

OLUSHOLA SOYOYE

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Education

University of Delaware

Aug. 2021 – Present

PhD in Educational Statistics and Research Methods (ABD)

Newark, Delaware

- Dissertation: *Advantages of Bayesian Methods for Causal Inference in Small-Sample Randomized Experiments in Education: A Monte Carlo Study*

University of Illinois at Urbana-Champaign

Aug. 2018 – Dec. 2020

MS in Teaching of Mathematics

Champaign, Illinois

Tai Solarin University of Education

Sep. 2007 – Oct. 2011

BSc(Ed) in Mathematics

Ogun, Nigeria

Relevant Graduate Coursework

- Program Evaluation
- Educ Measurement Theory
- Mixed Methods in Research
- Qualitative Research in Educ
- Advanced Statistical Methods
- Applied Regression Analysis
- Intro to Data Mining
- Multilevel Modeling
- Structural Equation Modeling
- Applied Multivariate Statistics
- Logistic Regression
- Math Techniques in Data Sci
- Applied Bayesian Statistics
- Advanced Research Design for Causal Inference

Research/Project Experience

Centre for Research in Education & Social Policy, University of Delaware

Aug. 2021 – Present

Research Assistant

Newark, Delaware

- Conduct Bayesian statistical analyses and perform Markov Chain Monte Carlo (MCMC) simulations using JAGS or JASP, enhancing the precision of causal inference in experimental studies.
- Develop and implement JAGS programming techniques for MCMC sampling, ensuring rigorous convergence diagnostics and effective chain mixing to accurately estimate and visualize model parameters from posterior distributions.

National Council of State Boards of Nursing (NCSBN)

Jun. 2024 – Jul. 2024

Psychometric Intern - Automated item evaluation

Chicago, Illinois

- Led an innovative project applying NLP to the calibration of nursing exam items.
- Explored the use of LLMs (e.g. llama3:70b-instruct) to evaluate item quality.
- Fine-tuned a BERT model to distinguish between high-quality and low-quality exam questions and predict item difficulty parameters.

Educational Testing Service (ETS)

Jun. 2023 – Jul. 2023

Summer Intern - Automated Item Generation (AIG) using LLM

Princeton, New Jersey

- Investigated the viability of utilizing generative language models to automatically generate proper math contexts based on target construct.
- Fine-tuned a pre-trained language model (GPT-3.5) to generate consistent and accurate mathematics items.

Educational Testing Service (ETS)

Jun. 2022 – Jul. 2022

Summer Intern

Princeton, New Jersey

- Applied computational and statistical tools for the preprocessing of process data in R and Python.
- Implemented a sequence clustering algorithm (Dynamic Time Warping) on NAEP Process Data using R.
- Contributed to the creation of presentation, manuscripts, and conference proposal.

Teaching Experience

University of Delaware

Instructor of Record (Fall 2023)

- EDUC 691 - Applied Statistics & Research Design (Graduate Course).
- Developed and taught course materials.
- Conducted robust statistical analyses utilizing SPSS and R.

Aug. 2023 – Dec. 2023

Newark, Delaware

Notre Dame College Prep

Mathematics Teacher

- Taught basic algebra I & II, and Pre-calculus.

Jan. 2021 – July. 2021

Chicago, Illinois

University of Illinois, Urbana Champaign

Instructor & Teaching Assistant.

- Instructor: MATH 124 - Finite Mathematics (UG Course).
- TA: MATH {101, 103, 115 & 199}.
- Taught foundational math concepts: pre-calculus, quantitative reasoning, linear programming, college algebra and trigonometry.
- Administered, proctored and graded exams and quizzes.

Aug. 2018 – Dec. 2020

Urbana-Champaign, Illinois

Meadow Hall

Numeracy Teacher

- Taught Mathematics in Key Stage 2 and Key Stage 3.
- Collaborated with the school's analytics team to analyze end-of-term reports for tracking pupils' progress in assigned cohort.
- Organized after-school intervention programs for underachieving students in Key Stage 2.

