ΔΗΜΟΚΡΙΤΕΙΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΘΡΑΚΗΣ ΣΧΟΛΗ ΚΛΑΣΙΚΩΝ ΚΑΙ ΑΝΘΡΩΠΙΣΤΙΚΩΝ ΣΠΟΥΔΩΝ ΤΜΗΜΑ ΕΛΛΗΝΙΚΗΣ ΦΙΛΟΛΟΓΙΑΣ σε συνεργασία με το ΕΘΝΙΚΟ ΚΕΝΤΡΟ ΕΡΕΥΝΑΣ ΦΥΣΙΚΩΝ ΕΠΙΣΤΗΜΩΝ «ΔΗΜΟΚΡΙΤΟΣ» ΙΝΣΤΙΤΟΥΤΟ ΠΛΗΡΟΦΟΡΙΚΗΣ ΚΑΙ ΤΗΛΕΠΙΚΟΙΝΩΝΙΩΝ

ΔΙΙΔΡΥΜΑΤΙΚΟ ΠΡΟΓΡΑΜΜΑ ΜΕΤΑΠΤΥΧΙΑΚΩΝ ΣΠΟΥΔΩΝ: ΕΞΕΙΔΙΚΕΥΣΗ ΣΤΙΣ Τ.Π.Ε. ΚΑΙ ΕΙΔΙΚΗ ΑΓΩΓΗ – ΨΥΧΟΠΑΙΔΑΓΩΓΙΚΗ ΤΗΣ ΕΝΤΑΞΗΣ

Η ΧΡΗΣΗ ΕΚΤΕΤΑΜΕΝΗΣ ΠΡΑΓΜΑΤΙΚΟΤΗΤΑΣ (VR, AR, MR) ΓΙΑ ΑΤΟΜΑ ΜΕ ΕΙΔΙΚΕΣ ΕΚΠΑΙΔΕΥΤΙΚΕΣ ΑΝΑΓΚΕΣ

Τζελέπη Έφη Α.Μ. 583

Μεταπτυχιακή διατριβή που υποβάλλεται στην τριμελή επιτροπή για την απόκτηση του μεταπτυχιακού τίτλου του Προγράμματος Μεταπτυχιακών Σπουδών Εξειδίκευσης του Τ.Ε.Φ-Δ.Π.Θ. σε συνεργασία με το Ε.Κ.Ε.Φ.Ε. Δημόκριτος – Ινστιτούτο Πληροφορικής και Επικοινωνιών με τίτλο: «Εξειδίκευση στις Τ.Π.Ε. και Ειδική Αγωγή – Ψυχοπαιδαγωγική της ένταξης»

Εγκεκριμένο από την τριμελή επιτροπή:

1ος Επιβλέπων Δρ. Δρίγκας Αθανάσιος, Ερευνητής Α’ βαθμίδας, Ι.Π.Τ. Ε.Κ.Ε.Φ.Ε.“ΔΗΜΟΚΡΙΤΟΣ”

2ος Επιβλέπων Βέρδης Αθανάσιος, Επίκουρος Καθηγητής Εκπαιδευτικής Έρευνας και Αξιολόγησης στο Παιδαγωγικό Τμήμα Δευτεροβάθμιας Εκπαίδευσης του ΕΚΠΑ

3ος Επιβλέπων Δρ. Καραμπατζάκη Ζωή, Δρ. Ειδικής αγωγής και Σχολική Σύμβουλος Π.Α, Συνεργαζόμενος ερευνητής, Ε.Κ.Ε.Φ.Ε.“ΔΗΜΟΚΡΙΤΟΣ”

Κομοτηνή

2024

ΠΕΡΙΛΗΨΗ

Η Εκτεταμένη Πραγματικότητα (Εικονική, Επαυξημένη και Μεικτή Πραγματικότητα) αποτελεί αναπόσπαστο κομμάτων των Τεχνολογιών Πληροφορίας και Επικοινωνίας. Οι εφαρμογές Εκτεταμένης Πραγματικότητας γίνονται ολοένα και πιο δημοφιλής στο κοινό, με αυξανόμενη χρήση της τεχνολογίας αυτής και σε εκπαιδευτικά πλαίσια, ειδικότερα στην Ειδική Αγωγή. Μαθητές με Ειδικές Εκπαιδευτικές Ανάγκες μπορούν να επωφεληθούν από τη χρήση της τεχνολογίας αυτής και αυτό ακριβώς έχει σκοπό να αναδείξει η παρούσα εργασία. Συγκεκριμένα η βιβλιογραφική αυτή ανασκόπηση εξετάσει πως η χρήση Εκτεταμένης Πραγματικότητας επηρεάζει τις γνωστικές, μεταγνωστικές, κοινωνικο-συναισθηματικές και κινητικές δεξιότητες και γενικότερα τον τρόπο με τον οποίο προσαρμόζεται στις εκάστοτε ειδικές εκπαιδευτικές ανάγκες των μαθητών. Τα αποτελέσματα έδειξαν πως η Εκτεταμένη Πραγματικότητα αποδεικνύεται ένα σημαντικό εργαλείο παρέμβασης στα πλαίσια της Ειδικής Αγωγής, λόγω των ιδιαίτερων χαρακτηριστικών της (Προσαρμογή Περιβαλλόντων, η προσομοίωση πραγματικότητας και δυνατότητα προσέλκυσης και διατήρησης της προσοχής του χρήστη) που την καθιστούν ιδανική για ποικίλες ειδικές εκπαιδευτικές ανάγκες, αλλά και λόγω της θετικής εμπειρίας που βιώνει ο χρήστης κατά την εκπαιδευτική αυτή διαδικασία.

