MINKYUNG LEE

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SUMMARY

A Ph.D. candidate in Learning Design and Technology with specialized expertise in collaborative learning, Social Network Analysis (SNA), and instructional design. Proficient in leveraging advanced data analysis and research methods to enhance educational practices and outcomes. Committed to applying data-driven research and innovative technologies to develop effective, evidence-based educational practices.

EDUCATION

Penn State University Spring, 2025 (Expected)
Ph.D., Learning Design and Technologies
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: Roy Clariana, Priya Sharma

Lesley University 2014
M.Ed., Curriculum and Instruction (Individually designed)
Department of Education
Thesis: "*Consideration in the improvement of Korean students' English proficiency and their perceptions to public English education"*
Advisor: William Stokes

Hanyang University 2009
B.A., French Language and Culture
Minor: English Language and Culture
Department of Liberal Arts

PROFESSIONAL APPOINTMENTS

Graduate Research Assistant June 2022 – Present
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.

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 2017 – 2018
Global Education Center for Engineering
College of Engineering, Seoul National University

- Managed video conferencing technologies to support flipped classroom models, enhancing student engagement and interactive learning.
- Developed and implemented STEM educational programs for middle school students, integrating technology to foster interest in engineering.
- Produced comprehensive reports on educational program outcomes, providing evidence-based recommendations for future initiatives.

Researcher 2016 – 2017
Smart Center for Teaching and Learning
Hanyang University

- Organized and led monthly workshops on 4C Industrialization, receiving high satisfaction ratings from participants.
- Assisted designing and adapting a Futurelearn course for a Korean MOOC platform, improving accessibility and impact.
- Assisted international flipped classroom practices, co-authoring a guidebook on essential techniques and recommended practices.

RESEARCH SKILLS

- Programming & Analysis Languages — Python, R
  - Experience in Network Analysis, Statistical Analysis, Discourse Analysis, and Predictive Analysis using Machine Learning techniques.
- Statistical Analysis Tools — SPSS, Mplus
- Content/Discourse Analysis Tools — NVivo
- Visualization & Network Analysis Tool — Gephi, yEd

FELLOWSHIPS & GRANTS

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

Penn State College of Education Graduate Student Travel Award	2019, 2020, 2021, 2023, 2024
Summer Tuition Assistance Funding, Penn State University	2019, 2020, 2021, 2023, 2024

RESEARCH EXPERIENCE IN FUNDED PROJECTS

Research and evaluation with quantitative and qualitative data analysis
Leonhard Center-funded Educational Innovation, 2024

- Project Title: VR Application for Mechanical Engineering Courses
- Principal Investigator: Daniel Cortes, Andrea Gregg, Laura Pauley
- Tasks: Quantitative and Qualitative Data Analysis, Publications
- Relevant published works:

  Cortes, D., Gregg, A., **Lee, M.K**., Pauley, L., Osunbunmi, I (2024, October). By students, for students: Development of custom Virtual Reality applications for teaching and learning in engineering courses, FIE (Frontier of Education), Washington DC 2024.

  Gregg, A., Cortes, D., Pauley, L., **Lee, M.K.,** Osunbunmi, I (2024, June). Designing and evaluating virtual reality applications for a machine design course, accepted as a presentation, ASEE, Portland 2024.

Research and evaluation with qualitative analysis
NSF-REU Project 2022, 2023, 2024

- Project Title: Integration of Biology and Materials in Chemical Engineering
- Principal Investigators: Stephanie Velegol, Esther Gomez
- Tasks: Data collection (interviews), qualitative data analysis to evaluate the program.
- Relevant published works : Xia, Y., Cutler, S., Osunbunmi, I., Zappe, S. E., Gomez, E., Velegol, S., & **Lee, M.K.** (in press). The impact of applied improvisation on undergraduate engineering students' professional development. *Advances in Engineering Education*.

Evaluation with qualitative analysis
Leonhard Center-funded Educational Innovation, 2023

- Project Title: A New Sustainable Lab Ambassador Program within the College of Engineering
- Principal Investigators: Rachel Brennan, Kristen Dreyer, Lydia Vandenburgh, David Jones
- Tasks: Qualitative report to evaluate the program by Interviews for Sustainable Lab Ambassadors and focus groups for the lap PI to understand their sustainable lab experiences.

Evaluation with quantitative data Analysis
NSF-Boeing PEER Grant, 2023, 2024

- Project Title: Engineering Online Learning in Advanced Manufacturing and Data Science
- Principal Investigator: Samuel Spiegel
- Tasks: large-scaled quantitative survey data analysis and publication.
- Relevant published work: **Lee, M.K**., Cutler, S., Osunbunmi, I., Zappe, S. E., Samuel, S (2024, June). Student preferences and performance in active learning online environments, accepted as a presentation, ASEE, Portland 2024.

CERTIFICATES

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

TEACHIING & COURSE DESIGN EXPERIENCE

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 2015- 2016
Grade 11
Daejin Woman's High School

- Prepared students for college entrance exams with a focus on critical reading, writing, and comprehension, implementing test-prep strategies and conducting mock tests.

English Instructor 2009- 2011
Grade 7-8
Garak Middle School

- Taught grammar, vocabulary, and conversational fluency, using multimedia resources and real-world contexts to engage students and foster interest in English.

PEER REVIEWED PUBLICATIONS AND PRESENTATIONS

Osunbunmi, I., **Lee, M.K.,** Curler, S (in preparation). Systematic Review on the Project based Learning in Engineering Education.

Lee, M.K., Strauss, S. (in preparation). Data-Driven Dynamics: Insights into Network Interactions and Outcomes in Student Discussions.

Lee, M.K., Sharma, P. (under review). Exploring Student Engagement through Social Learning Analytics: A Network Analysis of Asynchronous Discussions, Journal of Computer Assisted Learning.

Lee, M.K., Clariana, R. (under review). Implementing sociograms in online learning: Examining their influence on Community of Inquiry elements, American Journal of Distance Education.

Lee, M.K., Sharma, P. (under review). 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.

Lee, M.K., Sharma, Priya (2024, under review). Predicting Roles and Knowledge Construction Processes in Asynchronous Discussion Using Machine Learning, AERA, 2025

Cortes, D., Gregg, A., **Lee, M.K.,** 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.K., 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.

Xia, Y., Cutler, S., Osunbunmi, I., Zappe, S. E., Gomez, E., Velegol, S., & **Lee, M.K.** (in press). The impact of applied improvisation on undergraduate engineering students' professional development. *Advances in Engineering Education*.

Lee, M.K., 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., Clariana, R. B. (2022). The influence of external concept structures on an individual's knowledge structures. Educational technology research and development (ETR&D), 70(5), 1657-1674.

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

Lee, M.K. 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.

Jeong, J. & **Lee, M.K**. (2017). Hanyang MOOC Flipped Learning Guidebook, Hanyang University, Seoul.

Lee, M.K., & 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.

ACADEMIC SERVICE

Peer Review for AECT	2019-2021
Peer Review for ASEE	2022,2024
Peer Review for AERA	2023,2024

PROFESSIONAL AFFILIATIONS

American Educational Research Association (AERA)	2018, 2022, 2023, 2024
American Society for Engineering Education (ASEE)	2022, 2023, 2024
Association For Educational Communications & Technology (AECT)	2019, 2020, 2021, 2022