



## DAFTAR PUSTAKA

- [1] S. Hase and C. Kenyon, "From andragogy to heutagogy," *UltiBASE*, pp. 1–10, 12 2000. [Online]. Available: <https://webarchive.nla.gov.au/awa/20110407211124/http://ultibase.rmit.edu.au/Articles/dec00/hase2.htm>
- [2] R. L. Moore, "Developing lifelong learning with heutagogy contexts critiques and challenges," *Distance Education*, vol. 41, pp. 381–401, 2020.
- [3] L. M. Blaschke and S. Hase, *Heutagogy: A Holistic Framework for Creating Twenty-First-Century Self-determined Learners*. Springer Berlin, Heidelberg, 2016, pp. 25–41.
- [4] K. Mac Callum, S. Day, D. Skelton, I. Lengyl, and M. Verhaart, "A multiple case study approach exploring innovation, pedagogical transformation and inclusion for mobile learning," in *The Mobile Learning Voyage - From Small Ripples to Massive Open Waters*, T. H. Brown and H. J. van der Merwe, Eds. Cham: Springer International Publishing, 2015, pp. 315–329.
- [5] T. Cochrane and L. Antonczak, "Implementing a mobile social media framework for designing creative pedagogies," *Social Sciences*, vol. 3, pp. 359–377, 2014.
- [6] L. M. Blaschke and V. I. Marin, "Applications of heutagogy in the educational use of e-portfolios," *Revista de Educación a Distancia*, vol. 64, pp. 1–21, 2020.
- [7] L. M. Blaschke and S. Hase, "Heutagogy and digital media networks: Setting students on the path to lifelong learning," *Pacific Journal of Technology Enhanced Learning*, vol. 1, 2019.
- [8] S. Hase, "Self-determined learning (heutagogy): Where have we come since 2000?" 2016.
- [9] L. M. Blaschke, "Heutagogy and lifelong learning : A review of heutagogical practice and self-determined learning," *The International Review of Research in Open and Distance Learning*, vol. 13, 2012.
- [10] O. Peters, *Distance education in transition: New trends and challenges*. Bibliotheks- und Informationssystem der Carl von Ossietzky Universität Oldenburg (BIS), 2002. [Online]. Available: <http://oops.uni-oldenburg.de/550/2/petdis02.pdf>
- [11] M. I. Correa, "Visual maps to navigate non-linear learning environments," 2017. [Online]. Available: <https://static1.squarespace.com/static/58856d643a0411d1d209ba6f/t/59a075c9f14aa16f879c3b86/1503688141364/Visual+Maps+to+navigate+Non-Linear+Learning+Environments+.pdf>
- [12] H. Rootzén, "Individualized learning through non-linear use of learning objects: With examples from math and stat," in *Proceedings of the 14th European Conference on e-Learning (ECEL 2015)*. ECEL, 2015, pp. 500–506. [Online]. Available: <https://core.ac.uk/download/pdf/43254856.pdf>



- [13] M. A. A. Mamun, G. Lawrie, and T. Wright, "Instructional design of scaffolded online learning modules for self-directed and inquiry-based learning environments," *Computers & Education*, vol. 144, p. 103695, 1 2020. [Online]. Available: <https://linkinghub.elsevier.com/retrieve/pii/S0360131519302489>
- [14] E. O'Brien and J. Reale, *Supporting Learner Agency Using the Pedagogy of Choice*. EdTech Books, 2021, pp. 73–82. [Online]. Available: <https://edtechbooks.org/up>
- [15] H. Kaplan, I. Bar-Tov, A. Glassner, and S. Back, *Promoting Agentic Engagement and Heutagogy in Tomer Elementary School in Beer Sheva, Israel*. EdTech Books, 2021, pp. 112–123. [Online]. Available: <https://edtechbooks.org/up>
- [16] A. Shemshack and J. M. Spector, "A systematic literature review of personalized learning terms," *Smart Learning Environments*, vol. 7, 12 2020, copyright - © The Author(s) 2020. This work is published under <http://creativecommons.org/licenses/by/4.0/> (the "License"). Notwithstanding the ProQuest Terms and Conditions, you may use this content in accordance with the terms of the License. Last updated - 2020-12-22. [Online]. Available: <https://search.proquest.com/scholarly-journals/systematic-literature-review-personalized/docview/2471638583/se-2?accountid=13771>
- [17] C. M. Stracke, S. Downes, G. Conole, D. Burgos, and F. Nascimbeni, "Are moocs open educational resources? a literature review on history, definitions and typologies of oer and moocs," *Open Praxis*, 12 2019.
- [18] N. Agonacs and J. F. Matos, "Heutagogy and self determined learning a review of the published literature on the application and implementation of the theory," *Open Learning: The Journal of Open, Distance and e- Learning*, vol. 34, pp. 223–240, 2019.
- [19] G. George and A. M. Lal, "Review of ontology-based recommender systems in e-learning," *Computers & Education*, vol. 142, pp. 1–18, 2019. [Online]. Available: <https://doi.org/10.1016/j.compedu.2019.103642>
- [20] R. Huang, J. M. Spector, and J. Yang, *Lecture Notes in Educational Technology*. Springer Nature Singapore, 2019.
- [21] P. Lowenthal, C. Bauer, and K.-Z. Chen, "Student perceptions of online learning: An analysis of online course evaluations," *American Journal of Distance Education*, vol. 29, pp. 85–97, 4 2015.
- [22] V. Alevan, B. M. McLaren, J. Sewall, M. V. Velsen, O. Popescu, S. Demi, M. Ringenberg, and K. R. Koedinger, "Example-tracing tutors: Intelligent tutor development for non-programmers," *International Journal of Artificial Intelligence in Education*, vol. 26, pp. 224–269, 2016.
- [23] P. Buckley and E. Doyle, "Individualising gamification: An investigation of the impact of learning styles and personality traits on the efficacy of gamification using a prediction market," *Computers & Education*, vol. 106, pp. 43–55, 2017. [Online]. Available: <https://www.sciencedirect.com/science/article/pii/S036013151630238X>



- [24] C. C. Aggarwal, *Recommender Systems*. Springer International Publishing Switzerland, 2016.
- [25] G. F. Tondello, R. Orji, and L. E. Nacke, “Recommender systems for personalized gamification,” in *Adjunct Publication of the 25th Conference on User Modeling, Adaptation and Personalization*. ACM, 7 2017, pp. 425–430.
- [26] N. W. Rahayu, R. Ferdiana, and S. S. Kusumawardani, “A systematic review of learning path recommender systems,” *Education and Information Technologies*, vol. 28, pp. 7437–7460, 6 2023. [Online]. Available: <https://link.springer.com/10.1007/s10639-022-11460-3>
- [27] X. Wu, H. Jiang, J. Zhang, Z. Wu, X. Cheng, Q. Yang, and Y. Zhou, “Kamc: Knowledge-aware meta-concept recommendation,” 6 2024. [Online]. Available: <https://www.researchsquare.com/article/rs-4521552/v1>
- [28] K. Tazi, S. Azzouzi, and M. E. H. Charaf, “An ontology-based recommender system for identifying learners’ confusion in moocs,” in *2023 7th IEEE Congress on Information Science and Technology (CiSt)*. IEEE, 12 2023, pp. 492–496.
- [29] R. Alatrash, M. A. Chatti, Q. U. Ain, Y. Fang, S. Joarder, and C. Siepman, “Conceptgcn: Knowledge concept recommendation in moocs based on knowledge graph convolutional networks and sbert,” *Computers and Education: Artificial Intelligence*, vol. 6, p. 100193, 6 2024.
- [30] S. Amin, M. I. Uddin, A. A. Alarood, W. K. Mashwani, A. Alzahrani, and A. O. Alzahrani, “Smart e-learning framework for personalized adaptive learning and sequential path recommendations using reinforcement learning,” *IEEE Access*, vol. 11, pp. 89 769–89 790, 2023.
- [31] J. He, Z. Liu, and X. Kong, “A novel link prediction approach for mooc forum thread recommendation using personalized pagerank and machine learning,” in *2023 3rd International Conference on Educational Technology (ICET)*. IEEE, 9 2023, pp. 37–41.
- [32] N. W. Rahayu, R. Ferdiana, and S. S. Kusumawardani, “A systematic review of ontology use in e-learning recommender system,” *Computers and Education: Artificial Intelligence*, vol. 3, p. 100047, 6 2022. [Online]. Available: <https://linkinghub.elsevier.com/retrieve/pii/S2666920X22000029>
- [33] M. Zapata-Ros, “Sequencing of contents and learning objects: part ii,” *Revista de Educación a Distancia*, vol. V, pp. 1–15, 2006. [Online]. Available: <http://www.um.es/ead/red/14/>
- [34] R. Robberecht, “Interactive nonlinear learning environments,” *The Electronic Journal of e-Learning*, vol. 5, pp. 59–68, 2007. [Online]. Available: <https://academic-publishing.org/index.php/ejel/article/view/1503/1466>
- [35] I. de Ridder, L. Calvi, and W. Geerts, “Non-linear learning the ‘open’ way: language acquisition on the web,” 2002. [Online]. Available: <https://EconPapers.repec.org/RePEc:ant:wpaper:2002005>