Λέξεις κλειδιά: ΤΠΕ, εικονική, επαυξημένη, μεικτή, εκτεταμένη πραγματικότητα, ειδικές εκπαιδευτικές ανάγκες, γνωστικές, μεταγνωστικές, κοινωνικο-συναισθηματικές δεξιότητες, αυτισμός, ΔΕΠΥ, νοητική αναπηρία, δυσλεξία, δυσαριθμησία, δυσγραφία, χαρισματικοί, κωφοί, βαρήκοοι

ΒΙΒΛΙΟΓΡΑΦΙΑ

Ελληνική Βιβλιογραφία

Βαθρακογιάννη, Μ., Πιτσαδιώτη, Π., & Χαλιώτη, Β. (2018). Τεχνολογίες της Πληροφορίας και της Επικοινωνίας στην Εκπαίδευση της Ειδικής Αγωγής. Πανελλήνιο Συνέδριο Επιστημών Εκπαίδευσης, 8, 47-57.

Πεχλιβανίδης, Α., & Παπανικολάου, Κ. (2022). Διαταραχή ελλειμματικής προσοχής-υπερκινητικότητας Από τις υπερκινητικές στις νευροαναπτυξιακές διαταραχές. *Archives of Hellenic Medicine/Αρχεία Ελληνικής Ιατρικής*, 39 (2).

Κρουσταλάκης, Γ. (2005). *Παιδιά με ιδιαίτερες ανάγκες στην οικογένεια και το σχολείο.* (6η έκδ.) Αθήνα: Πολιτεία.

Κωσταρίδου-Ευκλείδη, Α. (2011). *Μεταγνωστικές διεργασίες και αυτο-ρύθμιση.* Αθήνα: Πεδίο.

Δημητριάδης, Σ. (2015). Θεωρίες Μάθησης. Βασικές Έννοιες & Ορισμοί. Έκδοση: 1.0. Θεσσαλονίκη. Διαθέσιμο από τη δικτυακή διεύθυνση: http://eclass.auth.gr/courses/OCRS416/

Σαϊπά Π., Καραμπάτσου Γ., Μπαλογιάννη Θ., & Σκορδιαλός Ε. (2020). Η χρήση της Υποστηρικτικής Τεχνολογίας Σε Άτομα Με Κινητικές Αναπηρίες. *Πανελλήνιο Συνέδριο Επιστημών Εκπαίδευσης*, 8, 925–936.

Συροπούλου, Α. (2021). *Η επίδραση της εικονικής πραγματικότητας πλήρους εμβύθισης στην κινητική και συναισθηματική ανάπτυξη μαθητών Πρωτοβάθμιας Εκπαίδευσης με Νοητική Αναπηρία* (Doctoral dissertation, Δημοκρίτειο Πανεπιστήμιο Θράκης (ΔΠΘ). Σχολή Επιστήμης Φυσικής Αγωγής & Αθλητισμού. Τμήμα Επιστήμης Φυσικής Αγωγής και Αθλητισμού).

Χαραλαμποπούλου, Α. (2024). *Η χρήση ΤΠΕ και Νέων Τεχνολογιών στην εργοθεραπευτική παρέμβαση.* Μεταπτυχιακή Διπλωματική εργασία. Πανεπιστήμιο Δυτικής Αττικής.

Ξενόγλωσση Βιβλιογραφία

Akçayır, M., & Akçayır, G. (2017). Advantages and challenges associated with augmented reality for education: Asystematic review of the literature. *Educational research review,* 20, 1-11.

Alcañiz, M., Chicchi-Giglioli, I. A., Carrasco-Ribelles, L. A., Marín-Morales, J., Minissi, M. E., Teruel-García, G., ... & Abad, L. (2022). Eye gaze as a biomarker in the recognition of autism spectrum disorder using virtual reality and machine learning: A proof of concept for diagnosis. Autism Research, 15(1), 131-145.

Al-Megren, S., & Almutairi, A. (2018). Assessing the effectiveness of an augmented reality application for theliteracy development of Arabic children with hearing impairments. *In Cross-Cultural Design. Applications in Cultural Heritage,*

Creativity and Social Development: 10th International Conference, CCD 2018, Held as Part of HCI International 2018, Las Vegas, NV, USA, July 15-20, 2018, Proceedings, Part II 10 (pp. 3-18). Springer International Publishing.

Alqithami, S., Alzahrani, M., Alzahrani, A., & Mustafa, A. (2019, November). AR-Therapist: Design and Simulation of an AR-Game Environment as a CBT for Patients with ADHD. In *Healthcare* (Vol. 7, No. 4, p. 146). MDPI.

American Psychiatric Association, D. S. M. T. F., & American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (Vol. 5, No. 5). Washington, DC: American psychiatric association.

Askay, S. W., Patterson, D. R., & Sharar, S. R. (2009). Virtual reality hypnosis. *Contemporary Hypnosis*, 26(1), 40-47. https://doi.org/10.1002/ch.371

Austin, D. W., Abbott, J. A. M., & Carbis, C. (2008). The use of virtual reality hypnosis with two cases of autism spectrum disorder: a feasibility study. *Contemporary Hypnosis*, 25(2), 102–109. https://doi.org/10.1002/ch.349

Avila-Pesantez, D., Rivera, L. A., Vaca-Cardenas, L., Aguayo, S., & Zuñiga, L. (2018, April). Towards the improvement of ADHD children through augmented reality serious games: Preliminary results. In *2018 IEEE Global Engineering Education Conference (EDUCON)* (pp. 843-848). IEEE.

