

# Minkyung Lee

One Main Street, Suite S629,  
Houston, TX.

[Email/](#) [Homepage](#)

## EDUCATION

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### **Penn State University**

Ph.D., Learning Design and Technology (Defended: Dec 2024) Department of Learning and Performance Systems

Dissertation: “*The Impact of Scripted Roles on Learner Engagement and Knowledge Construction Assignment in Asynchronous Discussion: A Comparative Study of Structured vs. Unstructured Collaborative Learning*”

Advisor: Priya Sharma, Roy Clariana

### **Lesley University**

M.Ed., Curriculum and Instruction (2014)

Department of Education

Thesis: “*Consideration in the improvement of Korean students’ English proficiency and their perceptions to public English education*”

### **Hanyang University**

B.A., French Language and Culture (2009)

Minor: English Language and Culture

Department of Liberal Arts

## PUBLICATIONS

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Lee, M., Sharma, P. (2025) Network structure and communication clarity as factors influencing engagement in asynchronous online discussions. *Interactive Learning Environment* (SSCI, Scopus Q1). <http://dx.doi.org/10.1080/10494820.2025.2550035>

Lee, M., Sharma, P. (2024). Applying a community detection algorithm to examine group formation in online discussions: Exploring network characteristics and dynamics. *International Journal of Educational Technology in Higher Education* (SSCI, Scopus Q1). <https://doi.org/10.1186/s41239-024-00495-w>

Xia, Y., Cutler, S., Osunbunmi, I., Zappe, S. E., Gomez, E., Velegol, S., & Lee, M. (2024). The impact of applied improvisation on undergraduate engineering students’ professional development. *Advances in Engineering Education*. <https://doi.org/10.18260/3-1-1153-36069>

Lee, M., Clariana, R. B. (2022). The influence of external concept structures on an individual’s knowledge structures. *Educational Technology Research and Development* (SSCI, Scopus Q1). 70(5), 1657-1674. <http://dx.doi.org/10.1007/s11423-022-10144-6>

Jeong, J. & Lee, M. (2017). *Hanyang MOOC Flipped learning guidebook*, Hanyang University, Seoul.

### **In revision**

- Sharma, P, **Lee, M.** (in revision). The quality of student cognitive engagement across different levels of social engagement in online discussions. *Education and Information Technologies*.
- Lee, M.**, Clariana, R. (in revision). Implementing sociograms in online learning: examining their influence on community of inquiry elements. *Learning Environment Research*.

### **Under Review**

- Lee, M.**, Bhati, D. (under review). Making dropout risk transparent: early academic, financial, and support signals as a foundation for AI enhanced early warning systems. *Urban Education*.
- Lee, M.**, Sharma, P., Clariana, R (under review). Which roles bridge, centralize, or synthesize collaboration in online courses? - Linking network metrics with knowledge construction in asynchronous discussions. *International Journal of Computer-Supported Collaborative Learning*.
- Lee, M.** Sharma, P., Clariana, R (under review) When does structure matter? social and cognitive outcomes in role-assigned vs. organic online groups. *Internet and Higher education*.
- Lee, M.** (under review). Predicting assigned roles and knowledge-construction processes in asynchronous discussion: a course-scale feasibility study. *Educational Technology Research and Development*.

