

## Development of Academic Skills in Children with Autism

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Article Received: 19 September 2018

Article Accepted: 21 January 2019

Article Published: 06 April 2019

### ABSTRACT

Autism is a neurodevelopmental disorder that affects the functioning of the brain and consequently other areas of development in an unstable and irregular way. There are many therapeutic approaches to autism and one of them is music therapy. Music therapy is a purely therapeutic treatment (Anagnostopoulou & Manti, 2009)<sup>[1]</sup>. It does not seek entertainment or music education. Music therapy is used as a means of expression and creativity, giving people with limited verbal communication capabilities such as autistic people an alternative way of communicating and expressing themselves. The purpose of this research is to investigate the development of social and communication skills through music therapy in children with ASD, focusing on emotional development, behavioral problems and academic performance. For the purposes of investigating the above purpose, the quality method and the data collection tools that helped to implement it were the semi-structured interview and the structured observation. In the interview were special therapists who implement music therapy approaches and observation was used to record a possible change in the unacceptable behaviors of a child attending a music therapy program. The results obtained from the qualitative analysis of the data demonstrate a significant weakness of the child with ADHD, both in terms of communication and sociability. Music therapy seems to be helpful in their academic skills. The results of the research show that music therapy plays an important role in early intervention to address the weaknesses faced by children with ASD.

**Keywords:** Autism Spectrum Disorders, Academic skills.

### 1. INTRODUCTION

Autism in DSM IV is defined as a birth defect in the development of the child but appears and evolves since three years old. The person in the autism spectrum presents problems in three areas, sociability, communication and imagination.

It is thought to be a developmental disorder of the brain and the person suffering from autism lives with it throughout his life. It is a premature and global disorder of evolution and its main features are serious communication disorders, weakness in their social relationships and behavioral disorders. A very common phenomenon in autism is the difficulties that arise in sensory integration, in the development of “theory of mind”, in their kinetic stereotypes and in their over-stimulation. Autism is due to a neurological disorder that affects brain function and consequently other growth areas in an unstable and irregular fashion. As reported, autism occurs at the age of three years, although early signs are rarely discovered. However, the mental level of children with autism ranges from higher levels of intelligence to the heaviest forms of mental deprivation (Kekes, Chitoglou – Antoniadou, Chitoglou – Hatzi, 2010)<sup>[2]</sup>.

Autism therefore needs careful evaluation and diagnosis to distinguish it from other similar syndromes. For autism there are many therapeutic approaches one of which is music therapy. Music therapy is claimed to be a purely therapeutic treatment and does not seek entertainment or music education, but instead is used as a means of expression and creativity, giving people with limited vocabulary (people with autism) an alternative way of communicating and expressing (Anagnostopoulou, Manti, 2009)<sup>[1]</sup>.

**CITE THIS ARTICLE:** Agapi Lygeraki, “Development of Academic Skills in Children with Autism”, *Mediterranean Journal of Basic and Applied Sciences*, Volume 3, Issue 2, Pages 01-12, April-June 2019

The research questions that are being asked to conduct this research based on the above are:

- Is there a positive effect on the emotional development of the student with the implementation of music therapy?
- Is there an improvement in the student's behavioral problems after the intervention of music therapy?
- Is the pupil's general positive and social behavior enhanced?

Following the paper and for the purpose of investigating the above purpose, the quality method was used and the data collection tools that helped in its realization were the interview, namely the semi-structured interview and the structured observation. The observation was made to record the child's unacceptable behaviors. Here are the ethical issues that describe how ethical principles were complied with, and the data collected was secured on the basis of the code of conduct.

From all of the above, it becomes clear the necessity of investigating music therapy as a result of the development of social and communicative skills of a child with autism. The research is expected to present a differentiated profile of a child with autism after a few music therapy sessions. It is also expected to have a positive effect on the pupil's emotional development as well as to improve the student's behavioral problems. Finally, the general positive and social behavior of the student is expected to be enhanced.

## **2. THEORETICAL BACKGROUND**

Wing (2000)<sup>[16]</sup> argues that it is difficult to give a specific definition of autism. For the reason that autism differs from the multitude of sources coming from the various professionals involved but also from the parents of children with autism.

