Deniz Ercan

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Research Summary

Ph.D. student researching how AI powered educational technologies can support the development of cognitive skills such as executive functioning, cognitive flexibility, and problem-solving. My research integrates generative AI, game-based learning, HCI, and UI/UX design to create and evaluate interactive learning environments grounded in cognitive and instructional theories. I have contributed to the development of multiple research prototypes, including an AI-driven web platform and educational games.

Education

University of Florida, PhD in Educational Technology — Aug 2023 – Current

- **Advisor:** Dr. SeyedAhmad Rahimi

Ege University, M.S. in Educational Technology — 2021 – 2023

- **Advisor:** Dr. Fırat Sarsar

Yıldız Technical University, B.S. in Educational Technology (Honor) — 2017 – 2021

- Erasmus+ Learning Mobility, University of Córdoba, Spain (2018 – 2019)

Funding, Fellowship and Other Research Awards

Best Graduate Student Paper Runner-up Award, College of Education Research Symposium, University of Florida — March 2025

School of Teaching and Learning Travel Award, University of Florida — Nov 2024

Publications

Conference Proceedings (Peer-Reviewed Conference)

- Rahimi, S., **Ercan, D.**, Gao, R., Esmaeiligoujar, S., Babaee, M., Li, H., Zhang, S., Lee, S., Closser, A., & Botelho, A. F. (2025, July). ProductiveMath: A Generative-AI-Powered App to Support Productive Failure Teaching. To appear in *the 26th International Conference on Artificial Intelligence in Education (AIED 2025)*, Palermo, Italy. *(Acceptance Rate: <16%,* ***Nominated Best Poster Award****)*
- **Ercan, D.**, Esmaeiligoujar, S., & Rahimi, S. (2025, June). Improving Pre-K–12 Students' Executive Functions Using Digital Games: A Systematic Review. To appear in *International Society of the Learning Sciences (ISLS) in Helsinki, Finland*.
- Rahimi, S., Esmaeiligoujar, S., Gao, R., **Ercan, D.**, & Keawphonkrang, S. (2025, June). The Effects of Digital Games on Pre-K–12 Students' Growth Mindset: A Systematic Review. To appear in *International Society of the Learning Sciences (ISLS) Annual Meeting 2025*, Helsinki, Finland.

Conference Presentations & Posters

- Gao, R., Kao, Y. C., Ma, C., Zheng, Y., **Ercan, D.**, Esmaeiligoujar, S., & Huang, R. (2025, December). *GeoQuest: Prototyping a mobile game for geography learning with game-based and design thinking approaches* [Poster presentation]. Joint Conference on Serious Games (JCSG), Rotkreuz, Switzerland.
- Rahimi, S., Esmaeiligoujar, S., Gao, R., **Celik, D.**, Li, H., & Botelho, A. F. (2025, April). Supporting teachers to prepare for productive failure using an AI-powered algebra problem generator. To appear in *American Educational Research Association (AERA) Annual Meeting 2025*, Denver, CO, USA.
- Rahimi, S., **Celik, D.**, Gao, R., Esmaeiligoujar, S., Li, H., & Botelho, A. F. (2025, April). Using generative AI for automated human-creativity assessment and machine creativity in a sandbox game. To appear in *American Educational Research Association (AERA) Annual Meeting 2025*, Denver, CO, USA.

- **Ercan, D.**, Rahimi, S., Esmaeiligoujar, S., Babaee, M., & Gao, R. (2025, April). Designing and prototyping an AI-powered web-based platform to support teachers in the productive failure method [Poster presentation]. *University of Florida Graduate Student Research Day*, Gainesville, FL, United States.
- Esmaeiligoujar, S., Rahimi, S., Gao, R., **Ercan, D.**, & Babaee, M. (2025, April). Towards better failure: Developing a rubric for algebra problem design [Poster presentation]. *University of Florida Graduate Student Research Day*, Gainesville, FL, United States.
- Babaee, M., Rahimi, S., **Ercan, D.**, Esmaeiligoujar, S., & Gao, R. (2025, April). From struggle to success: A professional development on productive failure for math educators [Poster presentation]. *University of Florida Graduate Student Research Day*, Gainesville, FL, United States.
- **Ercan, D.**, Rahimi, S., Esmaeiligoujar, S., Babaee, M., & Gao, R. (2025, March). Fail forward: Designing a platform to support productive failure in the classroom. Paper presented at the *University of Florida College of Education Research Symposium*, Gainesville, FL, United States.
- Esmaeiligoujar, S., Rahimi, S., Gao, R., **Ercan, D.**, & Babaee, M. (2025, March). Designing a rubric for assessing productive failure problems in algebra. Paper presented at the *University of Florida College of Education Research Symposium*, Gainesville, FL, United States.
- Babaee, M., Rahimi, S., **Ercan, D.**, & Esmaeiligoujar, S. (2025, March). From Struggle to Success: A Professional Development on Productive Failure For Math Educators. Paper presented at the *University of Florida College of Education Research Symposium*, Gainesville, FL, United States.
- Rahimi, S., Li, H., **Celik, D.**, Esmaeiligoujar, S., Gao, R., & Botelho, A. F. (2025, March). An Automated Human-Creativity Assessment and Machine Creativity in a Sandbox Game Using Generative AI. To appear in *Society for Psychology of Aesthetics, Creativity, and the Arts Annual Conference (APA Division 10)*, New Haven, CT, USA.
- DeLeon, J., Dunn, I., & **Celik, D.** (2024). Gamify to Amplify: Boosting Anatomy Mastery with Flashcards for Graduate Students. Poster presented at the *University of Florida College of Medicine Celebration of Research Day*, Gainesville, FL.
- DeLeon, J., Dunn, I., & **Celik, D.** (2024). Gamify to Amplify: Boosting Anatomy Mastery with Flashcards for Graduate Students. Poster presented at the *Regional AAA Conference*, Birmingham, AL.
- DeLeon, J., Dunn, I., & **Celik, D.** (2024). Gamify to Amplify: Boosting Anatomy Mastery with Flashcards for Graduate Students. Concurrent session presented at the *Association for Educational Communications and Technology (AECT)*, Kansas City, MO.
- **Celik, D.**, & Sarsar, F. (2023). Comparison of Educational Game Design Models: A New Model Proposal. In *Proceedings of the 3rd International Conference of Educational Technology and Online Learning*, Balikesir, Turkiye.
- **Ercan, D.**, Ozdemir, H., Kaya, A., Köseoglu, B., Turk, E., Zabzun, G., Ilgun-Cerci, S., Durak, T., & Sarsar, F. (2022). The Engineering Education Research Trends in Turkey: A content analysis of the Covid Pandemic in March 2020–December 2021. In *Proceedings of the 4th International Instructional Technologies in Engineering Education Symposium*, Izmir, Turkiye

