
Shufan Yu

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EDUCATION & EXPERIENCE

The Hong Kong Polytechnic University (PolyU)

Hong Kong SAR, China

Postdoctoral fellow

Sep. 2024

- **Brain, Language, and Computation Lab, Advisor: Prof. Ping Li**
- **Research:** Neural coupling during collaborative learning in VR

Central China Normal University (CCNU)

Wuhan, China

Ph.D. in Educational Technology

Sep. 2019 to Dec. 2023

- **Virtual Learning Lab, Advisor: Prof. Qingtang Liu**
- **Thesis:** “Research on the Construction and Application of a Virtual-real Mixed Junior High School Circuit Experiment based on the Theory of Embodied Cognition”

Arizona State University (ASU)

Tempe, AZ, USA

Visiting Scholar in Cognitive Psychology

Nov. 2021 to Dec. 2022

- **Embodied Games Lab, Advisor: Prof. Mina C. Johnson-Glenberg**
- **Project:** Haptic Titration experiment; Tuned Mass Damper simulation

Central China Normal University (CCNU)

Wuhan, China

M.Sc. in Educational Technology

Sep. 2016 to June. 2019

- **Virtual Learning Lab, Advisor: Prof. Qingtang Liu**
- **Thesis:** “Research on the AR-based magnetism experiment”

Yancheng Teachers University

Yancheng, China

B.Eng. in Digital Media Technology

Sep. 2012 to June. 2016

RESEARCH

Research Interest

- XR-based learning
- Cognitive neural science
- Embodied cognition
- Pedagogical agent/avatar

Research Project

Research on the effect of level of embodiment and external representation of a virtual real mixed electric circuit on students' learning performance— funded by excellent doctoral dissertation project of CCNU
PI Sep. 2022 - June. 2023

- Conduct a 2*2 quasi-experiment to investigate the effects of embodiment and representation of an AR-based electric circuit learning tool on students' learning
- Collect the quantitative and qualitative data
- Data analysis (t-test, ANCOVA, Content analysis)

Research on Key Technologies of constructing Virtual and Real Fusion Experimental

Environment — funded by excellent doctoral dissertation project of CCNU **PI Sep. 2021 - June. 2022**

- Develop an Assembleable AR-based circuit experiment
- Proposed A AR-based circuit calculation algorithm
- Visualizing current direction of AR circuit
- Implementing the auto-generation of circuit graph
- Designing the personalized feedback

Research on the development and implementation of an AR-based magnetism learning tool — funded by innovation project of graduate students of CCNU **PI Sep. 2019 - June. 2020**

- Investigate the key technology to develop a virtual-real mixed magnetism learning tool
- Conduct a quasi-experiment to explore its effects on students' learning
- Data analysis
- Paper writing and publishing

Research on development system for virtual and real fusion experiments of multimodal natural interaction — funded by self-determined researcher funds of CCNU from the colleges' basic research and operation of Ministry of Education in China. **Co-PI June. 2018- June. 2020**

- Design, develop, and assessment some AR/VR-based instructional virtual experiments

Key Technology Research and Demonstration of Tujia music culture digital protection and display — funded by Chinese National Key Technology Research and Development Program of the Ministry of Science and Technology of China. **Co-PI Jan. 2016-Jun. 2019**

- Design and develop the Tujia virtual dance teaching system based on Kinect
- Propose an algorithm calculating students' dancing performance based on Kinect

Journal Articles (*Corresponding author)

- J1. Gong, X., Yu, S., et al. (2025) Learners' interaction patterns in collaborative programming: An integration of the social epistemic interactions. *Educational Technology & Society* (accepted)
- J2. Ma, J., Liu, Q., Yu, S., Liu, J., Li, X., & Wang, C. (2025). What factors influence scientific concept learning? A study based on the fuzzy-set qualitative comparative analysis. *British Journal of Educational Technology*, 56(1), 250–275. <https://doi.org/10.1111/bjet.13499>
- J3. Ma, J., Liu, Q., Yu, S., Li, X., & Liu, J. (2025). Prompting scientific concept learning in augmented reality: impact of the concept map strategy on mental models and cognitive load. *Educational Technology Research and Development*, 0123456789. <https://doi.org/10.1007/s11423-025-10470-5>
- J4. Chen, F., Zhang, S., Liu, Q., Yu, S., Li, X., & Zheng, X. (2025). Supporting learning performance improvement: Role of online group assessment. *Education and Information Technologies*, 30(1), 1239–1264. <https://doi.org/10.1007/s10639-024-12907-5>
- J5. Gong, X., Xu, W., Yu, S., Ma, J., & Qiao, A. (2025). Enhancing computational thinking and spatial reasoning skills in gamification programming learning: A comparative study of tangible, block and paper-and-pencil tools. *British Journal of Educational Technology*, 56(1), 80–102. <https://doi.org/10.1111/bjet.13482>
- J6. Yu, S., Liu, Q., Liu, J., Ma, J., & Yang, Y. (2023). Integrating augmented reality into acoustics learning and examining its effectiveness: a case study of Doppler effect. *Education and Information Technologies*. <https://doi.org/10.1007/s10639-023-12091-y>
- J7. Liu, J., Liu, Q., Yu, S., Ma, J., Liu, M., & Wu, L. (2023). How do autonomy and learner characteristics combine to influence learners' learning outcomes and cognitive load in virtual reality learning environments? A fuzzy-set qualitative comparative analysis approach. *Education and Information Technologies*, 0123456789. <https://doi.org/10.1007/s10639-023-12262-x>