- [36] N. Rahayu, A. Arifin, R. Ferdiana, and S. Kusumawardani, "An ontology model for formative assessments," in *ICITEE 2022 - Proceedings of the 14th International Conference on Information Technology and Electrical Engineering*, 2022.
- [37] J. K. Tarus, Z. Niu, and G. Mustafa, "Knowledge-based recommendation: a review of ontology-based recommender systems for e-learning," *Artificial Intelligence Review*, vol. 50, pp. 21–48, 6 2018. [Online]. Available: <http://link.springer.com/10.1007/s10462-017-9539-5>
- [38] M. Salehi, I. N. Kamalabadi, and M. B. G. Ghouschi, "An effective recommendation framework for personal learning environments using a learner preference tree and a ga," *IEEE Transactions on Learning Technologies*, vol. 6, pp. 350–363, 2013.
- [39] A. Ana, "Trends in expert system development: A practicum content analysis in vocational education for over grow pandemic learning problems," *Indonesian Journal of Science and Technology*, vol. 5, 9 2020. [Online]. Available: <https://ejournal.kjpuji.id/index.php/ijost/article/view/127>
- [40] M. Hnida, M. K. Idrissi, and S. Bennani, "A formalism of the competency-based approach in adaptive learning systems," *WSEAS Transactions on Information Science and Applications*, vol. 11, pp. 83–93, 2014.
- [41] L. Romero, C. Saucedo, M. L. Caliusco, and M. Gutiérrez, "Supporting self-regulated learning and personalization using eportfolios: a semantic approach based on learning paths," *International Journal of Educational Technology in Higher Education*, vol. 16, p. 16, 12 2019, cited By :5<br/><br/>Export Date: 2 February 2021. [Online]. Available: <https://educationaltechnologyjournal.springeropen.com/articles/10.1186/s41239-019-0146-1>
- [42] B. Vesin, A. Klasnja-Milicevic, I. Mirjana, and Z. Budimac, "Applying recommender systems and adaptive hypermedia for e-learning personalization," *Computing and Informatics*, vol. 32, pp. 629–659, 2013. [Online]. Available: <https://www.cai.sk/ojs/index.php/cai/article/view/1736>
- [43] F. Colace, M. D. Santo, M. Lombardi, R. Mosca, and D. Santaniello, "A multi-layer approach for recommending contextual learning paths," *Journal of Internet Services and Information Security (JISIS)*, vol. 2, pp. 91–102, 2020.
- [44] J. El-Bouhdidi, M. Ghailani, and A. Fennan, "An intelligent architecture for generating evolutionary personalized learning paths based on learner profiles," *Journal of Theoretical and Applied Information Technology*, vol. 57, pp. 294–304, 2013.
- [45] F. Colace and M. D. Santo, "Ontology for e-learning: A bayesian approach," *IEEE Transactions on Education*, vol. 53, pp. 223–233, 2010.
- [46] N. Capuano and D. Toti, "Experimentation of a smart learning system for law based on knowledge discovery and cognitive computing," *Computers in Human Behavior*, vol. 92, pp. 459–467, 2019. [Online]. Available: <http://www.sciencedirect.com/science/article/pii/S0747563218301390>
- [47] A. Jevremovic, G. Shimic, M. Veinovic, and N. Ristic, "Ip addressing: Problem-based learning approach on computer networks," *IEEE Transactions on Learning Technologies*, vol. 10, pp. 367–378, 2017.



- [48] Y. lin Jeng and Y.-M. Huang, “Dynamic learning paths framework based on collective intelligence from learners,” *Computers in Human Behavior*, vol. 100, pp. 242–251, 2019. [Online]. Available: <https://doi.org/10.1016/j.chb.2018.09.012>
- [49] A. Akhdan and A. Fauzy, “Pendekatan rantai markov waktu diskrit dalam memprediksi penurunan dan kenaikan jumlah pelanggan air minum baru pdam kota surakarta,” *Emerging Statistics and Data Science Journal*, vol. 1, pp. 309–319, 6 2023.
- [50] S. Al-Muhaideb and M. E. B. Menai, “Evolutionary computation approaches to the curriculum sequencing problem,” *Natural Computing*, vol. 10, pp. 891–920, 6 2011. [Online]. Available: <http://link.springer.com/10.1007/s11047-010-9246-5>
- [51] A. H. Nabizadeh, J. P. Leal, H. N. Rafsanjani, and R. R. Shah, “Learning path personalization and recommendation methods: A survey of the state-of-the-art,” *Expert Systems with Applications*, vol. 159, pp. 1–20, 11 2020. [Online]. Available: <https://linkinghub.elsevier.com/retrieve/pii/S0957417420304206>
- [52] W. Fernando, “Moodle quizzes and their usability for formative assessment of academic writing,” *Assessing Writing*, vol. 46, p. 100485, 2020. [Online]. Available: <https://doi.org/10.1016/j.asw.2020.100485>
- [53] M. Ishaq, A. Abid, M. S. Farooq, M. F. Manzoor, U. Farooq, K. Abid, and M. A. Helou, “Advances in database systems education: Methods, tools, curricula, and way forward,” *Education and Information Technologies*, vol. 28, pp. 2681–2725, 3 2023. [Online]. Available: <https://link.springer.com/10.1007/s10639-022-11293-0>
- [54] M. Hannafin, S. Land, and K. Oliver, *Open Learning Environments: Foundations, Methods, and Models*. Mahwah: Lawrence Erlbaum, 1999, vol. II, pp. 115–140.
- [55] N. Rahayu, R. Ferdiana, and S. Kusumawardani, “Model of nonlinear learning path using heutagogy,” in *TALE 2021 - IEEE International Conference on Engineering, Technology and Education, Proceedings*, 2021.
- [56] R. Bridgstock, “Educating for digital futures: what the learning strategies of digital media professionals can teach higher education,” *Innovations in Education and Teaching International*, vol. 53, pp. 307–317, 2016. [Online]. Available: <http://dx.doi.org/10.1080/14703297.2014.956779>
- [57] A. Chimpololo, “Disciplinary variations in the diffusion of heutagogical use of mobile technologies among student□teachers,” *Education and Information Technologies*, 2021. [Online]. Available: <https://doi.org/10.1007/s10639-021-10505-3>
- [58] M. Vallance and P. A. Towndrow, “Pedagogic transformation, student-directed design and computational thinking,” *Pedagogies: An International Journal*, vol. 11, pp. 218–234, 2016.
- [59] A. Bansal, S. Jain, L. Sharma, N. Sharma, C. Jain, and M. Madaan, “Students’ perception regarding pedagogy , andragogy , and heutagogy as teaching – learning methods in undergraduate medical education,” *Journal of Education and Health Promotion*, vol. 9, 2020.



