

Yiming LIU 劉一鳴

Email: eduliuyym@connect.hku.hk WeChat: liuym110408

Education

2026 Ph.D., Educational Technology and Assessment, The University of Hong Kong, Hong Kong

Dissertation: Game-based assessment of collaborative problem solving skills for primary school students

Supervisors: Prof. Nancy Law & Prof. Xiao Hu

2019 M.S., Educational Technology, National Yang Ming Chiao Tung University, Taiwan

Master' thesis: Mediation analyses of the relationships among online self-regulated learning, engagement, and cognitive load: The case of an online learning environment integrated with online self-regulated learning strategies and instant feedback

Advisor: Prof. Jerry Chih-Yuan Sun

2016 B.A., Chinese Language and Literature, Jinan University, Guangdong

2016 B.A., Finance (double major), Jinan University, Guangdong

Research Interests

- Learning analytics
- Computational psychometrics
- Game-based assessment/learning
- Self-regulated learning
- Collaborative problem solving
- AI in education

Research Output

Google Scholar Profile: [150 citations; h-index: 6; i10-index: 4](#) (as of 28th April 2026)

Peer-reviewed journal articles

* Denotes corresponding author.

- [1] **Liu, Y.**, Hu, X., Ng, J. T. D., Ma, Z., & Lai, X. (2025). Ready or not? Investigating in-service teachers' integration of learning analytics dashboard for assessing students' collaborative problem solving in K–12 classrooms. *Education and Information Technologies*. [SSCI, JCR Q1, IF = 5.4]
<https://doi.org/10.1007/s10639-024-12842-5>
- [2] **Liu, Y.**, Huang, L., & Doleck, T. (2024). How teachers' self-regulation, emotions, perceptions, and experiences predict their capacities for learning analytics dashboard: A Bayesian approach. *Education and Information Technologies*. [SSCI, JCR Q1, IF = 5.4]
<https://doi.org/10.1007/s10639-023-12163-z>
- [3] **Liu, Y.**, Ng, J. T. D., Hu, X., Ma, Z., & Lai, X. (2024). Adopt or abandon: Facilitators and barriers of in-service teachers' integration of game learning analytics in K–12 classrooms?. *Computers & Education*. [SSCI/SCIE, JCR Q1, IF = 10.5]
<https://doi.org/10.1016/j.compedu.2023.104951>
- [4] **Liu, Y.**, Sun, J. C. Y., & Chen, S. K. (2023). Comparing technology acceptance of AR-based and 3D map-based mobile library applications: A multigroup SEM analysis. *Interactive Learning Environments*. [SSCI, JCR Q1, IF = 5.3]
<https://doi.org/10.1080/10494820.2021.1955271>
- [5] Sun, J. C. Y., **Liu, Y.***, Lin, X., & Hu, X. (2023). Temporal learning analytics to explore traces of self-regulated learning behaviors and their associations with learning performance, cognitive load, and student engagement in an asynchronous online course. *Frontiers in Psychology*. [SSCI, JCR Q1, IF = 2.9]
<https://doi.org/10.3389/fpsyg.2022.1096337>

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- [6] Sun, J. C. Y., & Liu, Y*. (2021). The mediation effect of online self-regulated learning between engagement and cognitive load: A case of an online course with smart instant feedback. *International Journal of Online Pedagogy and Course Design*. [ESCI, JCR Q3, IF = 0.6]
<http://dx.doi.org/10.4018/IJOPCD.295953>

