Socratic Dialogue in Education of Children Diagnosed with Autism Spectrum Disorder (ASD)

- An overview on the potential contributions of dialogic learning for teaching the autistic brain

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Abstract

This paper presents the theories and rationales guiding a forthcoming project of testing a dialogic program, using Socratic dialogue, to enhance social and emotional abilities of children diagnosed as autistic. The main study will be performed next year. The aim of this paper is to outline and examine the possibilities of Socratic dialogue as a basis for pedagogical thinking and practice when teaching students with autism, and to present a model for doing so in remedial classes. First, an introduction of the Autism Spectrum Disorders (ASDs), and the current educational interventions for children diagnosed with these disabilities is presented, using research from different sources. Research results from using Socratic dialogues as a pedagogical method with students in regular classes is presented, showing that systematic Socratic dialogue enhance the social and emotional skills of students, as well as their critical thinking. This is followed by a discussion where we show the potential advantages of dialogic learning as an effective strategy for intervention and remidiation of individuals diagnosed with autism. The hypothesis is that Socratic Dialouge can be used to enhance the social and emotional development also of children diagnosed as autistic. The argument is presented based on evidences on the impact of dialogue on typical and atypical students' learning and thinking. It is generally considered that the social nature of dialogic learning may equip children with specific abilities to effectively interact with others and perceive their emotions. However, the method might have to be revised to function with children diagnosed as autistic. Accordingly, the paper ends by introducing a dialogue based teching design that is compatible for children diagnosed with ASD, using weekly seminars in class.

Keywords: Autism, emotional abilities, social interaction, Socratic dialogue.

Introduction

The term "autism" is derived from the Greek root "auto" which means "self". Though "autism" is a familiar term in the early twenty first century, it was only recognized in the 1940s as a severe disability (Snell, 2002). In 1908, Eugen Bleuler first used the term "autism" to describe a specific type of social withdrawal that he observed in schizophrenia (Cotugno, 2009). Leo Kanner (1943) borrowed the term "autism" to refer to a group of children with inability to relate to people and situations, failure to use language for the purpose of communication, and obsessive desire for the maintenance of sameness in the environment. One year later, Hans Asperger (1944) published a report describing a group of children and adolescents with characteristics similar to Kanner's description; but with no significant delays in early intellectual development or language skills. He used the term "autistic psychopathy" to describe this condition. Several years later, in 1981, Lorna Wing used the term "Asperger's Syndrome" for the first time and referred to it in her research on autism. In 1988, Wing used the term autistic continuum to define the range of possible autism disorders, ranging from profound to mild (Cotugno, 2009).

Following then, in 1994, the American Psychiatric Association's *Diagnostic and Statistical Manual: Fourth Edition (DSM IV)* used the term Pervasive Developmental Disorder (PDD) to cover a group of developmental disorders that are characterized by impaired development across the social, cognitive, emotional and language domains. ASD (Autism Spectrum Disorder) is diagnosed on the basis of abnormalities or impaired development in social interaction and communication skills, and the presence of a severely restricted, stereotypic and repetitive repertoire of behavior, activity or interests (American Psychiatric Association, 1994). Currently, ASD is considered a subcategory of Pervasive Developmental Disorder (PDD), and includes the diagnoses of Autistic Disorder (AuD), Asperger's Disorder (AD), and Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS). Accordingly, it ranges along a continuum of severity, with AuD at one end, and including lower functioning individuals, PPD-NOS somewhere in the middle, and AD at the other end, including higher functioning individuals (Cotugno, 2009). It should be mentioned that Childhood Disintegrative Disorder (CDD) and Rett Syndrome (RS) are considered as two other subcategories of Pervasive Developmental Disorder (PDD) are distinct from ASD.

ASD symptoms are usually evident in children soon after birth and affects between 2 and 21 individuals per 10,000, with 4 to 5 times more males than females diagnosed (Snell, 2002). The

average of children with ASD has increased nearly 1300 percent over a ten-year span from 1992 to 2002 (Center for Environmental Health, 2005). In addition, about 80 percent of children with autism also meet the criteria for mental retardation, with significant limitations in IQ and adaptive behavior scores (Snell, 2002).

The recent studies suggest that the majority of the risk of developing ASD is due to variations in genetic structure (Auerbach et al, 2011; Gerdts et al, 2013). It has been well-established that developmental abnormalities associated with autism become apparent by 12 months of age (Osterling, et al, 2002). There are also studies which suggest that infants with older siblings with Autism Spectrum Disorders (ASD-sibs) are at increased risk for developing an ASD or subtle, inconsistent, but multi-faceted deficits in emotional expression and referential communication (Cassel et al., 2006).