Journal Articles

- Kirmiziyuz, E., **Ercan, D.**, & Bilgin, C. U. (2021). Designing, developing, and implementing an educational mobile game on electrical energy conversion and recycling. *Yıldız Journal of Educational Research, 6*(1), 48–60.

Dissertation and Thesis

- **Celik, D.** (2023). Teacher and Student Opinions on the Digital Educational Game Developed for the Mathematics Lesson (Unpublished master's thesis). Ege University, Izmir, Turkiye

Experience on Research and Grant Projects

Bill and Melinda Gates Foundation - PRODUCTIVE: AI-Powered Math Problem Generator for Supporting Teachers in Productive Failure Implementation Jan 2024 – Present
(Gates Foundation Award 080555)
Research Assistant & UI Designer - Figma
Principal Investigator: Dr. SeyedAhmad Rahimi

- Contributed to the design and prototyping of an AI-powered math problem generator to support teacher preparation in implementing productive failure pedagogy.
- Developed wireframes and interactive prototypes in Figma, ensuring alignment with instructional goals and user-centered design principles.
- Collaborated with researchers and educators to translate cognitive and pedagogical requirements into accessible, intuitive user interfaces.
- Conducted iterative user testing and design evaluations with K–12 educators to refine workflows and interface usability.

A Unique Blended Curriculum to Enhance the Research Capacity of Undergraduate and Graduate Students 2022–2023
(SOA-2021-22770, Multidisciplinary Priority Area Research Project)
Supported by Ege University Scientific Research Projects Coordination *Research Assistant*
Principal Investigator: Dr. Ozge Altun

- Contributed to the development of a blended learning curriculum aimed at enhancing research skills among undergraduate and graduate students.
- Supported instructional design, learning material development, and digital learning integration aligned with project goals.
- Collaborated with faculty to align curriculum content with academic standards and research methodologies.

Mobile Game Development About Electrical Energies and Recycling 2019 – 2021
(TUBITAK 2209-A Research Project Support Programme Award for Undergraduate Students)

- Designed and developed an educational mobile game to teach concepts of electrical energy conversion and recycling.
- Applied game-based learning principles to enhance engagement and understanding of environmental science topics.
- Led prototype design and testing process, integrating user feedback from student participants.

Teaching Experience

Teaching Assistant University of Florida, School of Teaching and Learning
IDS 2935 - Making Sense: Understanding the World with Data and AI Fall 2024
A 16-week course exploring the intersection of Artificial Intelligence and theories of learning through student-teacher interaction data.
Role: Third instructor

- Facilitated online discussions and lab sessions.
- Provided support to students on course concepts and technical issues.

EME 3813 - Technology-Enhanced Learning Environments Spring & Summer 2024
A 16-week course introducing the principles of human learning and the design of technology-enhanced learning environments.
Role: Lead instructor

- Delivered 8 modules and designed interactive class activities.
- Assessed student work and offered individualized feedback.

EME 2040 - Introduction to Educational Technology Fall 2023
A 16-week course covering digital literacy, productivity tools, multimedia design, and web-based instructional tools.
Role: Lead instructor

- Delivered 8 modules and designed in-class activities.
- Graded assignments and provided formative, constructive feedback.

Teaching Assistant Ege University, Turkiye
INV401 - Entrepreneurship and Innovation-Focused Research Processes Spring 2022
An interdisciplinary course focused on project development, mentor-mentee relationships, and collaborative innovation.
Role: Guest lecturer and assistant

- Delivered one lecture on project design.
- Supported instruction throughout the course alongside rotating faculty.

Intern Teacher Incirlibahce Public Middle School, Istanbul, Turkiye
Information Technologies and Software (6th Grade) Spring & Fall 2021
A 15-week course teaching basic programming, digital safety, and essential software skills.
Role: Sole instructor (online due to COVID-19)

- Designed lesson plans and interactive teaching materials.
- Delivered online instruction and managed class engagement.

Professional Service

Reviewer for Conferences
International Conference of the Learning Sciences (ICLS/ISLS)

Reviewer for Journals
Creativity Research Journal

Technologies

Languages: C#, SQL, Java, HTML, CSS, R, SPSS
Tools: Unity, Figma, Articulate Storyline, Articulate Rise, Adobe Creative Suite (PS, AI, AN), Camtasia
Platforms: Canvas, LMS, SCORM, ASP.Net