Gena (2000)<sup>[4]</sup> reports that autism originates from the Greek “autos”, meaning “me, myself”, and this is because autism is a form of self-heroism, because “autos” requires a return to self (Gena, 2000)<sup>[4]</sup>.

According to ICD-10 (2008) autism belongs to the Autistic Spectrum Disorder. The group of these disorders is characterized by qualitative anomalies in social transactions, ways of communication, and by limited stereotypes and repetitive activities and interests. These qualitative anomalies are the dominant diffuse feature of the individual's functionality in all circumstances.

As an early global disorder of evolution experiencing communication problems, weakness in social relationships and behavioral disorders is the result of a neurological disorder that affects brain function and various areas of growth in an unstable manner (Chitoglou – Antoniadou, Kekes, Chitoglou – Hatzi, 2000)<sup>[2]</sup>.

Gournieraki and Balomenaki (2009)<sup>[5]</sup> report the history of autism. In 1911 Breuler, a Swiss psychiatrist, gave the term “autism” to declare the loss of contact and communication of the mentally ill with reality, as he believed back then that these individuals had normal intelligence. In 1943 Leo Kanner described through his

work entitled “Emotional Contact Disorders of the Autistic Individual” the social and communication differences that characterize autism.

According to Argyriadi (2011), autism is a rare disorder, and although we do not yet know the nature of autism, it is difficult to know the exact number of people with autism due to epidemiological investigations based on behavioral characteristics. In recent research in Europe, scientists point out that the proportion of people with diffuse developmental disturbances in the autism spectrum is 58: 10,000. More specifically, autism is observed in every 1 to 2 children in every 10,000 who are born (1.5: 10,000). In older studies, 4 to 5 people in 10,000 births have classical autism and about 20 in every 10,000 show autistic tendencies. While recent research, and specifically the First Autism Epidemiological Congress of the Autistic World Organization (November 2002), shows that autistic people have a rate of 50 per 10,000.

In Greece, similar surveys have not been made, but on the basis of the data presented above in our country there are 4,000 to 5,000 children and adults with classical autism and 20,000 to 30,000 with autism spectrum disorders (Argyriadi, 2011).

In researches made over the past decade, however, they have returned to Kanner's original research with the researchers giving an emphasis on the complex interdependence of cognitive learning, social perception, language and societal patterns. The main symptoms of autism are examined in their natural environment, social understanding and socio-communicative contacts (Gournieraki and Balomenaki, 2009)<sup>[5]</sup>.

The causes of autism are still unknown today. The causes of autism are still unknown today. However, most in-depth studies converge on the view that the causes of autism are due to organic rather than psychogenic causes. Of course, it is still unknown whether the organic disorder that causes autism is due to a single organic agent or other diverse organic causes (Jordan & Powell, 2000)<sup>[6]</sup>. These factors are both genetic and psychosocial. Genetic factors for psychiatry conclude that autism is one of the most inherited disorders. Despite the high degree of heredity, etiology is heterogeneous, with a very likely involvement of genes and chromosomal regions. Genetic heterogeneity is in line with the diversity of the clinical picture. Each gene probably contributes differently to the onset of the disorder. That is, elements from genome control in families with more than one person with autism indicate that ten and perhaps more genes interact to cause autism. While psycho – social factors as mentioned in earlier theories, consider autism as an emotional coldness of parents or inappropriate practices of education and upbringing that are now regarded as non-existent (Jordan & Powell, 1995)<sup>[7]</sup>. Parents of people with autism belong to different social status and everyone needs support to deal with their children's disorder and chronic stress in the family. Children with autism spectrum disorder and with any other disorder react with an aggravation of symptoms in psychosocial stress and often show increased sensitivity even in very small changes in their environment (Vogindoukas & Sherratt, 2005)<sup>[14]</sup>.

Notas (2004)<sup>[11]</sup> argues that autism cannot be diagnosed from some evidence of a range of symptoms and disorders. The characteristics that should be evident in a diagnosis of an autism spectrum disorder are

initially the disruption of social interaction and sociality. That is, people show intense indifference to other people, especially for other children, showing more attention to objects. Some children seek the adult because they passively accept social contact and show some degree of pleasure, but they do not approach the others spontaneously, while others, approach them in a strange, inappropriate and ritualistic manner (Notas, 2004)<sup>[11]</sup>. The second feature is the communication disorder they face, presenting problems in understanding and using any verbal and non-verbal communication. Unlike typical children, children with autism do not repeat a formal procedure in communication. And a third feature is the understanding of information that transmits them with gestures, facial expression, posture, and tone of their voice. An equally important feature is that some children may never get a speech and alternative communication systems should be taught (Notas, 2004)<sup>[11]</sup>. From the above we observe that children with autism are deficient in interpersonal relationships.