Azuma, R. T. (1997). A survey of augmented reality. *Presence: teleoperators & virtual environments,* 6(4), 355-385

Baniasadi, T., Ayyoubzadeh, S. M., & Mohammadzadeh, N. (2020). Challenges and practical considerations in applying virtual reality in medical education and treatment. *Oman medical journal*, *35*(3), e125.

Bektic, E., Bruns, D., Gabriel, S., Kelle, F., Pölsterl, G., & Schniz, F. (Eds.). (2020). *Mixed Reality and Games: Theoretical and Practical Approaches in Game Studies and Education*. transcript Verlag. ISBN-13: 978-3837653298

Bellani, M., Fornasari, L., Chittaro, L., & Brambilla, P. (2011). Virtual reality in autism: state of the art. *Epidemiology and psychiatric sciences*, *20*(3), 235-238.

Bravou, V., Oikonomidou, D., & Drigas, A. S. (2022). Applications of virtual reality for autism inclusion. A review. *Retos: nuevas tendencias en educación física, deporte y recreación*, (45), 779-785.

Bossenbroek, R., Wols, A., Weerdmeester, J., Lichtwarck-Aschoff, A., Granic, I., & van Rooij, M. M. (2020). Efficacy of a virtual reality biofeedback game (DEEP) to reduce anxiety and disruptive classroom behavior: single-case study. *JMIR mental health*, *7*(3), e16066.

Buele, J., López, V. M., Franklin Salazar, L., Edisson, J. H., Reinoso, C., Carrillo, S., ... & Urrutia-Urrutia, P. (2019). Interactive system to improve the skills of children with dyslexia: a preliminary study. *In Developments and Advances in Defense*

and Security: Proceedings of MICRADS 2019 (pp. 439-449). Singapore: Springer Singapore

Burdea, G. C., & Coiffet, P. (2017). *Virtual reality technology*. John Wiley & Sons.

Cambra, U. C., & Viniegra, L. M. (2016). Integración de la realidad virtual inmersiva en los Grados de Comunicación. *Revista ICONO 14. Revista científica de Comunicación y Tecnologías emergentes*, *14*(2), 1-21.

Chen, C. H., Lee, I. J., & Lin, L. Y. (2015). Augmented reality-based self-facial modeling to promote the emotional expression and social skills of adolescents with autism spectrum disorders. *Research in developmental disabilities*, *36*, 396-403.

Cheung, S. K., Fong, J., Fong, W., & Wang, F. L. (Eds.). (2013). *Hybrid Learning and Continuing Education: 6th International conference, ICHL 2013, Toronto, ON, Canada, August 12-14, 2013, Proceedings* (Vol. 8038). Springer.

Cheung, J. C. W., Ni, M., Tam, A. Y. C., Chan, T. T. C., Cheung, A. K. Y., Tsang, O. Y. H., ... & Wong, D. W. C. (2022). Virtual reality based multiple life skill training for intellectual disability: A multicenter randomized controlled trial. *Engineered Regeneration*, *3*(2), 121-130.

Cieślik, B., Mazurek, J., Rutkowski, S., Kiper, P., Turolla, A., & Szczepańska-Gieracha, J. (2020). Virtual reality in psychiatric disorders: A systematic review of reviews. *Complementary Therapies in Medicine,* 52, 102480.

Özden Çınar, T., Yazıcı, H. & Kaya, M.T. (2023). Opinions of gifted students on augmented reality application insocial studies course, *E-International Journal of Educational Research,* 14 (2), 254-271. DOI:https://doi.org/10.19160/e-ijer.1238478

Danai Rapti, Demetris Gerogiannis & Spyridon-Georgios Soulis (2022): The effectiveness of augmented reality for English vocabulary instruction of Greek students with intellectual disability, *European Journal of Special Needs Education*, DOI: 10.1080/08856257.2022.2045816

Daniela, L., & Lytras, M. D. (2019). Themed issue on enhanced educational experience in virtual and augmented reality. *Virtual Reality*, *23*(4), 325-327.

Daniela, L. (2020). Virtual museums as learning agents. *Sustainability,* 12(7), 2698.

David, A., Kiose, V., Maikou, A., Tzelepi, E., & Stathopoulou, A. (2023). The impact of ICTs (Robotics, VR, AI, Games) on gifted students' education. Eximia, 8, 31-50.

David, A., Kiose, V., & Tzelepi, E. (2023). ICTs in education for Deaf and Hard-Of-Hearing learners. *World Journal of Biology Pharmacy and Health Sciences*, 14(03), 222–236.

De Castro, M. V. D., Bissaco, M. A. S., Panccioni, B. M., Rodrigues, S. C. M., & Domingues, A. M. (2014). Effect of a virtual environment on the development of mathematical skills in children with dyscalculia. *PloS one*, *9*(7).

Doulou, A., & Drigas, A. (2022). Electronic, VR & augmented reality games for intervention in ADHD. *Technium Soc. Sci. J.*, 28, 159.

Driga, A. M., Zavitsanou, A., & Drigas, A. (2023). Heavy metals, halogens, carbon and nitrogen oxides, and autism the important role of digital technologies in health education, prevention and digital health. GSC Advanced Research and Reviews, 16(2), 050-060.