Peer-reviewed conference proceedings

- [1] Liu, Y., Hu, X., & Ma, Z. (In press). *Psychometric network analysis of K-12 teachers' integration of learning analytics dashboard for collaborative problem solving assessment* [Paper presentation]. The 26th IEEE International Conference on Advanced Learning Technologies (ICALT 2026), Hung Yen, Vietnam.
- [2] Liu, Y., Ma, Z., Ng, J. T. D., & Hu, X. (2025, March). *Multimodal learning analytics for game-based assessment of collaborative problem solving skills among young students* [Paper presentation]. The 15th International Learning Analytics and Knowledge Conference (LAK '25), Dublin, Ireland. [Acceptance rate $\approx$ 30%, University Research Committee Grant]
<https://doi.org/10.1145/3706468.3706555>
- [3] Liu, Y., Ng, J. T. D., Hu, X., & Ma, Z. (2024, July). *Towards multimodal learning analytics of game-based collaborative problem solving among primary school students* [Paper presentation]. The 24th IEEE International Conference on Advanced Learning Technologies (ICALT 2024), Nicosia, North Cyprus. [IEEE TCLT Student Award]
<https://doi.org/10.1109/ICALT61570.2024.00035>
- [4] Ng, J. T. D., Liu, Y., Chui, D. S., Man, J. C., & Hu, X. (2023, March). *Leveraging LMS logs to analyze self-regulated learning behaviors in a maker-based course* [Paper presentation]. The 13th International Learning Analytics and Knowledge Conference (LAK '23), Arlington, USA. [Acceptance rate $\approx$ 30%]
<https://doi.org/10.1145/3576050.3576111>
- [5] Liu, Y., Sun, J. C. Y. (2021, July). *The mediation effects of task strategies on the relationship between engagement and cognitive load in a smart instant feedback system* [Paper presentation]. The 21st IEEE International Conference on Advanced Learning Technologies (ICALT 2021), Online. [Finalist for Best Short Paper, IEEE TCLT Student Award]
<https://doi.org/10.1109/ICALT52272.2021.00065>
- [6] Tsang, H. W. C., Liu, Y., & Law, N. W. Y. (2020, June). *An in-depth study of assessment of collaborative problem solving (CPS) skills of students in both technological and authentic learning settings* [Paper presentation]. The 14th International Conference of the Learning Sciences (ICLS 2020), Nashville, USA. [Acceptance rate $\approx$ 30%]
<https://repository.isls.org/handle/1/6340>

Conference presentations & posters

- [1] Liu, Y. (2022, May). *Temporal learning analytics to explore traces of self-regulated learning behaviors and their impacts on learning performance and extraneous cognitive load in an asynchronous online course* [Oral presentation]. The 2022 Research Postgraduate Conference (RPC 2022), Hong Kong SAR, China.

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- [2] **Liu, Y.**, Sun, J. C. Y., & Chen, S. K. (2021, April). *Students' acceptance of mobile library guides: Comparison between augmented reality and 3-D map—using multiple-group structural equation modeling* [Poster presentation]. The 2021 American Educational Research Association Virtual Annual Meeting (AERA 2021), Online.
- [3] **Liu, Y.**, Sun, J. C. Y., Chen, K. Z., & Chen, S. K. (2019, May). *Comparisons of AR and 3D map mobile library guides based on the general extended technology acceptance model for e-learning* [Poster presentation]. The 2019 Centre for Information Technology in Education Research Symposium (CITERS 2019), Hong Kong SAR, China.
- [4] **Liu, Y.**, & Sun, J. C. Y. (2018, May). *Effect of smart instant feedback on online learners' germane cognitive load and extraneous cognitive load: An investigation using a multiple mediation model* [Oral presentation]. The 22nd Global Chinese Conference on Computers in Education (GCCCE 2018), Guangzhou, China. [International Academic Conference Grant]

Working papers

- [1] **Liu, Y.**, & Hu, X. (Manuscript drafting). *Computational psychometrics for the assessment of collaborative problem solving skills among primary school students in a 3D multiplayer mobile role-playing game*. (Adapted from my Ph.D. dissertation)
- [2] **Liu, Y.**, & Hu, X. (In press). *Making the invisible visible: A network analysis of K-12 teacher integration of learning analytics dashboard for collaborative problem solving assessment*.
- [3] **Liu, Y.**, & Hu, X. (Manuscript drafting). *Seeing is believing: Delving into teachers' integration of learning analytics dashboard in K-12 classrooms: A psychometric network analysis*. (Targeting BJET)
- [4] **Liu, Y.**, & Luo, Y. (Data analysis in progress). *Examining interdependencies between inquiry-based working, intelligent TPACK, and attitudes towards AI application at work among in-service teachers: Person-centered and variable-centered analytic approaches*.
- [5] **Liu, Y.** (Conceptual stage). *What doesn't kill the cat makes it creative: Untangling the complex relations between curiosity and creativity in AI-empowered playful STEM learning from a network psychometrics perspective*.
- [6] **Liu, Y.** (Conceptual stage). *The anatomy of human-AI interaction in STEM learning environments: A collaborative problem solving approach*.