There is also a lack of imagination that makes it difficult for people to understand the feelings and the feelings of others so it makes them seem indifferent. In addition, children with autism have difficulty developing the fantastic game that helps normal children know the world they live in (Argyriadi, 2011).

The diagnosis of autism is critical and should therefore be done as early as possible because every person with autism is affected separately and to a different degree regardless of gender and age. In order for the diagnostic procedure to be correct, there should be a history of child development, behavior, psychological evaluation, using appropriate tests to show whether the child has autism and what educational procedures to follow (Vogindroukas, Kalomiris, Papageorgiou, 2007)<sup>[13]</sup>.

In the context of autism, several related researches have been made concerning the effect of music therapy on the behavior, communication and socialization of children with autism. Some researches focus on developing the general and special abilities of these children or their ability to cognitively process the music information. However, with regard to the effect of music on aggressive behavior, researches focus mainly on people with developmental disorders (Kargiou, 2012)<sup>[9]</sup>. Though there are no research data about their academic attainments. Only a little research is being made related to academic attainments in intellectual disability (Charitaki, Baralis, Polychronopoulou, Lappas, & Soulis, 2014b, 2015a, 2015b) and the factors that are related to it (Charitaki, Baralis, Polychronopoulou, Lappas, & Soulis, 2014).

In a study conducted by Ford (1999) as reported in Kargiou (2012)<sup>[9]</sup>, music compares ways of tackling the self-traumatic behavior of a 20-year-old girl with developmental difficulties, disability, reduced communication skills and vision problems. The conclusions that emerged from this research showed that during a music listening, self-traumatic behavior was diminished, while during the musical activities in which she actively participated with the researcher, this behavior did not appear. However, these research results cannot be generalized because this particular case study is just a case study.

In another study by Wigram (1992), as reported in Kargiou (2012)<sup>[9]</sup>, he focused on listening to music combined with low-frequency sounds, tackling the self-injury of three people with learning disabilities aged

26, 27 and 31. The results showed for the two out of the three participants that their self-traumatic behavior decreased and for the third participant the results were not clear. But this research cannot be generalized for the same reason as Ford's (1999) (Kargiou, 2012)<sup>[9]</sup>.

There are so many treatments for autism, so therapists do not know which one is most effective. Dealing with issues related to sensory disorder, such as sensitivity to noise and other everyday habits, allows many autistic children to work better in a preschool environment (Vougiouka, 2012). The types that could be applied to children with autism are ABA (Structured Behavioral Intervention). The goals of this program are a) to teach the child how to manage his behavior and the early intervention of special care by a special education teacher used to describe the care provided to the child before the age of three, b) the treatment of sensory integration implemented by an occupational therapist and helps the child to manage the stimuli he receives from his environment, as well as c) the speech therapy and special education which is a personalized program designed by a teacher of special treatment.

In this study, a relatively new treatment method for autism or music therapy is being studied. The term musical therapy is a complex term. It includes the concept of music and the concept of healing. By studying music therapy, we are basically talking about a combination of music with psychology, person development, healing and nursing (Makri – Makris, 2003)<sup>[10]</sup>.

Music therapy is a method of intervention that uses music to help patients cope with the difficulties they face. It is mainly applied to the diagnosis of children and adults with sensory, emotional-behavioral disorders and neurological problems (APMT, 2000 Association of Professional Music therapists in Great Britain).

Music, according to Tatsi and Tsoutsi (2007)<sup>[12]</sup>, is an emotional experience and accompanies man in all the events of his life and leads him to very deep and personal emotions. Man knows from the course of his life the powerful influence of music and therefore uses it according to his needs (Tatsi – Tsoutsi, 2007)<sup>[12]</sup>. This is the therapeutic capacity of music that can change the psychosomatic condition of people.

