

## Supplementary Material

### Full list of analyzed papers (84 documents)

#	Authors	Title	Year	Source title	Document Type
A1	López Ojeda W., Hurley R.A.	The Medical Metaverse, Part 1: Introduction, Definitions, and New Horizons for Neuropsychiatry	2023	The Journal of neuropsychiatry and clinical neurosciences	Article
A2	Gu J., Wang J., Guo X., Liu G., Qin S., Bi Z.	A Metaverse Based Teaching Building Evacuation Training System With Deep Reinforcement Learning	2023	IEEE Transactions on Systems, Man, and Cybernetics: Systems	Article
A3	Hare R., Tang Y.	Hierarchical Deep Reinforcement Learning With Experience Sharing for Metaverse in Education	2023	IEEE Transactions on Systems, Man, and Cybernetics: Systems	Article
A4	Zheng W., Yan L., Zhang W., Ouyang L., Wen D.	D→K→I: Data Knowledge Driven Group Intelligence Framework for Smart Service in Education Metaverse	2023	IEEE Transactions on Systems, Man, and Cybernetics: Systems	Article
A5	Li K., Cui Y., Li W., Lv T., Yuan X., Li S., Ni W., Simsek M., Dressler F.	When Internet of Things Meets Metaverse: Convergence of Physical and Cyber Worlds	2023	IEEE Internet of Things Journal	Article
A6	Hwang Y.	When makers meet the metaverse: Effects of creating NFT metaverse exhibition in maker education	2023	Computers and Education	Article
A7	Koohsari M.J., McCormack G.R., Nakaya T., Yasunaga A., Fuller D., Nagai Y., Oka K.	The Metaverse, the Built Environment, and Public Health: Opportunities and Uncertainties	2023	Journal of medical Internet research	Article
A8	Shu X., Gu X.	An Empirical Study of A Smart Education Model Enabled by the Edu Metaverse to Enhance Better Learning Outcomes for Students	2023	Systems	Article
A9	Bhattacharya P., Saraswat D., Savaliya D., Sanghavi S., Verma A., Sakariya V., Tanwar S., Sharma R., Raboaca M.S., Manea D.L.	Towards Future Internet: The Metaverse Perspective for Diverse Industrial Applications	2023	Mathematics	Article
A10	AbuKhoua E., El Tahawy M.S., Atif Y.	Envisioning Architecture of Metaverse Intensive Learning Experience (MiLEx): Career Readiness in the 21st Century and Collective Intelligence Development Scenario	2023	Future Internet	Article
A11	Ricci M., Scarcelli A., Fiorentino M.	Designing for the Metaverse: A Multidisciplinary Laboratory in the Industrial Design Program	2023	Future Internet	Article

A12	Kliestik T., Nagy M., Valaskova K.	Global Value Chains and Industry 4.0 in the Context of Lean Workplaces for Enhancing Company Performance and Its Comprehension via the Digital Readiness and Expertise of Workforce in the V4 Nations	2023	Mathematics	Article
A13	Tran N.C., Wang J. H., Vu T.H., Tai T. C., Wang J. C.	Anti aliasing convolution neural network of finger vein recognition for virtual reality (VR) human–robot equipment of metaverse	2023	Journal of Supercomputing	Article
A14	Manna M.	Teachers as augmented reality designers: A study on Italian as a foreign language teacher perceptions	2023	International Journal of Mobile and Blended Learning	Article
A15	Tlili A., Huang R., Kinshuk	Metaverse for climbing the ladder toward 'Industry 5.0' and 'Society 5.0'?	2023	Service Industries Journal	Article
A16	Hwang S., Koo G.	Art marketing in the metaverse world: Evidence from South Korea	2023	Cogent Social Sciences	Article
A17	Jiao B., Li M.	Metaverse Inspired VR Visualization Model of Italian Design Education	2023	Computer Aided Design and Applications	Article
A18	Battal A., Taşdelen A.	The Use of Virtual Worlds in the Field of Education: A Bibliometric Study	2023	Participatory Educational Research	Article
A19	Yang S. Y., Kang M. K.	Efficacy Testing of a Multi Access Metaverse Based Early Onset Schizophrenia Nursing Simulation Program: A Quasi Experimental Study	2023	International Journal of Environmental Research and Public Health	Article
A20	Wu C. H., Liu C. Y.	Educational Applications of Non Fungible Token (NFT)	2023	Sustainability (Switzerland)	Article
A21	Iwanaga J., Muo E.C., Tabira Y., Watanabe K., Tubbs S.J., D'Antoni	Who really needs a Metaverse in anatomy education? A review with preliminary survey results	2023	Clinical Anatomy	Article
A22	Sghaier S., Elfakki A.O., Alotaibi A.A.	Development of an intelligent system based on metaverse learning for students with disabilities	2022	Frontiers in Robotics and AI	Article
A23	Guo B.	Highlighting Effects of Flipped Learning on Mental Health through Metaverse: Moderating Impact of e learning and Cyber Resilience	2022	American Journal of Health Behavior	Article
A24	Wang G., Shin C.	Influencing Factors of Usage Intention of Metaverse Education Application Platform: Empirical Evidence	2022	Sustainability (Switzerland)	Article