Apr. 2014 – Jul. 2016

Lagos, Nigeria

Technical Skills

Familiar S/W: SPSS, SAS, Python, R, JMP, Weka, SQL

Membership and Affiliations

Data Science Institute Student Association

President

Fall 2024 – Present

Treasurer

Fall 2023 – Spring 2024

NCME Graduate Student Issues Committee

Member

Spring 2024 – Present

University of Delaware

Honors and Awards

- Recipient, NAEP Data Training Workshop, Arlington, VA, Summer 2024.
- Awardee, Center for Measurement Justice NCME Travel Scholarship for Minoritized Professionals in Educational Measurement (\$3,000), April 2024.
- Recipient, NAEP-ETS Conference Travel Grant (\$2,000), April 2023.
- Second-place Winner, Carol A. Ammon Case Competition, University of Delaware, Spring 2022
- Third-place Winner, Lerner Business Analytics Case Competition, University of Delaware, Winter 2022
- Distinguished as an Excellent Teacher by students at the University of Illinois at Urbana-Champaign, Spring 2020.
- Awarded Best Graduating Student at the Tai Solarin University of Education, class of 2011.
- Bronze Medalist, National Mathematics Competition for University Students (NAMCUS), Abuja, Nigeria, in 2010.

Publications

- **Soyoye, O.**, May, H. (in progress). Using Machine Learning Techniques for Predictive Modeling of On-Track Status for College Readiness.
- **Soyoye, O.**, Barbieri, C. A., Morra, G., Booth, J. (in progress). Student Satisfaction and Self-Regulation During COVID-Era Online Learning.
- Fan, X., **Soyoye, O.**, Uanhoro, J. O. (in progress). Assessing the Calibration of Bayesian Latent Variable Models in Mplus.
- Uanhoro, J. O., **Soyoye, O.** (under review). Historical measurement information can be used to improve estimation of structural parameters in structural equation modeling with small samples.
- Walter L. Leite., Huibin Zhang, Zachary K. Collier, Kamal Chawla; Lingchen Kong, Yongseok Lee, Jia Quan, **Olushola Soyoye** (under review). A Systematic Review of Machine Learning for Propensity Score Estimation.
- Collier, Z. K., Chawla, K., & **Soyoye, O.** (2024). Optimizing Imputation for Educational Data: Exploring Training Partition and Missing Data Ratios. *The Journal of Experimental Education*.
<https://doi.org/10.1080/00220973.2023.2287447>
- Collier, Z. K., Kong, M., **Soyoye, O.**, Chawla, K., Aviles, A., & Payne, Y. (2023). Deep Learning Imputation for Asymmetric and Incomplete Likert-Type Items. *Journal of Educational and Behavioral Statistics*, 49(2), 241-267.
<https://doi.org/10.3102/10769986231176014>
- Collier, Z. K., Zhang, H., & **Soyoye, O.** (2022). Alternative methods for interpreting Monte Carlo experiments. *Communications in Statistics-Simulation and Computation*, 1-16. <https://doi.org/10.1080/03610918.2022.2082474>

Conference Presentations

- **Soyoye, O.** (2024, June). Isolation Forest Algorithm for Anomaly Detection. Presentation delivered at an in-house research symposium, NCSBN, Chicago, Illinois.
- Walter L. Leite; Huibin Zhang; Zachary K. Collier; Kamal Chawla; Lingchen Kong; Yongseok Lee; Jia Quan; **Olushola Soyoye** (2024, April). A Systematic Review of Machine Learning for Propensity Score Estimation. Paper presented at the 2024 meeting of the American Educational Research Association (AERA), Philadelphia, Pennsylvania.
- **Soyoye, O.**, & Choi, I. (2024, April). Context-rich mathematics item generation using generative language models. Poster presented at the 2024 annual meeting of National Council on Measurement in Education (NCME), Philadelphia, Pennsylvania.
- Morra, G., **Soyoye, O.**, Barbieri, C. A., Booth, J. (2024, March). Student Satisfaction and Self-Regulation During COVID-Era Online Learning. Poster presented at the Cognitive Development Society Bi-Ennial Conference (CDS), Pasadena, California.
- **Soyoye, O.**, Collier, Z. K., Kong, M., Chawla, K., Aviles, A., & Payne, Y. (2023, June). Deep Learning Imputation for Unbalanced and Incomplete Likert-Type Items. Poster presented at the 2023 Modern Modeling Methods (M3) conference, Hartford, Connecticut.
- **Soyoye, O.**, Jiang, Y., & He, Q. (2023, April). Using Sequence Mining to Explore Students' Behaviors in Digital Reading Assessments (NAEP). Paper presented at the 2023 meeting of the American Educational Research Association (AERA), Chicago, Illinois.
- Collier, Z. K., Chawla, K., and **Soyoye, O.** (2022, September). Machine Learning-Based Imputation Techniques in Propensity Score Analysis. Poster presented at the 2022 meeting of the Society for Research on Educational Effectiveness(SREE), Arlington, Virginia.

Professional Service

- Panelist - Graduate Students Educational Workshop, University of Delaware, Spring 2024
- Conference Reviewer - 2024 National Council on Measurement in Education (NCME) Annual Meeting