

**‘Specialization in ICTs and Special Education: Psychopedagogy of Integration’**  
**Postgraduate Program**  
**DEMOCRITUS UNIVERSITY OF THRACE Department of Greek Philology**  
**in collaboration with**  
**NCSR DEMOKRITOS Informatics and Telecommunications Institute**

**EARLY AUTISM DETECTION THROUGH DIGITAL TOOLS**

**ANAGNOSTOU MARINA**

**POSTGRADUATE  
THESIS**

**SUPERVISORY COMMITTEE**

1. ΚΑΡΑΜΠΑΤΖΑΚΗ ΖΩΗ

ΣΥΝΕΡΓΑΖΟΜΕΝΗ ΕΡΕΥΝΗΤΡΙΑ Ι.Π.Τ Ε.Κ.Ε.Φ.Ε «ΔΗΜΟΚΡΙΤΟΣ»

2. ΔΡΙΓΚΑΣ ΑΘΑΝΑΣΙΟΣ

ΔΙΕΥΘΥΝΤΗΣ ΕΡΕΥΝΩΝ ΚΑΙ ΕΡΕΥΝΗΤΗΣ Α' ΒΑΘΜΙΔΑΣ Ι.Π.Τ. Ε.Κ.Ε.Φ.ΕΕ  
«ΔΗΜΟΚΡΙΤΟΣ»

3. ΣΤΑΘΟΠΟΥΛΟΥ ΑΓΑΘΗ

ΣΥΝΕΡΓΑΤΙΔΑ ΕΡΕΥΝΗΤΡΙΑ Ι.Π.Τ. Ε.Κ.Ε.Φ.Ε. «ΔΗΜΟΚΡΙΤΟΣ»

Athens 2019

## **Abstract**

As years passed, autism and all that related with this developmental disorder concern us more than ever and that is the reason, that researches increase constantly on this subject. The reasons for the spectrum were those, which firstly found in the researches target. When a first direction has given on what autism is, what cause it and what does spectrum mean, researches started to focus on detection and intervention on this. Moreover, this which someone understand through year's research, is the importance of these two meanings *detection-intervention* for the further development in people with autism.

According to Polichronopoulou, «*autism is a neurological disorder result, which influences the brain function and also the development areas in a child*». Autism came in medical discipline by Bleuer in 1911, it comes from the word «this» and it means «I, myself». Through this definition can someone understand the tendency in autistic people to turn upon in themselves. (Polichronopoulou, 2012). Autism is a situation, which has improved that doesn't change over the time, on the contrary it is developed. Also, autism has improved that get trained and for that reason the detection is important and especially the early detection. Early detection is this which will bring the early education, so the children with autism could handle the symptoms of this spectrum as better as they can with ultimate aim their inclusion in society.

Technology is also developed over the years and is included in the education trade dynamically. In the last years, new technologies started to use in education of the people with special needs and many important researches are taking place on this. (Drigas, 2013) Especially, in special education has investigated and has included a lot of digital tools, which are improved that are useful in education for people with special needs. The computer is a special educational tool, which creates a multi-sensory, a pluralistic and open for all environments. (Markou & Makris) The computer systems offer a big flexibility content adaptability, are easy to use and have variety in environments and applications (Komis, 2004), which in combination with the supportively technology assure a highly quality education in children with special needs. The students have the opportunity to take in their hands their learning and to follow their personal rhythm, gaining their aim. (Raptis, Rapti, 2003) and to acquire independence and autonomy. One more advantage in computer systems use is the fact that is provided a controlled and predictable educational environment, which helps children with special needs to be focused and to hold their attention in a isolation activity, confined the sensory impulses that they receive. (Pedagogic Institute, 2003) The intake of new technologies in the education is contributed the

achievement of crucial pedagogical and educational aims, which cause results so in educational process as in daily living and in job development in people with disabilities. (Makri and Markou 2015, Soulis 2013)

In particular, for autism have created many digital tools, which can use in educational process and intervention. Are there any digital tools for autism early detection? If there are, which are they and how can use them? What the importance of autism early detection? In this paper the aim is to answer all these questions through literature and through this to appreciate the importance of autism early detection and the role of the technology on it.

