Artificial Intelligence, Games, and Education

Barbero, G.

Bibliography

[1] N. K. Lai, T. F. Ang, L. Y. Por, and C. S. Liew, "The impact of play on child development - a literature review," *European Early Childhood Education Research Journal*, vol. 26, pp. 625–643, 9 2018.

[2] S. Ahmad, M. Phil, and M. Malik, "Play and cognitive development: Formal operational perspective of piaget's theory," *Journal of Education and Practice*, vol. 7, 2016.

[3] G. Frasca, "Simulation versus narrative: Introduction to ludology," in *The video game theory reader*, pp. 221–235, Routledge, 2013.

[4] S. Russels, "Spacewar!," 1962.

[5] K. Thompson, "Space travel," 1969.

[6] IBM and Board of Cooperative Educational Services of Westchester County, New York, "The sumerian game," 1964.

[7] J. F. Kihlstrom, "Ecological validity and "ecological validity"," *Perspectives on Psychological Science*, vol. 16, pp. 466–471, 3 2021.

[8] A. M. Bean, R. K. Nielsen, A. J. van Rooij, and C. J. Ferguson, "Video game addiction: The push to pathologize video games," *Professional Psychology: Research and Practice*, vol. 48, pp. 378–389, 10 2017.

[9] S. Deterding, D. Dixon, R. Khaled, and L. Nacke, "From game design elements to gamefulness: Defining "Gamification"," in *Proceedings of the 15th international academic MindTrek conference: Envisioning future media environments*, MindTrek '11, (New York, NY, USA), pp. 9–15, Association for Computing Machinery, 2011.

[10] K. S. Tekinbas and E. Zimmerman, *Rules of play: Game design fundamentals*. MIT press, 2003.

[11] Colossal Order, "Cities: Skyline," 2015.

[12] B. von Reisswitz, "Anleitung zur darstellung militairischer manöver mit dem apparat des kriegs-spieles.," 1824.

[13] Women's Social and Political Union, "Pank-a-squith," 1909.

[14] S. Dadzie, "Womanopoly," 1970.

[15] W. Güth, P. Ockenfels, and M. Wendel, "Cooperation based on trust. an experimental investigation," *Journal of Economic Psychology*, vol. 18, no. 1, pp. 15–43, 1997.

[16] D. A. Washburn, "The games psychologists play (and the data they provide)," *Behavior Research Methods, Instruments, & Computers*, vol. 35, no. 2, pp. 185–193, 2003.

[17] K. Robson, K. Plangger, J. H. Kietzmann, I. McCarthy, and L. Pitt, "Is it all a game? understanding the principles of gamification," *Business Horizons*, vol. 58, pp. 411–420, 7 2015.

[18] R. S. Alsawaier, *The Effect of Gamification on Motivation and Engagement in Three WSU College Courses*. PhD thesis, Washington State University, 2018.

[19] J. Hamari, K. Huotari, and J. Tolvanen, "Gamification and Economics," in *The Gameful World: Approaches, Issues, Applications*, The MIT Press, 01 2015.

[20] K. Sanford, L. J. Starr, L. Merkel, and S. B. Kurki, "Serious games: Video games for good?," *E-Learning and Digital Media*, vol. 12, pp. 90–106, 1 2015.

[21] Akili Interactive, "Endeavorrx," 2020.

[22] S. W. Evans, T. P. Beauchaine, A. Chronis-Tuscano, S. P. Becker, A. Chacko, R. Gallagher, C. M. Hartung, M. J. Kofler, B. K. Schultz, L. Tamm, *et al.*, "The efficacy of cognitive videogame training for adhd and what fda clearance means for clinicians," *Evidence-Based Practice in Child and Adolescent Mental Health*, vol. 6, no. 1, pp. 116–130, 2021.

[23] J. L. Plass, B. D. Homer, and C. K. Kinzer, "Foundations of game-based learning," *Educational Psychologist*, vol. 50, pp. 258–283, 10 2015.

[24] G. N. Yannakakis and J. Togelius, *Artificial Intelligence and Games*. Springer, 2018.

[25] Ludeon Studios, "Rimworld," 2018.

[26] Hello Games, "No man's sky," 2016.

[27] D. Silver, A. Huang, C. J. Maddison, A. Guez, L. Sifre, G. V. D. Driessche, J. Schrittwieser, I. Antonoglou, V. Panneershelvam, M. Lanctot, S. Dieleman, D. Grewe, J. Nham, N. Kalchbrenner, I. Sutskever, T. Lillicrap, M. Leach, K. Kavukcuoglu, T. Graepel, and D. Hassabis, "Mastering the game of go with deep neural networks and tree search," *Nature*, vol. 529, pp. 484–489, 1 2016.

[28] O. Vinyals, I. Babuschkin, W. M. Czarnecki, M. Mathieu, A. Dudzik, J. Chung, D. H. Choi, R. Powell, T. Ewalds, P. Georgiev, *et al.*, "Grandmaster level in starcraft ii using multi-agent reinforcement learning," *Nature*, vol. 575, no. 7782, pp. 350–354, 2019.

[29] B. Baker, I. Kanitscheider, T. Markov, Y. Wu, G. Powell, B. McGrew, and I. Mordatch, "Emergent tool use from multi-agent autocurricula," *arXiv preprint arXiv:1909.07528*, 2019.

[30] E. Klopfer, J. Reich, H. Abelson, and C. Breazeal, "Generative AI and K-12 Education: An MIT Perspective," *An MIT Exploration of Generative AI*, mar 27 2024. https://mit-genai.pubpub.org/pub/4k9msp17.

[31] P. Ravi, A. Broski, G. Stump, H. Abelson, E. Klopfer, and C. Breazeal, "Understanding teacher perspectives and experiences after deployment of ai literacy curriculum in middle-school classrooms," *arXiv preprint arXiv:2312.04839*, 2023.

[32] P. Denny, J. Prather, B. A. Becker, J. Finnie-Ansley, A. Hellas, J. Leinonen, A. Luxton-Reilly, B. N. Reeves, E. A. Santos, and S. Sarsa, "Computing education in the era of generative ai," *Communications of the ACM*, vol. 67, no. 2, pp. 56–67, 2024.

[33] G. Barbero, M. M. Bonsangue, and F. F. J. Hermans, "How to evaluate games in education: A literature review," in *Smart Learning for A Sustainable Society* (C. Anutariya, D. Liu, Kinshuk, A. Tlili, J. Yang, and M. Chang, eds.), (Singapore), pp. 32–41, Springer Nature Singapore, 2023.

