

DAFTAR PUSTAKA

- [1] H.-J. Kim and S.-J. Cho, “Impact of Hallyu (Korean Wave) on Language Acquisition and Cultural Identity Among Vietnamese Youth,” *Journal of Linguistics and Communication Studies*, vol. 3, no. 1, pp. 53–58, Mar 2024, doi: 10.56397/JLCS.2024.03.08.
- [2] Migration Data Portal, “International students,” Migration Data Portal, Jun. 09, 2020. <https://www.migrationdataportal.org/themes/international-students> (accessed May 28, 2024).
- [3] J. Min-Ji, “Korea’s foreign employment hits all-time high,” *koreajoongangdaily.joins.com*, Dec. 18, 2023. <https://koreajoongangdaily.joins.com/news/2023-12-18/business/economy/Koreas-foreign-employment-hits-alltime-high/1938469> (accessed May 30, 2024).
- [4] OECD, “A global powerhouse in science and technology,” OECD, Oct. 25, 2021. <https://www.oecd.org/country/korea/thematic-focus/a-global-powerhouse-in-science-and-technology-61cbd1ad/> (accessed May 30, 2024).
- [5] A. Huensch, “Pronunciation in foreign language classrooms: Instructors’ training, classroom practices, and beliefs,” *Language Teaching Research*, vol. 23, no. 6, pp. 745–764, Nov 2019, doi: 10.1177/1362168818767182.
- [6] Rurani Adinda, L. Lukman, I. M. Said, and Gusnawaty, “Phonological Interference of Indonesian Consonants Into Korean,” *Theory and Practice in Language Studies*, vol. 13, no. 1, pp. 137–144, Dec. 2022, doi: <https://doi.org/10.17507/tpls.1301.16>.
- [7] M. Shen and T. Chiu, “EFL Learners’ English Speaking Difficulties and Strategy Use,” *Education and Linguistics Research*, vol. 5, no. 2, pp. 88, Oct 2019, doi: 10.5296/ELR.V5I2.15333.
- [8] S. Suparlan, “FACTORS CONTRIBUTING STUDENTS’ SPEAKING ANXIETY,” *Journal of Languages and Language Teaching*, vol. 9, no. 2, pp. 160, Apr 2021, doi: 10.33394/JOLLT.V9I2.3321.
- [9] S. S. Suadi, “Improving Students’ English Speaking Skill By Using Their Speaking Video Recording,” *SALEE: Study of Applied Linguistics and English Education*, vol. 1, no. 01, pp. 1–10, Jan. 2020, doi: <https://doi.org/10.35961/salee.v1i01.74>.
- [10] Soohyung Joo, “Self- and Peer-Assessment of Speaking,” *DOAJ (DOAJ: Directory of Open Access Journals)*, vol. 16, no. 2, pp. 68–83, Dec. 2016, doi: <https://doi.org/10.7916/salt.v16i2.1257>.