## **REFERENCES**

### **1.ΕΛΛΗΝΟΓΛΩΣΣΗ**

- Βοσνιάδου, Σ. (2006). Παιδιά, Σχολεία και Υπολογιστές: *Προοπτικές, προβλήματα και προτάσεις για την αποτελεσματικότερη χρήση των νέων τεχνολογιών στην εκπαίδευση*, Αθήνα: εκδ. Gutenberg.
- Γκονέλα, Ε. (2006). *Αυτισμός: αίνιγμα και πραγματικότητα, από τη θεωρητική εκπαίδευση στην παρέμβαση*. Αθήνα: εκδ. Οδυσσέας.
- Καραϊβάζογλου, Κ. (2015). *Κλινική εικόνα και πρώιμη ανίχνευση Διαταραχής Αυτιστικού Φάσματος*: νεώτερα δεδομένα, ανακτήθηκε από <https://www.epsypea.gr>
- Κόμης, Β. (2004). *Εισαγωγή στις Εκπαιδευτικές Εφαρμογές των Τεχνολογιών της Πληροφορίας και των Επικοινωνιών*, Αθήνα: Εκδόσεις Νέων Τεχνολογιών.
- Κυπριωτάκης, Α.(2003). *Τα αυτιστικά παιδιά και η αγωγή τους*, Ηράκλειο:εκδ. Παπαγεωργίου.
- Μακρής, Α. & Μάρκου, Π. (2015). *Οι Νέες Τεχνολογίες στην Ειδική αγωγή*. Scientific Journal Articles C.V.P. παιδαγωγικής και εκπαίδευσης. Ανακτήθηκε 20 Νοεμβρίου 2019, από <http://www.scientific-journal-articles.org/greek/free-online-journals>
- Ματσαγγούρας, Η. Γ. (2003). Θεωρία και Πράξη της Διδασκαλίας, Β' τόμος. Στρατηγικές Διδασκαλίας, Αθήνα: Gutenberg
- Μπεζεβέγκης, Η. Γ. (1985). *Εξελικτική Ψυχοπαθολογία* (Α` τόμος.). Αθήνα
- Παιδαγωγικό Ινστιτούτο-Αναλυτικά Προγράμματα για μαθητές με αυτισμό.
- Παπαγεωργίου, Β. (2004) Προς τους γονείς, για τους γονείς, στο *ΤΟ ΠΑΖΛ ΤΟΥ ΑΥΤΙΣΜΟΥ*, Πρακτικά Διεθνούς Επιστημονικού Συμποσίου 9-11 Μαΐου 2003, εκδόσεις 'ΕΛΛΑ'
- Πολυχρονοπούλου, Σ. (2012). *Παιδιά και Έφηβοι με Ειδικές Ανάγκες και Δυνατότητες*, Αθήνα: Αυτοέκδοση
- Ράπτης, Α. & Ράπτη, Α. (2013). *Μάθηση και διδασκαλία στην εποχή της πληροφορίας*, Αθήνα: αυτοέκδοση.
- ΥΠΕΠΘ-Παιδαγωγικό Ινστιτούτο, (2003). *Διαθεματικό Ενιαίο Πλαίσιο Προγραμμάτων Σπουδών και Αναλυτικό Πρόγραμμα Σπουδών Ειδικής Αγωγής*, Αθήνα: ΥΠΕΠΘ & Παιδαγωγικό Ινστιτούτο
- Φύτρος, Κ. (2005). *Η Πληροφορική στην Ειδική Αγωγή*, Αθήνα.

## **2.ΞΕΝΟΓΛΩΣΣΗ**

Alexander, J., Ayres, K., Smith, K., Shepley, S., & Mataras, T. (2013). *Using video modeling on an ipad to teach generalized matching on a sorting mail task to adolescents with autism*. Research in Autism Spectrum Disorders.