The use of music therapy focuses on developing interpersonal relationships and social interaction, improving communication, developing interest in creative play and other activities as well as promoting psychomotor development and managing and reducing stereotypical behaviors. According to Vougioukas (2012), the music – therapeutic approach is also used as a multi-sensory approach.

There are many methods of music therapy and they are selected based on the approach chosen by the therapist for the needs of the patient. The main methods of music therapy are a) the receptive music therapy and b) the energetic music therapy. In receptive music therapy the hearer listens to pre-recorded or live music and responds to it either by speech or by drawing, movement, relaxation. This method is followed by the following categories: Relaxation, which is music and meditation where the healer listens to and enters the meditation process. There is also Sonotherapy which is a method used in the UK and the United States

and involves specific low-frequency sounds in the body. And the second class of music therapy is energetic music therapy. In this case the healed plays music and creates it. It is a composition with psycho-pedagogical methods and performing well-known musical works. The instruments used are “ethnic” instruments of various percussion, woodcarvings, metal halves and flares. It can be done in individual or group programs and does not require the healing knowledge (Kopsalidou, 2014).

People with autism lack the primary inter-subjectivity, the ability to harmonize their behavior with that of others. In addition, one of the manifestations of autism is communication disorder and music and movement are used to make communication as non-verbal means. That is, music can cultivate the individual's ability to communicate and improve their behavior.

In the case of autism, the aim of music therapy is to make the child perceive the world around him as a condition that can change and influence actively. It helps to take initiatives and interact consciously with people around him through positive experiences to diversify his social behavior. Music therapy is applied to autism on an individual level in two ways. One way is the healer to listen without talking, three musical pieces and tells his impressions. The first piece is about the emotional state that is experiencing at that time, the second to balance the charge that caused by the first piece and the third piece is to cause feelings of calm and joy. The second way that music therapy is applied is that the therapist develops with the healer a musical dialogue with simple organs with the Orff system (Evdokimou – Papageorgiou, 1999).

In the context of autism, several related researches have been made concerning the effect of music therapy on the behavior, communication and socialization of children with autism (Kargiou, 2012)<sup>[9]</sup>. Some researches focus on developing the general and special abilities of these children or their ability to cognitively process the music information. However, with regard to the effect of music on aggressive behavior, research focuses mainly on people with developmental disorders (Kargiou, 2012)<sup>[9]</sup>.

From all the above, the application of music therapy has a catalytic effect on the person's development as it contributes to sensory, mental, physical, social and psychomotor development and communication, giving the individual the opportunity to explore his emotions and social-communication difficulties.

### **3. RESEARCH METHODOLOGY**

#### **3.1 Method**

The method to be followed by the researcher is an important process in which he/she will have to study in depth so that he/she can gather a lot of information and draw conclusions. Two methods, quantitative and qualitative, are used to conduct a scientific research.

In the present study the qualitative method was chosen because it enables the researcher to approach and focus on a research field (Wellington, 2000)<sup>[15]</sup>.

### **3.2 Sampling**

The collection of data involved a total of seven people, namely four specialists (two women and two men), two music therapists (women) and a six-year-old child (boy) with autism attending a general school with the help of parallel support.

### **3.3 Interview**

One of the tools of quality research is the interview. It is the interaction and communication between persons guided by the researcher or the respondent depending on the purpose of the dissemination of information related to the subject of the research (Cohen and Manion, 2009)<sup>[3]</sup>. In this research a semi – structured interview will be taken, because certain questions can be asked which give the respondent space to respond in a freer way. The interview will be made to therapists who practice music therapy in children with autism. Their answers are expected to allow access to the way other people see things in the attitudes and thoughts behind their behavior. The interview was selected for this research as a tool for deeper consideration of respondents' motivation for the reasons they responded in this way.

### **3.4 Observation**

Also, in the survey will also be used the observation, and particularly the structured observation, which will be used to map the communicative and social skills of a child with autism aged 6 years. It will last 7 weeks and aims to record the change in social and communicative skills of the child while intervening through music therapies. The educational assessment of the particular needs of pupils belonging to the autism spectrum is one of the main factors determining the effective teaching and development of successful educational programs (Robson, 2002). In Greece, until today, there is no educational evaluation tool that responds to the needs of autistic students. Consequently, for the purposes of this research, a tool by Apssele, Mitropoulou and Tsakpinis will be used to evaluate the children of the autism spectrum in the developmental areas of communication and social skills.

