda, 2013).

The PCS Code is then particularly suitable for people with difficulties of abstraction: the actions and the abstract symbols are represented by drawings showing a series of concrete situations.

The *Core Picture Vocabulary* is another code largely used for the interventions in children with low levels of cognitive functionality. The Core code was developed by Don Joston in 1985, and is formed by symbols that can be photocopied in different sizes. The symbols can therefore be used for the composition of simple communication tables, based on a set of 160 images. The Core symbols are still more realistic than those of PCS and more related to everyday life, and for this reason they represent an elective choice for pupils with massive deficits in cognitive and communicative skills, such as those related to Autism Spectrum Disorders.

Other symbolic codes of relevant interest for the development of the AAC approach are represented by the systems PIC and PIC Syms (Hourcade, Pilotti, West, & Parette, 2004).

The *Pictogram Ideogram Communication* (PIC) symbols were developed by Maharaj in 1980, and they were originally meant for interventions in the child with visual disabilities (Glennen & DeCoste, 1997; Beukelman & Mirenda, 2013). The PIC system is based on self adhesive white symbols on a black background. This black-white contrast can enhance the meaning, and for this reason the PIC symbols represent a code with high transparency, largely used for children with Intellective Disabilities and Autism Spectrum Disorders.

On the other hand, the PIC Syms system is a hand-drawn symbolic code developed by F. Carlson in 1986. The symbols present a discrete level of perceived transparency, and are composed by black lines on a white background. PIC Syms is based on the vocabulary generally used by preschoolers.

The system can represent abstract concepts, and is based on a set of about 850 symbols grouped by semantic categories. Every symbol is realized in regular, small

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and large sizes. The code is associated to a set of blank grids and instructions in order to create new symbols, modify those existing and creating new meaning based on the child's knowledge.

Thanks to its transparency, the PIC Syms code can represent another opportunity to create communication tables that can be used in the intervention for the typical cognitive profile associated to Autism Spectrum Disorders (Glennen & DeCoste, 1997; Cafiero, 2005).

The first interventions of AAC have points of contact with the current low-tech AAC systems; they were led through the repeated presentation of the association symbol-figure (Zangari, Lloyd & Vicker, 1994).

The symbols could be applied and combined on the communicative table consisting of a sheet of paper for the development of simple sequences of communication aimed at expressing the child's desires and needs.

There are clear similarities with the low-tech systems, in which the table is represented by a Velcro support on which the symbols contained in a separate binder with transparent sheets can be applied or removed.

The results of these pioneering experiences were surprising as children with strong linguistic deficit were able to understand and express concepts of significant complexity.

These early encouraging results guided the scientific community towards the dissemination of research projects aimed at developing more appropriate graphic codes and the dissemination of AAC applications to other types of disabilities.

The research lines proposed by the group of Toronto in the seventies, which culminated in the founding of the ISAAC (*International Society of Augmentative and Alternative Communication*) in 1983, are quite significant. The terms characterizing the augmentative and alternative aspects of the new perspective appeared in the header of the association for the very first time.

The foundation of ISAAC, with operators coming from countries of different continents, has given birth to research lines converging towards the development of graphical features capable of facilitating their storage and recognition.

Further research perspective is represented by the control of maladaptive behavior resulting in the facilitation of expressive components in complex communication disabilities, such as those represented by Autism Spectrum Disorders (Sigafoos, 1999; Schlosser, 2003; Hourcade, Pilotti, West & Parette, 2004).

The temporal sequences approach and the use of before-after communication tables

The applications of AAC systems based on images and symbols now represent a

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consolidated figure in the intervention aimed at teaching children with Autism Spectrum Disorders.

Given the centrality of communicative deficits even in the forms of high cognitive function, the need to provide adequate answers to the special educational needs of children with preservation of language skills is quite obvious.

In other words, the actions of the AAC may have educational opportunities also for the children who received a diagnosis of Asperger's Syndrome in the DSM-IV (1994).

