

‘Specialization in ICTs and Special Education: Psychopedagogy of Integration’
Postgraduate Program
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**EDUCATING STUDENTS WITH DOWN
SYNDROME**

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ABSTRACT

This dissertation focuses on educating children with Down syndrome. In particular, the research was conducted with a literature review of the sources, focusing on the characteristics of the syndrome and the factors that affect the way these children learn. The physical, pathological, cognitive characteristics as well as the organic and kinetic problems form accordingly the learning profile of the children in the cognitive fields of reading, writing and mathematics, where similar learning strategies are followed. Finally, it is highlighted the importance of school integration of these children in general school and the contribution of new technologies as educational tools in order to utilize the capabilities of students with Down syndrome and design an educational program based on their needs.

Key words: Down syndrome, education, reading, writing, mathematics

References

- Annaz, D., Karmiloff-Smith, A., Johnson, M. H., & Thomas, M. S. (2009, April). A cross-syndrome study of the development of holistic face recognition in children with autism, Down syndrome, and Williams syndrome. *Journal of Experimental Child Psychology*, 102(4), σσ. 456-486. doi:10.1016/j.jecp.2008.11.005
- Antonarakis, S. E., & Epstein, C. J. (2006, October). The challenge of Down syndrome. *Trends in Molecular Medicine*, 12(10), σσ. 473-479. doi:10.1016/j.molmed.2006.08.005
- Baddeley , A., Hitch, G., & Allen, R. (2009, October). Working memory and binding in sentence recall. *Journal of Memory and Language*, 61(3), σσ. 438-456. doi:10.1016/j.jml.2009.05.004
- Bochner, S., Outhred, L., Pieterse, M., & Bashash, L. (2002). Numeracy and money management skills in young adults with Down syndrome. Στο M. Cuskelly, A. Jobling, & S. Buckley, *Down syndrome across the life span* (σσ. 93-106). Whurr Publishers.
- Brigstocke, S., Hulme, C., & Nye, J. (2008). Number and arithmetic skills in children with Down syndrome. *Down Syndrome Research and Practice*, σσ. 74-77. Ανάκτηση Μάιος 5, 2020, από <https://library.down-syndrome.org/en-us/research-practice/online/2008/number-arithmetic-skills-down-syndrome/>
- Buckley, S. (2000). *Living with Down syndrome*. United Kingdom: The Down Syndrome Educational Trust.
- Buckley, S., & Bird, G. (1993). Teaching children with Down syndrome to read. *Down Syndrome Research and Practice*, 1(1), σσ. 34-39. doi:10.3104/perspectives.9
- Buckley, S., Bird, G., Sacks, B., & Archer, T. (2006). A comparison of mainstream and special education for teenagers with Down syndrome: Implications for parents and teachers. *Down Syndrome Research and Practice*, 9(3), σσ. 54-67. doi:10.3104/reports.295

Burgoyné, K., Duff, F., Clarke, P., Smith, G., Buckley, S., Snowling, M., & Hulme, C. (2012). A *Reading and Language Intervention for Children with Down Syndrome - Teacher's Handbook*. England: Down Syndrome Education International.

Chapman, R. S., & Hesketh, L. J. (2001). Language, cognition and short-term memory in individuals with Down Syndrome. *Down Syndrome Research and Practice*, 7(1), σσ. 1-7. doi:10.3104/reviews.108

Daunhauer, L. A., & Fidler, D. J. (2011a). The Down Syndrome Behavioral Phenotype: Implications for Practice and Research in Occupational Therapy. *Occupational Therapy In Health Care*, 25(1), σσ. 7-25. doi:10.3109/07380577.2010.535601

Daunhauer, L., & Fidler, D. J. (2011b). Down Syndrome: General Overview. Στο P. Howlin, T. Charman, & M. Ghaziuddin, *The SAGE Handbook of Developmental Disorders* (σσ. 9-27). Great Britain: SAGE.

Drigas, A. S., & Ioannidou, R. (2013). Special Education and ICTs. *International Journal of Emerging Technologies in Learning (iJET)*, 8(2), σσ. 41-47. Ανάκτηση Απρίλιος 13, 2020, από <https://online-journals.org/index.php/i-jet/article/view/2514/2589>

Drigas, A. S., & Kokkalia, G. K. (2015). Working Memory and ADHD in Preschool Education. The Role of ICT'S as a Diagnosticand Intervention Tool: An Overview. *International Journal of Emerging Technologies in Learning (iJET)*, 10(5). doi:10.3991/ijet.v10i5.4359

Drigas, A. S., & Papanastasiou, G. P. (2014). Interactive White Boards' Added Value in Special Education. *International Journal of Online Engineering (iJOE)*, 10(6), σσ. 58-62. doi:10.3991/ijoe.v10i6.4004

Εθνική Επιτροπή Βιοηθικής. (2007). Προγεννητική και προεμφυτευτική διάγνωση και μεταχείριση του εμβρύου. Στο Θέσεις για σύγχρονα προβλήματα Κείμενα 2000-2007 (σσ. 349-370). Αθήνα: Εθνικό Τυπογραφείο.