[34] G. Barbero, M. A. Gómez-Maureira, and F. F. J. Hermans, "Computational thinking through design patterns in video games," in *ACM International Conference Proceeding Series*, Association for Computing Machinery, 9 2020.

[35] G. Barbero, M. Müller-Brockhausen, and M. Preuss, *Challenges of Open World Games for AI: Insights from Human Gameplay*, p. 127–141. Springer Nature Singapore, Nov. 2024.

[36] A. Marincioni, M. Miltiadous, K. Zacharia, R. Heemskerk, G. Doukeris, M. Preuss, and G. Barbero, "The effect of llm-based npc emotional states on player emotions: An analysis of interactive game play," in *2024 IEEE Conference on Games (CoG)*, pp. 1–6, 2024.

[37] M. A. Gómez-Maureira, G. Barbero, M. Freese, and M. Preuss, "Towards a taxonomy of ai in hybrid board games," in *ACM International Conference Proceeding Series*, Association for Computing Machinery, 9 2020.

[38] G. Barbero, R. Albrecht, C. Daske, and M. van Noordenne, *Emotion Recognition: Benefits and Human Rights in VR Environments*, p. 17–32. Springer Nature Switzerland, Oct. 2024.

[39] M. A. Gómez-Maureira, I. Kniestedt, G. Barbero, H. Yu, and M. Preuss, "An explorer's journal for machines: Exploring the case of cyberpunk 2077," *Journal of Gaming & Virtual Worlds*, vol. 14, p. 111–135, Apr. 2022.

[40] J. M. Wing, "Computational thinking," *Communications of the ACM*, vol. 49, no. 3, pp. 33–35, 2006.

[41] K. Brennan and M. Resnick, "New frameworks for studying and assessing the development of computational thinking," in *Proceedings of the 2012 annual meeting of the American educational research association, Vancouver, Canada*, vol. 1, p. 25, 2012.

[42] E. L. Deci and R. M. Ryan, *Intrinsic motivation and self-determination in human behavior*. Springer Science & Business Media, 2013.

[43] D. J. Shernoff, M. Csikszentmihalyi, B. Schneider, and E. S. Shernoff, "Student Engagement in High School Classrooms from the Perspective of Flow Theory," in *Applications of Flow in Human Development and Education*, pp. 475–494, Dordrecht: Springer Netherlands, 2014.

[44] S. Papert, "Personal computing and its impact on education," *The computer in the school: Tutor, tool, tutee*, pp. 197–202, 1980.

[45] S. A. Papert, *Mindstorms: Children, computers, and powerful ideas*. Basic books, 2020.

[46] D. King, F. Greaves, C. Exeter, and A. Darzi, "'gamification': Influencing health behaviours with games," 3 2013.

[47] E. A. Edwards, J. Lumsden, C. Rivas, L. Steed, L. A. Edwards, A. Thiyagarajan, R. Sohanpal, H. Caton, C. J. Griffiths, M. R. Munafò, S. Taylor, and R. T. Walton, "Gamification for health promotion: systematic review of behaviour change techniques in smartphone apps," 10 2016.

[48] T. Hainey, T. M. Connolly, E. A. Boyle, A. Wilson, and A. Razak, "A systematic literature review of games-based learning empirical evidence in primary education," *Computers & Education*, vol. 102, pp. 202–223, 2016.

[49] M. Hassenzahl, M. Burmester, and F. Koller, "Attrakdiff: Ein fragebogen zur messung wahrgenommener hedonischer und pragmatischer qualität," *Mensch & Computer 2003: Interaktion in Bewegung*, pp. 187–196, 2003.

[50] M. Liu, L. Horton, J. Olmanson, and P. Toprac, "A study of learning and motivation in a new media enriched environment for middle school science," *Educational technology research and development*, vol. 59, pp. 249–265, 2011.

[51] B. Huang and K. F. Hew, "Do points, badges and leaderboard increase learning and activity: A quasi-experiment on the effects of gamification," in *Proceedings of the 23rd international conference on computers in education*, pp. 275–280, 2015.

[52] A. Domínguez, J. Saenz-de Navarrete, L. De-Marcos, L. Fernández-Sanz, C. Pagés, and J.-J. Martínez-Herráiz, "Gamifying learning experiences: Practical implications and outcomes," *Computers & education*, vol. 63, pp. 380–392, 2013.

[53] C. Melo, L. Madariaga, M. Nussbaum, R. Heller, S. Bennett, C.-C. Tsai, and J. van Braak, "Editorial: Educational technology and addictions," *Computers & Education*, vol. 145, p. 103730, 2020.

[54] T. H. Laine and R. S. Lindberg, "Designing engaging games for education: A systematic literature review on game motivators and design principles," *IEEE Transactions on Learning Technologies*, vol. 13, no. 4, pp. 804–821, 2020.

[55] J. Hamari, J. Koivisto, and H. Sarsa, "Does gamification work?–a literature review of empirical studies on gamification," in *2014 47th Hawaii international conference on system sciences*, pp. 3025–3034, Ieee, 2014.

[56] N. J. Falkner and K. E. Falkner, "" whither, badges?" or" wither, badges!" a metastudy of badges in computer science education to clarify effects, significance and influence," in *Proceedings of the 14th Koli Calling international conference on computing education research*, pp. 127–135, 2014.

[57] Y. Bouzid, M. A. Khenissi, F. Essalmi, and M. Jemni, "Using educational games for sign language learning-a signwriting learning game: Case study," *Journal of Educational Technology & Society*, vol. 19, no. 1, pp. 129–141, 2016.

[58] S. Vandercruysse, M. Vandewaetere, F. Cornillie, and G. Clarebout, "Competition and students' perceptions in a game-based language learning environment," *Educational Technology Research and Development*, vol. 61, pp. 927–950, 2013.

[59] M. Hartono, M. A. Candramata, K. N. Adhyatmoko, and B. Yulianto, "Math education game for primary school," in *2016 International Conference on Information Management and Technology (ICIMTech)*, pp. 93–96, IEEE, 2016.

[60] J. N. Wanyama, B. Castelnuovo, G. Robertson, K. Newell, J. B. Sempa, A. Kambugu, Y. C. Manabe, and R. Colebunders, "A randomized controlled trial to evaluate the effectiveness of a board game on patients' knowledge uptake of hiv and sexually transmitted diseases at the infectious diseases institute, kampala, uganda," *JAIDS Journal of Acquired Immune Deficiency Syndromes*, vol. 59, no. 3, pp. 253–258, 2012.

