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EDUCATION

Purdue University – West Lafayette, IN *August 2024*
Ph.D. in Curriculum & Instruction
Specialization: Science Education
Dissertation: *Design, Implementation, and Evaluation of A NGSS-Aligned Quantum-Infused Science Curriculum Unit*
Advisor: Dr. Muhsin Menekse
Committee Members: Drs. Ruth Streveler, Yukiko Maeda, Sanjay Rebello, and Erica Carlson.

Bogazici University – Istanbul, Turkey *September 2018*
Master of Arts in Primary/Elementary Education
Specialization: Learning difficulties in science learning
Advisor: Dr. Serkan Ozel, Co-advisor: Dr. Nalan Babur
Committee Members: Drs. Annmarie Urso, Belma Haznedar.
Thesis: *Fifth graders' comprehension of expository texts: Performance differences between poor and adequate readers*

Bogazici University – Istanbul, Turkey *May 2015*
Bachelor of Science in Science Education

AWARDS

- 1. Poster winner, 2024 QED-C Plenary Meeting in Evanston, Northwestern University, Chicago, IL:** I was selected one of the top three graduate student poster presentation winner with my work entitled: “Quantum-Enhanced Curriculum For Middle School Students”
- 2. Best of CoED, 2022 ASEE Annual Conference & Exposition, Minneapolis, MN:** This award was given to my work-in-progress paper entitled “Door Alarm Lab: Integration of Engineering Design in a Simulation-Based Learning Environment for Pre-Service Elementary Teachers” in collaboration with Dr. Sanjay Rebello from Physics and Astronomy at Purdue. It was recognized as one of the best in the Division of Computers in Education 6 – Best of CoED at ASEE PEERS.
- 3. 2022-23 College of Education Graduate Student Mentor Fellow:** This fellowship was awarded by Purdue Graduate School Mentoring Fellows Initiative seeking to recognize

strengths and to identify possible opportunities for improvement in mentoring relationships within each college. I was the representative graduate student fellow on behalf of the College of Education with a funding of \$5000.

4. **Science Education and Dean’s Advisory Council Scholarship (August, 2019):** This scholarship is a one-time Wilson Doctoral Science Education Award (\$1000) that is awarded to an outstanding graduate student who seeks a PhD degree in Science Education in the College of Education.
5. **Ross Fellowship (Fall 2019-Spring 2023):** This is a Purdue Graduate School recruitment fellowship of doctoral-seeking students admitted to the College of Education for the upcoming academic year to a degree-granting graduate program. This prestigious fellowship is usually administered as an assistantship for four years in the program. I was awarded a total \$222,664.20 graduate school package involving benefits.

RESEARCH EXPERIENCE

Purdue University

Graduate Research Assistant

Summer 2020 – Summer 2024

Supervisor: Dr. Muhsin Menekse

Department of Defense (DoD) Grant “*Innovation in Quantum Pedagogy, Application, and its Relation to Culture (IQ-PARC)*”

Responsibilities include:

- Organized and co-chaired summer teacher professional development workshops to train in-service middle school teachers about fundamental quantum concepts.
- Collaborated with in-service teachers to implement the developed curricular units in their formal teaching setting.
- Collected and analyzed student data on conceptual understanding of quantum, engagement, and interest in quantum-infused integrated STEM education.
- Attended national and international conference meetings to introduce IQ-PARC and its achievements to educational organizations and practitioners in the field of K-12 STEM education.

Graduate Research Assistant

Fall 2019 – Spring 2020

Supervisor: Dr. Muhsin Menekse

Purdue College of Engineering Grant “*Quantum Technologies for K-12 Teachers and Students*”

Responsibilities include:

- Developed a high school curriculum unit introducing quantum key distribution to in-service high school teachers.
- Organized and co-chaired summer teacher professional development workshop to train in-service high school teachers about quantum key distribution experiment kit and its applications for cryptography.

- Prepared a magazine article manuscript which was published at the journal of *the Science Teacher* in 2021.