Evans-Martin, F. F. (2009). What is Down Syndrome? In *Down Syndrome (Genes and Disease)* (pp. 7-18). New York: Chelsea House.

Felix, V. G., Mena, L. J., Ostos, R., & Maestre, G. E. (2016, February 23). A pilot study of the use of emerging computer technologies to improve the effectiveness of reading and writing therapies in children with Down syndrome. *British Journal of Educational Technology*, 48(2), σσ. 611-624. doi:10.1111/bjet.12426

Fidler, D. J., Hepburn, S. L., Mankin, G., & Rogers, S. J. (2005, March). Praxis Skills in Young Children With Down Syndrome, Other Developmental Disabilities, and Typically Developing Children. *American Journal of Occupational Therapy*, 59, σσ. 129-138. doi:10.5014/ajot.59.2.129

Fidler, D. J., Philofsky, A., Hepburn, S. L., & Rogers, S. J. (2005, July). Nonverbal Requesting and Problem-Solving by Toddlers With Down Syndrome. *American Journal on Mental Retardation*, 110(4), σσ. 312-322. doi:10.1352/0895-8017(2005)110[312:NRAPBT]2.0.CO;2

Forlin, C., Loreman, T., Sharma, U., & Earle, C. (2009). Demographic differences in changing pre-service teachers' attitudes, sentiments and concerns about inclusive education. *International Journal of Inclusive Education*, 13(2), σσ. 195-209. doi:10.1080/13603110701365356

Frenkel, S., & Bourdin, B. (2009, January 15). Verbal, visual, and spatio-sequential short-term memory: assessment of the storage capacities of children and teenagers with Down's syndrome. *Journal of Intellectual Disability Research*, 53(2), σσ. 152-160. doi:10.1111/j.1365-2788.2008.01139.x

Hodapp, R. M. (2004). Behavioral Phenotypes: Going Beyond the Two-Group Approach. *International Review of Research in Mental Retardation*, 29, σσ. 1-30. doi:10.1016/S0074-7750(04)29001-2

Hughes, J. (2006). Inclusive education for individuals with Down syndrome. *Down Syndrome News and Update*, 6(1), σσ. 1-3. doi:10.3104/practice.370

Hughes, J. (2006). Teaching reading skills to children with Down syndrome. *Down Syndrome News and Update*, 6(2), σσ. 62-65. doi:10.3104/practice.349

Kelley, P., Underwood, G., Potter, F., Hunter , J., & Beveridge, S. (2007). VIEWPOINTS. *Learning, Media and Technology*, 32(3), σσ. 333-347. doi:10.1080/17439880701511164

Κρουσταλάκης, Γ. (2005). *Παιδιά Με Ιδιαίτερες Ανάγκες*. Αθήνα: Αυτοέκδοση.

Lanfranchi , S., Jerman, O., & Vianello, R. (2009). Working Memory and Cognitive Skills in Individuals with Down Syndrome. *Child Neuropsychology*, 15(4), σσ. 397-416. doi:10.1080/09297040902740652

Lanfranchi, S., Cornoldi, C., & Vianello, R. (2004, November). Verbal and Visuospatial Working Memory Deficits in Children With Down Syndrome. *American Journal on Mental Retardation*, 109(6), σσ. 456-466. doi:10.1352/0895-8017

Laws, G. (2002, March 12). Working memory in children and adolescents with Down Syndrome: evidence from a colour memory experiment. *Journal of Child Psychology and Psychiatry*, 43(3), σσ. 353-364. doi:10.1111/1469-7610.00026

Leshin, L. (2003). Pediatric Health Update On Down Syndrome. Στο W. I. Cohen, L. Nadel, & M.

E. Madnick, *Down Syndrome: Visions for the 21st Century* (σσ. 187-246). New York: Wiley-Liss.

Martin, G. E., Klusek, J., Estigarribia, B., & Roberts, J. E. (2009). Language Characteristics of Individuals With Down Syndrome. *Topics in Language Disorders*, 29(2), σσ. 112-132.