Despite the debate over the exclusion of Asperger's Syndrome from the last versions of DSM-5 (APA, 2013), we should take into consideration the possible applications of a system based on communication in interactive learning environments, such as those commonly represented by the AAC systems, since the possibility of sharing a communication code based on symbols enables children with High Cognitive Functionality to express their emotions and desires (Wetherby & Prizant, 2000; NRC, 2001; Schreibman, 2005; Kasari, Freeman & Paparella, 2006).

The use of the temporal sequences approach, based on the use of visual organizers such as the *before-after* communication tables, can present some positive aspects for any Special Education intervention oriented to teaching

the pragmatic and communicative skills to children with ASD at High Cognitive Functionality (Beukelman & Mirenda, 2013).

A dominant role in the structuring of the educational context is represented by the necessity of the use of visual organizers for the organization of activities (Cottini, 2011).

From this point of view, AAC systems could also favor the conversational skills and contribute to facilitate the learning of the language and its proper use in different social circumstances.

The ability to use the language in appropriate social contexts and the skills of starting and maintaining a conversation are deficient aspects of the child with ASD at higher cognitive functioning, and the targeted use of AAC systems could also provide some opportunities for the improvement of social skills.

In other words, the opportunities presented by the AAC systems can have positive effects on the development of functional communication in children with High Cognitive Functionality (Cafiero, 2005; Cottini, 2011; Beukelman & Mirenda, 2013).

Similarly, a possible organization of an educational context based on *visual schemes* allows the reduction of the discomfort associated with alterations of the temporal perception, which are frequently associated with ASD (Schopler et al., 1990; Cohen & Volkmar, 1997; NRC, 2001; Cottini, 2011).

The teacher's immediate use of the symbol referred to the activity that the child is doing, for example, has a reassuring effect on his perception of the amount of

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time remaining to the end of the activity. The same considerations may be expressed in relation to the use of *before – afte*r tables, which represent a key component of low-tech AAC systems (Cafiero, 2005) in view of their role in the organization of the activities that are offered to the child.

An example of a *before-after* communication table is represented by the understanding of the sequence of activities conducted in the educational context.

The symbols relating to the activities to be carried out before the others are placed to the left, while those that indicate subsequent activities are located on the right. A typical example is represented by the symbol of the child who sits at the desk, or the symbol of reading (open book) that, in general, may relate to the school. The symbol corresponding to the next activity (e.g. the symbol of the meal or the swing) is placed to the right.

The *before-after* table is an adaptation of the learning environment to the specific cognitive profile typically associated with ASD, characterized by discomfort and problematic behaviors, frequently caused by the feeling that the proposed activities never come to an end (Schopler et al., 1990).

An ulterior example of the use of the *before-after* systems is related to the understanding of the amount of time necessary for the activities. In this case, the child is trained to ask the teacher for the countdown to the end of the activity, or ask at what stage of the activity you are. The teacher can remind the child of the scanning activity - and the underlying necessity to carry out certain activities before others- simply by indicating the corresponding symbol.

Such a communication system can be implemented in situations of high ecological validity, and allows the child with ASD to understand the demands of the educational environment, giving predictability to the educational context.

The cognitive profile of children with ASD is characterized by its own specific educational needs represented by the need for predictability (Cottini, 2011), and the AAC systems based on communication tables may represent an appropriate response to this need, based on the empowerment of the environmental context (Cafiero, 2005; Beukelman & Mirenda, 2013).

Such a learning context is able to stimulate the spontaneous initiative of the child, representing a background of communicative knowledge that can facilitate the understanding of the instances proposed by the educational system.

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The opportunities brought by AAC systems in relation to the peculiarities of the cognitive profile associated with ASD are quite evident. The motivation for spontaneous communication is favored by the natural reinforcement associated with the pleasure of conducting activities related to the child's specific interests (such as playing with his favorite toy, or reading a picture book together with the teacher).

For this reason, each AAC intervention always begins with the execution of motivating activities; a typical example is the placement of an object of interest for the child so that he can reach it easily, and he can ask the communicative partner to do something for him (Schlosser, 2003; Beukelman & Mirenda, 2013).