### **3.5 Questionnaire**

Finally, one of the parents of the child will fill in a questionnaire listing the child's personal characteristics in order to fully illustrate the case.

### **3.6 Triangulation**

Triangulation will be carried out in the context of this survey. Triangulation in scientific research is the use of two or more collection methods in the study of human behavior. Using more than one method allows the researcher to collect more reliable results. Reliability will be enhanced by selecting the appropriate methodology to answer research questions using the appropriate sample and the combination of data collection tools.

#### **4. RESULTS AND DISCUSSION OF THE FINDINGS**

Two methods of qualitative research, observation (structured) and interview (semi-structured) were used to carry out the survey. The structured observation will be carried out to capture the communicative and social skills of a 6-year-old autistic child that lasted 4 weeks aiming at capture the change in social and communicative skills of the child while intervening through music therapies as well as six overall interviews to four special educational teachers and two music therapists who set out their views on music therapy.

The observation was made in a special education center in Attica where was observed a six-year-child studying at a general school where during the daily programme attends music therapy courses. The child is very functional, although is followed by constantly by a special educational teacher as parallel support.

As far as social skills are concerned, it was observed in the first week that their levels of social interaction were relatively quite good. At the time of the music therapy lesson, the child did not tolerate any physical contact such as hugging or tickling until the time of rest. When he is distressed, he seeks consolation only by the special educator of parallel support that helps him tolerate the noises or movements of others who work with him and he can control the attitude of his body from other faces. He moves between the crowd avoiding several times touching people who are close to him except when he is encouraged by the special educator.

His eye contact was also in a low level. He had no eye contact, could not notice others around him while he was engaged in some activity, or could easily see that a familiar person came or left. He can work on his own, standing up or sitting without disturbing others, while in his spare time he can work independently while at the same time other children play beside him. He participates in the group and several times with the help of the special educational teacher, he remains in the group during the session.

Of course, his social response to eye contact with his name's hearing is at a high level as he responds to the familiar faces, to familiar peers at school, but not to strangers. It responds to meanings and gestures and several visual prompts but not to visual prompts when asked to do something. He reacts differently to every one of his known but does not receive instructions or incentives to deal with his free time. He also does not respond by himself when asked for help, does not respond to the smile or to the handshake.

In the series rotation the first week of observation showed that the child does not wait for his turn for long without touching the others or without leaving the line where all the children sit. But he can, with the encouragement of parallel support, execute instructions to participate in table activities and participate in all the activities taking place in the music therapy lesson.

The second and third week of observation was based on his communication skills. In particular, it was stated whether he uses a verbal or non-verbal communication system.

The child to declare a request uses a non-verbal communication system by lifting a hand where this has been learned with the help of parallel support at school. He asks for help with verbal communication, specifically by shouting the word "I want help", asking permission or a break by saying the word "stop".

To attract the attention of the rest of the people in the room – mainly of the music therapist – uses a non-verbal communication system, that is to say, it stands up from the position and goes to the person with whom, for example, wants to play. He refuses in a non-verbal way by showing his palm, when he denies an object he waves his finger and when he does not want to execute a instruction he says “I do not want”.

He cannot comment on himself, other people, objects of action, right or wrong but uses a verbal communication system to say that he has finished an activity or questions he knows to answer for himself. He also responds rarely verbally but mainly by pointing (non-verbally) to give information about objects or faces. He answers verbally to small questions answered with “yes”, “no” or “*I do not know*”. Finally, as far as his verbal communication is concerned, he expresses his feelings just as he feels at that moment.

On the fourth week of observation, his social skills were again observed on whether they have changed after a month of intervention or not. So it turned out that during this month the child was gained skills that had not conquered before. The child from the point that couldn't tolerate any physical contact now tolerates the hug and during the time of the lesson from the four out of the eight kids who are totally in the music therapy department. Now when he is sad he expresses his feelings and not only calls for the attention of the special educator who is with him but also of the music therapist. Difference was also observed in touching the people around him.