- [60] N. Anand, S. Pujar, and S. Rao, “A heutagogical interactive tutorial involving fishbowl with fish battle and round robin brainstorming: A novel syndicate metacognitive learning strategy,” *Medical Journal Armed Forces India*, vol. 77, pp. S73–S78, 2021. [Online]. Available: <https://doi.org/10.1016/j.mjafi.2020.12.003>
- [61] T. Cochrane and L. Antonczak, “A mobile learning community of practice : Facilitating conceptual shifts in pedagogy,” in *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 2013.
- [62] V. Msila, “Heutagogy, africanisation and learning: Experiences from an open and distance learning (odl) program at the university of south africa.pdf,” *Mediterranean Journal of Social Sciences*, vol. 5, 2014.
- [63] D. Mulrennan, “Mobile social media and the news- where heutagogy enables journalism education.pdf,” *Journalism & Mass Communication Educator*, vol. 73, pp. 322–333, 2018.
- [64] V. Narayan, J. Herrington, and T. Cochrane, “Designing for learning with mobile and social media tools—a pragmatic approach,” in *Open Oceans: Learning without borders. Proceedings ASCILITE 2018*, M. Campbell, J. Willems, C. Adachi, D. Blake, I. Doherty, S. Krishnan, S. Macfarlane, L. Ngo, M. O’Donnell, S. Palmer, L. Riddel, I. Story, H. Suri, and J. Tai, Eds., 2018, pp. 214–223.
- [65] —, “Design principles for heutagogical learning: Implementing student-determined learning with mobile and social media tools,” *Australasian Journal of Educational Technology*, vol. 35, pp. 86–101, 2019.
- [66] L. Blaschke and C. Kenyon, *Experiences in Self-determined Learning*. CreateSpace Independent Publishing Platform, 2014.
- [67] A. Faherty, “Developing enterprise skills through peer-assessed pitch presentations,” *Education + Training*, vol. 57, 2015.
- [68] G. C. Geer, “Addressing reality: A model for learner driven and standards-based internships for educational leadership programs .pdf,” *Journal of Higher Education Theory and Practice*, vol. 20, pp. 33–54, 2020.
- [69] B. Nkuyubwatsi, “The outcome of constructive alignment between open educational services and learners’ needs , employability and capabilities development: Heutagogy and transformative migration among underprivileged learners in rwanda the outcome of constructive alignment,” *Cogent Education*, vol. 3, 2016. [Online]. Available: <http://dx.doi.org/10.1080/2331186X.2016.1198522>
- [70] N. Agonács, J. F. Matos, D. Bartalesi-Graf, and D. N. O’Steen, “Are you ready? self-determined learning readiness of language mooc learners,” *Education and Information Technologies*, vol. 25, pp. 1161–1179, 2020. [Online]. Available: <http://dx.doi.org/10.1007/s10639-019-10017-1>
- [71] R. Rahayu, S. Iskandar, and Y. Abidin, “Inovasi pembelajaran abad 21 dan penerapannya di indonesia,” *Jurnal Basicedu*, vol. 6, pp. 2099–2104, 2 2022.



- [72] K. R. Premlatha and T. V. Geetha, "Learning content design and learner adaptation for adaptive e-learning environment: a survey," *Artificial Intelligence Review*, vol. 44, pp. 443–465, 2015.
- [73] S. M. Land and K. Oliver, "Open learning environments," N. M. Seel, Ed. Springer, Boston, MA, 2012, pp. 2518–2521.
- [74] J. Mullen, C. Byun, V. Gadepally, S. Samsi, A. Reuther, and J. Kepner, "Learning by doing, high performance computing education in the mooc era," *Journal of Parallel and Distributed Computing*, vol. 105, pp. 105–115, 7 2017.
- [75] J. Wong, M. Khalil, M. Baars, B. B. de Koning, and F. Paas, "Exploring sequences of learner activities in relation to self-regulated learning in a massive open online course," *Computers and Education*, vol. 140, 10 2019.
- [76] M. Zhang, J. Zhu, Z. Wang, and Y. Chen, "Providing personalized learning guidance in moocs by multi-source data analysis," *World Wide Web*, vol. 22, pp. 1189–1219, 5 2019.
- [77] P. Wu, F. Ma, and S. Yu, "Using a linked data-based knowledge navigation system to improve teaching effectiveness," *Interactive Learning Environments*, 2021.
- [78] S. Hase, "Learner defined curriculum: heutagogy and action learning in vocational training," *Southern Institute of Technology Journal of Applied Research*, pp. 1–10, 2011. [Online]. Available: <https://www.sit.ac.nz/Portals/0/upload/documents/sitjar/SITJAR%20AR%20edition%20A.pdf>
- [79] M. Buitrago and A. Chiappe, "Representation of knowledge in digital educational environments: A systematic review of literature," *Australasian Journal of Educational Technology*, vol. 35, pp. 46–62, 2019.
- [80] J. D. Novak and A. J. Cañas, "The theory underlying concept maps and how to construct them," *Florida Institute for Human and Machine Cognition*, vol. 1, no. 1, pp. 1–31, 2006.
- [81] J. Gordon, "Creating knowledge maps by exploiting dependent relationships," *Knowledge-Based Systems*, vol. 13, pp. 71–79, 4 2000.
- [82] M. Lee and A. L. Baylor, "Designing metacognitive maps for web-based learning," *Journal of Educational Technology & Society*, vol. 9, pp. 344–348, 2006. [Online]. Available: <http://www.jstor.org/stable/jeductechsoci.9.1.344>
- [83] A. Junaidi, D. Wulandari, S. Arifin, H. Soetanto, S. S. Kusumawardani, S. P. Wastutiningsih, M. S. Utama, E. Cahyono, G. F. Hertono, N. M. Syam, H. J. WY, P. H. Putra, C. Wijayanti, and Jobih, *Panduan Penyusunan Kurikulum Pendidikan Tinggi di Era Industri 4.0 untuk Mendukung Merdeka Belajar-Kampus Merdeka*, S. S. Kusumawardani, Ed. Dirjen Dikti Kemdikbud, 2020.
- [84] L. V. Velsen, T. V. D. Geest, R. Klaassen, and M. Steehouder, "User-centered evaluation of adaptive and adaptable systems: A literature review," pp. 261–281, 9 2008.



- [85] A. Khaled, S. Ouchani, and C. Chohra, “Recommendations-based on semantic analysis of social networks in learning environments,” *Computers in Human Behavior*, vol. 101, pp. 435–449, 2019. [Online]. Available: <http://www.sciencedirect.com/science/article/pii/S0747563218304266>
- [86] J. Clemente, H. Yago, J. de Pedro-Carracedo, and J. Bueno, “A proposal for an adaptive recommender system based on competences and ontologies,” *Expert Systems with Applications*, vol. 208, p. 118171, 12 2022. [Online]. Available: <https://linkinghub.elsevier.com/retrieve/pii/S0957417422013392>
- [87] S. E. Middleton, D. D. Roure, and N. R. Shadbolt, *Ontology-Based Recommender Systems*. Springer-Verlag Berlin Heidelberg, 2009, pp. 1648–1686.
- [88] D. F. Murad, Y. Heryadi, B. D. Wijanarko, S. M. Isa, and W. Budiharto, “Recommendation system for smart lms using machine learning: A literature review,” in *2018 International Conference on Computing, Engineering, and Design (ICCED)*. IEEE, 9 2018, pp. 113–118. [Online]. Available: <https://ieeexplore.ieee.org/document/8691088/>
- [89] J. M. Harley, M. Taub, R. Azevedo, and F. Bouchet, ““let’s set up some subgoals”: Understanding human-pedagogical agent collaborations and their implications for learning and prompt and feedback compliance,” *IEEE Transactions on Learning Technologies*, vol. 11, pp. 54–66, 2018.
- [90] H. Yago, J. Clemente, D. Rodriguez, and P. F. de Cordoba, “On-smmle: Ontology network-based student model for multiple learning environments,” *Data & Knowledge Engineering*, vol. 115, pp. 48–67, 2018. [Online]. Available: <http://www.sciencedirect.com/science/article/pii/S0169023X17301945>
- [91] A. Siren and V. Tzerpos, “Automatic learning path creation using oer: A systematic literature mapping,” *IEEE Transactions on Learning Technologies*, vol. 15, pp. 493–507, 8 2022. [Online]. Available: <https://ieeexplore.ieee.org/document/9839386/>
- [92] M. de Oliveira Costa Machado, N. F. S. Bravo, A. F. Martins, H. S. Bernardino, E. Barrere, and J. F. de Souza, “Metaheuristic-based adaptive curriculum sequencing approaches: a systematic review and mapping of the literature,” *Artificial Intelligence Review*, vol. 54, pp. 711–754, 1 2021.
- [93] M. Erdt, A. Fernandez, and C. Rensing, “Evaluating recommender systems for technology enhanced learning: A quantitative survey,” *IEEE Transactions on Learning Technologies*, vol. 8, pp. 326–344, 10 2015.
- [94] ISO/IEC/IEEE, “Iso/iec/ieee international standard - systems and software engineering–vocabulary,” pp. 1–541, 8 2017.
- [95] A. Lockey, P. Conaghan, A. Bland, and F. Astin, “Educational theory and its application to advanced life support courses: a narrative review,” *Resuscitation Plus*, vol. 5, p. 100053, 3 2021.
- [96] S. Hase, *An Introduction to Self-Determined Learning (Heutagogy)*. CreateSpace Independent Publishing Platform, 2014, pp. 15–30.