In addition to investigating the role that genes play in ASD, several studies have reported functional and / or structural abnormalities of the neural system in autistic populations. It is demonstrated that the "social brain" areas of autistic individuals are less active compared to those of control groups. These social areas (e.g. amygdale, anterior cingulated, insula, temporal parietal junction and medial prefrontal cortex) are responsible for processing "mind-reading" tasks (Baron-Cohen, 2009). A functional MRI (fMRI) study reported abnormalities in regional brain activity of adults with autistic disorder during the explicit and implicit processing of emotional facial expressions. Autistic subjects in this study did not activate a cortical "face are" when explicitly appraising expressions, or the left amygdala region and left cerebellum when implicitly processing emotional facial expressions (Critchley, et al., 2000). Children diagnosed with autism also experience depletion in serotonin synthesis first few months after birth that contributes to hemispheric asymmetries in global and local connections, compromising language development (Dalton & Bergenn, 2007).

This literature leads us to point out that although dysfunction appears to contribute to some aspects of autism, it cannot account for all aspects of the disorder. Taking all the research presented above, it would be logical to conclude that a combination of various factors may be responsible for ineffective social interaction in children diagnosed with autism. Developmental evidence indicates that ASD involve multiple negative functional consequences that cannot be traced easily to a single gene or confined to a single brain region (Dalton & Bergenn, 2007). In fact, some researchers question the validity of the ASD diagnosis, and state that it more or less

consists of a very wide and differing spectra of behavioral descriptions, and that there has been no clear factor decidedly causing ASD (Cushing, 2013). In addition, while autism is generally defined by a suite of negative characteristics, recent studies are emphasizing the abilities and strengths of people diagnosed with autism. For instance, perceptual regions of the brain seem to be activated more among people diagnosed with autistics during a non-verbal intelligence test. Non-autistics typically perform equally well in tests of verbal and non-verbal intelligence. People diagnosed with ASD score much higher in non-verbal tests, such as Raven's Matrices that need no verbal instructions to complete, than in verbal ones, such as Wechsler's Scales that rely on verbal instructions and answers (Mottron, 2011). However, the intent of this paper is not to prove that ASD does or doesn't exist as a proper diagnosis but to find a model, helping children with the type of problems targeted. And there are research findings saying that effective training programs can be used to influence, regulate, and even remedy the symptoms addressed as ASD.

Methodology

This paper is a literature study using a structured literature examination method, integrative research review (Backman, 1998; Cooper & Cooper, 1989), where the goal is to make a research synthesis, comparing findings in literature on autism, social and emotional abilities, and the use of dialogue from different disciplines. The researchers have searched in data bases and combined, compared, triangulated, and confronted different findings, purposefully reviewing and integrating the relevant literature to categorize the insights supporting our hypothesis and to construct the a dialogue based teching design that is compatible for children diagnosed with ASD (Starrin et al., 1991).

The ASD/autism spectra is, as shown, quite divergent, with great variations within what is considered to belong to the diagnoses. It has been documented that 10-25% of children diagnosed with autism fail to develop speech (Koegel et al, 2009). It therefore seems incorrect to consider the nearly 75% of children diagnosed with autism, that do develop speech, as mentally retarded because they are having problems expressing and articulating their needs and communicating with others (Dalton & Bergenn, 2007). This paper, as well as the model described, targets ASD children with social and communication difficulties, but without severe communication or cognitive deficits, primarily including children diagnosed with Asperger's

Disorder. Although these children are of normal intelligence, they are often faced with life-long deficits in social communication and emotional behavior (Critchley et al., 2000).

Literature

Current Educational Interventions for Children with Autism Spectrum disorder

Students with any of the pervasive developmental disorders typically qualify for special education services (Snell, 2002). Therefore, research and program development in the area of educational intervention for children with ASD have focused largely on the early years of development; the earlier intensive interventions are made, the higher the likelihood of positive outcomes (Scott & Chris, 2007; Koegel, et al, 2009). There are several different approaches to educating children with autism. The current educational programs can be classified and discussed under three main categories: educational/behavioral, pharmacological, and biomedical-neuroscience approaches. The educational/behavioral approaches have the strongest research basis. Pharmacological approaches are not viewed as being appropriate or effective for all, and must be used cautiously, and in combination with educational treatments. Biomedical-neuroscience approaches are experimental with no existing validation at this point (Snell, 2002).

The following evidence-based methods and strategies are often used in school settings, home programs and early intervention.