[61] "Leiden university libraries - leiden university."

[62] C. Barros, A. A. Carvalho, and A. Salgueiro, "The effect of the serious game tempoly on learning arithmetic polynomial operations," *Education and Information Technologies*, vol. 25, pp. 1497–1509, 2020.

[63] M. Dankbaar, "Serious games and blended learning; effects on performance and motivation in medical education," *Perspectives on medical education*, vol. 6, pp. 58–60, 2017.

[64] D. P. de Sena, D. D. Fabrício, V. D. da Silva, L. C. Bodanese, and A. R. Franco, "Comparative evaluation of video-based on-line course versus serious game for training medical students in cardiopulmonary resuscitation: a randomised trial," *PloS one*, vol. 14, no. 4, p. e0214722, 2019.

[65] D. Drummond, P. Delval, S. Abdenouri, J. Truchot, P.-F. Ceccaldi, P. Plaisance, A. Hadchouel, and A. Tesnière, "Serious game versus online course for pretraining medical students before a simulation-based mastery learning course on cardiopulmonary resuscitation: A randomised controlled study," *European Journal of Anaesthesiology— EJA*, vol. 34, no. 12, pp. 836–844, 2017.

[66] I. García and E. Cano, "A computer game for teaching and learning algebra topics at undergraduate level," *Computer Applications in Engineering Education*, vol. 26, no. 2, pp. 326–340, 2018.

[67] V. Garneli, M. Giannakos, and K. Chorianopoulos, "Serious games as a malleable learning medium: The effects of narrative, gameplay, and making on students' performance and attitudes," *British Journal of Educational Technology*, vol. 48, no. 3, pp. 842–859, 2017.

[68] P. Haubruck, F. Nickel, J. Ober, T. Walker, C. Bergdolt, M. Friedrich, B. P. Müller-Stich, F. Forchheim, C. Fischer, G. Schmidmaier, *et al.*, "Evaluation of app-based serious gaming as a training method in teaching chest tube insertion to medical students: randomized controlled trial," *Journal of medical Internet research*, vol. 20, no. 5, p. e195, 2018.

[69] A. J. Q. Tan, C. C. S. Lee, P. Y. Lin, S. Cooper, L. S. T. Lau, W. L. Chua, and S. Y. Liaw, "Designing and evaluating the effectiveness of a serious game for safe administration of blood transfusion: A randomized controlled trial," *Nurse education today*, vol. 55, pp. 38–44, 2017.

[70] K. J. M. Klit, K. S. Pedersen, and H. Stege, "A prospective cohort study of game-based learning by digital simulation of a pig farm to train agriculture students to reduce piglet mortality," *Porcine health management*, vol. 4, pp. 1–8, 2018.

[71] P. Phungoen, S. Promto, S. Chanthawatthanarak, S. Maneepong, K. Apiratwarakul, P. Kotruchin, and T. Mitsungnern, "Precourse preparation using a serious smartphone game on advanced life support knowledge and skills: randomized controlled trial," *Journal of Medical Internet Research*, vol. 22, no. 3, p. e16987, 2020.

[72] D. Rodríguez-Cerezo, A. Sarasa-Cabezuelo, M. Gómez-Albarrán, and J.-L. Sierra, "Serious games in tertiary education: A case study concerning the comprehension of basic concepts in computer language implementation courses," *Computers in Human Behavior*, vol. 31, pp. 558–570, 2014.

[73] C.-Y. Tsai, H.-s. Lin, and S.-C. Liu, "The effect of pedagogical game model on students' pisa scientific competencies," *Journal of Computer Assisted Learning*, vol. 36, no. 3, pp. 359–369, 2020.

[74] R. A. Tubelo, F. F. Portella, M. A. Gelain, M. M. C. de Oliveira, A. E. F. de Oliveira, A. Dahmer, and M. E. B. Pinto, "Serious game is an effective learning method for primary health care education of medical students: A randomized controlled trial," *International journal of medical informatics*, vol. 130, p. 103944, 2019.

[75] M. Winter, R. Pryss, T. Probst, and M. Reichert, "Learning to read by learning to write: Evaluation of a serious game to foster business process model comprehension," *JMIR Serious Games*, vol. 8, no. 1, p. e15374, 2020.

[76] M. Yallihep and B. Kutlu, "Mobile serious games: Effects on students' understanding of programming concepts and attitudes towards information technology," *Education and Information Technologies*, vol. 25, no. 2, pp. 1237–1254, 2020.

[77] H. Hosseini, M. Hartt, and M. Mostafapour, "Learning is child's play: Game-based learning in computer science education," *ACM Transactions on Computing Education (TOCE)*, vol. 19, no. 3, pp. 1–18, 2019.

[78] B. Brezovszky, J. McMullen, K. Veermans, M. M. Hannula-Sormunen, G. Rodríguez-Aflecht, N. Pongsakdi, E. Laakkonen, and E. Lehtinen, "Effects of a mathematics game-based learning environment on primary school students' adaptive number knowledge," *Computers & Education*, vol. 128, pp. 63–74, 2019.

[79] M. Boeker, P. Andel, W. Vach, and A. Frankenschmidt, "Game-based e-learning is more effective than a conventional instructional method: a randomized controlled trial with third-year medical students," *PloS one*, vol. 8, no. 12, p. e82328, 2013.

[80] A. Khan, F. H. Ahmad, and M. M. Malik, "Use of digital game based learning and gamification in secondary school science: The effect on student engagement, learning and gender difference," *Education and Information Technologies*, vol. 22, pp. 2767–2804, 2017.

[81] R. Lorenzo-Alvarez, T. Rudolphi-Solero, M. J. Ruiz-Gomez, and F. Sendra-Portero, "Game-based learning in virtual worlds: a multiuser online game for medical undergraduate radiology education within second life," *Anatomical sciences education*, vol. 13, no. 5, pp. 602–617, 2020.

[82] M. Mavromihales, V. Holmes, and R. Racasan, "Game-based learning in mechanical engineering education: Case study of games-based learning application in computer aided design assembly," *International Journal of Mechanical Engineering Education*, vol. 47, no. 2, pp. 156–179, 2019.

[83] S. Perini, R. Luglietti, M. Margoudi, M. Oliveira, and M. Taisch, "Learning and motivational effects of digital game-based learning (dgbl) for manufacturing education–the life cycle assessment (lca) game," *Computers in Industry*, vol. 102, pp. 40–49, 2018.