His eye contact, which was relatively in a low level and could not notice others around him, now he even perceives that a familiar person is coming or gone. He did not respond to orders when asked for something, and after a month and with encouragement he did what he was asked for, could wait for his turn, shake hands and respond to the smile of everyone.

As part of the observation interviews were conducted by the experts responsible for his educational activity. In the interviews that took place between six participants (four special educational teachers and two music therapists) there were different views.

In the first three questions the participants are asked some personal details. Everyone answered and through these questions showed that most people are working for years in special education.

In the fourth question was asked why they chose to work in the field of special education and in particular, with music therapy. And they all responded that they wanted from the beginning of their career to deal with special education and new or/and alternative autism therapies as well. In the fifth question they answered what method of music therapy they followed. Most of them answered none and they improvise while two music therapists follow the Orff method.

In the sixth question they were asked whether the role of music therapy is important or not. And the answers given by all six are that music therapy plays a very important role as it helps the child in his everyday life to gain human experiences. In the seventh question they should answer if music therapy can help a child's everyday life. They replied that can help him in communicating with the people around him, but also to

control his behavior. From the two above-mentioned answers of the participants, we conclude that there is an improvement in the child's behavioral problems after the intervention of music therapy (a question that arose from the research questions).

In the eighth question they were asked whether music therapy positively contributed to the development of social and communicative skills in children with autism. And they all said that it really does, because music improves their self-awareness and their relationship with others around them. This conclusion arises through the research question whether the positive social behavior of the pupil is enhanced.

In the remaining eight questions the participants responsible for the child's educational activity are asked how the lesson is made and how he behaves in the classroom. And from the answers it appeared that the child is quite functional and with a good indicator of intelligence.

The last question asked to the participants is how the child behaves after music therapy and we concluded that after the end of each session, music therapy has a positive effect on the child.

From the six interviews that took place for the realization of the research we come to the conclusion from the participants' answers and from the research questions that there is a positive effect on the emotional development of the child after the implementation of the music therapy, there is improvement of the child's behavioral problems after the intervention of music therapy and finally the general positive social behavior of the student is enhanced.

## **5. CONCLUSION**

Autism is regarded by Kakouros and Maniadaki (2005)<sup>[8]</sup> as a developmental and neurological disorder. Although its main causes are still unknown, many scientists argue that they may be due to complex causes. People in the autistic spectrum live and see the world differently from the rest around them (Anagnostopoulou, Manti 2009)<sup>[1]</sup>. For these people their world is full of colors, sounds, images and smells, and the stimuli they receive are hard to embrace, and so they are confused. Understanding the quality deviations of people with autism has led to the creation of new and different psycho-educational interventions that promote the development, independence and quality of life of the individual and of his family.

As far as music therapy is concerned, on the other hand, it is worth noting that the application of music is catalytic in the development of the person, as it contributes positively to the mental, sensory, social psychomotor and communication development. In communication, it's really helpful and contributinal as is considered imperative need for the special educational context.

According to the above, it seems that this project concerns the design of a research aimed at exploring the development of social and communicative skills after the influence of music therapy on children with autism. The results of the research confirmed the research case and the research questions as it turned out

based on the results that music therapy not only positively affects autism in general but mainly in the social and communication skills that children with autism suffer.

The survey took place in a special education center during a two-month period (10 March to 30 April 2016). The results of the research were based on the interview and for its verification it became a structured observation to record the full behavior of the child with autism. Research has shown that music for autism is important as it develops many areas and, above all, gives the patient the opportunity to express themselves through melody. As we have seen from the above, the importance of music therapy in the educational process of a child with autism is emphasized.

However, there were some restrictions during the survey. In particular, it was observed that the sample was small, resulting in the findings in a wider population. Nevertheless, and based on the researches that have already been made on the existing issue, the data are confirmed and at the same time enrich the literature as this research. Also, there was a leak in the research, which made it difficult to carry out the research. In fact, the sample was got lost before carrying out the test, but the researcher managed to find the same sample over the course of one day as the one that had been selected since the beginning of the research.

Finally, it is recommended in the future to conduct a research aiming at the effect of music therapy on the development of social and communicative skills in a larger population involving children attending music therapy sessions. In this part ICT can play an important role (Charitaki, 2015).

From the above it can be concluded that music therapy positively affects children with autism in the development of both communicative skills and communication skills that children with autism have not acquired yet.