- **Applied Behavior Analysis (ABA)** is a process of systematically applying tentative principles of behavioral theory to improve specific behaviors and simultaneously evaluate the application of interventions that alter behavior (Baer, Wolf & Risley, 1968). It is widely used as a teaching method for promoting positive and adaptive behavior in students with autism. There are several studies presenting data on the impact of ABA on reducing inappropriate behavior and in increasing communication, learning, and appropriate social behavior in students diagnosed with autism (U.S. Department of Health and Human Services, 1999).

- **Discrete Trial Teaching (DTT)** uses applied behavior analysis techniques to eliminate skill deficiencies of students with autism (Lovaas, 1987). The basic skills are broken down into small steps and are taught using discrete trials at a time (Smith, 2001). Discrete Trial Teaching procedures have proven effective in many areas such as receptive language, gestural communication, play skills, prevention of problem behaviors, sentence structure and functional communication skills (Ünlü & Vuran, 2012).

- **Picture Exchange Communication System (PECS)** is a visual communication training program that has been developed to educate children with social-communication deficits. The system seeks to teach spontaneous social-communication skills by means of symbols or pictures. Teaching relies on behavioral principles, particularly reinforcement techniques (Charlop-Christy, 2002; Howlin et al., 2007). This program involve nonvocal methods of communication including sign language, picture-point systems, electronic devices, and other picture-communication systems using basic behavioral principles and techniques such as shaping, differential reinforcement, and transfer of stimulus control via delay to teach children functional communication (Charlop-Christy et al., 2002).

- **Pivotal Response Treatment (PRT)** is an evidence-based intervention program, built on the principles of Applied Behavior Analysis (ABA) to address the behavioral, communicative, social, and academic impairments of children with autism. Unlike other highly structured behavioral interventions for autism, PRT is one of the naturalistic intervention models aiming to facilitate positive changes in the basic social behaviors and the child's ability to monitor his/her own behavior (Genc & Vuran, 2013; Renshaw & Kuriakose, 2011). PRT aims to address the core deficits in social motivation and alter the child's developmental trajectory toward a more typical path by providing supplemental learning opportunities which enhance the reward properties of social communication interactions (Steiner et al., 2013).

- **Relationship Development Intervention (RDI)** is a parent-based, cognitive-developmental approach to improve social-emotional, cognitive, and functioning abilities in students with autism. The primary caregivers of children are trained through workshop sessions to provide daily opportunities for successful functioning in increasingly challenging dynamic systems (Gutstein, et al, 2007). The primary caregivers of children are trained through workshop sessions regarding the theory, principles, and components of RDI. Following the training sessions, parents plan regular weekly or biweekly meetings with a certified RDI consultant to address goal setting, program planning, and progress updates. Parents and their children both participate in re-evaluation every six months to monitor and adjust intervention (Gutstein, et al, 2007).

- **Social Communication/Emotional Regulation/Transactional Support (SCERTS)** is a program intervention to develop the ability of autistic children to learn and spontaneously

apply functional communication, emotional expression and trusting relationships with others (Prizant et al, 2006). The program has designed to help parents, educators and therapists work cooperatively as a team, in a carefully coordinated manner, to maximize progress in supporting a child. It is also applicable for individuals with a wide range of abilities and ages across home, school and community settings.

- **Verbal Behavior (VB)** approach employs specific behavioral research on the development of language and functional account of language to teach children multiple functions of language (e.g. mand, tact, intraverbal), and to teach each function using the ultimate controlling variables specific to that function (Carr & Firth, 2005).

- **Occupational Therapy (OT)** often is provided to promote development of self-care skills (eg, dressing, manipulating fasteners, using utensils, personal hygiene) and academic skills (eg, cutting with scissors, writing). It also may assist in promoting development of play skills, modifying classroom materials and routines to improve attention and organization, and providing prevocational training (Scott & Chris, 2007).

- **Sensory Integration Therapy (SIT)** is based on principles from neuroscience, biology, psychology, and education, and hypothesizes that some children with learning disorders experience difficulty processing and integrating sensory information and that this, in turn, affects their behavior and learning (Schaaf & Miller, 2005). The goal of program is to facilitate the development of the nervous system's ability in organizing responses to sensory input in a more productive way (Williamson & Anzalone, 1997).

- **Training and Education of Autistic and Related Communication Handicapped Children (TEACCH)** is a differentiated- and family-centered curriculum developed for individuals with autism of all ages and developmental levels (Schopler, Mesibov & Baker, 1982).This program uses visual supports to capitalize on the visual strength and preference for processing information to meet the individual needs of children with autism and communication disabilities. TEACCH focuses on structuring the physical environment to assist students with autism to successfully interact in the environment and understand meaning (Schopler, Mesibov & Hearsey, 1995).

Educational methods such as incidental teaching, mand-modeling, time delay, activity-based teaching, peer tutoring, self-management, and social stories are other scientifically grounded strategies that have been recommended for teaching students with autism.