Graduate Research Assistant

Fall 2019-Summer 2020

Supervisors: Drs. Selcen Guzey, Muhsin Menekse, Yukiko Maeda

National Science Foundation (NSF) Grant “*Integration of Engineering Design and Life Science: Investigating the Influence of an Intervention on Student Interest and Motivation in STEM Fields*”

Responsibilities include:

- Analyzed Grade 6-8 students’ dataset to compare their pre- and post- conceptual development on life sciences concepts.
- Used advanced statistical methods including hierarchical modeling.
- Documented research findings in conference papers and collaborated to generate journal manuscripts.

Graduate Research Assistant

Spring 2019- Fall 2019

Supervisor: Dr. Brenda Capobianco

National Science Foundation (NSF) Grant “Using Principles of Design to Advance Teacher Education (UPDATE)”

Responsibilities include:

- Qualitatively analyzed project findings and developed transcripts of project participants who were pre-service science education teachers.
- Attended regular meetings and shared relevant updates.

Graduate Research Assistant

Spring 2019 – Fall 2019

Supervisor: Dr. Muhsin Menekse

The Institute of Educational Sciences (IES) Grant “*Enhancing Undergraduate STEM Education by Integrating Mobile Learning Technologies with Natural Language Processing (COURSEMIRROR)*”

Responsibilities include:

- Cleaned undergraduate student dataset and contributed to the development of journal manuscripts, one of them co-authored and published in 2021 in *the Journal of Experimental Education*.

Istanbul Aydin University

Graduate Research Assistant

Fall 2015-Spring 2019

Supervisor: Advisor of the Board of Trustees, Prof. Metin Ger

Higher Education Studies Application and Research Center

- Conducted research on improving the quality of education and training of students in Istanbul Aydin University
- Communicated all research-based updates to the Office of the Board of Trustees of the institution

- Co-authored a [research report](#) published in the Journal of Higher Education and Science

TEACHING EXPERIENCE

(More than 3 years of experience of teaching STEM/Science/Engineering Design Thinking)

Gifted Education Research & Resource Institute (GER²I), Purdue University

STEM Educator (on-site)

Summer 2023

- Taught Grade 6-8 students in 4 weeks about fundamental quantum concepts such as superposition, wave-particle duality, basic principles of quantum mechanics.
- Organized field trips to the facilities of PU-1 Nuclear Reactor, PRIME LAB, Envision Center, and Birck NanoTechnology Center

Quantum Teacher Professional Workshop, Purdue University

Teacher Trainer (on-site)

Summer 2023

- Co-chaired three-day long PD workshop for twenty (half was returning) IN in-service middle school science teachers to introduce them about fundamental quantum concepts.
- Collaborated with teachers to refine and enrich the developed curriculum units (Grade 6-8).

Quantum Teacher Professional Workshop, Purdue University

Teacher Trainer (on-site)

Summer 2022

- Co-chaired a three-day long PD workshop for ten IN in-service middle school science teachers to introduce them about fundamental quantum concepts.
- Collaborated with teachers to refine and enrich the developed curriculum unit (Grade 7 only)

Purdue Polytechnic Institute, Purdue University

Volunteer Graduate Student Instructor (remote & on-site)

Summer 2021- Spring 2022

- Introduced Design Thinking in Technology (TECH 120) to freshmen.
- Guided students to engage in critical analysis of real-world's problems and global challenges, develop solutions, and apply principles of human-centered design within three separate projects.
- Trained students about the HyFlex model that gave students the options to stay home and participate in class in real-time online when needed.
- Mentored project groups for two Design & Innovation Challenge competitions.

Gifted Education Research & Resource Institute (GER²I), Purdue University

STEM Educator (remote)

Spring 2021

- Developed a middle school level lesson plan about the biomimicry engineering design process.
- Taught how to generate a three-layer fabric mask using the applications of superhydrophobic coating.

STEM Educator (on-site)

Fall 2020

- Developed a middle school level lesson plan about the working mechanisms of single stream machines.
- Taught how the engineering design process occurs for the waste management system of single stream machines.
- Trained students to build a prototype for a functional single stream machine.

Tecumseh Junior Senior High School, Lafayette School Corporation, IN

Volunteer GK-12 Program Intern (on-site)

Fall 2019

- Collaborated with a science teacher and contributed to her classroom with a \$1500 Student Service-Learning grant.
- Developed and taught a lesson to Grade 7 students about Newton's Laws for 10 weeks.