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- J8. Gong, X., **Yu, S***, Xu, J., Qiao, A., & Han, H. (2023). The effect of PDCA cycle strategy on pupils' tangible programming skills and reflective thinking. *Education and Information Technologies*, 0123456789. <https://doi.org/10.1007/s10639-023-12037-4>
- J9. Johnson-Glenberg, M. C., Yu, C. S. P., Liu, F., Amador, C., Bao, Y., **Yu, S.**, & LiKamWa, R. (2023). Embodied mixed reality with passive haptics in STEM education: randomized control study with chemistry titration. *Frontiers in Virtual Reality*, 4(July), 1–20. <https://doi.org/10.3389/frvir.2023.1047833>
- J10. **Yu, S***, Liu, Q., Johnson-Glenberg, M. C., Han, M., Ma, J., Ba, S., & Wu, L. (2023). Promoting musical instrument learning in virtual reality environment: Effects of embodiment and visual cues. *Computers & Education*, 198, 104764. <https://doi.org/10.1016/j.compedu.2023.104764>
- J11. Liu, Q., Ma, J., **Yu, S.**, Wang, Q., & Xu, S. (2023). Effects of an Augmented Reality-Based Chemistry Experiential Application on Student Knowledge Gains, Learning Motivation, and Technology Perception. *Journal of Science Education and Technology*, 32, 153–167. <https://doi.org/10.1007/s10956-022-10014-z>
- J12. **Yu, S.**, Liu, Q., Ma, J., Le, H., & Ba, S. (2023). Applying Augmented reality to enhance physics laboratory experience: does learning anxiety matter? *Interactive Learning Environments*, 31(10), 6952–6967. <https://doi.org/10.1080/10494820.2022.2057547>
- J13. Wang, C., & **Yu, S***. (2023). Tablet-to-student ratio matters: Learning performance and mental experience of collaborative inquiry. *Journal of Research on Technology in Education*, 55(4), 646–662. <https://doi.org/10.1080/15391523.2021.2015018>
- J14. Liu, Q., **Yu, S***, Chen, W., Wang, Q., & Xu, S. (2021). The effects of an augmented reality based magnetic experimental tool on students' knowledge improvement and cognitive load. *Journal of Computer Assisted Learning*, 37(3), 645–656. <https://doi.org/10.1111/jcal.12513>
- J15. Yang, W., Qingtang, L., Haoyi, H., Hairu, Y., **Shufan, Y.**, Huixiao, L., & Yangyang, Y. (2018). Personal Active Choreographer: Improving the Performance of the Tujia Hand-Waving Dance. *IEEE Consumer Electronics Magazine*, 7(4), 15–25.

Conference Proceedings

- C1. Liu, Q., Sun, L., Ma, J., **Yu, S.**, & Wu, L. (2023). Geometry Wall: An Embodied Gesture-based Game for Supporting Spatial Ability. *2022 IEEE International Conference on Teaching, Assessment and Learning for Engineering (TALE)*, 258–263.
- C2. Johnson-Glenberg, M. C., Kapadia, A., Liu, F., Likamwa, R., **Yu, S.**, Bennett, A., Kosa, M., Bao, Y., Balanzat, D., & Yu, C. S. P. (2022). *XR - Titration and Civil Engineering: Design Issues & Preliminary Results*. Poster presented at the American Educational Research Association (AERA), San Diego, CA. April, 2022.
- C3. Liu, J., Liu, Q., **Yu, S.**, Ma, J., Liu, M., & Wu, L. (2022). Which Types of Learners Are Suitable for the Virtual Reality Environment: A fsQCA Approach. *2022 8th International Conference of the Immersive Learning Research Network (ILRN)*, 1–5. <https://doi.org/10.23919/iLRN55037.2022.9815913>
- C4. Qingtang, L., Yuwei, J., Jindian, L., Miaomiao, H., Jingjing, M., & **Shufan, Y.** (2021). Design and Implementation of Virtual Sanxian Teaching System. *2021 IEEE International Conference on Engineering, Technology & Education (TALE)*, 938–943. <https://doi.org/10.1109/TALE52509.2021.9678770>
- C5. **Shufan, Y.**, Qingtang, L., Suxiao, X., Yuanyuan, Y., & Linjing, W. (2018). Design and Practice

of Exploratory Virtual Experiment in Physics Discipline. *Proceedings of the 2018 IEEE International Conference on Teaching, Assessment, and Learning for Engineering (TALE)*, Wollongong, Australia. (presentation)