Although there are some reports on the effectiveness of these programs on development or on modifying behavior for children with ASD, they have come under criticism in recent years for a variety of reasons. The usual criticism is that the research upon which they were based is not valid or reliable. There have been no controlled comparisons of educational or combined interventions to support such claims (Snell, 2002). Moreover, evaluations of most of these interventions rely mainly on single case or on case series studies or on non-randomized group trials (Howlin, *et al*., 2007). Critical aspects of interventions also remain unknown, including the impact of family factors on outcomes, and the relationship between an individual with autism, the appropriate treatment protocol, and the expected outcomes. Finally, there is a vast discrepancy between what is known about effective educational interventions, and what is available for children diagnosed with autism across settings, cultures, and income levels (Snell, 2002). Despite these limitations, research in this area need to be continued and evolved. Most of the above methods have built on principles aiming to change the behavior of the student, and not focusing their higher intellectual capacity and cognitive reflection on self or situation. It has reported that autistic individuals have good or even exceptional memory for facts that can be developed and used to bolster existing deficits (Frith & Happé, 1995). Mottron (2011) points out that educational programs for students diagnosed with ASD should be grounded in the unique ways they learn, instead to suppress their behaviors, and to make them follow a typical developmental trajectory.

Socratic Dialogue as an Educational Method

Dialogue is used as a pedagogical tool in the school environment to enhance students' social and emotional abilities (Pihlgren, 2010). Positive results on social and emotional abilities have also been found when systematically using Socratic dialogue in groups of students. The Swedish National agency of Education (Skolverket, 2011) has recently published an extensive research-based evaluation of the methods and materials used in Swedish schools to enhance social and emotional abilities among typical students. Large amounts of quantitative and qualitative data were collected from more than 40 schools, the data was analyzed and interpreted by acknowledged researchers. Programs and lessons to train empathy, emotional and social competence were proven without effect, and some of the programs even proved to have opposing effects – increasing bullying among the students. The students often found these lessons boring and sometimes even offensive. The lesson became a "school activity" – the student answered

what the teacher was expecting, instead of reaching a higher ability of social and emotional competence. However, where structured thoughtful dialogues were used the students showed improved skills and abilities in social and emotional areas.

Studies show that participating in systematic and recurrent Socratic seminars improve students' social and emotional abilities, abilities to express and motivate their viewpoints, and to realize the difference between personal and idea conflicts (Billings & Fitzgeralds, 2002; Pihlgren, 2008). It is also raported that students participating in Socratic seminars develop their language skills and ability to interact and cooperate with others (Robinsson, 2006). In addition, there are evidence on the positive effects of using Socratic questioning in cognitive therapy to sort out difficulties and complicated emotions (Kennerley, 2007). When Socratic dialogues are systematically used in education they facilitate and encourage flexibility in thinking, as well as training students' critical thinking skills (Orellana, 2008; Pihlgren, 2008). Students' learning is shown to be facilitated by modeling and imitation, particularly young children use the seminar facilitator as a role-model to understand and be able to perform the particular respectful and critically examining mode of interaction (Pihlgren, 2008). Setting and evaluating individual and group goals for the dialogue before and after the Socratic dialogue helps visualizing the cooperative dialogue and how to perform it to the participants. The dialogues are highly structured, evolving through a series of set stages, helping the students to keep on track, and to navigate into problem solving and deeper thinking by hearing other students' thoughts. The students need to concentrate to be able to build on other participants' ideas, and to be able to go on to new ideas when necessary (Pihlgren, 2008). The questioning nature of the Socratic dialogue shift students' attention into focus on the learning situation and intrinsically motivate them to actively engage in a mutually reciprocal interaction (Nouri, 2014).

Results

Socratic Dialogue as a Strategy for Teaching Children with ASD

Designing adequate teaching programs for students with autism requires an appropriate knowledge of their unique educational needs. As we have seen earlier children diagnosed with Autism Spectrum Disorder (ASD) demonstrate problems with social communication, emotional regulation, imitation and imagination, sensory integration, problem solving, attention, and motivation. With this in mind, we will now discuss why and how a dialogue based teching design is compatible with the educational needs of children with ASD.

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The potiential of dialogue in social communication behaviour

As previously mentioned, the brain of children diagnosed with autism is said to have fundamental difficulties in representing the actions and intentions of others and they thus have little understanding of other minds (Frith & Happé, 1998). They suffer from low levels of social interaction, lack of eye contact, deficits in orienting to eye gaze and pointing gestures, and inability to react to the emotions of others that often observed in their first years of life (Frith, 2003; Gallagher & Varga, 2015). They use communication primarily for requests and protests, and almost never for information-seeking (Koegel, et al., 2010).