Research Experience (Selected)

- Worked on the TRS project titled [Learning and Assessment for Digital Citizenship](#) (PI: Prof. Nancy Law) at the Faculty of Education, University of Hong Kong
 - ✓ **Co-developed** [Digital City Fighter](#), a 3D multiplayer mobile role-playing game designed to assess primary school students' collaborative problem solving skills.
 - ✓ **Co-developed** **CPSLens**, a learning analytics dashboard enabling teachers to visualize and evaluate students' in-game collaborative problem solving performance.
 - ✓ **Wrote the research proposal** (supervised by Prof. Nancy Law and Prof. Xiao Hu), which included:
 - ✧ Conducting extensive literature reviews and formulating research questions.
 - ✧ Establishing theoretical frameworks and devising a multimodal coding scheme.
 - ✧ Adopting evidence-centered design and developing the experimental protocol.

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- ✓ **Conducted in-school experiments**, collecting multimodal data from 100 teams (N = 400 students), including log files, verbal communications, and survey responses.
- ✓ **Served as the primary coder**, coding over 115,000 lines of multimodal data based on the coding scheme, achieving high inter-rater reliability.
- ✓ **Analyzed the coded data** via quantitative analyses (e.g., psychometric network analysis, multilevel SEM, and data visualization) and **drafted journal manuscripts**.
- Worked on the project titled [The Application of Big Data in Education: From Smart Online Learning to the Flipped Classroom Integrated with Interactive Feedback Technologies](#) (PI: Prof. Jerry Chih-Yuan Sun) at the Institute of Education, National Yang Ming Chiao Tung University
 - ✓ **Assisted in proposal writing** for grant applications and **experimental design and implementation**.
 - ✓ **Analyzed multimodal data** using partial least squares SEM and temporal learning analytics methods to model the mechanisms of self-regulated learning.
 - ✓ **Drafted manuscripts** for publication and **wrote up project reports**.
- Worked on the project titled [Research of Glocally Meaningful and Relevant MOOCs Redevelopment Model: Cross-Cultural Design, Learning Analytics, and Curriculum Evaluation](#) (PI: Prof. Ken-Zen Chen) at the Institute of Education, National Yang Ming Chiao Tung University
 - ✓ **Co-redesigned and localized** [Learning How to Learn](#), a renowned Coursera MOOC with over 4 million learners.
 - ✓ **Developed and validated test items** to measure student learning outcomes.
 - ✓ **Facilitated World Café focus groups** to gather qualitative student feedback.

Teaching Experience

- **Guest Lecturer** | College of Information Science
The University of Arizona | Spring 2026
 - ✓ **Invited to deliver a lecture** titled "From Theory to Application: Unlocking 21st-Century Skills with Computational Psychometrics" for the graduate-level course, *INFO505: Foundations of Information*.
- **Guest Lecturer** | Department of Curriculum and Instruction
The Education University of Hong Kong | Fall 2025
 - ✓ **Invited to deliver a lecture** titled "From Theory to Application: Unlocking 21st-Century Skills with Computational Psychometrics" for the graduate-level course, *EDT6001: Digital Leadership and Technologies to Transform Instruction, Learning and Evaluation*.
- **Guest Lecturer** | Department of Curriculum and Instruction
The Education University of Hong Kong | Fall 2023
 - ✓ **Invited to deliver a lecture** titled "Game-based Assessment of Collaborative Problem Solving among Young Students" for the graduate-level course, *TLS6088: Effective Teaching and Learning Using Mobile Technologies*.
- **Teaching Assistant** | Faculty of Education

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The University of Hong Kong | Spring 2022

- ✓ **Assisted supervision of undergraduates' final-year projects** on research design, data cleaning and coding, statistical analysis, and thesis writing.

- **Teaching Assistant** | Institute of Education

National Yang Ming Chiao Tung University | 2017 – 2019

- ✓ **Led tutorials, assisted in lecture preparation, provided feedback to students, and marked assignments** for the following courses:

- ✧ *Instructional Media and Operations* (teacher education program)
- ✧ *Application of Emerging Technologies in Education* (graduate-level)
- ✧ *Learning How to Learn* (ewant platform version)

- **Workshop Designer & Instructor**

- ✓ **Plan to lead a hands-on professional workshop** titled "Item Generation, Validation, and Visualization via AI." This training will introduce a novel, integrated workflow for leveraging LLMs in scale development, equipping participants with key skills in:
 - ✧ Automating item generation and response simulation using LLMs.
 - ✧ Examining the psychometric qualities of AI-generated scales without human data.
 - ✧ Creating intuitive visualizations to enhance the interpretability of psychometric findings.