Assessment and Evaluation in Education (SNO360, Istanbul Aydin University, Turkey)

Volunteer Course Instructor

Summer 2017

- Served as the instructor for this face-to-face course to teach the fundamentals of assessment and evaluation in social sciences to pre-service elementary education students.

PUBLICATIONS – JOURNAL ARTICLES (Published or Under-Review)

1. Jannini, A. S. & Akdemir, Z. G., & Menekse, M. (2024). Achievement goal theory in STEM education: A systematic review. *Journal of Engineering Education*, 1-22. <https://doi.org/10.1002/jee.20585>
2. Akdemir, Z. G., Menekse, M., Hosseini, M., Nandi, A., & Furuya, K. (2021). For Your Eyes Only: Introducing Quantum Key Distribution to High School Students. *The Science Teacher (National Science Teachers Association)*, 88(3), 44–51.
3. Menekse, M., Anwar, S., & Akdemir, Z. G. (2020). How do different reflection prompts affect engineering students' academic performance and engagement? *The Journal of Experimental Education*, 90(2), 261-279. <https://doi.org/10.1080/00220973.2020.1786346>
4. Saribas, D. & Akdemir, Z. G. (2020). Action research on pre-service elementary teachers' understandings of the scientific method and the use of evidence in a science and technology teaching course. *Research in Science & Technological Education*. <https://doi.org/10.1080/02635143.2020.1814233>
5. Saribas, D., Akdemir, Z. G., Aydin, G., & Yilmaz, S. (2019). Critical thinking skills in preschool science education and suggestions towards teacher education. *Necatibey Faculty of Education Electronic Journal of Science & Mathematics Education*, 13(2), 704-734.
6. Saribas, D., Akdemir, Z. G. (2018). Using an innovative tool in science education: Examining pre-service elementary teachers' evaluation levels on the topic of wetlands. *International Journal of Science Education*, 41(1), 123-138. <https://doi.org/10.1080/09500693.2018.1536302>

PUBLICATIONS – JOURNAL ARTICLES (In Preparation)

1. **Akdemir-Beveridge, Z. G.**, Zaghi, A., & Syharat, C. (*in preparation - UConn affiliated*). Exploring Engineering Creativity: Development of an Alternative Consensual Assessment Tool (A-CAT).
2. **Akdemir-Beveridge, Z.**, Beveridge, C., Muhoberac, M., & Chopra, G. (*in preparation - Purdue affiliated*). Introduction of an AI-assisted agent-based learning environment for STEM education.
3. Glover, M., **Akdemir-Beveridge, Z.**, & Sirnoorkar, A. (*in preparation - Purdue affiliated*). Content Analysis of Pedagogical Relationships Involving Generative-AI Supported Teaching and Learning Practices in Physics Education

PUBLICATIONS – PEER-REVIEWED CONFERENCE PROCEEDINGS

1. **Akdemir, Z. G.**, Menekse, M., Carlson, E., Dang, N., Hosseini, M., Li D. (2024). Supporting Middle School Students' Learning Outcomes and Engagement with NGSS-Aligned Quantum Infused Science Curriculum. Paper presented at *ASEE 2024 Annual Meeting, Portland, OR*.
2. **Akdemir, Z. G.**, Dang, N., Menekse, M. (2024). Fostering Quantum Understanding: Crafting, Applying, and Assessing A Science Curriculum for Middle School. *2024 NARST Annual International Conference, Denver, CO*.
3. **Akdemir, Z. G.**, Li Dongyang, Menekse, M., Hosseini, M., Carlson, E., Dang, N. Q. (2023). Innovation in Quantum Pedagogy, Application, and Its Relation to Culture (IQPARC). *Indiana STEM Education Conference Research Brief, Purdue e-Pubs*.
<https://doi.org/10.5703/1288284317594>
4. **Akdemir, Z.**, & Rebello, N. S. (2022, August), Door-Alarm Lab: Integration of Engineering Design in a Simulation-based Learning Environment for Pre-Service Elementary Teachers. Paper presented at 2022 ASEE Annual Conference & Exposition, Minneapolis, MN. <https://peer.asee.org/41267>
5. **Akdemir, Z. G.**, Menekse, S., Guzey, S. (2022). Exploring Student- and Teacher-Level Characteristics on Middle School Students' Engagement in Life Science Classes. *Proceedings of the American Educational Research Association (AERA), San Diego, CA*.
6. **Akdemir, Z. G.**, Menekse, S., Guzey, S. (2022). Exploring Student- and Teacher-Level Characteristics on Middle School Students' Engagement in Life Science Classes. *2022 NARST Annual International Conference*.
7. **Akdemir, Z. G.**, Menekse, M., Anwar, S., Guzey, S. (2021). How does integrated STEM life sciences unit affect middle school students' engagement and science content knowledge? *Indiana STEM Education Conference Research Brief, Purdue e-Pubs*.
<https://doi.org/10.5703/1288284317294>
8. **Akdemir, Z.**, Anwar, S., & Menekşe, M. (2021, in press). How does integrated STEM life sciences unit affect middle school students' engagement and academic success? *2021 NARST Annual International Conference*.