- [97] Y. Gazi, "Issues surrounding a heutagogical approach in global engineering education," in *2014 ASEE Annual Conference & Exposition Proceedings*. ASEE Conferences, 2014, pp. 24.830.1–24.830.10. [Online]. Available: <http://peer.asee.org/20722>
- [98] S. Hase and L. M. Blaschke, *So, You Want to Do Heutagogy: Principles and Practice*. EdTech Books, 2021, pp. 13–33.
- [99] F. Rasheed and A. Wahid, "Sequence generation for learning: a transformation from past to future," *The International Journal of Information and Learning Technology*, vol. ahead-of-print, 7 2019.
- [100] A. Iglesias, P. Martínez, R. Aler, and F. Fernández, *Learning Content Sequencing in an Educational Environment According to Student Needs*. Springer-Verlag, 2004, vol. 3244, pp. 454–463. [Online]. Available: [https://doi.org/10.1007/978-3-540-30215-5\\_34](https://doi.org/10.1007/978-3-540-30215-5_34)
- [101] B. Pepin and Z. Jan Kock, "Students' use of resources in a challenge-based learning context involving mathematics," *International Journal of Research in Undergraduate Mathematics Education*, vol. 7, pp. 306–327, 7 2021.
- [102] J. Cock and B. Meier, "Task sequencing and learning," N. M. Seel, Ed. Springer, Boston, MA, 2012, pp. 3266–3269.
- [103] P. Lucin and H. Mahmutefendic, "A new world of learning," *Donald School Journal of Ultrasound in Obstetrics and Gynecology*, vol. 7, pp. 248–260, 9 2013. [Online]. Available: <https://www.dsjuog.com/doi/10.5005/jp-journals-10009-1290>
- [104] S. Feldman, "The link and how we think -using hypertext as a teaching n learning tool," *International Journal of Instructional Media*, vol. 28, pp. 153–158, 2001. [Online]. Available: <https://www.proquest.com/scholarly-journals/link-how-we-think-using-hypertext-as-teaching/docview/204262050/se-2>
- [105] J. S. Leroux, L. de Lannoy, and C. P. T. Baillie, "Disorientation in community service-learning: A phenomenological inquiry," *Pedagogy in Health Promotion*, vol. 10, pp. 16–24, 3 2024.
- [106] A. Klačnja-Milicevic, M. Ivanovic, and A. Nanopoulos, "Recommender systems in e-learning environments: a survey of the state-of-the-art and possible extensions," *Artificial Intelligence Review*, vol. 44, pp. 571–604, 2015.
- [107] B. B. Sinha and R. Dhanalakshmi, "Evolution of recommender system over the time," *Soft Computing*, vol. 23, pp. 12 169–12 188, 2019. [Online]. Available: <https://doi.org/10.1007/s00500-019-04143-8>
- [108] G. van Capelleveen, C. Amrit, D. M. Yazan, and H. Zijm, "The recommender canvas: A model for developing and documenting recommender system design," *Expert Systems with Applications*, vol. 129, pp. 97–117, 9 2019. [Online]. Available: <https://linkinghub.elsevier.com/retrieve/pii/S0957417419302313>
- [109] J. Hebel, M. Fisher, R. Blace, and A. Perez-Lopez, *Semantic Web Programming*, M. Dean and M. Smith, Eds. Wiley Publishing, Inc., 2009.



- [110] J. T. Pollock, *Semantic Web For Dummies*. Wiley Publishing, Inc., 2009.
- [111] J. E. Gómez, J. F. Huete, and V. L. Hernandez, “A contextualized system for supporting active learning,” *IEEE Transactions on Learning Technologies*, vol. 9, pp. 196–202, 2016, cited By :14<br/><br/>Export Date: 2 February 2021. [Online]. Available: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-84979088456&doi=10.1109%2FTLT.2016.2531685&partnerID=40&md5=c4296dbff41f1758a974adc226bab455>
- [112] B. D. R. Mariño, M. J. Rodríguez-fórtiz, M. V. H. Torres, and H. M. Haddad, “Accessibility and activity-centered design for ict users : Accesibilitic ontology,” *IEEE Access*, vol. 6, pp. 60 655–60 665, 2018.
- [113] M. Al-Yahya, R. George, and A. Alfaries, “Ontologies in e-learning : Review of the literature,” *International Journal of Software Engineering and Its Applications*, vol. 9, pp. 67–84, 2015. [Online]. Available: <https://www.earticle.net/Article/A242009>
- [114] A. C. Khadir, H. Aliane, and A. Guessoum, “Ontology learning: Grand tour and challenges,” *Computer Science Review*, vol. 39, pp. 1–14, 2021. [Online]. Available: <https://doi.org/10.1016/j.cosrev.2020.100339>
- [115] M. Tapia-Leon, J. Chicaiza, and S. Lujan-Mora, “Application of ontologies in higher education: A systematic mapping study,” in *2018 IEEE Global Engineering Education Conference (EDUCON)*. IEEE, 2018, pp. 1344–1353.
- [116] P. Fournier-Viger, J. C.-W. Lin, R. U. Kiran, Y. S. Koh, and R. Thomas, “A survey of sequential pattern mining,” *Data Science and Pattern Recognition*, vol. 1, pp. 54–77, 2 2017.
- [117] S. Wan and Z. Niu, “A hybrid e-learning recommendation approach based on learners’ influence propagation,” *IEEE Transactions on Knowledge and Data Engineering*, vol. 32, pp. 827–840, 5 2020.
- [118] J. Pei, J. Han, B. Mortazavi-Asl, J. Wang, H. Pinto, Q. Chen, U. Dayal, and M.-C. Hsu, “Mining sequential patterns by pattern-growth: the prefixspan approach,” *IEEE Transactions on Knowledge and Data Engineering*, vol. 16, pp. 1424–1440, 11 2004.
- [119] D. Al-Fraihat, M. Joy, R. Masa’deh, and J. Sinclair, “Evaluating e-learning systems success: An empirical study,” *Computers in Human Behavior*, vol. 102, pp. 67–86, 1 2020.
- [120] C. S. Reichardt, *Quasi-experimentation: a guide to design and analysis*. The Guilford Press, 2019.
- [121] M. G. Isnawan, *Kuasi-Eksperimen*, Sudirman, Ed. Nashir Al-Kutub Indonesia, 1 2020.
- [122] J. Rogers and A. Révész, *Experimental and quasi-experimental designs*. Routledge, 12 2019.