The child with ASD presents particular discomfort associated with the change in the routines of activity, and this peculiarity of his cognitive profile implies specific educational needs. The conservation of visual skills is a further characteristic of the cognitive profile that can be used as background for the implementation of communication tables or agendas.

The use of possibility of a progressive insertion of symbols in a table or in a communicative VOCA device is, in this perspective, a way for the representation of the codes in a structured educational environment that shows analogies with visual sequences and agendas known by the child. (Cafiero, 2005; Beukelman & Mirenda, 2013).

The opportunities offered by such a system of communication facilitation can be easily inferred, especially if its implementation is promoted in the early grades of primary school. The teacher may in fact indicate on the corresponding communicative table the symbol of the activity that the child is doing and the symbols of the following activities to help him understand the temporal structure of each teaching session.

This structured use of communication tables can be considered as an effective educational tool for the facilitation of emersion of functional spontaneous communication skills in the child with ASD (Beukelman & Mirenda, 2013).

In this perspective, the use of AAC systems could actually be considered as an effective support to the learning of functional spontaneous communication for the child with ASD. The AAC approach provides an adequate background for the introduction of educational systems based on the use of visual agendas and, more generally, of all the systems that provide for the exploitation of visual memory capacity, a competence generally conserved in the cognitive profile associated with the disorder (Cottini, 2011).

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Conclusions

The above considerations may encourage reflections on the opportunities presented by the use of AAC systems in the educational relationship developed according to the needs presented by the child with ASD.

We should focus above all on the data according to which the use of such systems seems to favor an increase in communication based on verbal language, with particular reference to the enrichment of the vocabulary, the skills of beginning and maintaining a conversation, and the use of language depending on the social context (Beukelman & Mirenda, 2013).

Additional opportunities for Special Education interventions are represented by the potential relating to high-tech systems (e.g. VOCA devices or communication apps for the tablet), which allow a functional use of AT in structured situations such as those represented by the responses to questions in class or specific requests to the teacher. Such capabilities enable the child with ASD to really participate in everyday school life, favoring the development of the processes of inclusion even in cases of marked impairment in language and communication.

Similarly, we can highlight the points of contact with naturalistic and evolutionary approaches which currently represent the most effective evidence- based models for educational interventions aimed at the child with ASD (Schreibman, 2005; SIPeS, 2008).

Among the efficacy validated models that could use the support provided by the AAC systems we can mention the *Pivotal Response Training* (Koegel, 2000), the *Denver Model* (Rogers, 1998) and the TEACCH (*Teaching and Education of Autistic and related Communication -handicapped Children*) by Schopler et al. (1990).

The AAC systems in this view should not be considered only as a tool for teaching language codes alternative to verbal language, but rather as systems for the learning of functional communication skills (Beukelman & Mirenda, 2013).

This reconsideration of the properties of the systems based on the approach of AAC might encourage their further spread in Special Education programs whose implementation must necessarily be considered for the effective inclusion of children with ASD in educational systems.

If we consider that the mission of Special Education is finding the educational response that best matches the special needs of people with disabilities (Caldin,

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2014), we can easily understand how the use of AAC systems may represent one of most appropriate responses to children with communication deficits.

From this point of view, the references to the historical evolution and the explicit recommendations for the use of AAC in Italian National Guidelines (2011) for intervention in ASD should lead us to consider the opportunities promoted by the approach for Parent Training (Caldin, 2014). Family members should thus be trained to use basic communication tables for the development of communicative facilitation for their child (Beukelman & Mirenda, 2013).

Similar considerations can be extended to the increasing trend concerning the use of AAC systems to Low and High Technology in children with communicative disabilities resulting from complex disabilities (*multidisability*) or from traumatic injuries, considered emerging areas of particular interest for the Special Education (Caldin, 2014).

The AAC systems, in other words, present communication opportunities to promote participatory processes of people with disabilities in decisions that might affect their destiny, with the consequent possibility of exercising their rights of citizenship, and a positive influence on the well-being of people with disabilities (Corsi & Ulivieri, 2013).

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