9. **Akdemir, Z. G.**, Babur, N., & Ozel, S. (2017). Examination of expository text reading comprehension performances of 5th grade students with and without reading difficulties. *Paper presented at 27th National Congress on Special Education (UOEK), Anemon Samsun Hotel, Samsun, Turkey.*
10. **Akdemir, Z. G.** & Turk, Z. (2017). Motivational beliefs based on primary grade students' text preferences. *Paper presented at 4th International Eurasian Educational Research Congress (EJER), Pamukkale University, Denizli, Turkey.*
11. **Akdemir, Z. G.** & Turk, Z. (2017). Examining foreign language reading anxiety of native Turkish students at a successful college in Turkey. *Paper presented at 4th International Eurasian Educational Research Congress (EJER), Pamukkale University, Denizli, Turkey.*
12. **Akdemir, Z. G.**, Babur, N., & Kaya, E. (2016). Reading scientific text for students with learning difficulties (LD). *Paper presented at 7th World Conference on Psychology, Guidance and Counseling (WCPCG), Kusadasi, Turkey.*

PUBLICATIONS – POSTER PRESENTATIONS

1. **Akdemir, Z. G.**, Menekse, M., Hosseini, M., Carlson, E., Dang, N., Li, D. (2024). Poster presented at *ISLS 2024 Annual Meeting, University of Buffalo, Buffalo, NY.*
2. Quantum-Enhanced Curriculum For Middle School Students. Poster presented at *2024 QED-C Plenary Meeting in Evanston, Northwestern University, Chicago, IL.*
3. **Akdemir, Z. G.**, Menekse, S., Guzey, S. (2022). Exploring Student- and Teacher-Level Characteristics on Middle School Students' Engagement in Life Science Classes. *Poster presented at AERA 2022 Annual Meeting, San Diego, CA.*
4. **Akdemir, Z. G.**, Menekse, M., Anwar, S., Guzey, S. (2021). How does an integrated STEM life sciences unit affect middle school students' engagement and academic success? *Poster accepted by NARST 94th International Conference (Remote).*
5. **Akdemir, Z. G.**, Ozel, S., & Babur, N. (2019). Fifth graders' comprehension of expository texts: Performance differences between adequate and poor readers. *Poster presented at Annual Graduate Student Education Research Symposium (AGSERS, 2019), Purdue University, West Lafayette, IN.*

SYMPOSIUM TALKS

1. **Akdemir, Z. G.**, Menekse, M., Hosseini, M., Carlson, E., Dang, N. Q., & Li Dongyang. (2023). Teaching Quantum-Infused Science Learning Content to Middle School Students. *Popular Press Talk presented at 2023 Graduate Women in Engineering (GWiE) Network Symposium, Purdue University, IN.*

TRAINING WORKSHOPS

1. **Akdemir, Z. G.**, Menekse, M., Hosseini, M., Carlson, E., Dang, N. Q., & Li Dongyang. (2023). 2023 Teacher Quantum Professional Development Workshop. *Hands-on Workshop Organized at the School of Engineering Education, Purdue University.*