- [11] H. Hazen, "Use of oral examinations to assess student learning in the social sciences," *Journal of Geography in Higher Education*, vol. 44, no. 4, pp. 592–607, Oct 2020, doi: 10.1080/03098265.2020.1773418.
- [12] A. Andujar and M. S. Cruz-Martínez, "Cognitive test anxiety in high-stakes oral examinations: Face-to-face or computer-based?," *Language Learning in Higher Education*, vol. 10, no. 2, pp. 445–467, Dec. 2020, doi: <https://doi.org/10.1515/cercles-2020-2029>.
- [13] P. Krakowian, "Investigating Rater Perceptions in the Assessment of Speaking," *Research in Language*, vol. 20, no. 3, pp. 277–289, Feb. 2023, doi: <https://doi.org/10.18778/1731-7533.20.3.04>.
- [14] T. Thi-Nhu Ngo, H. Hao-Jan Chen, and K. Kuo-Wei Lai, "The effectiveness of automatic speech recognition in ESL/EFL pronunciation: A meta-analysis," *ReCALL*, vol. 36, no. 1, pp. 1–18, Apr. 2023, doi: <https://doi.org/10.1017/s0958344023000113>.
- [15] C. Tejedor-García, Valentín Cardeñoso-Payo, and David Escudero-Mancebo, "Automatic Speech Recognition (ASR) Systems Applied to Pronunciation Assessment of L2 Spanish for Japanese Speakers," *Appl. Sci.*, vol. 11, no. 15, pp. 6695–6695, Jul. 2021, doi: <https://doi.org/10.3390/app11156695>.
- [16] C. -G. Stativă, A. Iftene and C. -M. Miluț, "Assessment of Pronunciation in Language Learning Applications," 2021 International Conference on Speech Technology and Human-Computer Dialogue (SpeD), Bucharest, Romania, 2021, pp. 114–119, doi: 10.1109/SpeD53181.2021.9587353.
- [17] R. M. Tolba, T. Elarif, Z. Taha and R. Hammady, "Interactive Augmented Reality System for Learning Phonetics Using Artificial Intelligence," in *IEEE Access*, vol. 12, pp. 78219–78231, 2024, doi: 10.1109/ACCESS.2024.3406494.
- [18] A. Hamad and B. Jia, "How Virtual Reality Technology Has Changed Our Lives: An Overview of the Current and Potential Applications and Limitations," *International Journal of Environmental Research and Public Health* 2022, Vol. 19, Page 11278, vol. 19, no. 18, pp. 11278, Sep 2022, doi: 10.3390/IJERPH191811278.
- [19] C. Stinson and D. A. Bowman, "Feasibility of training athletes for high-pressure situations using virtual reality," *IEEE Trans Vis Comput Graph*, vol. 20, no. 4, pp. 606–615, 2014, doi: 10.1109/TVCG.2014.23.
- [20] S. C. Michalski, A. Szpak, D. Saredakis, T. J. Ross, M. Billingham, and T. Löttscher, "Getting your game on: Using virtual reality to improve real table tennis skills," *PLoS One*, vol. 14, no. 9, pp. e0222351, Sep 2019, doi: 10.1371/JOURNAL.PONE.0222351.

- [21] J. M. Davila Delgado, L. Oyedele, P. Demian, and T. Beach, "A research agenda for augmented and virtual reality in architecture, engineering and construction," *Advanced Engineering Informatics*, vol. 45, pp. 101122, Aug 2020, doi: 10.1016/J.AEI.2020.101122.
- [22] A. Pestek and M. Sarvan, "Virtual reality and modern tourism," *Journal of Tourism Futures*, vol. 7, no. 2, pp. 245–250, 2020, doi: 10.1108/JTF-01-2020-0004.
- [23] A. Parmaxi, "Virtual reality in language learning: a systematic review and implications for research and practice," *Interactive Learning Environments*, vol. 31, no. 1, pp. 172–184, 2023, doi: 10.1080/10494820.2020.1765392.
- [24] C. Hua and J. Wang, "Virtual reality-assisted language learning: A follow-up review (2018–2022)," *Front Psychol*, vol. 14, pp. 1153642, Mar 2023, doi: 10.3389/FPSYG.2023.1153642/BIBTEX.
- [25] D. Alonzo, *Assessment to Support Learning and Teaching*, 1st ed. Taylor & Francis, 2024, p. 19.
- [26] A. Babaeian, "Pronunciation Assessment: Traditional vs Modern Modes," *Journal of studies in education*, vol. 13, no. 4, pp. 20–20, Nov. 2023, doi: <https://doi.org/10.5296/jse.v13i4.21417>.
- [27] C. Chang and H.-C. K. Lin, "Effects of a mobile-based peer-assessment approach on enhancing language-learners' oral proficiency," *Innovations in Education and Teaching International*, vol. 57, no. 6, pp. 1–12, May 2019, doi: <https://doi.org/10.1080/14703297.2019.1612264>.
- [28] R. Babo, L. Babo, J. Suhonen, and M. Tukiainen, "E- Assessment with Multiple-Choice Questions: A 5 Year Study of Students' Opinions and Experience," *Journal of Information Technology Education: Innovations in Practice*, vol. 19, pp. 001-029, 2020, doi: <https://doi.org/10.28945/4491>.
- [29] J. Kim, S.-A. Yoon, and E. Lee, *Korean Pronunciation Guide - How to Sound Like a Korean*. Darakwon, 2018.
- [30] Y. Han, "Virtual Reality in Engineering Education," *SHS Web of Conferences*, vol. 157, pp. 02001, 2023, doi: 10.1051/SHSCONF/202315702001.
- [31] C. Blanco, "2023 Duolingo Language Report," *Duolingo Blog*, Dec. 04, 2023. <https://blog.duolingo.com/2023-duolingo-language-report/?ref=thediff.co>