Allen G., Burk D. & Ess C. (2008). *Ethical Approaches to Robotic Data Gathering in Academic Research*. International Journal of Internet Research Ethics.

American Psychiatric Association, DSM-IV-TR Diagnostic and Statistical Manual of Mental Disorders-IV – Text Revision, 2000

Bailey, A., Le Couteur, A., Gottesman, I., Bolton, P., Simonoff, E., Yuzda, F. Y., & Rutter, M. (1995). *Autism as a strongly genetic disorder: Evidence from a British twin study*. Psychological Medicine, 25, 63-77. ανακτήθηκε από:

<https://www.researchgate.net>

Baron-Cohen, S., Allen, J. & Gillberg, C. (1992). *Can Autism Be Detected at 18 Months? The Needle, the Haystack and the CHAT*. British Journal of Psychiatry, 161: 839-43

Bosl, W. J., Tager-Flusberg, H., Nelson, C. A. (2018). *EEG analytics for early detection of autism spectrum disorder: A data-driven approach*. Scientific Reports, 8, Article 6828. Doi:[10.1038/s41598-018-24318-x](https://doi.org/10.1038/s41598-018-24318-x)

Bernard-Opitz, V., Ross, K. & Tuttas, M. L . (1990) *Computer-Assisted Instruction for Autistic Children*, 19(5):611-616, PMID: 2260815, ανακτήθηκε από:<https://europepmc.org/>

Bernard-Opitz, V., Sriram, N., & Nakhoda-Sapuan, S. (2001). *Enhancing social problem solving in children with autism and normal children through computer-assisted*, article in Journal of Autism and Developmental Disorders 31(4):377-84 , DOI: 10.1023/A:1010660502130, ανακτήθηκε από:

<https://www.researchgate.net>

Bosl, W.J., H. Tager-Flusberg and C.A. Nelson, 2018. EEG analytics for early detection of autism spectrum disorder: A data-driven approach. Scientific Repor., 8: 1-20. DOI: 10.1038/s41598-018-24318-x

Bosseler, A. & Massaro, D.W. (2003). Development and Evaluation of a Computer-Animated Tutor for Vocabulary and Language Learning for Children with Autism. Journal of Autism and Developmental Disorders, 33, 653-672

Bosseler, A. & Massaro, D.W. (2003). Development and Evaluation of a Computer-Animated Tutor for Vocabulary and Language Learning for Children with Autism. Journal of Autism and Developmental Disorders, 33, 653-672

Bosseler, A. & Massaro, D.W. (2003). Development and Evaluation of a Computer-Animated Tutor for Vocabulary and Language Learning for Children with Autism. *Journal of Autism and Developmental Disorders*, 33, 653-672

Bosseler, A. and Massaro, D.W. (2003). *Development and Evaluation of a Computer-Animated Tutor for Vocabulary and Language Learning for Children with Autism*. *Journal of Autism and Developmental Disorders*, ανακτήθηκε από:

<https://www.researchgate.net>

Burke, M., Marlow, C., & Lento, T. (2010). *Social Network Activity and Social Well-being*. Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, 1909–1912. doi:10.1145/1753326.1753613, ανακτήθηκε από:

<https://www.researchgate.net>

Cabibihan, J.-J., Javed, H., Ang Jr, M., & Aljunied, S. M. (2013). Why robots? *A survey on the roles and benefits of social robots in the therapy of children with autism*. *International Journal of Social Robotics*, 5(4), 593–618. ανακτήθηκε από:

<https://www.researchgate.net>

Cramer, G. R., Urano, K., Delrot, S., Pezzotti, M., and Shinozaki, K. (2011). *Effects of abiotic stress on plants: a systems biology perspective*. *BMC Plant Biol.* 11:163. doi: 10.1186/1471-2229-11-163, ανακτήθηκε από:

<https://www.ncbi.nlm.nih.gov>

Cihak, Martin, Aslı Demirgürç-Kunt, Erik Feyen, and Ross Levine, 2012. Benchmarking Financial Development around the World. *World Bank Policy Research Working Paper* 6175. World Bank, Washington, DC. ανακτήθηκε από:

<https://www.researchgate.net>

Charlop, M. H., Dennis, B., Carpenter, M. H., & Greenberg, A. L. (2010). *Teaching socially expressive behaviors to children with autism through video modeling*. *Education & Treatment of Children*, ανακτήθηκε από:

<https://www.researchgate.net>

Colby, K. M., & Smith, D. C. Computers in the treatment of nonspeaking autistic children. In J. H. Masserman (Ed.), *Current psychiatric therapies*. New York: Grune & Stratton, 1971.

Colby, K. M. (1973). The rationale for computer-based treatment of language difficulties in nonspeaking autistic children. *Journal of Autism & Childhood Schizophrenia*, 3(3), 254–260. <https://doi.org/10.1007/BF01538283>

Cortez Bellotti de Oliveira M. & Contreras M. M. (2007). *Early diagnosis of the autism spectrum disorders (18-36 months)*. Article in: *Archivos argentinos de pediatría* 105(5):418-426, ανακτήθηκε από:

<https://www.researchgate.net>

Daniels, A. M., & Mandell, D. S. (2013). *Explaining differences in age at autism spectrum disorder diagnosis: A critical review*. ανακτήθηκε από:

<https://www.ncbi.nlm.nih.gov>

Darne, S., (2016) *Early detection of autism: comparison of two screening tools*, article in: International Journal of Research in Medical Sciences Darne S. Int J Res Med Sci. 2016 May;4(5):1698-1701, pISSN 2320-6071 | eISSN 2320-6012, ανακτήθηκε από:

<https://pdfs.semanticscholar.org>

Dautenhahn, K. 2003. *Roles and functions of robots in human society: Implications from research in autism therapy.* Volume 21, Issue 4, pp. 443-452, ανακτήθηκε από: <https://www.cambridge.org> › robotica

Detheridge, T. (1996) Information Technology. In Carpenter, B., Ashdow, R. and Bovair, K. (Eds) *Enabling Access: Effective teaching and Learning for Pupils with Learning Difficulties*. London:David Fulton

Diehl, J.J., Schmitt L.M., Villano, M. C.R. CROWELL (2012) The clinical use of robots for individuals with autism spectrum disorders: A critical review, *Research in Autism Spectrum Disorders*, PMID:22125579  
PMCID:PMC3223958 DOI:10.1016/j.rasd.2011.05.006, ανακτήθηκε από:

<https://www.ncbi.nlm.nih.gov>

Dietz, C., Swinkels, S., van Daalen, E., van Engeland, H., & Buitelaar, J. K. (2006). *Screening for autistic spectrum disorder in children aged 14–15 months II: population screening with the Early Screening of Autistic Traits Questionnaire (ESAT)*. *Journal of Autism and Developmental Disorders*, 36(6), 713–722.  
Doi: [10.1007/s10803-006-0114-1](https://doi.org/10.1007/s10803-006-0114-1), ανακτήθηκε από: <https://www.researchgate.net>

Dowrick, P.W. (1999). *A review of self modeling and related interventions*. *Applied and Preventive Psychology*, Volume 8, Issue 1, Pages 23-39, [https://doi.org/10.1016/S0962-1849\(99\)80009-2](https://doi.org/10.1016/S0962-1849(99)80009-2), ανακτήθηκε από: <https://www.sciencedirect.com>.