Based on PPM and TAM Models					
A25	Gattullo M., Laviola E., Evangelista A., Fiorentino M., Uva A.E.	Towards the Evaluation of Augmented Reality in the Metaverse: Information Presentation Modes	2022	Applied Sciences (Switzerland)	Article
A26	Sunardi, Ramadhan A., Abdurachman E., Trisetyarso A., Zarlis M.	Acceptance of augmented reality in video conference based learning during COVID 19 pandemic in higher education	2022	Bulletin of Electrical Engineering and Informatics	Article
A27	Penaherrera Pulla O.S., Baena C., Fortes S., Baena E., Barco R.	KQI Assessment of VR Services: A Case Study on 360 Video Over 4G and 5G	2022	IEEE Transactions on Network and Service Management	Article
A28	Yang D., Zhou J., Chen R., Song Y., Song Z., Zhang X., Wang Q., Wang K., Zhou C., Sun J.,	Expert consensus on the metaverse in medicine	2022	Clinical eHealth	Article
A29	Crolla K., Goepel G.	Entering hyper reality: "Resonance In Sight," a mixed reality art installation	2022	Frontiers in Virtual Reality	Article
A30	Wang X. W., Zhu Y. J., Zhang Y. C.	An empirical study of college students' reading engagement on academic achievement	2022	Frontiers in Psychology	Article
A31	Kshetri N., Rojas Torres D., Grambo M.	The Metaverse and Higher Education Institutions	2022	IT Professional	Article
A32	Sánchez López I., Roig Vila R., Pérez Rodríguez A.	Metaverse and education: the pioneering case of Minecraft in immersive digital learning	2022	Profesional de la Informacion	Article
A33	Pregowska A., Osial M., Dolega Dolegowski D.,	Information and Communication Technologies Combined with Mixed Reality as Supporting Tools in Medical Education	2022	Electronics (Switzerland)	Article
A34	López Belmonte J., Pozo Sánchez S., Lampropoulos G., Moreno Guerrero A. J.	Design and validation of a questionnaire for the evaluation of educational experiences in the metaverse in Spanish students (METAEDU)	2022	Heliyon	Article
A35	Lo S. C., Tsai H. H.	Design of 3D Virtual Reality in the Metaverse for Environmental Conservation Education Based on Cognitive Theory	2022	Sensors	Article
A36	Mahmudiono T., Rachmah Q., Indriani D., Permatasari E.A., Hera N.A., Chen H. L.	Food and Beverage Consumption Habits through the Perception of Health Belief Model (Grab Food or Go Food) in Surabaya and Pasuruan	2022	Nutrients	Article