- [123] A. Field and G. Hole, *How to Design and Report Experiments*. SAGE Publications Ltd, 2002.
- [124] J. L. Schafer and J. Kang, “Average causal effects from nonrandomized studies: A practical guide and simulated example.” *Psychological Methods*, vol. 13, pp. 279–313, 2008.
- [125] A. Fouasson-Chailloux, P. Daley, P. Menu, R. Gross, and M. Dauty, “Social media in health studies: A systematic review of comparative learning methods,” *International Journal of Environmental Research and Public Health*, vol. 19, 2 2022.
- [126] E. Lobos, A. Catanzariti, and R. McMillen, “Critical analysis of retrospective study designs,” *Clinics in Podiatric Medicine and Surgery*, vol. 41, pp. 273–280, 4 2024.
- [127] C. V. Obionwu, K. O. Kalu, P. Blockhaus, D. Broneske, and G. Saake, “A strategy for retrospective evaluation of students sql learning engagements,” in *2023 3rd International Conference on Electrical, Computer, Communications and Mechatronics Engineering (ICECCME)*. IEEE, 7 2023, pp. 1–7.
- [128] M. J. Gotlin, S. Baron, M. T. Kingery, J. McCafferty, M. Student, L. M. Jazrawi, and R. J. Meislin, “Recall bias in retrospective assessment of preoperative patient reported outcomes,” *Orthopaedic Journal of Sports Medicine*, vol. 7, p. 2325967119S0033, 7 2019.
- [129] K. Talari and M. Goyal, “Retrospective studies – utility and caveats,” *Journal of the Royal College of Physicians of Edinburgh*, vol. 50, pp. 398–402, 12 2020.
- [130] M. Goss-Sampson, *Statistical Analysis in JASP: A Guide for Students*. University of Greenwich, 6 2019. [Online]. Available: <https://static.jasp-stats.org/Statistical%20Analysis%20in%20JASP%20-%20A%20Students%20Guide%20v0.10.2.pdf>
- [131] M. Yildiz, R. Shi, and M. Kara, “How to improve the design of experimental studies in computing education: Evidence from the international assessments,” *Education and Information Technologies*, vol. 27, pp. 5075–5102, 5 2022.
- [132] B. Hoffman, G. Schraw, and M. T. McCrudden, *Cognitive Efficiency*. Boston, MA: Springer US, 2012, pp. 590–593. [Online]. Available: [https://doi.org/10.1007/978-1-4419-1428-6\\_353](https://doi.org/10.1007/978-1-4419-1428-6_353)
- [133] K. A. Renninger and A. List, *Scaffolding for Learning*. Boston, MA: Springer US, 2012, pp. 2922–2926. [Online]. Available: [https://doi.org/10.1007/978-1-4419-1428-6\\_569](https://doi.org/10.1007/978-1-4419-1428-6_569)
- [134] E. A. Webster and A. F. Hadwin, *Study Strategies*. Boston, MA: Springer US, 2012, pp. 3219–3223. [Online]. Available: [https://doi.org/10.1007/978-1-4419-1428-6\\_1287](https://doi.org/10.1007/978-1-4419-1428-6_1287)
- [135] H. Drachsler, H. G. Hummel, and R. Koper, “Identifying the goal, user model and conditions of recommender systems for formal and informal learning,” *Journal of Digital Information*, vol. 10, pp. 1–17, 2009. [Online]. Available: <https://jodi-ojs-tdl.tdl.org/jodi/article/view/442>



- [136] N. R. Ursia, I. B. Siaputra, and N. Sutanto, “Academic procrastination and self-control in thesis writing students of faculty of psychology, universitas surabaya,” *Makara Human Behavior Studies in Asia*, vol. 17, p. 1, 7 2013.
- [137] Q. Zhang, J. Lu, and G. Zhang, “Recommender systems in e-learning,” *Journal of Smart Environments and Green Computing*, 2021.
- [138] R. J. M. Oliveira, “Recommender system for an e-learning platform,” Ph.D. dissertation, Faculdade de Ciências da Universidade do Porto, 2016. [Online]. Available: [https://sigarra.up.pt/fcup/pt/pub\\_geral.show\\_file?pi\\_doc\\_id=90364](https://sigarra.up.pt/fcup/pt/pub_geral.show_file?pi_doc_id=90364)
- [139] J. Xiao, “Learner-content interaction in distance education: The weakest link in interaction research,” *Distance Education*, vol. 38, pp. 123–135, 1 2017.
- [140] B. Dick, *Crafting Learner-Centred Processes Using Action Research and Action Learning*. Bloomsbury Academic, 2013, pp. 39–53.
- [141] N. L. B. Zaidi, K. L. Grob, S. M. Monrad, J. B. Kurtz, A. Tai, A. Z. Ahmed, L. D. Gruppen, and S. A. Santen, “Pushing critical thinking skills with multiple-choice questions: Does bloom’s taxonomy work?” *Academic Medicine*, vol. 93, pp. 856–859, 6 2018.
- [142] D. DiBattista and L. Kurzawa, “Examination of the quality of multiple-choice items on classroom tests,” *The Canadian Journal for the Scholarship of Teaching and Learning*, vol. 2, 12 2011.
- [143] A. Dharmasmita, H. Puntha, and P. Molthan-Hill, “Practical challenges and digital learning: getting the balance right for future-thinking,” *On the Horizon*, vol. 25, pp. 33–44, 2017.
- [144] N. E. Cagiltay, K. Cagiltay, and B. Celik, “An analysis of course characteristics, learner characteristics, and certification rates in mitx moocs,” *The International Review of Research in Open and Distributed Learning*, vol. 21, pp. 121–139, 4 2020. [Online]. Available: <http://www.irrodl.org/index.php/irrodl/article/view/4698>
- [145] M. McDaniel and V. C. Storey, “Evaluating domain ontologies: Clarification, classification, and challenges,” *ACM Comput. Surv.*, vol. 52, pp. 1–44, 9 2019. [Online]. Available: <https://doi.org/10.1145/3329124>
- [146] A. Buchner, *Understanding Moodle Plugins*, 4th ed. Packt Publishing, 2022.
- [147] K. I. Ghauth and N. A. Abdullah, “Measuring learner’s performance in e-learning recommender systems,” *Australasian Journal of Educational Technology*, vol. 26, 10 2010.
- [148] Moodle, “Plugins faq,” 3 2024. [Online]. Available: [https://docs.moodle.org/403/en/Plugins\\_FAQ](https://docs.moodle.org/403/en/Plugins_FAQ)
- [149] C. T. Force, *Computing Curricula 2020*. ACM and IEEE, 12 2020.



- [150] B. C. K. Choi and A. W. P. Pak, “Multidisciplinarity, interdisciplinarity and transdisciplinarity in health research, services, education and policy: 1 . definitions, objectives, and evidence of effectiveness,” *Clin Invest Med*, vol. 29, pp. 351–364, 2006. [Online]. Available: <https://pubmed.ncbi.nlm.nih.gov/17330451/>
- [151] ACM/IEEE, *Computer Engineering Curricula 2016*. ACM and IEEE, 12 2016. [Online]. Available: <https://www.acm.org/binaries/content/assets/education/ce2016-final-report.pdf>
- [152] —, *Computer Science Curricula 2013*, A. C. C. T. Force, Ed. ACM, Inc, 1 2013.
- [153] T. J. A. I. T. Force, *IS2020: A Competency Model for Undergraduate Programs in Information Systems*. ACM and AIS, 12 2020. [Online]. Available: <https://www.acm.org/binaries/content/assets/education/curricula-recommendations/is2020.pdf>
- [154] ACM/IEEE, *Information Technology Curricula 2017: Curriculum Guidelines for Baccalaureate Degree Programs in Information Technology*. Association for Computing Machinery, 12 2017.
- [155] N. W. Rahayu, R. Ferdiana, and S. S. Kusumawardani, “An enhanced domain ontology model of database course in computing curricula,” *IAES International Journal of Artificial Intelligence (IJ-AI)*, vol. 13, p. 1339, 6 2024.
- [156] T. Connolly and C. Begg, *Database Systems: A Practical Approach to Design, Implementation and Management 4th Edition*. Pearson Education, 2005.
- [157] N. W. Rahayu, *Menjadi profesional basisdata relasional*. Penerbit UII, 2017.
- [158] L. Tahmidaten and W. Krismanto, “Permasalahan budaya membaca di indonesia (studi pustaka tentang problematika & solusinya),” *Scholaria: Jurnal Pendidikan dan Kebudayaan*, vol. 10, pp. 22–33, 1 2020.
- [159] D. Purwati, “The effects of lecturers’ formal and informal talks on students’ understanding of the material in the language learning process,” *IDEAS: Journal on English Language Teaching and Learning, Linguistics and Literature*, vol. 8, 6 2020.
- [160] K. Hyland and F. K. Jiang, “Is academic writing becoming more informal?” *English for Specific Purposes*, vol. 45, pp. 40–51, 1 2017.
- [161] A. Sudijono, *Pengantar Evaluasi Pendidikan*, 1st ed. Rajawali Pers, 2015.
- [162] I. Gunawan and A. R. Palupi, “Taksonomi bloom-revisi ranah kognitif: Kerangka landasan untuk pembelajaran, pengajaran dan penilaian,” *Premiere Educandum: Jurnal Pendidikan Dasar dan Pembelajaran*, vol. 2, pp. 98–117, 2012.
- [163] L. W. Anderson and D. R. Krathwohl, “Revised bloom’s taxonomy – question starters,” 10 2013. [Online]. Available: <https://education.illinoisstate.edu/downloads/casei/5-02-Revised%20Blooms.pdf>
- [164] M. N. Demaidi, M. M. Gaber, and N. Filer, “Ontopfege : Ontology-based personalized feedback generator,” *IEEE Access*, vol. 6, pp. 31 644–31 664, 2018.