Individuals diagnosed with ASD demonstrate rigidity or inflexibility in their thinking and behavior, attributed to sever deficits in their ability to communicate and interact effectively with other individuals (Cotugno, 2009; McEvoy et al, 1993). Inflexibility/rigidity behaviors may include several difficulties such as isolation, noncompliance, aggression, stereotypic movements or activities, transition problems, and tantrums which may ultimately limit the ASD individual's independence (Cotugno, 2009).

However, humans are social beings who are innately preprogrammed and biologically wired to communicate with others and themselves (Noori, 2014). Dialogue is a unique feature of humans, no other animal is able to interact in dialogue as humans do. Social interaction plays an important role in development of children diagnosed with ASD, and it is fair to consider knowledge of dialogic strategies and techniques important to their development. *Our first hypothesis is that students diagnosed with ASD will benefit from participating in systematic dialogic training where interaction with other people is methodically facilitated and encouraged, and by which both teachers and students co-construct their knowledge and develop their understandings in flexible ways (cf. Nouri, 2014).*

The potiential of dialogue in emotional regulation

The social and communication deficits of children with ASD may be attributed to an impaired "theory of mind" (Frith & Happé, 1995, 1998; Baron-Cohen, 2000). They thus are thought to have an impaired capacity to understand mental and emotional states of others and are not able to detect explicit or implicit intentions of others.

Recent findings show that social processing in the brain is strongly interrelated with the processing of emotion (Nouri, 2014). We have earlier concluded that programs, aimed at training the social and emotional abilities of students in general often fail to do so, wheras systematic

dialogue enhance emotional and cooperativ skills (Pihlgren, 2010; Robinsson, 2006; Skolverket, 2011) as well as sorting out difficulties and complex emotions (Kennerley, 2007).

A notable finding here is that active engagement in social interactions (e.g., use of verbal language) is one of the best predictors of long-term positive outcomes in programs for children diagnosed with autism (Iovannone et al., 2003). This would imply that dialogue may influence the social communication of children diagnosed with autism, as well as have implications on intervention and remediation. *Our second hypothesis is that the emotional involvement in dialogic learning contexts will encourage students diagnosed with autism to act and react to the emotions of others.*

The potiential of dialogue in imagination and immitation abilities

While educators have long known that imitation in learning and communication in various settings plays a key role, it is recently demonstrated that human infants have a specific sensitivity to imitate facial expressions within their first hour of life (Csibra & Gergely, 2006; Meltzoff & Prinz, 2002). Recent studies on humans' brain also indicate that the human brain is equipped with a neural system that specializes in understanding both the actions of others and their emotions and intentions. Researchers have named these neurons "mirror neurons", because they "mirror the behavior of others" (Gallese *et al*, 1996, p. 995). There is evidence that the mirror neurons system of autistic individuals are less actively reading the movements of others (Enticott et al, 2012; Theoret et al, 2005), or their facial expressions of basic emotions (Dapretto et al, 2006; Sato et al, 2013). These findings may explain the structural and functional difficulties in the brain of children diagnosed with autism to imitate others' actions and to respond to social interaction.

One important potential of dialogic learning is related to its possibility to facilitate learning by modeling and imitation. As we have concluded from previous research, this has shown to be particularly effective with younger children where the facilitator is actively molding the behavior of the participants during the dialogue, and when the events in the dialogue is discussed by setting goals and evaluating the process. *Our third hypothesis is that autistic students will learn to reproduce behavior (emotion, thought, or action) that teacher and other students perform during dialogue if the teacher is actively working as a role model and allowing the process to be discussed.*

The potiential of dialogue in multi-sensory integration

It is generally believed and extensively reported that the majority of individuals diagnosed with Autism Spectrum Disorders (ASD) experience severe difficulties in modulating and integrating multiple sensory inputs, especially visual, auditory, and tactile inputs (Dalton & Bergenn, 2007; Baranek, 2002). They frequently have difficulty with modulating motor skills such as sitting, switching, walking, stopping, running, jumping, balance and coordination. These sensory problems in children diagnosed with autism seem to be associated with self-absorbed behaviors such as rocking, spinning, or hand flapping (Greenspan & Wieder, 1997). It has also been suggested that these behaviors occur because individuals diagnosed with autism try to cope with the multiplicity of sensory inputs that they have problems to modulate and integrate, by finding repetitive ways to distract the brain, or even connect to the surrounding context (Maiese, 2013; Stubblefieds, 2013).