Drigas A., Vlachou A. J. (2016) *Information and Communication Technologies (ICTs) and Autistic Spectrum Disorders (ASD)*. DOI: 10.3991/ijes.v4i1.5352 ανακτήθηκε από:

<https://www.researchgate.net>

Durkin MS, Elsabbagh M, Barbaro J. (2015) *Autism screening and diagnosis in low resource settings: challenges and opportunities to enhance research and services worldwide*. *Autism Research* 8: 473–476. ανακτήθηκε από: <https://www.ncbi.nlm.nih.gov>

Duquette, A., Michaud, F., & Mercier, H. (2007). *Exploring the use of a mobile robot as an imitation agent with children with low functioning autism*. *Autonomous Robots*, 24(2), 147-157. ανακτήθηκε από: <https://www.researchgate.net>

Ehlers, S., Nydén, A., Gillberg, C., Dahlgren Sandberg, A., Dahlgren, S.-O., Hjelmquist, E., & Oden, A. (1997). *Asperger syndrome, autism and attention disorders: A comparative study of the cognitive profiles of 120 children*. *Journal of Child Psychology and Psychiatry*, 37, 207–217, ανακτήθηκε από:

<https://www.ncbi.nlm.nih.gov>

Eltyeb, E., E. (2017). *Autistic Spectrum Disorders: The Challenge of Early Detection in the Arab Region*, DOI: 10.18535/jmscr/v5i9.46, ανακτήθηκε από: <https://www.researchgate.net>

- Falck-Ytter, T., Bolte, S., & Gredeback, G. (2013c). *Eye tracking in early autism research*. Journal of Neurodevelopmental Disorders, Doi: 10.1186/1866-1955-5-28. ανακτήθηκε από: <https://www.researchgate.net>
- Gabriels, R.L., Ivers, B.J., Hill, D.E., Agnew, J.A., & McNeill, J. (2007). *Stability of adaptive behaviors in middle-school children with autism spectrum disorders*. Research in Autism Spectrum Disorders, 1, 291–303. [ανακτήθηκε από:https://psycnet.apa.org](https://psycnet.apa.org)
- Geoffrion, L. D., & Goldenberg, E. P. (1981). *Computer-based learning systems for communication-handicapped children*. Journal of Special Education, 15, 325–332 [ανακτήθηκε από:https://psycnet.apa.org](https://psycnet.apa.org)
- Goussé V, Amsellem F, Delorme R., *Early detection of autism spectrum disorders: emerging symptoms and biomarkers*, article in French, Mar; 200(3):415-22. PMID: 28627160, ανακτήθηκε από: <https://www.ncbi.nlm.nih.gov>
- Grynszpan, O., Weiss, P. L., Perez-Diaz, F., & Gal, E. (2014). *Innovative technology based interventions for Autism Spectrum Disorders: A meta-analysis*. Autism, 18(4), 346–361. doi:10. 1177/1362361313476767. ανακτήθηκε από: <https://www.researchgate.net>
- Happe F. (1998) Αυτισμός. Ψυχολογική Θεώρηση. Αθήνα: Gutenberg Verlag
- Hayes, G., Hirano, S., Marcu, G., Monibi, M., Nguyen, D., & Yeganyan, M. (2010). *Interactive visual supports for children with autism*. Personal and Ubiquitous Computing, 14(7), 663-680 ανακτήθηκε από: <https://www.semanticscholar.org>
- Hirano, Shigeo, Maksim L. Pinkovskiy, and James M. Snyder Jr. (2012). *Voter Learning in State Primary Elections*.
- Howlin, P. (1998) Practitioner review: *psychological and educational treatments for autism*. Journal of Child Psychology and Psychiatry, 39, 307–322., ανακτήθηκε από: <https://onlinelibrary.wiley.com>
- ICD-10.(1992).*Ταξινόμηση Ψυχικών Διαταραχών και Διαταραχών Συμπεριφοράς*, Αθήνα: Βήτα
- Kamio Y, Tobimatsu S and Fukui H. (2011) *Developmental disorders*. In: Decety J and Cacioppo J (Eds) *The Oxford Handbook of Social Neuroscience*. Oxford: Oxford University Press, 848–858
- Kamio, Y, Tobimatsu, S, Fukui, H. (2011) *Developmental disorders*. In: Decety, J, Cacioppo, J (Eds) *The Oxford Handbook of Social Neuroscience*. Oxford: Oxford University Press, 848–858.
- Kamio Y, Inada N. (2006) *A preliminary study on the early detection of pervasive developmental disorders at 18-month check-up*. Clinical Psychiatry 48 (9):981-990.
- Limon A. (2007) *Importance of early detection in autism spectrum disorder*. Article in Spanish, 143(1):73-8, PMID: 17388098, ανακτήθηκε από: <https://www.ncbi.nlm.nih.gov>