Drigas, A. S., & Ioannidou, R. E. (2013). ICTs in special education: A review. *Information Systems, E-learning, and Knowledge Management Research: 4th World Summit on the Knowledge Society, WSKS 2011, Mykonos, Greece, September 21-23, 2011. Revised Selected Papers 4*, 357-364.

Drigas, A., & Kokkalia, G. (2016). Mobile Learning for Special Preschool Education. International Journal of Interactive Mobile Technologies (iJIM), 1(10).

Drigas, A., & Mitsea, E. (2020). A metacognition based 8 pillars mindfulness model and training strategies. *Int. J. Recent Contributions Eng. Sci. IT,* 8(4), 4-17

Drigas, A., & Mitsea, E. (2021). Neuro-linguistic programming & vr via the 8 pillars of metacognition x 8 layers of consciousness x 8 Intelligences. *Technium Soc. Sci. J.*, 26, 159.

Drigas, A., Mitsea, E., & Skianis, C. (2021). The role of clinical hypnosis and VR in special education. *International Journal of Recent Contributions from Engineering Science & IT (iJES),* 9(4), 4-17. https://doi.org/10.3991/ijes.v9i4.26147

Drigas, A., Mitsea, E., & Skianis, C. (2022a). Clinical Hypnosis & VR, Subconscious Restructuring-Brain Rewiring & the Entanglement with the 8 Pillars of Metacognition X 8 Layers of Consciousness X 8 Intelligences. *International Journal of Online & Biomedical Engineering*, *18*(1).

Drigas, A., Mitsea, E., & Skianis, C. (2022b). Neuro-linguistic programming, positive psychology & VR in special education. *Scientific Electronic Archives,* 15(1).

Drigas, A., Mitsea, E., & Skianis, C. (2022c). Metamemory: Metacognitive Strategies for Improved Memory Operations and the Role of VR and Mobiles. *Behavioral Sciences*, *12*(11), 450.

Drigas, A., Mitsea, E., & Skianis, C. (2022d). Virtual Reality and Metacognition Training Techniques for Learning Disabilities. *Sustainability,* 14(16), 10170.

Durlak, J. A., Weissberg, R. P., & Pachan, M. (2010). A meta-analysis of after-school programs that seek to promote personal and social skills in children and adolescents. *American journal of community psychology*, 45(3-4), 294-309.

Flores-Gallegos, R., Rodríguez-Leis, P., & Fernández, T. (2022). Effects of a virtual reality training program on visual attention and motor performance in children with reading learning disability. *International Journal of Child-Computer Interaction,* 32, 100394.

Gabana, D., Tokarchuk, L., Hannon, E., & Gunes, H. (2017, October). Effects of valence and arousal on working memory performance in virtual reality gaming. In *2017 Seventh International Conference on Affective Computing and Intelligent Interaction (ACII)* (pp. 36-41). IEEE.

Harrison, P. L., & Oakland, T. (2015). ABAS-3. Torrance: Western Psychological Services.

Hirsch, J. A. (2012). Virtual reality exposure therapy and hypnosis for flying phobia in a treatment-resistant patient: a case report. *American Journal of Clinical Hypnosis,* 55(2), 168-173. https://doi.org/10.1080/00029157.2011.639587

Huang, H. M., Rauch, U., & Liaw, S. S. (2010). Investigating learners' attitudes toward virtual reality learning environments: Based on a constructivist approach. *Computers & Education*, 55(3), 1171-1182.

Huang, T. C., Chen, C. C., & Chou, Y. W. (2016). Animating eco-education: To see, feel, and discover in an augmented reality-based experiential learning environment. *Computers & Education*, *96*, 72-82.

Ip, H. H., Wong, S. W., Chan, D. F., Byrne, J., Li, C., Yuan, V. S., ... & Wong, J. Y. (2018). Enhance emotional and social adaptation skills for children with autism spectrum disorder: A virtual reality enabled approach. *Computers & Education,* 117, 1-15.

Jeon, B., Oh, J., & Son, S. (2021, March). Effects of tooth brushing training, based on augmented reality using a smart toothbrush, on oral hygiene care among people with intellectual disability in Korea. In *Healthcare* (Vol. 9, No. 3, p. 348). MDPI.

Ji, C., Yang, J., Lin, L., & Chen, S. (2022). Executive function improvement for children with autism spectrum disorder: A comparative study between virtual training and physical exercise methods. *Children,* 9(4), 507.

Karably, K., & Zabrucky, K. M. (2009). Children's metamemory: A review of the literature and implications for the classroom. *International Electronic Journal of Elementary Education*, *2*(1), 32-52.

Karagianni, E., & Drigas, A. (2023). New Technologies for Inclusive Learning for Students with Special Educational Needs. International Journal of Online & Biomedical Engineering, 19(5).

Ke, F., & Moon, J. (2018). Virtual collaborative gaming as social skills training for high-functioning autistic children. *British Journal of Educational Technology*, 49(4), 728-741.

Ke, F., Moon, J., & Sokolikj, Z. (2022). Virtual reality–based social skills training for children with autism spectrum disorder. *Journal of Special Education Technology,* 37(1), 49-62.

Khan, M. F., Hussain, M. A., Ahsan, K., Saeed, M., Nadeem, A., Ali, S., & Rizwan, K. (2017). Augmented reality based spelling assistance to dysgraphia students. *Journal of Basic and Applied Sciences*, *13*, 500-507.