- [32] Hwan-Seong, “*VR*을 활용한 한국어 말하-나 교육 플랫폼 연구-중국어 초급 학습자를 대상으로-,” repository.hanyang.ac.kr, Feb. 2023, Accessed: Jun. 2, 2024. [Online]. Available: <https://repository.hanyang.ac.kr/handle/20.500.11754/179982>
- [33] J.-H. Kim, “Basic Research for the Development of Beginner Korean Education Contents Applying Virtual Reality (VR) Technology,” *The Journal of Next-generation Convergence Technology Association*, vol. 6, no. 7, pp. 1313–1320, Jul. 2022, doi: <https://doi.org/10.33097/jncta.2022.06.07.1313>.
- [34] Y. Lim and E. Kim, “Teaching with Immersive Technologies: Methods for Middle School Technology Education,” *Daehan gonggong gyeonghak hakoeji/Daehan gong’gong gyeonghak hakoeji*, vol. 49, no. 1, pp. 63–95, Feb. 2024, doi: <https://doi.org/10.35140/kiiedu.2024.49.1.63>.
- [35] B. Anam, “메타버스를 활용한 한국어 초급 말하-나 교육 플랫폼 연구 : VRChat 중시-으로,” 2022. Accessed: Jun. 03, 2024. [Online]. Available: <https://scienceon.kisti.re.kr/srch/selectPORSrchArticle.do?cn=DIKO0016422568>
- [36] D. López-Fernández, A. Gordillo, P. P. Alarcón and E. Tovar, "Comparing Traditional Teaching and Game-Based Learning Using Teacher-Authored Games on Computer Science Education," in *IEEE Transactions on Education*, vol. 64, no. 4, pp. 367-373, Nov. 2021, doi: 10.1109/TE.2021.3057849
- [37] D. Zhao, C. H. Muntean, A. E. Chis, G. Rozinaj and G. -M. Muntean, "Game-Based Learning: Enhancing Student Experience, Knowledge Gain, and Usability in Higher Education Programming Courses," in *IEEE Transactions on Education*, vol. 65, no. 4, pp. 502-513, Nov. 2022, doi: 10.1109/TE.2021.3136914.
- [38] M. Belter and H. Lukosch, "Towards a Virtual Reality Math Game for Learning In Schools - A User Study," 2022 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW), Christchurch, New Zealand, 2022, pp. 808-809, doi: 10.1109/VRW55335.2022.00255.
- [39] N. AlQallaf et al., "Teaching Solar Energy Systems Design using Game-Based Virtual Reality," 2022 IEEE Global Engineering Education Conference (EDUCON), Tunis, Tunisia, 2022, pp. 956-960, doi: 10.1109/EDUCON52537.2022.9766460.
- [40] A. J. Blažič, "Game-based Assessment and Training of Elderly for Upgrading Digital Skills: New Game INFINITY," 2024 IEEE 7th Eurasian Conference on Educational Innovation (ECEI), Bangkok, Thailand, 2024, pp. 206-210, doi: 10.1109/ECEI60433.2024.10510827.