Monari Martinez, E. (2002). Learning mathematics at school....and later on. *Down Syndrome News and Update*, 2(1), σσ. 19-23. doi:10.3104/practice.160

Nadel, L. (2003, May 22). Down's syndrome: a genetic disorder in biobehavioral perspective.

Genes, Brain and Behavior, 2(3), σσ. 156-166.

Ortega-Tudela, J., & Gómez-Ariza, C. (2006). Computer-assisted teaching and mathematical learning in Down Syndrome children. *Journal of Computer Assisted Learning*, 22(4), σσ. 298- 307. doi:10.1111/j.1365-2729.2006.00179.x

Patterson, D., & Costa, A. C. (2005, February 10). Down syndrome and genetics — a case of linked histories. *Nature Reviews Genetics*, 6(2), σσ. 137-147. doi:10.1038/nrg1525

Pijl, S., Skaalvik, E. M., & Skaalvik, S. (2010). Students with special needs and the composition of their peer group. *Irish Educational Studies*, 29(1), σσ. 57-70. doi:10.1080/03323310903522693

Πολυχρονοπούλου, Σ. (2003). Εκπαιδευτικά και Υποστηρικτικά Προγράμματα: Σύγχρονες τάσεις και Προβλήματα. Στο *Παιδιά και Έφηβοι με Ειδικές Ανάγκες και Δυνατότητες* (Ε' εκδ., Τόμ. Α, σσ. 104-106). Αθήνα: Ατραπός.

Πολυχρονοπούλου, Σ. (2004). Αιτιολογία Νοητικής Υστέρησης-Σύνδρομα. Στο *Παιδιά και Έφηβοι με Ειδικές Ανάγκες και Δυνατότητες* (Ε' εκδ., σσ. 78-103). Αθήνα: Ατραπός.

Πολυχρονοπούλου, Σ. (2004). Σκοπός και Ογάνωση της Εκπαίδευσης Παιδιών με Νοητική Υστέρηση. Στο *Παιδιά και Έφηβοι με Ειδικές Ανάγκες και Δυνατότητες* (Ε' εκδ., Τόμ. Β, σσ. 133-137). Αθήνα: Ατραπός.

Prensky, M. (2002). The motivation of gameplay: The real twenty-first century learning revolution. *On the Horizon*, 10(1), σσ. 5-11. doi:10.1108/10748120210431349

Pueschel, S. M. (2001). Exploring the causes of Down syndrome. Στο *A parent's guide to Down syndrome : toward a brighter future* (σσ. 17-28). Baltimore: Paul H. Brookes.

Purser, H. R., & Jarrold, C. (2005, May). Impaired verbal short-term memory in Down syndrome reflects a capacity limitation rather than atypically rapid forgetting. *Journal of Experimental Child Psychology*, 91(1), σσ. 1-23. doi:10.1016/j.jecp.2005.01.002

Rondal, J. A. (2009). Spoken language in persons with Down Syndrome: A life-span perspective. *International Journal of Early Childhood Special Education*, 1(2), σσ. 138-163. Ανάκτηση από <https://dergipark.org.tr/en/download/article-file/91562>

Roubertoux , P. L., & Carlier , M. (2009). Neurogenetic Analysis and Cognitive Functions in Trisomy 21. Στο Y.-K. Kim, *Handbook of Behavior Genetics* (σσ. 175-185). New York: Springer. doi:10.1007/978-0-387-76727-7_12

Saz, O., Yin, S.-C., Lleida, E., Rose, R. C., Vaquero, C., & Rodriguez-Dueñas, W. R. (2009). Tools and Technologies for Computer-Aided Speech and Language Therapy. *Speech Communication*, 51(10), σσ. 948-967. doi:10.1016/j.specom.2009.04.006

Sherman, S. L., Allen, E. G., Bean, L. H., & Freeman, S. B. (2007). EPIDEMIOLOGY OF DOWN SYNDROME. *Mental Retardation and Developmental Disabilities Research Reviews*, 13(3), σσ. 221-227. doi:10.1002/mrdd.20157

Σκέντου, Χ. Α. (2002). Μελέτη της Ασφάλειας της Παρακέντησης της Εξωεμβρυικής κοιλότητας. Αδημοσίευτη Διδακτορική Διατριβή, Πανεπιστήμιο Ιωαννίνων, Ιατρική Σχολή, Ιωάννινα, Ελλάδα.

Στασινός, Δ. Π. (2016). Σύνδρομο Down. Στο *H Ειδική Εκπαίδευση 2020 plus* (σσ. 109-114). Αθήνα: Παπαζήση.