- [165] J. Clemente, J. Ramírez, and A. de Antonio, “A proposal for student modeling based on ontologies and diagnosis rules,” *Expert Systems with Applications*, vol. 38, pp. 8066–8078, 2011. [Online]. Available: <http://www.sciencedirect.com/science/article/pii/S0957417410015095>
- [166] W. Howden, “Functional program testing,” *IEEE Transactions on Software Engineering*, vol. SE-6, pp. 162–169, 3 1980.
- [167] S. R. Lowe, C. O. Dillon, J. E. Rhodes, and L. Zwiebach, “Defining adult experiences,” *Journal of Adolescent Research*, vol. 28, pp. 31–68, 1 2013, pMID: 23554545. [Online]. Available: <http://journals.sagepub.com/doi/10.1177/0743558411435854>
- [168] J. A. Sterne, M. A. Hernán, A. McAleenan, B. C. Reeves, and J. P. Higgins, *Chapter 25: Assessing risk of bias in a non-randomized study*. Cochrane, 2023.
- [169] J. K. Tarus, Z. Niu, and A. Yousif, “A hybrid knowledge-based recommender system for e-learning based on ontology and sequential pattern mining,” *Future Generation Computer Systems*, vol. 72, pp. 37–48, 2017. [Online]. Available: <http://www.sciencedirect.com/science/article/pii/S0167739X17303254>
- [170] M. Tedre and N. Moisseinen, “Experiments in computing: A survey,” *The Scientific World Journal*, vol. 2014, pp. 1–11, 2014.
- [171] A. M. Kaplan and M. Haenlein, “Higher education and the digital revolution: About moocs, spocs, social media, and the cookie monster,” *Business Horizons*, vol. 59, pp. 441–450, 7 2016.
- [172] M. Lahti, R. Kontio, A. Pitkänen, and M. Välimäki, “Knowledge transfer from an e-learning course to clinical practice,” *Nurse Education Today*, vol. 34, pp. 842–847, 5 2014.
- [173] Z. Marosan, N. Savic, A. Klasnja-Milicevic, M. Ivanovic, and B. Vesin, “Students’ perceptions of ils as a learning-style-identification tool in e-learning environments,” *Sustainability*, vol. 14, 2022. [Online]. Available: <https://www.mdpi.com/2071-1050/14/8/4426>
- [174] R. M. Felder, L. K. Silverman *et al.*, “Learning and teaching styles in engineering education,” *Engineering education*, vol. 78, pp. 674–681, 1988.
- [175] A. Hidayat, K. Adi, and B. Surarso, “Detection of student learning styles using the index of learning style,” in *Proceedings of the 1st International Conference Of Education, Social And Humanities (INCESH 2021)*. Atlantis Press, 2021, pp. 34–38. [Online]. Available: <https://doi.org/10.2991/assehr.k.211028.090>
- [176] L. Agustina, M. Meyliana, and S. T. S. Tin, “Assessing accounting students’ performance in “cognitive misfit” condition,” *Journal of Business & Retail Management Research*, vol. 11, pp. 131–139, 8 2017.
- [177] E. Simangunsong, “Learning style preference: Results of repetitive cross-sectional surveys in an higher education institution,” *JPI (Jurnal Pendidikan Indonesia)*, vol. 9, p. 730, 12 2020.



- [178] A. Rohman and S. Muhtamiroh, "Shaping the santri's inclusive attitudes through learning in pesantren: A case study of pesantren al-anwar sarang rembang indonesia," *Journal of Educational and Social Research*, vol. 12, p. 367, 3 2022.
- [179] E. R. Maharany, "Pengembangan silabus pengajaran bipa berbasis teks," *Jurnal Pendidikan Bahasa dan Sastra Indonesia Undiksha*, vol. 10, pp. 80–87, 5 2020.
- [180] J. J. López-Jiménez, J. L. Fernández-Alemán, J. A. García-Berná, L. L. González, O. G. Sequeros, J. N. Ros, J. M. C. de Gea, A. Idri, and A. Toval, "Effects of gamification on the benefits of student response systems in learning of human anatomy: Three experimental studies," *International Journal of Environmental Research and Public Health*, vol. 18, p. 13210, 12 2021.
- [181] R. Jerz, "Amount of time spent in course," 1 2018. [Online]. Available: <https://moodle.org/mod/forum/discuss.php?d=364261>
- [182] T. M. Franke, T. Ho, and C. A. Christie, "The chi-square test," *American Journal of Evaluation*, vol. 33, pp. 448–458, 9 2012.
- [183] D. Keržič, J. K. Alex, R. P. B. Alvarado, D. da Silva Bezerra, M. Cheraghi, B. Dobrowolska, A. F. Fagbamigbe, M. E. Faris, T. França, B. González-Fernández, L. M. Gonzalez-Robledo, F. Inasius, S. K. Kar, K. Lazányi, F. Lazăr, J. D. Machin-Mastromatteo, J. Marôco, B. P. Marques, O. Mejía-Rodríguez, S. M. M. Prado, A. Mishra, C. Mollica, S. G. N. Jiménez, A. Obadić, D. Raccanello, M. M. U. Rashid, D. Ravšelj, N. Tomažević, C. Uleanya, L. Umek, G. Vicentini, Özlem Yorulmaz, A.-M. Zamfir, and A. Aristovnik, "Academic student satisfaction and perceived performance in the e-learning environment during the covid-19 pandemic: Evidence across ten countries," *PLOS ONE*, vol. 16, p. e0258807, 10 2021.
- [184] H. M. Selim, "An empirical investigation of student acceptance of course websites," *Computers & Education*, vol. 40, pp. 343–360, 2003. [Online]. Available: <https://www.sciencedirect.com/science/article/pii/S0360131502001422>
- [185] A. Hassanzadeh, F. Kanaani, and S. Elahi, "A model for measuring e-learning systems success in universities," *Expert Systems with Applications*, vol. 39, pp. 10 959–10 966, 2012. [Online]. Available: <https://www.sciencedirect.com/science/article/pii/S0957417412004988>
- [186] X. Jing, V. L. Patel, J. J. Cimino, J. H. Shubrook, Y. Zhou, C. Liu, and S. D. Lacalle, "The roles of a secondary data analytics tool and experience in scientific hypothesis generation in clinical research: Protocol for a mixed methods study," *JMIR Research Protocols*, vol. 11, p. e39414, 7 2022.
- [187] M. J. Kintu, C. Zhu, and E. Kagambe, "Blended learning effectiveness: the relationship between student characteristics, design features and outcomes," *International Journal of Educational Technology in Higher Education*, vol. 14, p. 7, 12 2017.
- [188] O. A. Aliyu, C. N. Arasanmi, and S. Ekundayo, "Do demographic characteristics moderate the acceptance and use of the moodle learning system among business students," *International Journal of Education and Development using ICT*, 2019.