- Lord, C., Rutter, M., & Le Couteur, A. (1994). Autism Diagnostic Interview-Revised: A revised version of a diagnostic interview for caregivers of individuals with possible pervasive developmental disorders. *Journal of Autism and Developmental Disorders*, 24, 659–68
- Matson JL, Mahan SS, Fodstad JC, Worley JA, Neal DD, Sipes MM.(2011) *Effects of symptoms of co-morbid psychopathology on challenging behaviours among infants and toddlers with Autistic Disorder and PDD-NOS as assessed with the Baby and Infant Screen for Children with aUtlsm Traits (BISCUIT)* *Developmental Neurorehabilitation*. 14(3):129–139.
- Merin N., Young G. S., Ozonoff S, Rogers S. J. (2007) *Visual fixation patterns during reciprocal social interaction distinguish a subgroup of 6-month-old infants at-risk for autism from comparison infants*. *Journal of Autism and Developmental Disorders*. 37:108–121. [PubMed: 17191096]
- Moreno J., C., Sontomayor Morales E., M., Seller P., E. (2017) *Case Study of the Vulnerabilities that Children with Autism Spectrum Disorder have in Education: The Importance of Early Detection*, Article in Procedia - Social and Behavioral Sciences 237:661-666, DOI: 10.1016/j.sbspro.2017.02.038, ανακτήθηκε από: <https://www.researchgate.net>
- Newson, E. (1977), Making Sense of Autism, National Autistic Society, London
- Panyan, M., McGregor, G., Bennett, A., Rysticken, N., & Spurr, A. (1984, January). *The effects of microcomputer based instruction on the academic and social progress of autistic students*. Paper presented at the CEC Technology in Special Education Conference, Reno, Nevada.
- Pleinis, A., & Romanczyk, R. G. (1983, May). *Computer assisted instruction for atypical children: Attention, performance, and collateral behavior*. Paper presented at the Applied Behavior Analysis Conference, Milwaukee.
- Ploog, B. O., Scharf, A., Nelson, D., Brooks, P. J. (2013). *Use of computer-assisted technologies (CAT) to enhance social, communicative, and language development in children with autism spectrum disorders*. *Journal of Autism and Developmental Disorders*, 43, 301–322
- Puerto E., Aguilar J., López C., Chávez D., *Using Multilayer Fuzzy Cognitive Maps to diagnose Autism Spectrum Disorder*. Applied Soft Computing Journal 75 (2019) 5871. <https://doi.org/10.1016/j.asoc.2018.10.034> ανακτήθηκε από: <https://www.sciencedirect.com/>
- Riby M. D., Doherty J. M., (2009) *Tracking eye movements proves informative for the study of gaze direction detection in autism*, Article in Research in Autism Spectrum Disorders 3(3):723-733, DOI: 10.1016/j.rasd.2009.02.001, ανακτήθηκε από: <https://www.sciencedirect.com/>
- Ricks DJ, Colton MB. *Trends and considerations in robot-assisted autism therapy*; 2010 IEEE International Conference on Robotics and Automation (IRCA); 2010. pp. 4354–4359. [[Google Scholar](#)]
- Robins, R. W., Tracy, J. L., Trzesniewski, K. H., Potter, J, & Gosling, S. D. (2001). *Personality Correlates of Self-Esteem*. *Journal of Research in Personality*, 35, 463-482, ανακτήθηκε από:

<https://www.ncbi.nlm.nih.gov>

Robins, B., Dickerson, P., & Dautenhahn, K. (2005). *Robots as embodied beings-interactionally sensitive body movements in inter actions among autistic children and a robot*. In Proceedings IEEE international workshop on robots and human interactive communication, 54-59.