Kosmopoulos, D., Constantinopoulos, C., Trigka, M., Papazachariou, D., Antzakas, K., Lampropoulou, V., ... &Moneda, A. (2022). Museum Guidance in Sign Language: The SignGuide project. In *Proceedings of the 15thInternational Conference on PErvasive Technologies Related to Assistive Environments* (pp. 646-652).

Lagos, M., Martín, J., Gómez, Á., & Pousada, T. (2021). Virtual Reality at the Service of People with Functional Diversity: Personalized Intervention Spaces. *Engineering Proceedings,* 7(1), 43.

Lan, Y. J., Hsiao, I. Y., & Shih, M. F. (2018). Effective learning design of game-based 3D virtual language learning environments for special education students. *Journal of Educational Technology & Society*, *21*(3), 213-227.

Lee, H. S., & Lee, J. W. (2008). Mathematical education game based on augmented reality. *In Technologies for E-Learning and Digital Entertainment: Third International Conference*, Edutainment 2008 Nanjing, China, June 25-27, Proceedings 3 (pp. 442-450). Springer Berlin Heidelberg.

Lee, I. J., Chen, C. H., Wang, C. P., & Chung, C. H. (2018). Augmented reality plus concept map technique to teach children with ASD to use social cues when meeting and greeting. *The Asia-Pacific Education Researcher*, *27*, 227-243.

Li, C., & Lalani, F. (2020). The COVID-19 pandemic has changed education forever. In *World economic forum* (Vol. 29).

Li, Z., Connell, S., Dannels, W., & Peiris, R. (2022, October). SoundVizVR: Sound Indicators for Accessible Sounds in Virtual Reality for Deaf or Hard-of-Hearing Users. In *Conference on Computers and Accessibility (ASSETS'22)*.

Li, P., Fang, Z., & Jiang, T. (2022, February). Research Into improved Distance Learning Using VR Technology. In *Frontiers in Education* (Vol. 7, p. 757874). Frontiers

Lie, S. S., Helle, N., Sletteland, N. V., Vikman, M. D., & Bonsaksen, T. (2023). Implementation of virtual reality in health professions education: scoping review. *JMIR Medical Education*, *9*, e41589.

Lis, S., Baer, N., Franzen, N., Hagenhoff, M., Gerlach, M., Koppe, G., ... & Kirsch, P. (2013). Social interaction behavior in ADHD in adults in a virtual trust game. *Journal of attention disorders*, *20*(4), 335-345.

Lorenzo, G., Lledó, A., Pomares, J., & Roig, R. (2016). Design and application of an immersive virtual reality system to enhance emotional skills for children with autism spectrum disorders. *Computers & Education*, *98*, 192-205.

Loyens, S.M.M., Magda, J. & Rikers, R.M.J.P. (2008). Self-directed learning in problem-based learning and its relationships with self-regulated learning. *Educational Psychology Review,* 20(4), 411-427.

Lupu, V., Matu, S., & Lupu, I. R. (2019). Cognitive-behavioral hypnotherapy augmented with virtual reality exposure in flight phobia: a case study. *Journal of Evidence-Based Psychotherapies,* 19(1). https://doi.org/10.24193/jebp.2019.1.3

Lu, A., Chan, S., Cai, Y., Huang, L., Nay, Z. T., & Goei, S. L. (2018). Learning through VR gaming with virtual pink dolphins for children with ASD. *Interactive Learning Environments*, *26*(6), 718-729.

Maas, M. J., & Hughes, J. M. (2020). Virtual, augmented and mixed reality in K–12 education: A review of the literature. *Technology, Pedagogy and Education*, *29*(2), 231-249.

Maskey, M., Lowry, J., Rodgers, J., McConachie, H., & Parr, J. R. (2014). Reducing specific phobia/fear in young people with autism spectrum disorders (ASDs) through a virtual reality environment intervention. *PloS one,* 9(7).

Mayer, J. D. (2008). «Human Abilities: Emotional Intelligence». *Annual Review of Psychology* 59: 507–536. doi: 10.1146/annurev.psych.59.103006.093646

Mesa-Gresa, P., Gil-Gómez, H., Lozano-Quilis, J. A., & Gil-Gómez, J. A. (2018). Effectiveness of virtual reality for children and adolescents with autism spectrum disorder: an evidence-based systematic review. *Sensors*, *18*(8), 2486.

Mikropoulos, T. A., & Natsis, A. (2011). Educational virtual environments: A ten-year review of empirical research (1999–2009). *Computers & education*, *56*(3), 769-780. http://dx.doi.org/10.1016/j.compedu.2010.10.020

Martín-Gutiérrez, J., Fabiani, P., Benesova, W., Meneses, M. D., & Mora, C. E. (2015). Augmented reality to promote collaborative and autonomous learning in higher education. *Computers in human behavior,* 51, 752-761.

Martín-Gutiérrez, J., Mora, C. E., Añorbe-Díaz, B., & González-Marrero, A. (2017). Virtual technologies trends in education. *Eurasia journal of mathematics, science and technology education*, *13*(2), 469-486.

Michalski, S. C., Gallomarino, N. C., Szpak, A., May, K. W., Lee, G., Ellison, C., & Loetscher, T. (2023). Improving real-world skills in people with intellectual disabilities: an immersive virtual reality intervention. *Virtual Reality*, 1-12.

Mitsea, E., Drigas, A., & Skianis, C. (2022a). Metacognition in Autism Spectrum Disorder: Digital Technologies in Metacognitive Skills Training. *Technium Soc. Sci. J.*, *31*, 153.