Professional Services

- **Ad Hoc Journal Reviewer**

- ✓ **Computers and Education**

[SSCI, JCR 2024: Q1, Rank: 5/762 in Education & Educational Research, IF = 10.5]

- ✓ **British Journal of Educational Technology**

[SSCI, JCR 2024: Q1, Rank: 7/762 in Education & Educational Research, IF = 8.1]

- ✓ **Education and Information Technologies**

[SSCI, JCR 2024: Q1, Rank: 22/762 in Education & Educational Research, IF = 5.4]

- ✓ **IEEE Transactions on Learning Technologies**

[SSCI, JCR 2024: Q1, Rank: 27/762 in Education & Educational Research, IF = 4.9]

- ✓ **Asia-Pacific Education Researcher**

[SSCI, JCR 2024: Q1, Rank: 37/762 in Education & Educational Research, IF = 4.6]

- ✓ **Thinking Skills and Creativity**

[SSCI, JCR 2024: Q1, Rank: 41/762 in Education & Educational Research, IF = 4.5]

- ✓ **Australasian Journal of Educational Technology**

[SSCI, JCR 2024: Q1, Rank: 45/762 in Education & Educational Research, IF = 4.2]

- ✓ **Knowledge Management & E-Learning-An International Journal**

[ESCI, JCR 2024: Q1, Rank: 111/762 in Education & Educational Research, IF = 2.8]

- ✓ **Information Development**

[SSCI, JCR 2024: Q2, Rank: 60/166 in Information Science & Library Science, IF = 2.1]

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- **Conference Reviewer**
 - ✓ The 25th IEEE International Conference on Advanced Learning Technologies (ICALT 2025)
 - ✓ The 14th International Learning Analytics and Knowledge Conference (LAK '24)
 - ✓ The 24th ACM/IEEE Joint Conference on Digital Libraries (JCDL '24)
- **Session Chair**
 - ✓ The 24th IEEE International Conference on Advanced Learning Technologies (ICALT 2024)
Session on "Big Data in Education and Learning Analytics"
- **Program Committee Member**
 - ✓ The 30th Global Chinese Conference on Computers in Education (GCCCE 2026)
C3: Joyful Learning, Educational Games, and Digital Toys
 - ✓ The 29th Global Chinese Conference on Computers in Education (GCCCE 2025)
C1: Learning Sciences & Computer-Supported Collaborative Learning
 - ✓ The 25th IEEE International Conference on Advanced Learning Technologies (ICALT 2025)
Track 6: Big Data in Education and Learning Analytics
 - ✓ The 14th International Learning Analytics and Knowledge Conference (LAK '24)
LAK24 – Posters
 - ✓ The 24th ACM/IEEE Joint Conference on Digital Libraries (JCDL '24)
Research Paper
- **Community Membership**
 - ✓ The National Council on Measurement in Education (NCME)
 - ✓ The Society for Learning Analytics Research (SoLAR)
 - ✓ The Asia-Pacific Society for Computers in Education (APSCE)
Special Interest Group 5: Educational Gamification and Game-based Learning
 - ✓ The IEEE Computer Society
Technical Committee on Learning Technology
- **Conference & Workshop Volunteer**
 - ✓ The 24th ACM/IEEE Joint Conference on Digital Libraries (JCDL '24)
 - ✓ The University of Hong Kong-East China Normal University Joint Workshop (HKU-ECNU 2023)

Honors & Awards

2025, **University Research Committee Conference Grant**, *The University of Hong Kong* (to present at LAK '25)

2024, **IEEE TCLT Student Award**, *IEEE Technical Committee on Learning Technology* (to present at ICALT 2024)

2023, **University Research Committee International Academic Training Grant**, *The University of*

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Email: eduliuyym@connect.hku.hk WeChat: liuym110408*Hong Kong* (for the Statistical Horizons workshop on Network Psychometrics)2021, **Finalist for Best Short Paper**, *IEEE Technical Committee on Learning Technology* (at ICALT 2021)2021, **IEEE TCLT Student Award**, *IEEE Technical Committee on Learning Technology* (to present at ICALT 2021)2021, **Erik Duval Travel Scholarship**, *The Society for Learning Analytics Research* (for the Learning Analytics Summer Institute)2019 – 2023, **Postgraduate Scholarship**, *The University of Hong Kong*2018, **International Academic Conference Grant**, *Ministry of Science and Technology (Taiwan)* (to present at GCCCE 2018)2017 – 2018, **Outstanding Student Scholarship**, *National Yang Ming Chiao Tung University*2016 – 2017, **Excellent Student Scholarship**, *National Yang Ming Chiao Tung University***Quantitative Analysis Expertise***Extensive training and hands-on experience in the following quantitative methods:*● **Foundational & linear models**