- [189] J. Li, Y. Tang, M. Cao, and X. Hu, "The moderating effects of discipline on the relationship between asynchronous discussion and satisfaction with moocs," *Journal of Computers in Education*, vol. 5, pp. 279–296, 9 2018.
- [190] M. Sibanda and S. Donnelly, "The impact of e-learning on student performance: A case study of an entry-level module at a south african university," *Mediterranean Journal of Social Sciences*, 5 2014.
- [191] A. J. Martin, M. Maria, and F. Sagayaraj, "Learners classification for personalized learning experience in e-learning systems," *International Journal of Advanced Computer Science and Applications*, vol. 12, 2021.
- [192] S. Tatminingsih and H. Hulaifi, "Correlation between i-learning skills, domicile and student learning achievement in distance education," *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, vol. 6, pp. 2936–2944, 2 2022.
- [193] L. Alnaji and Y. Karsu, "Effect of work status, experience and job sector on e-learning style in hybrid classrooms: Gcc case study," *European Journal of Business and Management*, vol. 8, pp. 31–36, 2016.
- [194] S. Affouneh and E. Alshawish, "Trigger factors of using moodle or e-learning by faculty of medicine and health sciences college and education college," *Journal of Education Technology*, vol. 6, pp. 499–506, 8 2022.
- [195] D. F. McCaffrey, B. A. Griffin, D. Almirall, M. E. Slaughter, R. Ramchand, and L. F. Burgette, "A tutorial on propensity score estimation for multiple treatments using generalized boosted models," *Statistics in Medicine*, vol. 32, pp. 3388–3414, 8 2013.
- [196] J. Gong, T. X. Liu, and J. Tang, "How monetary incentives improve outcomes in moocs: Evidence from a field experiment," *Journal of Economic Behavior & Organization*, vol. 190, pp. 905–921, 10 2021.
- [197] M. Bond, "Facilitating student engagement through the flipped learning approach in k-12: A systematic review," *Computers & Education*, vol. 151, p. 103819, 7 2020.
- [198] B. Ross, A.-M. Chase, D. Robbie, G. Oates, and Y. Absalom, "Adaptive quizzes to increase motivation, engagement and learning outcomes in a first year accounting unit," *International Journal of Educational Technology in Higher Education*, vol. 15, p. 30, 12 2018.
- [199] M. E. O'Neill and K. L. Mathews, "Levene tests of homogeneity of variance for general block and treatment designs," *Biometrics*, vol. 58, pp. 216–224, 3 2002.
- [200] B. A. Schneider, M. Avivi-Reich, and M. Mozuraitis, "A cautionary note on the use of the analysis of covariance (ancova) in classification designs with and without within-subject factors," *Frontiers in Psychology*, vol. 6, 4 2015.
- [201] Y. Chan and R. P. Walmsley, "Learning and understanding the kruskal-wallis one-way analysis-of- variance-by-rankstest for differences among three or more independent groups," *Physical Therapy*, vol. 77, pp. 1755–1761, 12 1997.



- [202] S. Lee and D. K. Lee, "What is the proper way to apply the multiple comparison test?" *Korean Journal of Anesthesiology*, vol. 71, pp. 353–360, 10 2018.
- [203] A. Dinno, "Nonparametric pairwise multiple comparisons in independent groups using dunn's test," *The Stata Journal: Promoting communications on statistics and Stata*, vol. 15, pp. 292–300, 4 2015.
- [204] R. Diestel, *Graph Theory*, 5th ed. Springer Berlin Heidelberg, 2017, vol. 173.
- [205] D. Ifenthaler, D. Gibson, and E. Dobozy, "Informing learning design through analytics: Applying network graph analysis," *Australasian Journal of Educational Technology*, vol. 34, 4 2018.
- [206] P. Shea, S. Hayes, S. U. Smith, J. Vickers, T. Bidjerano, M. Gozza-Cohen, S.-B. Jian, A. Pickett, J. Wilde, and C.-H. Tseng, "Online learner self-regulation: Learning presence viewed through quantitative content- and social network analysis," *The International Review of Research in Open and Distributed Learning*, vol. 14, p. 427, 7 2013.
- [207] Lynn, K. M. C. Kathryn, and Jeffery, "Heutagogical approaches in the understanding and modelling the adoption of mobile learning," in *The Mobile Learning Voyage - From Small Ripples to Massive Open Waters*, H. J. B. T. H. and van der Merwe, Eds. Springer International Publishing, 2015, pp. 330–342.
- [208] L. Cadorin, V. Bressan, and A. Palese, "Instruments evaluating the self-directed learning abilities among nursing students and nurses: a systematic review of psychometric properties," *BMC Medical Education*, vol. 17, p. 229, 12 2017.
- [209] S.-F. Cheng, C.-L. Kuo, K.-C. Lin, and J. Lee-Hsieh, "Development and preliminary testing of a self-rating instrument to measure self-directed learning ability of nursing students," *International Journal of Nursing Studies*, vol. 47, pp. 1152–1158, 9 2010.
- [210] T. Taryudi, L. Lindayani, and I. Darmawati, "Comparing self-directed online learning between nursing and non-nursing students during novel corona virus-2019 pandemic in indonesia: A national web-based survey," *Jurnal Aisyah : Jurnal Ilmu Kesehatan*, vol. 6, pp. 199–206, 6 2021.
- [211] M. Harrathi and R. Braham, "Recommenders in improving students' engagement in large scale open learning," in *25th International Conference on Knowledge-Based and Intelligent Information & Engineering Systems*. Elsevier B.V., 2021, pp. 1121–1131.
- [212] A. Simsek, "Learner control," in *Encyclopedia of the Sciences of Learning*, N. M. Seel, Ed. Springer Science+Business Media, 2012, pp. 1748–1750.
- [213] N. R. Maulana and A. P. Lintang Sari, "The use of moodle in english language learning during the pandemic: The students voice," *The Journal of English Literacy Education: The Teaching and Learning of English as a Foreign Language*, vol. 8, pp. 27–41, 5 2021.
- [214] A. Shoufan, "Lecture-free classroom: Fully active learning on moodle," *IEEE Transactions on Education*, vol. 63, no. 4, pp. 314–321, 2020.



- [215] Coursera, “Course certificates,” 2021. [Online]. Available: [https://www.coursera.support/s/article/208280196-Course-Certificates?language=en\\_US](https://www.coursera.support/s/article/208280196-Course-Certificates?language=en_US)
- [216] H. P. Institute, “Records on openhpi,” 2023. [Online]. Available: [https://open.hpi.de/pages/document\\_types](https://open.hpi.de/pages/document_types)
- [217] N. Agonács and J. F. Matos, *Learner Agency in Distance Education Settings: Understanding Language MOOC Learners’ Heutagogical attribute*. EdTech Books, 2021, pp. 94–103. [Online]. Available: <https://edtechbooks.org/up>
- [218] E. J. Palmer and P. G. Devitt, “Assessment of higher order cognitive skills in undergraduate education: modified essay or multiple choice questions? research paper,” *BMC Medical Education*, vol. 7, p. 49, 12 2007.
- [219] M.-K. Kim, R. A. Patel, J. A. Uchizono, and L. Beck, “Incorporation of bloom’s taxonomy into multiple-choice examination questions for a pharmacotherapeutics course,” *American Journal of Pharmaceutical Education*, vol. 76, p. 114, 8 2012.
- [220] R. Boero and M. Novarese, “Feedback and learning,” in *Encyclopedia of the Sciences of Learning*, N. M. Seel, Ed. Springer Science+Business Media, 2012, pp. 1282–1285.
- [221] C. B. White and J. C. Fantone, “Pass–fail grading: laying the foundation for self-regulated learning,” *Advances in Health Sciences Education*, vol. 15, pp. 469–477, 10 2010.
- [222] F. H. UII, “Pedoman penilaian,” 2023. [Online]. Available: <https://law.uii.ac.id/akademik-pshpm/pedoman-penilaian/>
- [223] Moodle, “Using chat,” 5 2024.
- [224] —, “Forum activity,” 4 2024.
- [225] O. Scheu and C. Zinn, “How did the e-learning session go? the student inspector,” in *13th international conference on artificial Intelligence and Education (AIED 2007)*. IOS Press, 2007.
- [226] H. P. Institute, “More about massive open online courses (moocs),” 2024. [Online]. Available: <https://open.hpi.de/pages/mooc>
- [227] Moodle, “Database schema introduction,” 5 2022.
- [228] W. Feng, J. Tang, and T. X. Liu, “Understanding dropouts in moocs,” *Proceedings of the AAAI Conference on Artificial Intelligence*, vol. 33, pp. 517–524, 7 2019.
- [229] Z. Chi, S. Zhang, and L. Shi, “Analysis and prediction of mooc learners’ dropout behavior,” *Applied Sciences*, vol. 13, p. 1068, 1 2023.
- [230] B. Kurniawan, “Waktu indonesia barat,” 5 2024. [Online]. Available: [https://id.wikipedia.org/wiki/Waktu\\_Indonesia\\_Barat](https://id.wikipedia.org/wiki/Waktu_Indonesia_Barat)
- [231] A. P. Association, “Apa style numbers and statistics guide,” 2022. [Online]. Available: <https://apastyle.apa.org/instructional-aids/numbers-statistics-guide.pdf>