[84] O. Ku, S. Y. Chen, D. H. Wu, A. C. Lao, and T.-W. Chan, "The effects of game-based learning on mathematical confidence and performance: High ability vs. low ability," *Journal of Educational Technology & Society*, vol. 17, no. 3, pp. 65–78, 2014.

[85] S. B. Bayram and N. Caliskan, "Effect of a game-based virtual reality phone application on tracheostomy care education for nursing students: A randomized controlled trial," *Nurse education today*, vol. 79, pp. 25–31, 2019.

[86] O. Ak and B. Kutlu, "Comparing 2d and 3d game-based learning environments in terms of learning gains and student perceptions," *British Journal of Educational Technology*, vol. 48, no. 1, pp. 129–144, 2017.

[87] M. S. Jong, "Does online game-based learning work in formal education at school? a case study of visole," *Curriculum Journal*, vol. 26, no. 2, pp. 249–267, 2015.

[88] C.-L. D. Chen, T.-K. Yeh, and C.-Y. Chang, "The effects of game-based learning and anticipation of a test on the learning outcomes of 10th grade geology students," *Eurasia Journal of Mathematics, Science and Technology Education*, vol. 12, no. 5, pp. 1379–1388, 2016.

[89] M.-T. Cheng, W.-Y. Huang, and M.-E. Hsu, "Does emotion matter? an investigation into the relationship between emotions and science learning outcomes in a game-based learning environment," *British Journal of Educational Technology*, vol. 51, no. 6, pp. 2233–2251, 2020.

[90] G. Y.-M. Kao, C.-H. Chiang, and C.-T. Sun, "Customizing scaffolds for game-based learning in physics: Impacts on knowledge acquisition and game design creativity," *Computers & Education*, vol. 113, pp. 294–312, 2017.

[91] N.-Z. Legaki, N. Xi, J. Hamari, K. Karpouzis, and V. Assimakopoulos, "The effect of challenge-based gamification on learning: An experiment in the context of statistics education," *International journal of human-computer studies*, vol. 144, p. 102496, 2020.

[92] T. Radnai, T. T. Juhász, A. Juhász, and P. Jenei, "Educational experiments with motion simulation programs: can gamification be effective in teaching mechanics?," in *Journal of Physics: Conference Series*, vol. 1223, p. 012006, IOP Publishing, 2019.

[93] M. Ortiz-Rojas, K. Chiluiza, and M. Valcke, "Gamification through leaderboards: An empirical study in engineering education," *Computer Applications in Engineering Education*, vol. 27, no. 4, pp. 777–788, 2019.

[94] M. Jurgelaitis, L. Čeponienė, J. Čeponis, and V. Drungilas, "Implementing gamification in a university-level uml modeling course: A case study," *Computer Applications in Engineering Education*, vol. 27, no. 2, pp. 332–343, 2019.

[95] M. Dicks and F. Romanelli, "Impact of novel active-learning approaches through ibooks and gamification in a reformatted pharmacy course," *American Journal of Pharmaceutical Education*, vol. 83, no. 3, p. 6606, 2019.

[96] L. Gutiérrez-Puertas, V. V. Márquez-Hernández, P. Román-López, M. J. Rodríguez-Arrastia, C. Ropero-Padilla, and G. Molina-Torres, "Escape rooms as a clinical evaluation method for nursing students," *Clinical Simulation in Nursing*, vol. 49, pp. 73–80, 2020.

[97] I. Yildirim, "The effects of gamification-based teaching practices on student achievement and students' attitudes toward lessons," *The Internet and Higher Education*, vol. 33, pp. 86–92, 2017.

[98] C. H.-H. Tsay, A. Kofinas, and J. Luo, "Enhancing student learning experience with technology-mediated gamification: An empirical study," *Computers & Education*, vol. 121, pp. 1–17, 2018.

[99] A. Ahmad, F. Zeshan, M. S. Khan, R. Marriam, A. Ali, and A. Samreen, "The impact of gamification on learning outcomes of computer science majors," *ACM Transactions on Computing Education (TOCE)*, vol. 20, no. 2, pp. 1–25, 2020.

[100] D. R. Sanchez, M. Langer, and R. Kaur, "Gamification in the classroom: Examining the impact of gamified quizzes on student learning," *Computers & Education*, vol. 144, p. 103666, 2020.

[101] G. Goehle and J. Wagaman, "The impact of gamification in web based homework," *Primus*, vol. 26, no. 6, pp. 557–569, 2016.

[102] J. A. Stansbury and D. R. Earnest, "Meaningful gamification in an industrial/organizational psychology course," *Teaching of Psychology*, vol. 44, no. 1, pp. 38–45, 2017.

[103] M. D. Hanus and J. Fox, "Assessing the effects of gamification in the classroom: A longitudinal study on intrinsic motivation, social comparison, satisfaction, effort, and academic performance," *Computers & education*, vol. 80, pp. 152–161, 2015.

[104] J. Jo, H. Jun, and H. Lim, "A comparative study on gamification of the flipped classroom in engineering education to enhance the effects of learning," *Computer Applications in Engineering Education*, vol. 26, no. 5, pp. 1626–1640, 2018.

[105] C. Kroustalli and S. Xinogalos, "Studying the effects of teaching programming to lower secondary school students with a serious game: a case study with python and codecombat," *Education and Information Technologies*, vol. 26, no. 5, pp. 6069–6095, 2021.

[106] S. I. Ch'ng, Y. C. Low, Y. L. Lee, W. C. Chia, and L. S. Yeong, "Video games: A potential vehicle for teaching computational thinking," *Computational thinking education*, pp. 247–260, 2019.

[107] M. L. Wu and K. Richards, "Facilitating computational thinking through game design," in *Edutainment Technologies. Educational Games and Virtual Reality/Augmented Reality Applications: 6th International Conference on E-learning and Games, Edutainment 2011, Taipei, Taiwan, September 2011. Proceedings 6*, pp. 220–227, Springer, 2011.

[108] M. Papastergiou, "Digital game-based learning in high school computer science education: Impact on educational effectiveness and student motivation," *Computers & education*, vol. 52, no. 1, pp. 1–12, 2009.

[109] M. Prensky, "Digital game-based learning," *Computers in entertainment (CIE)*, vol. 1, no. 1, pp. 21–21, 2003.

[110] D. Weintrop, N. Holbert, M. S. Horn, and U. Wilensky, "Computational thinking in constructionist video games," *International Journal of Game-Based Learning (IJGBL)*, vol. 6, no. 1, pp. 1–17, 2016.