### **PEER REVIEWED PRESENTATIONS**

- Lee, M.**, Sharma, P (2025, April). Predicting roles and knowledge construction processes in asynchronous discussion using machine learning, AERA, 2025
- Cortes, D., Gregg, A., **Lee, M.**, Pauley, L., Osunbunmi, I (2024, October). By students, for students: development of custom virtual reality applications for teaching and learning in engineering courses, accepted as a presentation, FIE (Frontier of Education), Washington DC, 2024
- Gregg, A., & Cortes, D., & Osunbunmi, I. S., & Pauley, L. L., & **Lee, M.** (2024, June), Designing and evaluating virtual reality applications for a machine design course, accepted as a presentation, ASEE Annual Conference & Exposition, Portland, Oregon. 10.18260/1-2--47139
- Lee, M.**, & Cutler, S., & Zappe, S. E., & Spiegel, S., & Osunbunmi, I. S. (2024, June), Student preferences and performance in active learning online environments. accepted as a presentation, ASEE Annual Conference & Exposition, Portland, Oregon. 10.18260/1-2—48018
- Lee, M.**, Roy B. Clariana (2024, April). Implementing sociograms in online learning: examining their influences on community of inquiry elements, accepted as a poster, AERA, Philadelphia. 10.3102/2107692
- Lee, M.**, Sharma, P. (2023, April). Applying community detection algorithms to examine group formation in online discussions, accepted as a presentation, AERA, Chicago  
<https://www.aera.net/Publications/Online-Paper-Repository/AERA-Online-Paper-Repository-Viewer/ID/2107692>
- Lee, M.**, Sharma, P. (2022, October). Applying the Louvain algorithm to examine emergent groups in asynchronous online discussion, accepted as a presentation, College of Education Research Conference, State College
- Clariana, R., **Lee, M.** (2022, October). An OER tool for writing-to-learn in undergraduate architectural engineering, accepted as a presentation, College of Education Research Conference, State College
- Lee, M.**, Garbrick, A., Clariana, R. (2021, November). Knowledge convergence in collaborative concept mapping, accepted as a presentation, Association for Educational Communications & Technology

(AECT), Chicago

**Lee, M.,** Garbrick, A., Clariana, R. (2021, November). Lexical network analysis on synchronous discussion, accepted as a poster, Association for Educational Communications & Technology (AECT), Chicago

**Lee, M.,** Clariana, R. (2021, November). Students' perceptions in online courses with the Community of Inquiry Framework, accepted as a presentation, Association for Educational Communications & Technology (AECT)

**Lee, M.,** Garbrick, A., Clariana, R. (2021). Knowledge convergence in collaborative concept mapping, Association for Educational Communications & Technology (AECT), accepted as a presentation, Chicago, Selected Research and Development Papers Vol1, 106-120

**Lee, M.,** (2020, November). Social network analysis on online collaborative knowledge construction, accepted as a poster, Association for Educational Communications & Technology (AECT), Virtual

**Lee, M.,** Clariana, R. (2019, November). Knowledge structure measurement of cross-classification table as a visual external representation, accepted as a poster, Association for Educational Communications & Technology (AECT), Las Vegas

**Lee, M., & Jiyeon Lee.** (2016, October). Examining affective variables within the EFL learner's interlanguage system, accepted as a presentation, KEFL (Korean Association of English as Foreign Language), Seoul

## **FELLOWSHIPS & GRANTS**

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Penn State World Campus Graduate Research Fellowship	Fall 2018 - Spring 2022
Penn State World Campus Learning Design, Summer Research Fellowship	2019 - 2021
Penn State UPAC Graduate Student Travel Grant	2021, 2023

## **HONORS & AWARDS**

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AERA SIG Instructional Technology Graduate Student Paper Award	2024
Penn State College of Education Graduate Student Travel Award	2019, 2020, 2021, 2023, 2024

## **RESEARCH & PROFESSIONAL EXPERIENCE**

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<b>Director</b>	Feb 2025- Current
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Institutional Data Analytics, Office of Institutional Effectiveness  
University of Houston, Downtown

- Lead institution-wide research and analytics initiatives to inform strategic decisions on student success, retention, and equity.
- Developed predictive and temporal models using six years of institutional data (50,000+ students; 645,000+ records; 127 variables) to identify early signals of dropout and enrollment trends.
- Conducted integrated analyses of academic, financial, and support service data to guide evidence-based interventions and policy decisions.
- Prepared and supported grant proposals focused on data-informed interventions to enhance student success.