Several programs based on sensory integration theory (SI) have been designed to engage children in active sensory and motor challenges involving multimodal sources of stimulation, but sensory integration alone is not purported to produce gains in cognitive achievement; instead, it is designed to remove neurobehavioral obstacles that prevent learning (Dalton & Bergenn, 2007). Educational programs for young children diagnosed with autism need to incorporate appropriately structured physical and sensory environments, such as " creative movement therapy" (Hartshorn et al, 2001), that accommodate these unique sensory processing patterns and provide opportunities for developmentally appropriate sensory-motor experiences within the context of functional educational goals (Baranek, 2002).

This sensory integration is strongly supported and facilitated in the dialogic learning processes where cognitive, physical and motor skills are brought together when sharing knowledge and experiences in multiple and productive ways (Jenkins et al, 2008). Multiple modes of representation (oral, facial, visual, auditorial) are included in the dialogic learning contexts, and the Socratic seminar at the same time provides a higly predictable structure, helping students to practice their skills in a safe area. This is particularly useful for children diagnosed with autism who have deficits in sensorimotor integration and facial emotions, tone of voice, and gesture recognition (Dalton & Bergenn, 2007). *Our forth hypothesis is that the structured dialogues will help the students diagnosed with autism to display and develop their interactive and social abilities by supporting and facilitating the sensory integration.*

The potiential of dialogue in problem solving abilities

While individuals diagnosed with ASD show delays on tasks that require global processing, they may perform better on the tasks that require detail-focused processing (Frith, 2003; Shah & Frith, 1993). This failure to process global features is attributed to weak central coherence, whereby contextualized meaning is thought to be missed due to an obsessive attention to detail (Happe & Frith, 2006). Consequently, children diagnosed with ASD exhibit limited capability in generalization of knowledge and skills to new situations (Pierce et al, 1997). It is therefore necessary to provide increased structure and task-analyzed goals in designing curriculum for children diagnosed with ASD (Erba, 2000).

In Socratic dialogues, open-ended questioning embeded in dialogic learning helps students to find new solutions, understand emotions, or see new possibilities (Andersen, 1987, 1994; Orellana, 2008). The structure is highly regulated and students in ordinary classes learn how to navigate within the structure to come to a higher understanding of the ideas discussed in the dialogue (Pihlgren, 2008; Orellana, 2008).

Previous research suggests that teaching children diagnosed with autism "question-asking" strategies has a significant role in enhancing spontaneous child-initiated social interactions and expressive language development (Koegel, et al., 1998). Exoposed to real- life opportunities through dialogue, they might learn how to act in school and in society. *Our fifth hypothesis is that the structured Socratic dialogues might allow children diagnosed with autism to discover the rules governing each part of a system and eventually achieve an understanding of a whole system, and that this understanding may eventually allow children to combine and apply their understanding into new settings and situations.*

The potiential of dialogue in attention promotion

Children with Autism Spectrum Disorders (ASD) possess considerable skill in attending to and remembering visual features of objects and performing tasks that involve redundant and repetitive sequences. However, the majority of children diagnosed with ASD appears to suffer from fundamental problems to rapidly disengage, shift attention, and engage in a different or unfamiliar sequence of activities (Dalton & Bergenn, 2007). Available studies make clear that most children diagnosed with Autism Spectrum Disorders (ASD) are particularly poor at directing their attention to the appropriate sources of information (Roeyers et al, 2001). They also demonstrate problems with joint attention (Leekam et al, 2000; Loveland & Landry, 1986) –

the ability to recognize and respond to the requests, demands, or needs for attention elicited by others, important and essential competencies for reciprocal interchange and communication (Cotugno, 2009).

The questioning nature of the Socratic dialogue focuses students' attention to the learning situation and intrinsically motivate them to engage actively in a mutually reciprocal interaction (Nouri, 2014). In other words, by the questioning dialogue, the students are elicited by a request for direct answer, and will sustain their attention on one activity or idea, and eventually, by new questions and in the flow of the dialogical interaction, shift focus on to other activities and ideas. *Our sixth hypothesis is that structured Socratic dialogues will help children diagnosed with autism to develop focused, sustained, selective, flexible and joint aspects of attention.*

The potiential of dialogue in motivation

A major problem encountered in the field of autism is a lack of motivation that is especially apparent when children diagnosed with autism attempt to complete learning tasks (Koegel & Egel, 1979). They show very little interest in academic assignments and exhibit disruptive behavior when assignments are presented. One possible explanation presented in literature is that children with autism are capable of producing joint attention but lack the social motivation to share their interests with others (Vismara & Lyons, 2007). However, a research overview suggests that incorporating specific motivational variables such as choice, combining of tasks, and natural reinforcers during intervention leads to improvements in core symptoms of autism and may possibly be effective in academic areas (Koegel, Singh, & Koegel, 2010).