[111] C. Kazimoglu, M. Kiernan, L. Bacon, and L. MacKinnon, "Learning programming at the computational thinking level via digital game-play," in *Procedia Computer Science*, vol. 9, pp. 522–531, Elsevier B.V., 2012.

[112] J. M. Wing, "Computational thinking and thinking about computing," *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, vol. 366, no. 1881, pp. 3717–3725, 2008.

[113] A. Ater-Kranov, R. Bryant, G. Orr, S. Wallace, and M. Zhang, "Developing a community definition and teaching modules for computational thinking: accomplishments and challenges," in *Proceedings of the 2010 ACM conference on Information technology education*, pp. 143–148, 2010.

[114] M. Berland and V. R. Lee, "Collaborative strategic board games as a site for distributed computational thinking," *International Journal of Game-Based Learning (IJGBL)*, vol. 1, no. 2, pp. 65–81, 2011.

[115] S. Bjork and J. Holopainen, *Patterns in Game Design (Game Development Series)*. USA: Charles River Media, Inc., 2004.

[116] C. Alexander, *A pattern language: towns, buildings, construction*. Oxford university press, 1977.

[117] E. Gamma, R. Helm, R. Johnson, J. Vlissides, and D. Patterns, "Elements of reusable object-oriented software," *Design Patterns*, 1995.

[118] B. Softworks, "The elder scrolls." [PC, Consoles], 1994.

[119] P. D. Studio, "Stellaris." [PC, Consoles], 2016.

[120] F. Games, "Civilization v." [PC, Consoles], 2010.

[121] M. Games and E. F. Studio, "Thea 2: The shattering." [PC], 2018.

[122] JoyBits, "Doodle god." [PC, Consoles], 2010.

[123] S. Enix, "Final fantasy x." [PlayStation 2], 2001.

[124] L. Haaranen and R. Duran, "Computer science in online gaming communities," in *Computers Supported Education: 9th International Conference, CSEDU 2017, Porto, Portugal, April 21-23, 2017, Revised Selected Papers 9*, pp. 279–299, Springer, 2018.

[125] K. Ferguson, "Everything is a remix." `https://vimeo.com/14912890`, 2011.

[126] A. Lenhart and M. Madden, *Teen content creators and consumers*, vol. 2. Pew Internet & American Life Project Washington, DC, 2005.

[127] Q.-Y. Yin, J. Yang, K.-Q. Huang, M.-J. Zhao, W.-C. Ni, B. Liang, Y. Huang, S. Wu, and L. Wang, "Ai in human-computer gaming: Techniques, challenges and opportunities," *Machine intelligence research*, vol. 20, no. 3, pp. 299–317, 2023.

[128] K. Arulkumaran, A. Cully, and J. Togelius, "Alphastar: An evolutionary computation perspective," in *Proceedings of the genetic and evolutionary computation conference companion*, pp. 314–315, 2019.

[129] C. R. Madan, "Considerations for comparing video game ai agents with humans," *Challenges*, vol. 11, p. 18, 8 2020.

[130] S. Davern and M. Haahr, "On the interactions between narrative puzzles and navigation aids in open world games," in *International Conference on Interactive Digital Storytelling*, pp. 259–275, Springer, 2023.

[131] E. Tomai, "Extraction of interaction events for learning reasonable behavior in an open-world survival game," in *Workshops at the Thirty-Second AAAI Conference on Artificial Intelligence*, 2018.

[132] W. Min, B. W. Mott, J. P. Rowe, B. Liu, and J. C. Lester, "Player goal recognition in open-world digital games with long short-term memory networks.," in *IJCAI*, pp. 2590–2596, 2016.

[133] A. Gupta, D. Carpenter, W. Min, J. Rowe, R. Azevedo, and J. Lester, "Enhancing multimodal goal recognition in open-world games with natural language player reflections," in *Proceedings of the aaai conference on artificial intelligence and interactive digital entertainment*, vol. 18, pp. 37–44, 2022.

[134] Z. Wang, S. Cai, G. Chen, A. Liu, X. Ma, and Y. Liang, "Describe, explain, plan and select: Interactive planning with large language models enables open-world multi-task agents," *arXiv preprint arXiv:2302.01560*, 2023.

[135] I. Borovikov and A. Beirami, "From demonstrations and knowledge engineering to a dnn agent in a modern open-world video game.," in *AAAI Spring Symposium: Combining Machine Learning with Knowledge Engineering*, 2019.

[136] M. Müller-Brockhausen, G. Barbero, and M. Preuss, "Chatter generation through language models," in *2023 IEEE Conference on Games (CoG)*, pp. 1–6, IEEE, 2023.

[137] A. Nantes, R. Brown, and F. Maire, "A framework for the semi-automatic testing of video games," in *Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment*, vol. 4, pp. 197–202, 2008.

[138] A. Albaghajati and M. Ahmed, "Video game automated testing approaches: An assessment framework," *IEEE Transactions on Games*, vol. 15, pp. 81–94, 3 2023.

[139] M. Aung, S. Demediuk, Y. Sun, Y. Tu, Y. Ang, S. Nekkanti, S. Raghav, D. Klabjan, R. Sifa, and A. Drachen, "The trails of just cause 2: spatio-temporal player profiling in open-world games," in *Proceedings of the 14th International Conference on the Foundations of Digital Games*, pp. 1–11, 2019.

[140] W. Min, B. W. Mott, J. P. Rowe, B. Liu, and J. C. Lester, "Player goal recognition in open-world digital games with long short-term memory networks.," in *IJCAI*, pp. 2590–2596, 2016.

[141] M. A. Gómez-Maureira, I. Kniestedt, G. Barbero, H. Yu, and M. Preuss, "An explorer's journal for machines: Exploring the case of cyberpunk 2077," *Journal of Gaming and Virtual Worlds*, vol. 14, pp. 111–135, 4 2022.

[142] Obsidian Entertainment, "The outer worlds," 2019.

[143] Y. Zhang, Y. Li, L. Cui, D. Cai, L. Liu, T. Fu, X. Huang, E. Zhao, Y. Zhang, Y. Chen, L. Wang, A. T. Luu, W. Bi, F. Shi, and S. Shi, "Siren's song in the AI ocean: A survey on hallucination in large language models," *CoRR*, vol. abs/2309.01219, 2023.

[144] S. Bjork and J. Holopainen, *Patterns in game design*, vol. 11. Charles River Media Hingham, 2005.