- [232] O. W. Ariyani and T. Prasetyo, “Efektivitas model pembelajaran problem based learning dan problem solving terhadap kemampuan berpikir kritis siswa sekolah dasar,” *Jurnal Basicedu*, vol. 5, pp. 1149–1160, 4 2021.
- [233] R. Norouzian and L. Plonsky, “Eta- and partial eta-squared in l2 research: A cautionary review and guide to more appropriate usage,” *Second Language Research*, vol. 34, pp. 257–271, 4 2018.
- [234] L. A. Becker, “Effect size (es),” 2000. [Online]. Available: <https://www.uv.es/~friasnav/EffectSizeBecker.pdf>
- [235] IBM, “Post-hoc tests for one-way ancova models,” 4 2020. [Online]. Available: <https://www.ibm.com/support/pages/node/417563>
- [236] M. A.-Y. Oliveira and J. J. P. Ferreira, “Business model generation: A handbook for visionaries, game changers and challengers (book review),” *African Journal of Business Management*, vol. 5, 4 2011. [Online]. Available: <https://academicjournals.org/journal/AJBM/article-full-text-pdf/BA71B6427744>
- [237] D. Mora, S. Jain, O. Nalbach, and D. Werth, “An in-store recommender system leveraging the microsoft hololens,” in *HCI International 2020 - Posters*, C. Stephanidis and M. Antona, Eds. Springer International Publishing, 2020, pp. 99–107.
- [238] J. Robert, “Recipe suggestion for meal-sharing online marketplaces,” B.S. thesis, University of Twente, 2020. [Online]. Available: <https://essay.utwente.nl/82079/>
- [239] A. B. Chagas, “A recommender system to support the development of context-aware intelligent transportation systems,” Ph.D. dissertation, Federal University of Pernambuco, 2022.
- [240] I. Magnisalis, S. Demetriadis, and A. Karakostas, “Adaptive and intelligent systems for collaborative learning support: A review of the field,” *IEEE Transactions on Learning Technologies*, vol. 4, pp. 5–20, 2011.
- [241] F. L. da Silva, B. K. Slodkowski, K. K. A. da Silva, and S. C. Cazella, “A systematic literature review on educational recommender systems for teaching and learning: research trends, limitations and opportunities,” *Education and Information Technologies*, vol. 28, pp. 3289–3328, 3 2023.
- [242] S. Roy, C. Beer, and C. Lawson, “The importance of clarity in written assessment instructions,” *Journal of Further and Higher Education*, vol. 44, pp. 143–155, 2 2020.
- [243] M. Deschênes, “Recommender systems to support learners’ agency in a learning context: a systematic review,” *International Journal of Educational Technology in Higher Education*, vol. 17, p. 50, 12 2020.
- [244] D. F. Murad, Y. Heryadi, S. M. Isa, and W. Budiharto, “Personalization of study material based on predicted final grades using multi-criteria user-collaborative filtering recommender system,” *Education and Information Technologies*, vol. 25, pp. 5655–5668, 11 2020.



- [245] H. Li, M. Y.-P. Peng, M. Yang, and C.-C. Chen, “Exploring the influence of learning motivation and socioeconomic status on college students’ learning outcomes using self-determination theory,” *Frontiers in Psychology*, vol. 11, 7 2020.
- [246] S. Wild and C. Neef, “Analyzing the associations between motivation and academic performance via the mediator variables of specific mathematic cognitive learning strategies in different subject domains of higher education,” *International Journal of STEM Education*, vol. 10, p. 32, 5 2023.
- [247] J. Sweller, P. Ayres, and S. Kalyuga, *Cognitive Load Theory*. Springer Science+Business Media, 2011.
- [248] L. B. Sartor, L. L. da Rosa, K. Madeira, M. L. R. Uggioni, O. F. F. Filho, and M. I. da Rosa, “Undergraduate medical student’s perception about the progress testing,” *Revista Brasileira de Educação Médica*, vol. 44, 2020.
- [249] M. R. Smith, “Student perspectives on satisfaction with learning in bachelor of nursing programs in australia: A constructivist grounded theory study,” Ph.D. dissertation, Griffith University, 8 2018.
- [250] F. D. Betoret, “The influence of students’ and teachers’ thinking styles on student course satisfaction and on their learning process,” *Educational Psychology*, vol. 27, pp. 219–234, 4 2007.
- [251] A. Al-Azawei, P. Parslow, and K. Lundqvist, “Investigating the effect of learning styles in a blended e-learning system: An extension of the technology acceptance model (tam),” *Australasian Journal of Educational Technology*, 11 2016.
- [252] S. Fraihat and Q. Shambour, “A framework of semantic recommender system for e-learning,” *Journal of Software*, vol. 10, pp. 317–330, 3 2015.
- [253] M. T. H. Widyarti, H. Hartono, J. Handayani, Z. P. Rokhimah, and S. Y. Kusuma, “Implementasi business model canvas pada ud makmur mandiri,” *Jurnal Aktual Akuntansi Keuangan Bisnis Terapan (AKUNBISNIS)*, vol. 6, p. 50, 6 2023.
- [254] M. Pepin, M. Tremblay, L. K. Audebrand, and S. Chassé, “The responsible business model canvas: designing and assessing a sustainable business modeling tool for students and start-up entrepreneurs,” *International Journal of Sustainability in Higher Education*, vol. 25, pp. 514–538, 2 2024.
- [255] J. A. Ruiz-Ramirez, D. F. Reyes-Cancino, and C. J. Arenas-Castro, “Business model canvas as an analytical tool for the evaluation of companies: Case study for the audiovisual industry in bogota, colombia,” *South African Journal of Industrial Engineering*, vol. 30, 12 2019.
- [256] J. Kruger and D. Dunning, “Unskilled and unaware of it: how difficulties in recognizing one’s own incompetence lead to inflated self-assessments.” *Journal of personality and social psychology*, vol. 77, p. 1121, 1999.
- [257] D. Strmečki, A. Bernik, and D. Radošević, “Gamification in e-learning: Introducing gamified design elements into e-learning systems,” *Journal of Computer Science*, vol. 11, pp. 1108–1117, 12 2015.



- [258] E. Meşe and Çiğdem Sevilen, “Factors influencing efl students’ motivation in online learning: A qualitative case study,” *Journal of Educational Technology and Online Learning*, vol. 4, pp. 11–22, 2021. [Online]. Available: <https://dergipark.org.tr/en/pub/jetol/issue/60134/817680>
- [259] S. Shen, E. Chen, Q. Liu, Z. Huang, W. Huang, Y. Yin, Y. Su, and S. Wang, “Monitoring student progress for learning process-consistent knowledge tracing,” *IEEE Transactions on Knowledge and Data Engineering*, pp. 1–15, 2023.