- [41] M. J. Gomez, J. A. RUIPÉREZ-Valiente and F. J. G. Clemente, "A Systematic Literature Review of Game-Based Assessment Studies: Trends and Challenges," in *IEEE Transactions on Learning Technologies*, vol. 16, no. 4, pp. 500-515, Aug. 2023, doi: 10.1109/TLT.2022.3226661.
- [42] H. Sarma, M. Shaik, S. T. Tangirala and S. K. Singh, "Game Based Virtual Reality Platform for Geometry," 2023 IEEE International Conference on Big Data (BigData), Sorrento, Italy, 2023, pp. 4812-4818, doi: 10.1109/BigData59044.2023.10386710.
- [43] H. Chen, "Research and Application of English Learning Games Based on VR technology," 2022 International Conference on Education, Network and Information Technology (ICENIT), Liverpool, United Kingdom, 2022, pp. 93-97, doi: 10.1109/ICENIT57306.2022.00027.
- [44] B. Alexander, Y. Hou, B. Khan and J. Jin, "Learn Programming In Virtual Reality? A Case Study of Computer Science Students," 2022 IEEE Global Engineering Education Conference (EDUCON), Tunis, Tunisia, 2022, pp. 270-275, doi: 10.1109/EDUCON52537.2022.9766621.
- [45] B. G. Lee, H. Tang and F. Fang, "Enhancing Critical Thinking and Engagement through Puzzle Box Integration in Virtual Reality-based Digital Game-Based Learning," 2023 IEEE International Conference on Teaching, Assessment and Learning for Engineering (TALE), Auckland, New Zealand, 2023, pp. 1-8, doi: 10.1109/TALE56641.2023.10398330.
- [46] D. M. Berry, "Level up your Pronunciation: Impact of a Mobile Game," *MEXTESOL Journal*, vol. 45, no. 1, pp. 1-12, Jan. 2021, doi: <https://doi.org/10.61871/mj.v45n1-4>.
- [47] C. Tejedor-García, D. Escudero-Mancebo, V. Cardeñoso-Payo and C. González-Ferreras, "Using Challenges to Enhance a Learning Game for Pronunciation Training of English as a Second Language," in *IEEE Access*, vol. 8, pp. 74250-74266, 2020, doi: 10.1109/ACCESS.2020.2988406.
- [48] H. Liu, Y. Yao, R. Sato and K. Liu, "The Development and Application of AI System based on a Japanese Pronunciation Training Game," 2019 IEEE 1st Global Conference on Life Sciences and Technologies (LifeTech), Osaka, Japan, 2019, pp. 95-99, doi: 10.1109/LifeTech.2019.8884062.
- [49] P. -h. Su, C. -h. Wu and L. -s. Lee, "A Recursive Dialogue Game for Personalized Computer-Aided Pronunciation Training," in *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, vol. 23, no. 1, pp. 127-141, Jan. 2015, doi: 10.1109/TASLP.2014.2375572

- [50] M. Ramamurthy and I. Krishnamurthi, “An Automated Assessment System for Evaluation of Students’ Answers Using Novel Similarity Measures,” *Research Journal of Applied Sciences, Engineering and Technology*, vol. 12, no. 3, pp. 258–263, Feb. 2016, doi: <https://doi.org/10.19026/rjaset.12.2332>.
- [51] J. Rugayan, G. Salvi, and T. Svendsen, “Perceptual and Task-Oriented Assessment of a Semantic Metric for ASR Evaluation,” *Interspeech*, Aug. 2023, doi: <https://doi.org/10.21437/interspeech.2023-1778>.
- [52] L. Wang, “English Speech Recognition and Pronunciation Quality Evaluation Model Based on Neural Network,” *Scientific Programming*, vol. 2022, pp. 1–10, Jun. 2022, doi: <https://doi.org/10.1155/2022/2249722>.
- [53] J. Gerocs, “Korean Pronunciation: How to Say Letters & Words,” *90 Day Korean®*, Aug. 26, 2020. <https://www.90daykorean.com/korean-pronunciation/> (accessed Apr. 25, 2024).
- [54] N. Schmitt and M. P. H. Rodgers, *An introduction to applied linguistics*. Milton Park, Abingdon, Oxon ; New York, Ny: Routledge, 2019.
- [55] M. Ma, “Speech Service Update – Hierarchical Transformer for Pronunciation Assessment,” *TECHCOMMUNITY.MICROSOFT.COM*, Feb. 13, 2023. <https://techcommunity.microsoft.com/t5/ai-azure-ai-services-blog/speech-service-update-hierarchical-transformer-for-pronunciation/ba-p/3740866> (accessed Mar. 2024).
- [56] GutierrezM. A., D. Thalmann, and Frederic Vexo, *Stepping into virtual reality*. London: Springer, 2008.
- [57] Ralf Dorner, W. Broll, P. Grimm, and B. Jung, *Virtual and augmented reality (VR/AR) : foundations and methods of extended realities (XR)*. Cham, Switzerland: Springer, 2022.
- [58] V. Ramanathan, G. Natarajan, and S. Balasubramanian, “4 Convergence of AR/VR with IoT in manufacturing and their novel usage in IoT,” *De Gruyter eBooks*, pp. 77–98, Jun. 2023, doi: <https://doi.org/10.1515/9783110790146-004>.
- [59] E. Adams, *Fundamentals of Game Design, Third Edition*, 3rd ed. Berkeley, Ca: New Riders, 2019.
- [60] D. Baron, *Game Development Patterns with Unity 2021*, 2nd ed. Packt Publishing Ltd, 2021.
- [61] A. Barczak and H. Woźniak, “Comparative Study on Game Engines,” *Studia Informatica*, no. 23, pp. 5–24, Dec. 2020, doi: <https://doi.org/10.34739/si.2019.23.01>.