Rogers, S. J. (2001). *Diagnosis of autism before the age of 3*. In L. M. Glidden (Ed.), International review of research in mental retardation (Vol. 23, pp. 1-31). San Diego, CA: Academic Press

Rosenberg E. R., Landa R., Law K., Stuart A. E., Law A. P. (2011) Factors Affecting Age at Initial Autism Spectrum Disorder Diagnosis in a National Survey, Autism Research and Treatment Volume 2011, Article ID 874619, <http://dx.doi.org/10.1155/2011/874619>

Rutter, M (1978) Diagnosis and definition In M. Rutter & E. Schopler (Eds.), *Autism: A reappraisal of concepts of treatment*.

Sampedro-Tobón M.E., González-González M., Vélez-Vieira S. (2013) *Early detection of autism spectrum disorders: a responsible decision for a better prognosis*.

Bol Med Hosp Infant Mex 2013; 70 (6) ανακτήθηκε από:

<https://www.medigraphic.com> ›

Santos J. F Brosh N., Falk H. T., Zwaigenbaum L., Bryson E. S., Roberts W., Smith M. I., Szatmari P., Brian A. J. (2013) *Very early detection of autism spectrum disorders based on Acoustic analysis of pre-verbal vocalizations of 18-month old toddlers*. ICASSP 2013 7567

Sapiro, G.; Hashemi, J.; Dawson, G. (2018) *Computer vision and behavioral phenotyping: An autism case study*. *Curr. Opin. Biomed. Eng.*, 9, 14–20. DOI: [10.1016/j.cobme.2018.12.002](https://doi.org/10.1016/j.cobme.2018.12.002) ανακτήθηκε από: <https://www.researchgate.net>

Seraphim I., Rao S. L., Joshi S. (2018). *Survey on Early Detection of Autism Using Data Mining Techniques*. International Journal of Engineering & Technology, Vol. 7(2.24): 79-80. DOI: 10.14419/ijet.v7i2.24.12003. ανακτήθηκε από: <https://www.researchgate.net>

Schopler, E., Reichler, R. J., DeVellis, R. F. and Daly, K. 1980. *Toward objective classification of childhood autism: Childhood Autism Rating Scale (CARS)*. *Journal of Autism and Developmental Disorders*, 10: 91–103.

Steyaert J.G. and De La Marche W. (2008) *What's new in autism?* European Journal of Pediatrics 167(10): 1091–1101. ανακτήθηκε από:

<https://www.ncbi.nlm.nih.gov>

Simpson M., Taylor N., Barker K. (2004) *Environmental responsibility in SMEs: does it deliver competitive advantage?* *Business Strategy and the Environment* 13 (3) 156-171

Stone W, Hogan K. (1993) *A structured parent interview for identifying young children with autism*. *Journal of Autism and Developmental Disorders*. 23:639–652.

Tariq, Q., Daniels, J., Schwartz, J. N., Washington, P., Kalantarian, H., & Wall, D. P. (2018, November 27). *Mobile detection of autism through machine learning on home video: A development and prospective validation study*. PLoS Med, 15(11). doi:<https://doi.org/10.1371/journal.pmed.1002705>, ανακτήθηκε από: <https://www.ncbi.nlm.nih.gov>

Wetherby, A., & Prizant, B. (2002). *Communication and Symbolic Behavior Scales Developmental Profile—First Normed Edition*. Baltimore: Brookes

Wing, L. (2000). Το αυτιστικό φάσμα. Ελληνική Εταιρία Αυτιστικών Ατόμων.

## **ΠΗΓΕΣ**

AAP.org

[autismspeaks.org](http://autismspeaks.org) (*How early can autism be diagnosed*)

<http://autismsciencefoundation.org>

noesi.gr

buffalo.edu

healthline.com

apothetirio.teeip.gr

in.gr

scholarworks.boisestate.edu

<http://www.cbsnews.com> (*Autism can be diagnosed as early as 14 months, study suggests from Dr David Agus*)

springbookautismbehavioral.com