Stoel-Gammon, C. (2001). Down syndrome phonology: Developmental patterns and intervention strategies. *Down syndrome research and practice*, 7(3), σσ. 93-100. Ανάκτηση Μάρτιος 3, 2020, από <https://assets.cdn.down-syndrome.org/pubs/a/reviews-118.pdf>

Wood, A. (2004). Supporting learning and development with ICT. *Down Syndrome News and Update*, 4(1), σσ. 2-10. doi:10.3104/practice.325

Διαδίκτυο

(AAIDD), A. A. (2019). Definition of Intellectual Disability. Ανάκτηση Μάρτιος 26, 2020, από <https://www.aaidd.org/intellectual-disability/definition>

American Psychiatric Association (APA). (2013). Intellectual Disability. *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)*. Ανάκτηση Μάρτιος 24, 2020, από https://www.psychiatry.org/File%20Library/Psychiatrists/Practice/DSM/APA_DSM-5-Intellectual-Disability.pdf

Bannister, D. (2010). Guidelines for effective school/classroom use of interactive Whiteboards, The EuSCRIBE Project. (European Schoolnet, Επιμ.) Belgium. Ανάκτηση Απρίλιος 13, 2020, από http://moe.eun.org/c/document_library/get_file?uuid=589ce404-1607-49a0-9f39-bc6b7990f30a&groupId=10620

Βικιπαίδεια. (2019, Δεκεμβρίου 20). Καρυότυπος. Ανάκτηση Μάρτιος 12, 2020, από [https://el.wikipedia.org/wiki/%CE%9A%CE%B1%CF%85%CF%8C%CF%84%CF%85%CF%80%CE%BF%CF%82](https://el.wikipedia.org/wiki/%CE%9A%CE%B1%CF%81%CF%85%CF%8C%CF%84%CF%85%CF%80%CE%BF%CF%82)

Βικιπαίδεια. (2020, Ιανουάριος 30). Ανάκτηση Μάρτιος 9, 2020, από <https://el.wikipedia.org/wiki/%CE%93%CE%B1%CE%BC%CE%AD%CF%84%CE%B7%CF%82>

Central Mississippi Down Syndrome Society. (2003). About Down Syndrome. Mississippi, USA. Ανάκτηση Μάρτιος 8, 2020, από <https://cmdss.org/parent-guide/about-down-syndrome/diagnosis/>

Down Syndrome Education International . (n.d.). See and Learn Numbers. Ανάκτηση Απρίλιος 28, 2020, από <https://www.seeandlearn.org/en-us/numbers/>

Down Syndrome Foundation of Orange County. (n.d.). *Down Syndrome Guild of Greater Kansas City*. Ανάκτηση Απρίλιος 18, 2020, από Down Syndrome Guild of Greater Kansas City: <https://www.kcdsg.org/files/content/DSFOC%20Literacy%20Guide.pdf>

Down Syndrome Ireland. (n.d.). *Down Syndrome Ireland*. Ανάκτηση Απρίλιος 21, 2020, από <https://downsyndrome.ie/>:
<https://downsyndrome.ie/wp-content/uploads/2019/10/Supporting-students-with-Down-syndrome-in-Post-Primary-School.pdf>

Down's Syndrome Association. (2019, November 25). *Down's Syndrome Association*. Ανάκτηση Απρίλιος 6, 2020, από Down's Syndrome Association: <https://www.downsyndrome.org.uk/download-package/communication-series-pre-language-skills-for-babies-and-young-children/>

DownCiclopedia. (n.d.). Vision and hearing. Ανάκτηση Μάιος 5, 2020, από <https://www.downciclopedia.org/salud-y-biomedicina/problemas-de-salud/423-vision-y-audicion.html?showall=&start=1>

Down's Syndrome Association . (n.d.). *Down's Syndrome Association*. Ανάκτηση Απρίλιος 5, 2020, από Down's Syndrome Association: <https://www.downs-syndrome.org.uk/for-families-and-carers/education/early-years/>

Down's Syndrome Association. (2011). *Down Syndrome Family Network*. Ανάκτηση Απρίλιος 18, 2020, από Down Syndrome Family Network: http://dsfamilynetwork.org/wp-content/uploads/2013/03/unit_5_primary.pdf

Down's Syndrome Association. (2011). *Down's Syndrome Association*. Ανάκτηση Απρίλιος 28, 2020, από Down's Syndrome Association: <https://www.downs-syndrome.org.uk/for-new-parents/education/education-support-packs/?highlight=mathematics>