2. **Akdemir, Z. G.**, Menekse, M., Hosseini, M., Carlson, E., Dang, N. Q., & Li Dongyang. (2023). No More Quantum Intimidation: Let's Learn & Teach Quantum-Infused Middle School Science STEM Curriculum Unit. *Hands-on Workshop Organized at NSTA 2023 Atlanta National Conference, Georgia World Congress Center, Atlanta, GA.*
3. **Akdemir, Z. G.**, Menekse, M., Hosseini, M., Carlson, E., Dang, N. Q., & Li Dongyang. (2023). Introducing fundamental quantum concepts to K-12 students and teachers. *Professional Development Workshop Organized at DoD STEM Exchange Meeting, Hyatt Regency, Capitol Hill, Washington D.C.*
4. **Akdemir, Z. G.**, Menekse, M., Hosseini, M., Carlson, E., Dang, N. Q., & Li Dongyang. (2023). Work-in-Progress (WIP): Change in Middle School Teachers' Perceptions About Teaching Quantum After They Participate in a Quantum-Infused Integrated STEM Workshop. *Professional Development Workshop Organized at HASTI & ICTM 2023, Marriott East, Indianapolis, IN.*
5. **Akdemir, Z. G.**, Menekse, M., Hosseini, M., Carlson E., Dang, N. Q., & Li, Dong Yang. (2023). Innovation in Quantum Pedagogy, Application, and Its Relation to Culture (IQ-PARC). *Presented at Indiana STEM Education Conference 2023, West Lafayette, IN.*
6. Sederberg, D., & **Akdemir, Z. G.** (2022). Newton's Cart – The Third Law. *Professional Development Workshop Organized for High School Physics Teachers at 50th Anniversary HASTI & ICTM 2022, Marriott East, Indianapolis, IN.*

SERVICE – PEER REVIEWING

1. Environment and Social Psychology - June 2024
2. Review of Education - May 2024
3. International Society of the Learning Sciences (ISLS) - January 2024
4. National Science Teachers Association (NSTA) - October 2023
5. National Association of Research in Science Teaching (NARST) - October 2023
6. Journal of Pre-College Engineering Education Research (J-PEER) - October 2023
7. The Curriculum Review Committee Member, The Indiana Department of Education (IDOE) - Fall 2023
8. NSTA – Fall 2023
9. American Educational Research Association (AERA) – Fall 2023
10. Journal of Engineering Education – Fall 2022
11. Connected Science Learning – Fall 2022
12. Poster Judge, Undergraduate Research Conference, Purdue University – Spring 2022
13. NARST – Spring 2021
14. NARST – Spring 2020

SERVICE – PROFESSIONAL ORGANIZATIONS

1. Sub-committee member, NARST Graduate Student Communication and Networking since 2023

2. Member, National Science Teaching Association (NSTA) since 2020
3. Member, National Association for Research in Science Teaching (NARST) since 2015
4. Member, American Educational Research Education (AERA) since 2015
5. Member, American Association for Engineering Education (ASEE) since 2019

SERVICE – LEADERSHIP

1. Symposium Moderator, AI-ED Fusion: Symposium on STEM Education In The Era of AI, College of Education, Purdue University, April 19th, 2024.
2. In-service Teacher Trainer, School of Engineering Education, since Summer 2019
3. Co-chair, Purdue College of Education Mentoring Luncheon, Spring 2023
4. Graduate Student Mentor Fellow, Purdue University Graduate School Mentoring Fellows Program, Fall 2021- Spring 2022
5. Volunteer Graduate Student Mentor, The Graduate Student Education Council (GSEC) Peer Mentor Program, Purdue University, Fall 2021-Spring 2022
6. Volunteer Gifted Student Mentor, Engineering Girl Ambassador Program, National Academy of Engineering (NAE), Summer 2022

SERVICE – LEARNING GRANTS

1. Submitted a grant proposal to the Office of Engagement at Purdue University, secured a \$1500 funding for a local socioeconomically low junior senior high school to provide quality science learning and engagement. Supervisor: Dr. Anatoli Rapoport (Purdue University)

SKILLS & CERTIFICATIONS

1. Software: SPSS, HLM 8.0, MS Office, MSTEAMS, Adobe Illustration.
2. *Certificate in Foundations of College Teaching*, Center for Instructional Excellence, Purdue University, Fall 2021
3. *Intensive Writing Experience*, Purdue University On-Campus Writing Lab, May 16-18, 2023