- C6. Liu, Q., **Yu, S.**, Lin, L., Xu, S., & Wu, L. (2018). Design and Implementation of an Immersive Virtual Reality Biological Courseware—Miraculous Eyeball. *Proceedings of the 2018 International Conference on Blended Learning (ICBL)*, Kansai, Japan. (presentation)
- C7. Liu, Q., **Yu, S.**, Wang, Y., Le, H., & Yuan, Y. (2017). A hand-waving dance teaching system based on kinect. *Proceedings of the 2017 International Conference on Blended Learning (ICBL)*, Hongkong, China. (presentation)
- C8. Liu, Q., Xu, S., **Yu, S.**, Yang, Y., Wu, L., & Ba, S. (2019). Design and implementation of an ar-based inquiry courseware - Magnetic field. *Proceedings of the 2019 International Symposium on Educational Technology (ISET)*, Hradec Králové, Czech Republic.
- C9. Zhai, X. M., Meng, N., & **Yu, S.** (2019). Investigating Using Behaviors of E-dictionary with Multiple Design: A Perspective from the Integration of Eye-Tracking Technique and Stimulated Recall. *Proceedings of the 2018 IEEE International Conference on Teaching, Assessment, and Learning for Engineering (TALE)*, Wollongong, Australia.
- C10. Yang, Y., Liu, Q., Wu, L., Xu, S., **Yu, S.**, & Zhang, N. (2019). Design and development of mobile augmented reality for mathematical experiments. *Proceedings of the 2019 International Symposium on Educational Technology (ISET)*, Hradec Králové, Czech Republic.

Software Copyright

- An education game based on Leapmotion -- cellular immunity
- A Tujia Hand-waving dance teaching system based on kinect
- A Tujia Sayeerhe dance teaching system based on kinect
- A virtual experiment platform based on AR technology
- Experimental system of light polarization based on augmented reality technology

Chinese National Invention Patent

- Liu, Q., **Yu, S.**, Jiang, Y., Han, M., Zhou, S., Ma, J., Wu, L. (2023) A Computational Method and System for an Assemblable Virtual-Real Fusion Experimental Circuit. ZL 2021 1 0813426.9
- Liu, Q., **Yu, S.**, Ma, J., Xu, S., Zheng, X., Yang, W., Wu, L. (2023) A magnetic field visualization method, system, and equipment for virtual-real fusion experiments. ZL 2020 1 1393486.1
- Liu, Q., **Yu, S.**, Li, Y., Zhang, Y., Yuan, Y., Wang, Y., Huang, J., Wu, L. (2021) A teaching method and system for virtual dance. ZL 2018 1 0548334.0
- Liu, Q., Wang, Y., **Yu, S.**, Wu, L., Huang, J., Zhang, Y., Chang, Y., Yuan, Y. (2019) An assessment method for virtual dance system. ZL 2017 1 0774286.2

HONORS AND AWARDS

- National Scholarship for Graduate Students, Ministry of Education of the PRC, 2021.
- First prize, the 3rd “iTeach” National College Students Digital Education Application Innovation Competition, Ministry of Education of the PRC, 2019.
- Second Prize, the “Internet+” competition of the school of Educational information technology, CCNU, 2018
- National Scholarship for Graduate Students, Ministry of Education of the PRC, 2018.

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- The scholarship for outstanding graduates, CCUN, 2017

PROFESSIONAL MEMBERSHIP

- Immersive Learning Research Network (iLRN)

REVIEWER

- Journal of computer assisted learning
- IEEE transactions on learning technology
- Computers & Education
- Education and information technologies
- Journal of Research on Technology in Education
- Journal of educational computing research
- Universal Access in the Information Society
- International Journal of Human–Computer Interaction

PROFESSIONAL SKILL

- **Specialized software:** SPSS, Visual Studio, Mplus, Photoshop, Premiere, 3DS max etc
- **Data analysis:** GLM, HLM, Network analysis (ENA, ONA), sequential analysis (LSA)
- **Programing language:** C, C #, R, HTML, Jekyll
- **3D game engine technology:** UNITY
- **XR development:** Vuforia, VR_TK