Mitsea, E., Drigas, A., & Skianis, C. (2022b). Mindfulness for Anxiety Management and Happiness: The Role of VR, Metacognition, and Hormones. *Technium BioChemMed,* 3(3), 37-52.

Mitsea, E., Drigas, A., & Skianis, C. (2022c). Metacognition in Autism Spectrum Disorder: Digital Technologies in Metacognitive Skills Training. *Technium Soc. Sci. J.*, *31*, 153.

Mitsea, E., Drigas, A., & Skianis, C. (2023). VR Gaming for Meta-Skills Training in Special Education: The Role of Metacognition, Motivations, and Emotional Intelligence. *Education Sciences*, 13(7), 639.

Miundy, K., Zaman, H. B., Nosrdin, A., & Ng, K. H. (2019). Evaluation of visual based Augmented Reality (AR) learning application (V-ARA-Dculia) for dyscalculia learners. *JOIV: International Journal on Informatics Visualization*, *3*(4), 343-354.

Mirzaei, M., Kán, P., & Kaufmann, H. (2021). Effects of using vibrotactile feedback on sound localization by deaf and hard-of-hearing people in virtual environments. *Electronics*, *10*(22), 2794.

Muneer, R., Saxena, T., & Karanth, P. (2015). Virtual reality games as an intervention for children: A pilot study. *Disability, CBR & Inclusive Development*, *26*(3), 77-96.

Newbutt, N., Bradley, R., & Conley, I. (2020). Using virtual reality head-mounted displays in schools with autistic children: Views, experiences, and future directions. *Cyberpsychology, Behavior, and Social Networking*, *23*(1), 23-33.

Novotný, M., Lacko, J., & Samuelčík, M. (2013). Applications of multi-touch augmented reality system in education and presentation of virtual heritage. *Procedia Computer Science*, *25*, 231-235.

Oblinger, D. (2006). Simulations, Games, and Learning. In *Virtual Worlds* (Vol. 1, pp. 1-6).

O'Connor, S. (2019). Virtual reality and avatars in health care. *Clinical nursing research*, *28*(5), 523-528.

OECD (2023), *Equity and Inclusion in Education: Finding Strength through Diversity*, OECD Publishing, Paris, https://doi.org/10.1787/e9072e21-en.

Offermans, S., & Hu, J. (2013). Augmented home: integrating a virtual world game in a physical environment. *In Entertainment Computing–ICEC 2013: 12th International Conference, ICEC 2013*, São Paulo, Brazil, October 16-18, 2013. Proceedings 12 (pp. 30-35). Springer Berlin Heidelberg.

Önal, N. T., & Önal, N. (2021). The effect of augmented reality on the astronomy achievement and interest level of gifted students. *Education and Information Technologies*, *26*(4), 4573-4599.

Opris, D., Enea, V., Pop, A., & Dafinoiu, I. (2011). Hypnotic suggestions effect on sense of presence in virtual reality. A brief report". *Erdélyi Pszichológiai Szemle,* 12(1), 13-22.

Orlosky, J., Kiyokawa, K., & Takemura, H. (2017). Virtual and augmented reality on the 5G highway. *Journal of Information Processing*, *25*, 133-141

Ou, Y. K., Wang, Y. L., Chang, H. C., Yen, S. Y., Zheng, Y. H., & Lee, B. O. (2020). Development of virtual reality rehabilitation games for children with attention-deficit hyperactivity disorder. *Journal of Ambient Intelligence and Humanized Computing*, *11*, 5713-5720.

Pallavicini, F., & Pepe, A. (2019). Comparing player experience in video games played in virtual reality or on desktop displays: Immersion, flow, and positive emotions. In *Extended abstracts of the annual symposium on computer-human interaction in play companion extended abstracts* (pp. 195-210).

Pan, Z., Cheok, A. D., Yang, H., Zhu, J., & Shi, J. (2006). Virtual reality and mixed reality for virtual learning environments. *Computers & graphics*, *30*(1), 20-28.

Pantelidis, V. S. (2010). Reasons to use virtual reality in education and training courses and a model to determine when to use virtual reality. *Themes in science and technology education*, *2*(1-2), 59-70

Papanastasiou, G., Drigas, A., Skianis, C., Lytras, M., & Papanastasiou, E. (2019). Virtual and augmented reality effects on K-12, higher and tertiary education students' twenty-first century skills. *Virtual Reality,* 23, 425-436.

Papoutsi, C., Drigas, A., & Skianis, C. (2021). Virtual and augmented reality for developing emotional intelligence skills. *Int. J. Recent Contrib. Eng. Sci. IT (IJES)*, *9*(3), 35-53.

Park, M. J., Kim, D. J., Lee, U., Na, E. J., & Jeon, H. J. (2019). A literature overview of virtual reality (VR) in treatment of psychiatric disorders: recent advances and limitations. Frontiers in psychiatry, 10, 505.

Parsons, S., & Cobb, S. (2011). State-of-the-art of virtual reality technologies for children on the autism spectrum. *European Journal of Special Needs Education*, *26*(3), 355-366.

Parsons, S. (2015). Learning to work together: Designing a multi-user virtual reality game for social collaboration and perspective-taking for children with autism. *International Journal of Child-Computer Interaction*, *6*, 28-38.

Parsons, S. (2016). Authenticity in Virtual Reality for assessment and intervention in autism: A conceptual review. *Educational Research Review*, *19*, 138-157.