Children diagnosed with autism do not tend to be controlled. It is demonstrated that students with autism often enjoy interacting with computer programs because they view these programs as safe devices that they can control and focus their attention on, blocking confusing input around them (Huntiger and Rippey, 1997; Rajendran and Mitchell).

As students participate and engage in group-based tasks and activities, their interest and motivation increase (Jensen, 2015). It is important that the student is interested in the subject at hand and that students' have a mutual goal when participating (Jensen, 2015). Using open-ended questions to motivate the students to explore further has also shown to be important (Jensen, 2015, Pihlgren, 2013). This is especially shown in the goal-focused Socratic dialogue, where the participants work together to solve problems and find better solutions. *Our seventh hypothesis is that the motivation of children diagnosed with autism for participating in learning tasks will be*

enhanced by the group dialogue's emphasis on reaching a common goal and that their feeling of control can be evoked and supported if using Socratic questioning together with information and communication technologies.

A Dialogic based Design Model for Teaching Children with ASD

The above insights from relevant literature highlight the potential of dialogic learning as a basis for pedagogical thinking in the teaching, learning and schooling of children diagnosed with ASD.

According to Snell, (2002), the following characteristics are the most promising educational interventions for these children: (1) behaviorally based; (2) carefully planned and monitored instruction involving task analyses of skills, individualized incentives, goals embedded in routines and activities, and adequate intensity and quality; (3) ongoing, planned opportunities for interaction with typical peers; (4) need-based supports and intervention for families; (5) services delivered in many different settings to meet support needs and promote generalization; (6) broad curricular content that addresses all developmental needs; and (7) proactive use of positive behavior support for challenging behavior.

An effective dialogic design model for students with autism thus should probably take these characteristiscs into account. However, as Stubblefield (2013) states many of the individuals diagnosed with ASD are able to think and also make conclusions about other people's feeling, why a onesided concentration on behaviorist methods might hinder, rather than promote their understanding of, and interaction with, other people. On the other hand, many children diagnosed with ASD have problems coping with too many inputs at a time. Our method is built on a recurrent structure in the Socratic seminar, but where the thinking content is free and participants are encouraged to reflect openly. Snell's (2002) first quality *(1) behaviorally based* is hence treated in a more elaborated way. The following section describe our suggested model in terms of its objective, target population, content and instructional materials, and teaching and assessing processes.

Target population for the suggested model

The model described here targets ASD children with social and communication difficulties, but without severe communication or cognitive deficits. This primarily include children with Asperger's Disorder. Although these children are of normal intelligence, they are faced with life-long deficits in social communication and emotional behavior (Critchley et al, 2000). However,

children with other ASD disorders may also benefit from this model, since social and emotional difficulties seem to be the most prominent common characteristic among all within the ASD spectra. The targeted population belongs to the compulsory school age.

The objectives of the suggested teaching model

Equipping students with skills in communication, social interaction, appropriate behavior, choice making, and functional academic abilities should be seen as the important educational aims in teaching students with autism (Snell, 2002). These aims can be realized by pursuing the following objectives:

- To understand and appreciate their own viewpoints and others' perspectives;
- To work well with others and comprehend how the self is perceived by others;
- To actively question, discuss and individually construct new knowledge;
- To value and use communication media to serve the purposes of everyday life;
- To encourage their self-esteem and self-confidence;
- To engage in authentic experiences in situated learning settings;
- To understand and appropriately react to the emotions of others;
- And, in the long run to reduce their dependence on others and extend their abilities to include supported functioning at home, in school, and in society.

The content and instructional materials

Self-modeling can be strengthened to develop social, vocational, motor, cognitive, and instructional skills (Bellini & Akullian, 2007). Children with autism often lack appropriate means to communicate and may rely on aggression and other disruptive behaviors to express their needs (Koegel, Koegel, & Steibel, 1998). The literature suggests that self-management treatment packages have the potential strengths for improvement of social skills and disruptive behavior in students with severe autistic disabilities (Koegel & Koegel, 1990). Self-management could also be used as a technique for reduction or elimination of stereotypic behavior (Koegel, et al, 1992).

To support the learning and self-modeling, the model is based on recurrent, weekly Socratic seminars in remedial classes. The seminar will follow the steps of the Socratic Paideia seminar (Adler, 1984), starting with the individuals and the group setting goals for the dialogic performance in the seminar, continuing with an opening question that each participant answers. The dialogue is then concentrated on analysis of the used material, and finally the ideas of the

text are discussed and compared to the participant's experience. After the seminar is closed, the individual and group goals are evaluated.