[145] M. Lafond, "The complexity of speedrunning video games," in *9th International Conference on Fun with Algorithms (FUN 2018)*, Schloss-Dagstuhl-Leibniz Zentrum für Informatik, 2018.

[146] X. Cui and H. Shi, "A*-based pathfinding in modern computer games," *International Journal of Computer Science and Network Security*, vol. 11, no. 1, pp. 125–130, 2011.

[147] E. Alonso, M. Peter, D. Goumard, and J. Romoff, "Deep reinforcement learning for navigation in aaa video games," *arXiv preprint arXiv:2011.04764*, 2020.

[148] E. Tomai, R. Salazar, and R. Flores, "Mimicking humanlike movement in open world games with path-relative recursive splines," in *Proceedings of the aaai conference on artificial intelligence and interactive digital entertainment*, vol. 9, pp. 93–99, 2013.

[149] L. Zheng, J. Chen, J. Wang, J. He, Y. Hu, Y. Chen, C. Fan, Y. Gao, and C. Zhang, "Episodic multi-agent reinforcement learning with curiosity-driven exploration," *Advances in Neural Information Processing Systems*, vol. 34, pp. 3757–3769, 2021.

[150] X. Chen, T. Shi, Q. Zhao, Y. Sun, Y. Gao, and X. Wang, "Wild-scav: Benchmarking fps gaming ai on unity3d-based environments," *arXiv preprint arXiv:2210.09026*, 2022.

[151] A. Hintze, R. S. Olson, and J. Lehman, "Orthogonally evolved ai to improve difficulty adjustment in video games," in *Applications of Evolutionary Computation: 19th European Conference, EvoApplications 2016, Porto, Portugal, March 30–April 1, 2016, Proceedings, Part I 19*, pp. 525–540, Springer, 2016.

[152] P. Spronck, I. Sprinkhuizen-Kuyper, and E. Postma, "Difficulty scaling of game ai," in *Proceedings of the 5th International Conference on Intelligent Games and Simulation (GAME-on 2004)*, pp. 33–37, 2004.

[153] R. Hunicke, "The case for dynamic difficulty adjustment in games," in *Proceedings of the 2005 ACM SIGCHI International Conference on Advances in computer entertainment technology*, pp. 429–433, 2005.

[154] Paradox Development Studio, "Stellaris," 2016.

[155] Paradox Development Studio, "Hearts of iron iv," 2016.

[156] M. Buro, "Real-time strategy games: A new ai research challenge," in *IJCAI*, vol. 2003, pp. 1534–1535, 2003.

[157] Larian Studio, "Divinity: Original sin ii," 2016.

[158] D. Livingstone, "Turing's test and believable ai in games," *Computers in Entertainment (CIE)*, vol. 4, no. 1, pp. 6–es, 2006.

[159] J. R. Searle, "Minds, brains, and programs," in *Machine Intelligence*, pp. 64–88, Routledge, 2012.

[160] N. R. Jennings, "Coordination techniques for distributed artificial intelligence," *Foundations of DAI*, 1996.

[161] Y. Nakajima, "Task-driven autonomous agent utilizing gpt-4, pinecone, and langchain for diverse applications." `https://yoheinakajima.com/task-driven-autonomous-agent-utilizing-gpt-4-pinecone-and-langchain-for-diverse-applications/`. Accessed: 2024-05-01.

[162] L. M. Csepregi, "The effect of context-aware llm-based npc conversations on player engagement in role-playing video games," *Unpublished manuscript*, 2021.

[163] N. Akoury, Q. Yang, and M. Iyyer, "A framework for exploring player perceptions of llm-generated dialogue in commercial video games," in *Findings of the Association for Computational Linguistics: EMNLP 2023*, pp. 2295–2311, 2023.

[164] Y. Liu, "Roberta: A robustly optimized bert pretraining approach," *arXiv preprint arXiv:1907.11692*, vol. 364, 2019.

[165] D. Demszky, D. Movshovitz-Attias, J. Ko, A. Cowen, G. Nemade, and S. Ravi, "Goemotions: A dataset of fine-grained emotions," *arXiv preprint arXiv:2005.00547*, 2020.

[166] D. Yang, E. Kleinman, and C. Harteveld, "Gpt for games: A scoping review (2020-2023)," *arXiv preprint arXiv:2404.17794*, 2024.

[167] R. Gallotta, G. Todd, M. Zammit, S. Earle, A. Liapis, J. Togelius, and G. N. Yannakakis, "Large language models and games: A survey and roadmap," *arXiv preprint arXiv:2402.18659*, 2024.

[168] M. U. Nasir and J. Togelius, "Practical pcg through large language models," in *2023 IEEE Conference on Games (CoG)*, pp. 1–4, IEEE, 2023.

[169] J. Roberts, A. Banburski-Fahey, and J. Lanier, "Surreal vr pong: Llm approach to game design," in *36th Conference on Neural Information Processing Systems (NeurIPS 2022)*, vol. 1, 2022.

[170] S. Hu, T. Huang, F. Ilhan, S. Tekin, G. Liu, R. Kompella, and L. Liu, "A survey on large language model-based game agents," *arXiv preprint arXiv:2404.02039*, 2024.

[171] H. Shakeri, C. Neustaedter, and S. DiPaola, "Saga: Collaborative storytelling with gpt-3," in *Companion Publication of the 2021 Conference on Computer Supported Cooperative Work and Social Computing*, pp. 163–166, 2021.

[172] M. Elgarf, S. Zojaji, G. Skantze, and C. Peters, "Creativebot: a creative storyteller robot to stimulate creativity in children," in *Proceedings of the 2022 International Conference on Multimodal Interaction*, pp. 540–548, 2022.

[173] A. Zhu, L. Martin, A. Head, and C. Callison-Burch, "Calypso: Llms as dungeon master's assistants," in *Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment*, vol. 19, pp. 380–390, 2023.

[174] A. Anable, *Playing with feelings: Video games and affect*. U of Minnesota Press, 2018.

[175] D. K. Langlois, S. Drury, and S. Krigl stein, "Press h to help: The impact of prosocial video games on prosocial behaviors by exposure time," in *Proceedings of the 18th International Conference on the Foundations of Digital Games*, FDG '23, (New York, NY, USA), Association for Computing Machinery, 2023.

[176] M. Viggiato De Almeida, "Leveraging natural language processing techniques to improve manual game testing," 2023.

[177] B. Sandhya, *A Learning Based Emotion Classifier with Semantic Text Processing*, vol. 320, pp. 371–382. Springer International Publishing, 01 2015.