## REFERENCES

- [1] Anagnostopoulou, A., Manti, A., (2009) Autism: Music Therapy and alternative treatment approaches., Ioannina: Technological Educational Institute of Ipeiros.
- [2] Charitaki, G. (2015). The effect of ICT on emotional education and development in young children with Autism Spectrum Disorder. International Conference on Communication, Management and Information Technology (ICCMIT 2015), Procedia Computer Science, 65, 285-293. <http://www.sciencedirect.com/science/article/pii/S1877050915029117>
- [3] Charitaki, G., Baralis, G., Polychronopoulou, S., Lappas, D., & Soulis, S.-G. (2014). Factors Related to Numerical Ability of Children with Down's syndrome. The International Journal of Early Childhood Learning, 21, 1-17. <http://ijlecl.cgpublisher.com/product/pub.256/prod.48>
- [4] Charitaki, G., Baralis, G., Polychronopoulou, S., Lappas, D., & Soulis, G. S. (2014). Early Numeracy in Children with Down's Syndrome in Greece. Psychology, 5, 1426-1432. <http://dx.doi.org/10.4236/psych.2014.512153>

- [5] Charitaki, G., Baralis, G., Polychronopoulou, S., Lappas, D., & Soulis, G. S. (2015). Difficulty in Learning to Count or Effect of Short-term Memory Deficiency in Mathematical Abilities?. *International Journal of Innovation and Research in Educational Sciences*, 2(2), 60-62.  
<http://www.ijires.org/index.php/issues?view=publication&task=show&id=56>
- [6] Charitaki, G., Baralis, G., Polychronopoulou, S., Lappas, D., & Soulis, G. S. (2015). Common Difficulties which face children with Down's syndrome in acquiring basic counting skills. *British Journal of Education, Society & Behavioural Science*, 7(2), 121-128. <http://dx.doi.org/10.9734/BJESBS/2015/15323>.
- [7] Chitoglou – Antoniadou, M., Kekes, G., (2010)., *Autism-Hope (Autisme – Espoir*, 2 University Studio Press, ed.). Thessaloniki University Studio Press.
- [8] Cohen L., Manion L. & Morrison K., (2007) *Educational Research Methodology*. Athens: Editions: Metaihmio.
- [9] Gena, A., (2002) *Autism and diffuse developmental disorders*. Athens: Zafiropoulos.
- [10] Gournieraki, K., Balomenaki (2009), *Autism in Childhood and Adolescence, Parents' Views and Health and Welfare Professionals.*, Heraklion: Technological Educational Institute of Crete.
- [11] Jordan, R., & Powell, S. (2000). *Understanding and Teaching Children with Autism*. Athens: Hellenic Society for the Protection of Autistic Children.
- [12] Jordan, R., & Powell, S. (1995). *Understanding and Teaching Children with autism*. Wiley.
- [13] Kakouros, E., Maniadaki, K., (2005) *Psychopathology of children and adolescents: Developmental approach*. Tipothito: Athens.
- [14] Kargiou, K., (2012) *Music as a Means of Responding to the Self-Traumatic Behavior of Autistic Individuals: A Pilot Research on the View of Music therapists*. Athens.
- [15] Makris, I., & Makri, D., (2003) *Introduction to music therapy*. Athens: Grigoris.
- [16] Notas, S., (2004) *Spectrum of Autism - Diffuse Developmental Disorders A Family Guide*. Athens: Ministry of National Education and Religious Affairs.
- [17] Tatsi, K., Tsoutsi, A., (2007) *Special Treatments in the Area of Mental Health*. Thessaloniki: Alexandrio Technological Educational Health.
- [18] Vogindroukas, I., Kalomoiris, G., Papageorgiou, V., (2007) *Autism: Positions and Approaches*. Athens: Traveler (2nd Edition).
- [19] Vogindroukas, I., & Sherratt, D. (2005). *A guide to educating children with diffuse developmental disorders*. Athens: Traveler, (2nd edition).
- [20] Wellington, J., (2000) *Educational research contemporary issues and practical approaches*. USA: Bloomsbury.
- [21] Wing L., (2000) *Autistic Spectrum: A Guide for Parents and Professionals*. Athens: EEPAA