- [62] C. ISAR, "A Glance into Virtual Reality Development Using Unity," *Informatica Economica*, vol. 22, no. 3/2018, pp. 14–22, Sep. 2018, doi: <https://doi.org/10.12948/issn14531305/22.3.2018.02>.
- [63] S. R. Wicaksono, *Blackbox Testing Teori dan Studi Kasus*. European Organization for Nuclear Research, 2022. doi: <https://doi.org/10.5281/zenodo.7659674>.
- [64] G. J. Myers, T. Badgett, and T. M. Thomas with C. Sandler, *The Art of Software Testing, Second Edition*. www.Wiley.com, 2004.
- [65] P. Kurniawati, "Penguujian Sistem - SkyshiDigital - Medium," *Medium*, Oct. 29, 2018. [Online]. Available: <https://medium.com/skyshidigital/penguujian-sistem-52940ee98c77>. (Accessed: Jun. 10, 2024).
- [66] L. Setiyani, "Penguujian Sistem Informasi Inventory Pada Perusahaan Distributor Farmasi Menggunakan Metode *Black Box Testing*," *Techno Xplore: Jurnal Ilmu Komputer Dan Teknologi Informasi*, vol. 4, no. 1, pp. 1–9, 2019. [Online]. Available: <https://doi.org/10.36805/technoxplore.v4i1.539>. (Accessed: Jun. 10, 2024)..
- [67] Z. Sharfina and H. B. Santoso, "An Indonesian adaptation of the System Usability Scale (SUS)," 2016 International Conference on Advanced Computer Science and Information Systems (ICACSIS), Malang, Indonesia, 2016, pp. 145-148, doi: 10.1109/ICACSIS.2016.7872776.
- [68] P. Vlachogianni and N. Tselios, "Perceived usability evaluation of educational technology using the System Usability Scale (SUS): A systematic review," *Journal of Research on Technology in Education*, vol. 54, no. 3, pp. 1–18, Feb. 2021, doi: <https://doi.org/10.1080/15391523.2020.1867938>.
- [69] J. M. Finley, M. Gotsis, V. Lymphouridis, S. Jain, A. Kim, and B. E. Fisher, "Design and Development of a Virtual Reality-Based Mobility Training Game for People With Parkinson's Disease," *Frontiers in Neurology*, vol. 11, Jan. 2021, doi: <https://doi.org/10.3389/fneur.2020.577713>.
- [70] M. Schrepp, "User Experience Questionnaire Handbook," pp. 1-11, 2015
- [71] V. Bezdek, "System Usability Scale," *UX Methods*. <https://www.uxmethods.guru/method/system-usability-scale> (accessed Jun. 02, 2024)
- [72] Zoubaolian, R. Millsap, E. Urban, and N. Mehrotra, "How to use pronunciation assessment in AI Studio - Azure AI services," learn.microsoft.com, Jan. 21, 2024.



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<https://learn.microsoft.com/en-us/azure/ai-services/speech-service/pronunciation-assessment-tool?tabs=displaygranularity-of-pronunciation-assessment> (accessed Jun. 10, 2024).