A37	Park J. Y., Lee K., Chung D.R.	Public interest in the digital transformation accelerated by the COVID 19 pandemic and perception of its future impact	2022	Korean Journal of Internal Medicine	Article
A38	Hyun J., Choi H., Kim J.	Deriving Improvement Plans through Metaverse Technology and Implications	2022	International Journal of Intelligent Systems and Applications in Engineering	Article
A39	Dou W., Tian Y., Ye G., Zhu J.	Antenna Artificial Intelligence: The Relentless Pursuit of Intelligent Antenna Design [Industry Activities]	2022	IEEE Antennas and Propagation Magazine	Article
A40	Dwivedi Y.K., Hughes L., Baabdullah A.M., Ribeiro Navarrete S., Giannakis M., Al Debei M.M., Dennehy D., Metri B., Buhalis D., Kshetri N., Kumar V.,	Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy	2022	International Journal of Information Management	Article
A41	Ramesh P., Joshua T., Ray P., Devadas A., Raj P., Ramesh S., Ramesh M., Rajasekaran R.	Holographic elysium of a 4D ophthalmic anatomical and pathological metaverse with extended reality/mixed reality	2022	Indian Journal of Ophthalmology	Article
A42	Hutson J.	Social Virtual Reality: Neurodivergence and Inclusivity in the Metaverse	2022	Societies	Article
A43	Cortés Rodríguez F., Dal Peraro M., Abriata L.A.	Online tools to easily build virtual molecular models for display in augmented and virtual reality on the web	2022	Journal of Molecular Graphics and Modelling	Article
A44	Alpala L.O., Quiroga Parra D.J., Torres J.C., Peluffo Ordóñez D.H.	Smart Factory Using Virtual Reality and Online Multi User: Towards a Metaverse for Experimental Frameworks	2022	Applied Sciences (Switzerland)	Article
A45	Lee J., Lee T.S., Lee S., Jang J., Yoo S., Choi Y., Park Y.R.	Development and Application of a Metaverse Based Social Skills Training Program for Children With Autism Spectrum Disorder to Improve Social Interaction: Protocol for a Randomized Controlled Trial	2022	JMIR Research Protocols	Article
A46	Zhao J., Lu Y., Zhou F., Mao R., Fei F.	Systematic Bibliometric Analysis of Research Hotspots and Trends on the Application of Virtual Reality in Nursing	2022	Frontiers in Public Health	Article
A47	Tan T.F., Li Y., Lim J.S., Gunasekeran D.V., Teo Z.L., Ng W.Y., Ting D.S.W.	Metaverse and Virtual Health Care in Ophthalmology: Opportunities and Challenges	2022	Asia Pacific Journal of Ophthalmology	Article
A48	Yong Y.J., Lee J.H., Kim Y.S.	A study on the possibility of a change in culture and arts education curriculum by shooting "METACLASSROOM" in the COVID19 pandemic era	2022	Cypriot Journal of Educational Sciences	Article

A49	Sofianidis A.	Why Do Students Prefer Augmented Reality: A Mixed Method Study on Preschool Teacher Students' Perceptions on Self Assessment AR Quizzes in Science Education	2022	Education Sciences	Article
A50	Gupta R., He J., Ranjan R., Gan W. S., Klein F., Schneiderwind C., Neidhardt A., Brandenburg K., Valimaki V.	Augmented/Mixed Reality Audio for Hearables: Sensing, control, and rendering	2022	IEEE Signal Processing Magazine	Article
A51	Dahan N.A., Al Razgan M., Al Laith A., Alsoufi M.A., Al Asaly M.S., Alfakih T.	Metaverse Framework: A Case Study on E Learning Environment (ELEM)	2022	Electronics (Switzerland)	Article
A52	Lee H.J., Hwang Y.	Technology Enhanced Education through VR Making and Metaverse Linking to Foster Teacher Readiness and Sustainable Learning	2022	Sustainability (Switzerland)	Article
A53	Guo H., Gao W.	Metaverse Powered Experiential Situational English Teaching Design: An Emotion Based Analysis Method	2022	Frontiers in Psychology	Article
A54	Suh W., Ahn S.	Utilizing the Metaverse for Learner Centered Constructivist Education in the Post Pandemic Era: An Analysis of Elementary School Students	2022	Journal of Intelligence	Article
A55	Lee H., Woo D., Yu S.	Virtual Reality Metaverse System Supplementing Remote Education Methods: Based on Aircraft Maintenance Simulation	2022	Applied Sciences (Switzerland)	Article
A56	Park S., Kim S.	Identifying World Types to Deliver Gameful Experiences for Sustainable Learning in the Metaverse	2022	Sustainability (Switzerland)	Article
A57	Jovanović A., Milosavljević A.	VoRtex Metaverse Platform for Gamified Collaborative Learning	2022	Electronics (Switzerland)	Article
A58	Kang D., Choi H., Nam S.	Learning Cultural Spaces: A Collaborative Creation of a Virtual Art Museum Using Roblox	2022	International Journal of Emerging Technologies in Learning	Article
A59	Ng D.T.K.	What is the metaverse? Definitions, technologies and the community of inquiry	2022	Australasian Journal of Educational Technology	Article
A60	Bansal G., Rajgopal K., Chamola V., Xiong Z., Niyato D.	Healthcare in Metaverse: A Survey on Current Metaverse Applications in Healthcare	2022	IEEE Access	Article
A61	Bhavana S., Vijayalakshmi V.	AI Based Metaverse Technologies Advancement Impact on Higher Education Learners	2022	WSEAS Transactions on Systems	Article