The material (texts, pictures, films) discussed in the seminars will be chosen from four different aspects. The material:

- is age appropriate and of interest to the students.
- addresses questions of human social interaction, emotions, or dilemmas.
- addresses important ideas and questions and does not present obvious answers.
- asks questions and promotes discussion.

The teacher needs to engage all students in dialogue and keep conversations confidential, and within the group, to create a secure room for "brave exploring" (Pihlgren, 2008). He or she must be a willing partner, not only questioning, but also listening, supporting, and giving constructive feedback emotionally. The teacher will work as a facilitator, facilitating the discussion by asking questions to the students and by pointing out connections or differences in different participants' ideas, and by functioning as a role-model in thinking, reasoning, listening and by showing respect of other participants' ideas.

Teaching methods and learning activities

Collaborative projects are useful tools that provide students with authentic social experiences they need to live in their society. Physical organization of the classroom should facilitate reciprocal interaction and communication. The 6-8 participants are seated round a table, where everyone can see each other. The facilitating teacher is placed as one in the group. The room is sparsely furnished and decorated. The only thing exposed on the table is the material (text, picture).

The initial goal setting and evaluation will function as a way to promote the rules of the seminar. The following dialogic rules will also be presented to the participants, in order to clarify the social interaction and its system:

- Think carefully.
- Help others to think better.
- Listen to others' ideas.
- Be prepared to change your mind if you hear a better idea.

The teacher need to engage all students in dialogue and keep conversations confidential, and within the group, to create a secure room for "brave exploring" (Pihlgren, 2008). He or she must

be a willing partner, not only questioning, but also listening, supporting, and giving constructive feedback emotionally. The teacher will work as a facilitator, facilitating the discussion by asking questions to the students and by pointing out connections or differences in different participant's ideas, and by functioning as a role-model in thinking, reasoning, listening and by showing respect of other participants' ideas. Students' insights and ideas are respected. They are free to make choices.

Assessment techniques and procedures

Given the challenges with language and shifting attention, visual supports can help students to make the sequence of school tasks and daily activities understandable and predictable. Integrating verbal information with pictures, visual schedules, gestures, visual examples, written directions and video modeling have a very important part to play in learning social behaviors. The steps of the seminar will be exposed in the classroom, and the seminar rules. The material (text, picture, film) that is about to be discussed will be exposed in the room, read, or looked at on some occasions before the seminar.

Students with autism benefit from individualized and often intense educational services beginning early in life. An effective dialogic-based curriculum for students diagnosed with autism probably also require a diversity of other instuctional materials. In addition to the textbooks, a set of computerized programs can be required to support students in their academic learning and help them build basic skills and independence.

It is of vital importance that students meet assessment in a safe and supportive context where their problems and concerns related to knowledge, attitudes and skills can be addressed. Effective assessment in dialogic learning strategy demands a broad range of challenges by which children with autism could explore their needs, feelings, knowledge and skills. Assessment should provide specific feedback, reinforcement, and formative feedback, showing the student how to go on in learning. This will be done after every 3rd seminar, using rubrics for formative assessment, concentrated on self-evaluation, supported by the teacher, of criterias like listening, thinking, talking, and understanding. The rubrucs might later in the process be able to use as a material for peer-evaluation and discussions.

Parental involvement

The students diagnosed with autism often require support from their home and their community. Hence, a positive and collaborative relationship with the family is beneficial to help children.

Parents will be kept informed of the program and how it progresses, and they will also be trained through workshops how to support their child's development through open questions, productive discussions while reading, listening to music, watching films, and playing computer games at home. They will also be invited to participate in Socratic sessions and dialogue with teacher and students in the classroom.

Final conclusions

The overview of relevant literature discussing ASD suggests that children with ASD have extensive, long-term educational needs and the individualized education programs (IEPs) for these students need to be planed, implemented, and evaluated by an interdisciplinary team of special educators, general educators, and speech and language pathologists (Snell, 2002). However, drawing on a body of evidence, the outline provided here suggests that humans are biologically wired for dialogue and interaction with one another in socially and culturally shaped contexts. Children are social learners who will actively construct meaning and knowledge as they interact with their cultural and social environment through dialogue. Our belief is that this also is true for children diagnosed with autism, and that their awareness of how social and emotional skills are wired and functions could be trained by exposing their mechanisms in discussions of text, pictures, and films, addressing such subjects, and by discussing student performances as individual and group goals and seminar rules. The teacher will enforce the learning by being a role-model and by structuring the seminar and the context to support the learning. It also requires an authentic dialogue with parents about what can be done to improve this process.

Further research is clearly needed to establish the impact of dialogic based interventions on social and academic success of children with autism. This paper presents the model that will be tested and revised in our forthcoming study.

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