[178] F. Anvari, E. Efendić, J. Olsen, R. C. Arslan, M. Elson, and I. K. Schneider, "Bias in self-reports: An initial elevation phenomenon," *Social Psychological and Personality Science*, vol. 14, no. 6, pp. 727–737, 2023.

[179] C. Zhang, F. Zhang, J. Xie, and S. Wang, "Bert based text emotion classification," 2022.

[180] A. Alhuzali, Y. S. Alginahi, and M. A. Alzahrani, "Robust emotion detection from text using advanced deep learning techniques," 2023.

[181] E. Cambria, S. Poria, A. Gelbukh, and M. Thelwall, "Sentiment analysis is a big suitcase," *IEEE Intelligent Systems*, vol. 32, no. 6, pp. 74–80, 2017.

[182] Y. Zhou, A. I. Muresanu, Z. Han, K. Paster, S. Pitis, H. Chan, and J. Ba, "Large language models are human-level prompt engineers," *arXiv preprint arXiv:2211.01910*, 2022.

[183] E. Delvaux, N. Vanbeselaere, and B. Mesquita, "Dynamic interplay between norms and experiences of anger and gratitude in groups," *Small Group Research*, vol. 46, no. 3, pp. 300–323, 2015.

[184] P. Konieczny, "Golden Age of Tabletop Gaming: Creation of the Social Capital and Rise of Third Spaces for Tabletop Gaming in the 21st Century," *Polish Sociological Review*, no. 206, pp. 199–215, 2019.

[185] J. Arjoranta, V. Kankainen, and T. Nummenmaa, "Blending in Hybrid Games: Understanding Hybrid Games Through Experience," in *Proceedings of the 13th International Conference on Advances in Computer Entertainment Technology*, ACE '16, (Osaka, Japan), pp. 1–6, Association for Computing Machinery, Nov. 2016.

[186] S. Risi and M. Preuss, "From Chess and Atari to StarCraft and Beyond: How Game AI is Driving the World of AI," *KI - Künstliche Intelligenz*, vol. 34, pp. 7–17, Mar. 2020.

[187] V. Kankainen and J. Paavilainen, "Hybrid Board Game Design Guidelines," in *Proceedings of the 2019 DiGRA International Conference: Game, Play and the Emerging Ludo-Mix*, p. 22, DiGRA, 2019.

[188] C. C. Abt, *Serious Games*. Viking Press, 1970.

[189] Niantic Inc., Nintendo Co. Ltd., The Pokémon Company, "Pokémon GO," 2016. [Android, iOS].

[190] S. Björk and J. Juul, "Zero-Player Games Or: What We Talk about When We Talk about Players," in *Philosophy of Computer Games Conference*, 2012.

[191] J. Schell, *The Art of Game Design: A book of lenses*. CRC Press, Aug. 2008.

[192] Blizzard Entertainment, "StarCraft II: Wings of Liberty," 2010. [Windows, macOS].

[193] M. J. Rogerson, M. Gibbs, and W. Smith, ""I Love All the Bits": The Materiality of Boardgames," in *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*, CHI '16, (San Jose, California, USA), pp. 3956–3969, Association for Computing Machinery, May 2016.

[194] J. R. Wallace, J. Pape, Y.-L. B. Chang, P. J. McClelland, T. N. Graham, S. D. Scott, and M. Hancock, "Exploring automation in digital tabletop board game," in *Proceedings of the ACM 2012 conference on Computer Supported Cooperative Work Companion*, CSCW '12, (Seattle, Washington, USA), pp. 231–234, Association for Computing Machinery, Feb. 2012.

[195] A. Liapis, G. N. Yannakakis, and J. Togelius, "Sentient sketchbook : computer-assisted game level authoring," in *8th International Conference on the Foundations of Digital Games*, May 2013. Accepted: 2018-04-26T10:13:13Z Publisher: ACM.

[196] S. Deterding, J. Hook, R. Fiebrink, M. Gillies, J. Gow, M. Akten, G. Smith, A. Liapis, and K. Compton, "Mixed-Initiative Creative Interfaces," in *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems*, CHI EA '17, (Denver, Colorado, USA), pp. 628–635, Association for Computing Machinery, May 2017.

[197] F. de Mesentier Silva, S. Lee, J. Togelius, and A. Nealen, "AI-based playtesting of contemporary board games," in *Proceedings of the 12th International Conference on the Foundations of Digital Games*, FDG '17, (Hyannis, Massachusetts), pp. 1–10, Association for Computing Machinery, Aug. 2017.

[198] M. Preuss, T. Pfeiffer, V. Volz, and N. Pflanzl, "Integrated balancing of an RTS game: Case study and toolbox refinement," in *2018 IEEE Conference on Computational Intelligence and Games, CIG 2018, Maastricht, The Netherlands, August 14-17, 2018*, pp. 1–8, IEEE, 2018.

[199] Y. Xu, E. Barba, I. Radu, M. Gandy, and B. MacIntyre, "Chores Are Fun: Understanding Social Play in Board Games for Digital Tabletop Game Design," in *Proceedings of the 2011 DiGRA International Conference*, p. 16, 2011.

[200] Anki, "Anki OVERDRIVE," 2015. [Android, iOS, Physical Platform].

[201] L. van Velthoven, "Room Racers: Design and Evaluation of a Mixed Reality Game Prototype," Master's thesis, Leiden University, 2012.

[202] E. M. Lang, "XCOM: The Board Game," 2015. [Android, iOS, Tabletop Platform].

[203] Berserk Games, "Tabletop Simulator," 2015. [Windows, macOS, Linux].

[204] R. Abbott and E. Rothman, "Disrupting creativity: Copyright law in the age of generative artificial intelligence," *Fla. L. Rev.*, vol. 75, p. 1141, 2023.

[205] D. Baidoo-Anu and L. O. Ansah, "Education in the era of generative artificial intelligence (ai): Understanding the potential benefits of chatgpt in promoting teaching and learning," *Journal of AI*, vol. 7, no. 1, pp. 52–62, 2023.

[206] E. Shein, "The impact of ai on computer science education," 2024.

[207] R. Yilmaz and F. G. K. Yilmaz, "The effect of generative artificial intelligence (ai)-based tool use on students' computational thinking skills, programming self-efficacy and motivation," *Computers and Education: Artificial Intelligence*, vol. 4, 1 2023.

[208] F. Deriba, I. T. Sanusi, O. O Campbell, and S. S. Oyelere, "Computer programming education in the age of generative ai: Insights from empirical research," *SSRN*, 2024.