Parton, B. S., Hancock, R., & Dawson, J. (2010). Augmented reality for deaf students: Can mobile devices make it possible? *In Human-Computer Interaction: Second IFIP TC 13 Symposium,* HCIS 2010, Held as Part of WCC 2010, Brisbane,

Australia, September 20-23, 2010. Proceedings (pp. 309-312). Springer Berlin Heidelberg.

Patterson, D. R., Jensen, M. P., Wiechman, S. A., & Sharar, S. R. (2010). Virtual reality hypnosis for pain associated with recovery from physical trauma. Intl. *Journal of Clinical and Experimental Hypnosis,* 58(3), 288-300. https://doi.org/10.1080/00207141003760595

Patterson, D. R., Tininenko, J. R., Schmidt, A. E., & Sharar, S. R. (2004). Virtual reality hypnosis: a case report. *International Journal of Clinical and Experimental Hypnosis,* 52(1), 27-38. https://doi.org/10.1076/iceh.52.1.27.23925

Pedroli, E., Padula, P., Guala, A., Meardi, M. T., Riva, G., & Albani, G. (2017). A psychometric tool for a virtual reality rehabilitation approach for dyslexia. *Computational and mathematical methods in medicine,* 7048676.

Peng, X., Huang, J., Li, L., Gao, C., Chen, H., Tian, F., & Wang, H. (2019, May). Beyond horror and fear: Exploring player experience invoked by emotional challenge in VR games. In *Extended abstracts of the 2019 CHI conference on human factors in computing systems* (pp. 1-6).

Petry, B., Illandara, T., & Nanayakkara, S. (2016, November). MuSS-bits: sensor-display blocks for deaf people to explore musical sounds. In *Proceedings of the 28th Australian Conference on Computer-Human Interaction* (pp. 72-80).

Potter, M. C., Wyble, B., Hagmann, C. E., & McCourt, E. S. (2014). Detecting meaning in RSVP at 13 ms per picture. *Attention, Perception, & Psychophysics*, *76*, 270-279.

Psotka, J. (2013). Educational games and virtual reality as disruptive technologies. *Journal of Educational Technology & Society*, *16*(2), 69-80.

Quintero, J., Baldiris, S., Rubira, R., Cerón, J., & Velez, G. (2019). Augmented reality in educational inclusion. Asystematic review on the last decade. *Frontiers in psychology,* 10, 1835.

Rebelo, F., Noriega, P., Duarte, E., & Soares, M. (2012). Using Virtual Reality to Assess User Experience. Human Factors: *The Journal of the Human Factors and Ergonomics Society,* 54(6), 964-982. https://doi.org/10.1177/0018720812465006

Reed, G. M., First, M. B., Kogan, C. S., Hyman, S. E., Gureje, O., Gaebel, W., ... & Saxena, S. (2019). Innovations and changes in the ICD-11 classification of mental, behavioural and neurodevelopmental disorders. *World psychiatry*, *18*(1), 3-19.

Riva, G., Baños, R. M., Botella, C., Mantovani, F., & Gaggioli, A. (2016). Transforming experience: the potential of augmented reality and virtual reality for enhancing personal and clinical change. *Frontiers in psychiatry*, *7*, 164.

Rodrigo-Yanguas, M., Martin-Moratinos, M., Menendez-Garcia, A., Gonzalez-Tardon, C., Royuela, A., & Blasco-Fontecilla, H. (2021). A virtual reality game (The Secret Trail of Moon) for treating attention-deficit/hyperactivity disorder: development and usability study. *JMIR Serious Games*, *9*(3), e26824.

Rodríguez, C., Areces, D., García, T., Cueli, M., & González-Castro, P. (2018). Comparison between two continuous performance tests for identifying ADHD: Traditional vs. virtual reality. *International journal of clinical and health psychology*, *18*(3), 254-263.

Rodríguez-Cano, S., Ausín-Villaverde, V., Delgado-Benito, V., & Tuñón, M. (2020). Líneas de intervención para el diseño de toolkit en el proyecto FORDYSVAR. *V Encontro International de Formação na Docência| Livro de Resumos. Instituto Politécnico de Bragança*.

Rodríguez-Cano, S., Delgado-Benito, V., Ausín-Villaverde, V., & Martín, L. M. (2021). Design of a virtual reality software to promote the learning of students with dyslexia. *Sustainability*, *13*(15), 8425.

Rosenberg, R. S., Baughman, S. L., & Bailenson, J. N. (2013). Virtual superheroes: Using superpowers in virtual reality to encourage prosocial behavior. *PloS one*, *8*(1), e55003.

Rosenfield, N. S., Lamkin, K., Re, J., Day, K., Boyd, L., & Linstead, E. (2019). A virtual reality system for practicing conversation skills for children with autism. *Multimodal Technologies and Interaction*, *3*(2), 28.

Saba, M. P., Filippo, D., Pereira, F. R., & De Souza, P. L. P. (2011). Hey yaa: a haptic warning wearable to support deaf people communication. In *Collaboration and Technology: 17th International Conference, CRIWG 2011, Paraty, Brazil, October 2-7, 2011. Proceedings 17* (pp. 215-223). Springer Berlin Heidelberg.

Schöne, B., Wessels, M., & Gruber, T. (2019). Experiences in virtual reality: A window to autobiographical memory. *Current Psychology*, *38*(3), 715-719.

Simón-Vicente, L., Rodríguez-Cano, S., Delgado-Benito, V., Ausín-Villaverde, V., & Delgado, E. C. (2022). Cybersickness. A systematic literature review of adverse effects related to virtual reality. *Neurología*.