**Graduate Research Assistant**

June 2022 – Dec 2024

Leonhard Center for Engineering Education  
College of Engineering, Penn State University

- Conducted quantitative data analysis to evaluate the effectiveness of VR applications in educational settings, ensuring data quality and reliability
- Analyzed student preferences and learning outcomes for the NSF-Boeing PEER Grant project on online learning in advanced manufacturing and data science
- Collaborated with faculty to interpret data analysis results and provided insights to guide enhancements in course design and instructional strategies

*Funded Projects:*

- **Leonhard Center Educational Innovation (2024)** – VR applications in mechanical engineering (PI: Cortes, Gregg, Pauley).
- **NSF–Boeing PEER Grant (2023–2024)** – Quantitative survey analysis for engineering online learning (PI: Spiegel).
- **NSF–REU Project (2022–2024)** – Integration of biology and materials in chemical engineering (PI: Velegol & Gomez).

**Graduate Research Fellow**

Aug 2018 – May 2022

World Campus Learning Design

World Campus, Penn State University

- Collaborated with faculty and learning designers to design and develop online course content.
- Conducted needs assessments to identify instructional goals and develop effective course materials tailored to diverse learning environments
- Applied social network analysis to study collaborative learning dynamics, using findings to inform course design and improve group interactions in online discussions
- Utilized natural language processing techniques to perform lexical network analysis on synchronous discussions, enhancing understanding of student discourse patterns
- Designed and refined asynchronous discussion activities and rubrics to improve student engagement and learning outcomes

**Researcher**

Dec 2017 – July 2018

Global Education Center for Engineering, Seoul National University

- Designed and implemented STEM education programs for middle school students, integrating technology to enhance learning outcomes
- Managed flipped classroom projects using video conferencing tools, enabling interactive and student-centered learning
- Produced evaluation reports with actionable recommendations for program improvement, contributing to the center's strategic goals

*Funded Projects:*

- **Korean Ministry of Education, Science and Technology- Engineering experience program for middle school students (2018)** – help designing and implement STEM education integrating technology such as Arduino

**Researcher**

- Smart Center for Teaching and Learning, Hanyang University Feb 2015– March 2016
- Organized and facilitated monthly workshops on innovative teaching strategies for technology- enhanced education, receiving high satisfaction ratings from participants
  - Assisted in adapting and localizing a Futurelearn MOOC for a Korean audience, improving accessibility and relevance for local learners
  - Co-authored a flipped learning guidebook in collaboration with Tokyo University, sharing best practices in international contexts

## CERTIFICATES

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TESOL Certificate, University of California at San Diego.	2009
Massachusetts ESL Initial license (expired).	2014

## TEACHING & COURSE DESIGN EXPERIENCE

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### Teaching Assistant

- 'Seminar for Engineering Teaching Assistants'* Fall 2023, Spring 2024, Fall 2024  
College of Engineering, Penn State University
- Graded and provided the feedback for any asynchronous discussion and collaborative projects
  - Assisted in F2F classroom instruction and grading
  - Developed asynchronous collaborative discussion generated by Louvain algorithm

### Research-based Course Designer

- 'Introduction to Business Information Systems'* Fall 2021, Spring 2022  
World Campus, Penn State University
- Designed two modules for enhancing asynchronous discussions in the *'Introduction to Business Information Systems'* course, which were formally accepted into the curriculum

### Teaching Assistant

- 'Global Engineering Technology Exchange'* Fall 2017, Spring 2018  
College of Engineering, Seoul National University
- Managed IP-based video conferencing for "flipped classroom" models and assisted collaboratively designed engineering MOOC classrooms with Tokyo university

### Course Design Assistant

- 'Korea in a Global Context'* Fall 2016  
Smart Center for Teaching and Learning, Hanyang University
- Assisted in refining MOOC (Futurelearn) course materials to align with pedagogical objectives, ensuring both quality and relevance

### English Instructor

Daejin Woman's High School | Grade 11

2014–2015

- Developed and implemented curricula to prepare students for college entrance exams, emphasizing critical reading, writing, and comprehension
- Conducted mock exams and provided tailored feedback, improving students' readiness for high-stakes assessments
- Led collaborations with other instructors to align lesson plans and introduced student-centered learning strategies

**English Instructor**

**Garak Middle School** | Grades 7–8

2009–2011

- Taught grammar, vocabulary, and conversational fluency using interactive teaching strategies and multimedia resources