[209] F. A. Sakib, S. H. Khan, and A. R. Karim, "Extending the frontier of chatgpt: Code generation and debugging," in *2024 International Conference on Electrical, Computer and Energy Technologies (ICECET*, pp. 1–6, IEEE, 2024.

[210] D. Spinellis, "Pair programming with generative ai," *IEEE Software*, vol. 41, pp. 16–18, 5 2024.

[211] B. Idrisov and T. Schlippe, "Program code generation with generative ais," *Algorithms*, vol. 17, 2 2024.

[212] Özgen Korkmaz, R. Çakir, and M. Y. Özden, "A validity and reliability study of the computational thinking scales (cts)," *Computers in Human Behavior*, vol. 72, pp. 558–569, 7 2017.

[213] V. Ramalingam and S. Wiedenbeck, "Development and validation of scores on a computer programming self-efficacy scale and group analyses of novice programmer self-efficacy," *Journal of Educational Computing Research*, vol. 19, pp. 367–381, 1998.

[214] C. Cao, "Scaffolding cs1 courses with a large language model-powered intelligent tutoring system," in *International Conference on Intelligent User Interfaces, Proceedings IUI*, pp. 229–232, Association for Computing Machinery, 3 2023.

[215] T. Phung, V.-A. Pădurean, J. Cambronero, S. Gulwani, T. Kohn, R. Majumdar, A. Singla, and G. Soares, "Generative ai for programming education: Benchmarking chatgpt, gpt-4, and human tutors," in *Proceedings of the 2023 ACM Conference on International Computing Education Research-Volume 2*, pp. 41–42, 2023.

[216] A. Baytak, "The acceptance and diffusion of generative artificial intelligence in education: A literature review," *Current Perspectives in Educational Research*, vol. 6, no. 1, pp. 7–18, 2023.

[217] K. Kanont, P. Pingmuang, T. Simasathien, S. Wisnuwong, B. Wiwatsiripong, K. Poonpirome, N. Songkram, and J. Khlaisang, "Generative-ai, a learning assistant? factors influencing higher-ed students' technology acceptance," *Electronic Journal of e-Learning*, vol. 22, no. 6, pp. 18–33, 2024.

[218] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS Quarterly: Management Information Systems*, vol. 13, pp. 319–339, 1989.

[219] D. Melhart, A. Azadvar, A. Canossa, A. Liapis, and G. N. Yannakakis, "Your gameplay says it all: Modelling motivation in tom clancy's the division," in *2019 ieee conference on games (cog)*, pp. 1–8, IEEE, 2019.

[220] D. Yang, E. Kleinman, and C. Harteveld, "Gpt for games: An updated scoping review (2020-2024)," *arXiv preprint arXiv:2411.00308*, 2024.

[221] Y. Wang, S. Guo, L. Ling, and C. W. Tan, "Nemobot: Crafting strategic gaming llm agents for k-12 ai education," in *Proceedings of the Eleventh ACM Conference on Learning@ Scale*, pp. 393–397, 2024.

[222] S. E. Huber, K. Kiili, S. Nebel, R. M. Ryan, M. Sailer, and M. Ninaus, "Leveraging the potential of large language models in education through playful and game-based learning," *Educational Psychology Review*, vol. 36, 3 2024.

[223] A. Isaza-Giraldo, P. Bala, P. F. Campos, and L. Pereira, "Prompt-gaming: A pilot study on llm-evaluating agent in a meaningful energy game," in *Conference on Human Factors in Computing Systems - Proceedings*, Association for Computing Machinery, 5 2024.

[224] I. Steenstra, P. Murali, R. B. Perkins, N. Joseph, M. K. Paasche-Orlow, and T. Bickmore, "Engaging and entertaining adolescents in health education using llm-generated fantasy narrative games and virtual agents," in *Conference on Human Factors in Computing Systems - Proceedings*, Association for Computing Machinery, 5 2024.

[225] Y. Shao, L. Li, J. Dai, and X. Qiu, "Character-llm: A trainable agent for role-playing," *arXiv preprint arXiv:2310.10158*, 2023.

[226] A. Kong, S. Zhao, H. Chen, Q. Li, Y. Qin, R. Sun, X. Zhou, E. Wang, and X. Dong, "Better zero-shot reasoning with role-play prompting," *arXiv preprint arXiv:2308.07702*, 2023.

[227] W. Zhang, J. Sheng, S. Nie, Z. Zhang, X. Zhang, Y. He, and T. Liu, "Revealing the challenge of detecting character knowledge errors in llm role-playing," *arXiv preprint arXiv:2409.11726*, 2024.

[228] Y.-M. Tseng, Y.-C. Huang, T.-Y. Hsiao, Y.-C. Hsu, J.-Y. Foo, C.-W. Huang, and Y.-N. Chen, "Two tales of persona in llms: A survey of role-playing and personalization," *arXiv preprint arXiv:2406.01171*, 2024.

[229] Y.-S. Chuang, K. Nirunwiroj, Z. Studdiford, A. Goyal, V. V. Frigo, S. Yang, D. Shah, J. Hu, and T. T. Rogers, "Beyond demographics: aligning role-playing llm-based agents using human belief networks," *arXiv preprint arXiv:2406.17232*, 2024.

[230] S. Höhn, J. Nasir, D. C. Tozadore, A. Paikan, P. Ziafati, and E. André, "Beyond pretend-reality dualism: Frame analysis of llm-powered role play with social agents," in *Proceedings of the 12th International Conference on Human-Agent Interaction*, pp. 393–395, 2024.

[231] H. Elsayed, "The impact of hallucinated information in large language models on student learning outcomes: A critical examination of misinformation risks in ai-assisted education," *Northern Reviews on Algorithmic Research, Theoretical Computation, and Complexity*, vol. 9, no. 8, pp. 11–23, 2024.

[232] Infocom, "Zork." [PC, Consoles], 1977.

[233] H. Heyen, A. Widdicombe, N. Y. Siegel, M. Perez-Ortiz, and P. Treleaven, "The effect of model size on llm post-hoc explainability via lime," *arXiv preprint arXiv:2405.05348*, 2024.

[234] A. Liu, B. Feng, B. Wang, B. Wang, B. Liu, C. Zhao, C. Dengr, C. Ruan, D. Dai, D. Guo, *et al.*, "Deepseek-v2: A strong, economical, and efficient mixture-of-experts language model," *arXiv preprint arXiv:2405.04434*, 2024.