Skulmowski, A., & Rey, G. D. (2018). Embodied learning: introducing a taxonomy based on bodily engagement and task integration. *Cognitive research: principles and implications*, *3*(1), 1-10.

Slater, M., & Sanchez-Vives, M. V. (2014). Transcending the self in immersive virtual reality. *Computer*, *47*(7), 24-30.

Squire, K. D., & Jan, M. (2007). Mad city mystery: Developing scientific argumentation skills with a place-basedaugmented reality game on handheld computers. *Journal of science education and technology,* 16, 5-29.

Stevens, C. (2004). Information and communication technology, special educational needs and schools: a historical perspective of UK government initiatives. *ICT and special educational needs: A tool for inclusion*, 21-34.

Teeley, A. M., Soltani, M., Wiechman, S. A., Jensen, M. P., Sharar, S. R., & Patterson, D. R. (2012). Virtual reality hypnosis pain control in the treatment of multiple fractures: a case series. *American journal of clinical hypnosis,* 54(3), 184-194. https://doi.org/10.1080/00029157.2011.619593

Terlouw, G., Kuipers, D., van't Veer, J., Prins, J. T., & Pierie, J. P. E. (2021). The development of an escape room–based serious game to trigger social interaction and communication between high-functioning children with autism and their peers: Iterative design approach. *JMIR serious Games*, *9*(1), e19765.

Thompson, T., Steffert, T., Steed, A., & Gruzelier, J. (2010). A randomized controlled trial of the effects of hypnosis with 3-D virtual reality animation on tiredness, mood, and salivary cortisol. *International Journal of Clinical and Experimental Hypnosis,* 59(1), 122-142. https://doi.org/10.1080/00207144.2011.522917

Tsai, W. T., Lee, I. J., & Chen, C. H. (2021). Inclusion of third-person perspective in CAVE-like immersive 3D virtual reality role-playing games for social reciprocity training of children with an autism spectrum disorder. *Universal Access in the Information Society*, *20*, 375-389.

Tsopanidou, V., & Drigas, A. (2022). Environmental factors and their effect on the occurrence of autism. *Technium BioChemMed*, 3(1), 34-41.

Ulmer, J., Braun, S., Cheng, C. T., Dowey, S., & Wollert, J. (2022). Gamification of virtual reality assembly training: Effects of a combined point and level system on motivation and training results. *International Journal of Human-Computer Studies*, *165*, 102854.

Villena-Taranilla, R., Tirado-Olivares, S., Cozar-Gutierrez, R., & González-Calero, J. A. (2022). Effects of virtual reality on learning outcomes in K-6 education: A meta-analysis. *Educational Research Review*, *35*, 100434.

Wallace, S., Parsons, S., Westbury, A., White, K., White, K., & Bailey, A. (2010). Sense of presence and atypical social judgments in immersive virtual environments: Responses of adolescents with Autism Spectrum Disorders. *Autism*, *14*(3), 199-213.

Wang, M., & Reid, D. (2013). Using the virtual reality-cognitive rehabilitation approach to improve contextual processing in children with autism. *The Scientific World Journal* 716890.

Weerdmeester, J., Cima, M., Granic, I., Hashemian, Y., & Gotsis, M. (2016). A feasibility study on the effectiveness of a full-body videogame intervention for decreasing attention deficit hyperactivity disorder symptoms. *Games for health journal*, *5*(4), 258-269.

Wuang, Y. P., Chiang, C. S., Su, C. Y., & Wang, C. C. (2011). Effectiveness of virtual reality using Wii gaming technology in children with Down syndrome. *Research in developmental disabilities*, *32*(1), 312-321.

Yoon, G., & Vargas, P. T. (2014). Know thy avatar: The unintended effect of virtual-self representation on behavior. *Psychological science*, 25(4), 1043-1045.

Yang, F. C., Mousas, C., & Adamo, N. (2022). Holographic sign language avatar interpreter: A user interaction study in a mixed reality classroom. *Computer Animation and Virtual Worlds*, *33*(3-4), e2082.

Zainuddin, N. M. M., Zaman, H. B., & Ahmad, A. (2010). Developing augmented reality book for deaf in science: the determining factors. *In 2010 International Symposium on Information Technology*, (Vol. 1, pp. 1-4). IEEE.

Zhao, X., You, X., Shi, C., & Gan, S. (2015). Hypnosis therapy using augmented reality technology: treatment for psychological stress and anxiety. *Behaviour & Information Technology*, 34(6), 646-653. https://doi.org/10.1080/0144929X.2015.1022223

Zygouris, S., Ntovas, K., Giakoumis, D., Votis, K., Doumpoulakis, S., Segkouli, S., Karagiannidis, Ch., Tzovaras, D., & Tsolaki, M. (2017). A preliminary study on the feasibility of using a virtual reality cognitive training application for remote detection of mild cognitive impairment. *Journal of Alzheimer's Disease*, 56(2), 619-627. DOI 10.3233/JAD-160518

Νόμοι – Υπουργικές αποφάσεις – Προεδρικά διατάγματα

Νόμος 3699/2008. Ειδική Αγωγή και Εκπαίδευση Ατόμων με Αναπηρίες ή Ειδικές Εκπαιδευτικές Ανάγκες. Άρθρο 12: Ύδρυση και οργάνωση των ΚΕΔΔΥ, Εφημερίς της κυβερνήσεως της Ελληνικής Δημοκρατίας (ΦΕΚ Α 199/2.10.2008)