Εγκυκλοπαίδεια Βιολογίας. (n.d.). Γαμέτης. Ανάκτηση Μάρτιος 9, 2020, από [www.hellenicaworld.com:](http://www.hellenicaworld.com/)
<http://www.hellenicaworld.com/Science/Biology/gr/Gametis.html>

Jones, V. (2011). *Speech Teach UK*. Ανάκτηση Απρίλιος 23, 2020, από [www.speechteach.co.uk:](http://www.speechteach.co.uk/)
http://www.speechteach.co.uk/p_resource/gen_ed/gardenwriting.htm

Κύπρου, Υ. Π. (n.d.). [www.moec.gov.cy](http://www.moec.gov.cy/eidiki_ekpaidefsi/ekpaideftiko_yliko/dimotiki_mesi/down_syndrom_booklet.pdf). Ανάκτηση Απρίλιος 21, 2020, από [www.moec.gov.cy](http://www.moec.gov.cy/eidiki_ekpaidefsi/ekpaideftiko_yliko/dimotiki_mesi/down_syndrom_booklet.pdf):

Λέκκα, Ν. (2006). Μαθησιακές ιδιαιτερότητες των παιδιών με σύνδρομο Down (Ντάουν). Ανάκτηση Απρίλιος 4, 2020, από <https://www.noesi.gr/book/syndrome/down/odigos-ekpaideftikou>

Leshin, L. (2005, March). Obstructive Sleep Apnea and DS. Ανάκτηση Μάιος 5, 2020, από <http://www.ds-health.com/apnea.htm>

Leshin, L. (2013, November 3). Down Syndrome: Health Issues - News and Information for Parents and Professionals. Texas, USA. Ανάκτηση Μάρτιος 16, 2020, από <http://www.ds-health.com/>

Νικολαϊδης, Κ. Η., Σούκα, Α. Π., & Σκέντου, Χ. (2004). *Docplayer*. (F. M. Foundation, Επιμ.) Ανάκτηση από Το Υπερηχογράφημα εβδομάδων: <https://docplayer.gr/141401-To-yperihografima-11-13-6-evdomadon.html>

Παγκόσμιος Οργανισμός Υγείας (ΠΟΥ). (2016). Mental Retardation. *International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10)*. Ανάκτηση Μάρτιος 24, 2020, από <https://icd.who.int/browse10/2016/en#/F70-F79>

Παπαδοπούλου, Σ. (2008). Υπερηχογράφημα 2ου τριμήνου - Σωματομετρία, έλεγχος ανάπτυξης και εφαρμογές των υπερήχων. (Α. Π. Αθηνών, Επιμ.) Αθήνα. Ανάκτηση Μάρτιος 12, 2020, από <http://panacea.med.uoa.gr/topic.aspx?id=371>

Stearns, C. (n.d.). Writing Activities for Students with Down Syndrome. Ανάκτηση Απρίλιος 21, 2020, από <https://study.com/academy/lesson/writing-activities-for-students-with-down-syndrome.html>

Troncoso, M., & Del Cerro, M. (n.d.). Reading and writing - Teaching of Reading and Writing. Ανάκτηση Απρίλιος 21, 2020, από <https://www.down21.org/educacion/1136-lectura-y-escritura.html?start=3>

<http://www.aretaieio-obgyn.com/>. (n.d.). Προγεννητικός Έλεγχος - Μαιευτικό Υπερηχογράφημα. (Πανεπιστήμιο Αθηνών, Αρεταίειο Νοσοκομείο, Επιμ.) Αθήνα. Ανάκτηση Μάρτιος 11, 2020, από <http://www.aretaieio-obgyn.com/el/obstetric-ultrasound.html>

www.emvriomitriki.gr. (2016, Δεκέμβριος 20). Alpha test. (Κ. Αναστάσιος, Συντάκτης) Αθήνα. Ανάκτηση Μάρτιος 11, 2020, από <https://emvriomitriki.gr/diagnwstikes-eksetaseis/mhemematikos-elegxos/alpha-test#information>

www.iaso.gr. (n.d.). Η εγκυμοσύνη μήνα προς μήνα. Αθήνα. Ανάκτηση Μάρτιος 11, 2020, από <https://www.iaso.gr/item/47-%CE%B7-%CE%B5%CE%B3%CE%BA%CF%85%CE%BC%CE%BF%CF%83%CF%8D%CE%BD%CE%B7-%CE%BC%CE%AE%CE%BD%CE%B1-%CF%80%CF%81%CE%BF%CF%82-%CE%BC%CE%AE%CE%BD%CE%B1>