- ✓ *t*-test, ANOVA (e.g., factorial, repeated measures), ANCOVA, MANOVA, Chi-square test
- ✓ Correlation, Linear regression, Logistic regression, Path analysis

● **Latent variable modeling**

- ✓ Covariance-based SEM, Partial least squares SEM, Exploratory SEM, IRT
- ✓ Latent profile analysis, Latent class analysis, Latent class auxiliary model

● **Modeling dependent & complex data structure**

- ✓ Hierarchical linear modeling, Multilevel SEM, Latent growth modeling
- ✓ Sequence analysis, Sequence mining, Lag sequential analysis
- ✓ Process mining, Process data analysis, Hidden Markov models

● **Network analysis & modeling**

- ✓ Epistemic network analysis, Ordered network analysis
- ✓ Psychometric network analysis, Exploratory graph analysis
- ✓ Social network analysis

● **Machine learning & data mining**

- ✓ Classification & prediction (e.g., Support vector machines, Random forests)
- ✓ Clustering (e.g., Hierarchical clustering, K-means, Sequence clustering)
- ✓ Text mining (e.g., Text classification with large language models)

● **Bayesian statistical inference**

- ✓ Bayesian linear models (e.g., ANOVA, regression)
- ✓ Bayesian SEM, Bayesian mixture modeling
- ✓ Bayesian multilevel modeling
- ✓ Bayesian networks

● **Meta-analysis**

- ✓ Conventional meta-analysis, Meta-analytic SEM, Meta-analytic network models

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- **Data visualization**

- ✓ Categorical data (e.g., Circular barplot, Lollipop, Spider/Radar plot)
- ✓ Numeric data (e.g., Box plot, Heatmap, Histogram, Scatter plot)
- ✓ Relational data (e.g., Dendrogram, Network, Sankey diagram)
- ✓ Temporal data (e.g., Barplot, Line chart, Stacked area graph)

- **Technical skills**

- ✓ R, Mplus, Smart-PLS, SPSS, Netica, Python, Figma

Professional Training (Selected)

Retain lecture materials, notes, and key papers for each training, enabling me to revisit previous training whenever needed.

Workshops

2026, **Item generation and validation with large language models**

2026, **Meta-analytic structural equation modeling**

2025, **From ideas to impact: Research and publishing in technology-enhanced learning**

2024, **Text classification with large language models**

2023, **Quantitative ethnography masterclass**

2023, **Multilevel structural equation modeling**

2023, **Exploratory graph analysis**

2023, **Psychometric network analysis**

2023, **Bayesian statistics for social and health science**

2023, **Bayesian structural equation modeling**

2023, **Introduction to Bayesian networks**

2023, **Finite mixture modeling**

2023, **Machine learning**

2022, **Network analysis**

2022, **Meta-analysis**

2021, **Temporal and sequential analysis for learning analytics**

2021, **An introduction to methodologies in learning analytics**

2021, **Systematizing analytics with serious games**

2021, **Addressing the data challenges from next-generation assessments: Data science upskilling for psychometrician**

2021, **Statistical learning of process data: Methods, software, and applications**

2021, **Bayesian networks in educational assessment**

2021, **Bayesian statistical modeling**

2021, **Big data mining with R**

2021, **Text mining with R**

2020, **Using Stan for Bayesian psychometric modeling**

2020, **Cognitive diagnosis modeling**

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Courses

2021, **Social network analysis**

2020, **Professional certificate in teaching and learning in higher education**

2020, **Item response theory**

2019, **Text analytics in education**

2019, **Data science and learning analytics**

2019, **Longitudinal methods: Measurement and data analysis**

2018, **Special topic in advanced structural equation modeling**

2017, **Structural equation modeling**

2017, **Applied multivariate analysis**

2017, **Research on educational testing and measurement**

2016, **Research on advanced educational statistics**

2016, **Introduction to educational statistics**