A62	Ryu J., Son S., Lee J., Park Y., Park Y.	Design of Secure Mutual Authentication Scheme for Metaverse Environments Using Blockchain	2022	IEEE Access	Article
A63	Lee J.	A study on the intention and experience of using the metaverse [Studija o namjeri i iskustvu korištenja metaverzuma]	2022	Jahr	Article
A64	Zhou B.	Building a Smart Education Ecosystem from a Metaverse Perspective	2022	Mobile Information Systems	Article
A65	Teng Z., Cai Y., Gao Y., Zhang X., Li X.	Factors Affecting Learners' Adoption of an Educational Metaverse Platform: An Empirical Study Based on an Extended UTAUT Model	2022	Mobile Information Systems	Article
A66	Alsaleh S., Tepljakov A., Kose A., Belikov J., Petlenkov E.	ReImagine Lab: Bridging the Gap Between Hands On, Virtual and Remote Control Engineering Laboratories Using Digital Twins and Extended Reality	2022	IEEE Access	Article
A67	Alawadhi M., Alhumaid K., Almarzooqi S., Aljasmi S., Aburayya A., Salloum S.A., Almesmari W.	Factors Affecting Medical Students' Acceptance of the Metaverse System in Medical Training in the United Arab Emirates	2022	South Eastern European Journal of Public Health	Article
A68	Ge J.	Multiple Influences of Intelligent Technology on Network Behavior of College Students in the Metaverse Age	2022	Journal of Environmental and Public Health	Article
A69	Afshar S.V., Eshaghi S., Kim I.	Pattern Analysis of Virtual Landscape within Educational Games	2022	Journal of Digital Landscape Architecture	Article
A70	Hwang G. J., Chien S. Y.	Definition, roles, and potential research issues of the metaverse in education: An artificial intelligence perspective	2022	Computers and Education: Artificial Intelligence	Article
A71	Almarzouqi A., Aburayya A., Salloum S.A.	Prediction of User's Intention to Use Metaverse System in Medical Education: A Hybrid SEM ML Learning Approach	2022	IEEE Access	Article
A72	Lee S.H., Lee H., Kim J.H.	Enhancing the Prediction of User Satisfaction with Metaverse Service Through Machine Learning	2022	Computers, Materials and Continua	Article
A73	Chang H. Y., Chung C. C., Cheng Y. M., Lou S. J.	A Study on the Development and Learning Effectiveness Evaluation of Problem based Learning (PBL) Virtual Reality Course Based on Intelligence Network and Situational Learning	2022	Journal of Network Intelligence	Article

A74	Akour I.A., Al Maroof R.S., Alfaisal R., Salloum S.A.	A conceptual framework for determining metaverse adoption in higher institutions of gulf area: An empirical study using hybrid SEM ANN approach	2022	Computers and Education: Artificial Intelligence	Article
A75	SiyaeV A., Jo G. S.	Towards aircraft maintenance metaverse using speech interactions with virtual objects in mixed reality	2021	Sensors	Article
A76	SiyaeV A., Jo G. S.	Neuro Symbolic Speech Understanding in Aircraft Maintenance Metaverse	2021	IEEE Access	Article
A77	Nurhidayah N.N., Halim N., Basri M.	Analyzing Student's Learning Outcome Using Systemic Approach	2020	Asian EFL Journal	Article
A78	Estudiante A., Dietrich N.	Using Augmented Reality to Stimulate Students and Diffuse Escape Game Activities to Larger Audiences	2020	Journal of Chemical Education	Article
A79	Díaz J.E.M.	Virtual World as a Complement to Hybrid and Mobile Learning	2020	International Journal of Emerging Technologies in Learning	Article
A80	Díaz J.E.M., Saldaña C.A.M., Avila C.A.R.	Virtual world as a resource for hybrid education	2020	International Journal of Emerging Technologies in Learning	Article
A81	Masferrer J.Á.R., Sánchez F.E., Hernández D.F. O.	Experiences complementing classroom teaching with distance seminars in metaverses and videos	2014	Journal of Cases on Information Technology	Article
A82	Belei N., Noteborn G., De Ruyter K.	It's a brand new world: Teaching brand management in virtual environments	2011	Journal of Brand Management	Article
A83	Brennen B., dela Cerna E.	Journalism in second life	2010	Journalism Studies	Article
A84	Au W.J.	Taking new world notes: An embedded journalist's rough guide to reporting from inside the internet's next evolution	2005	First Monday	Article