Aaron Wenger

Ph.D Candidate

Kalamazoo, Michigan

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I am a Ph.D. candidate in the Mallinson Institute of Science Education, currently preparing my dissertation manuscript. Example work can be found on my Github page in the 'Portfolio' repository. Several hyperlinks to relevant projects are embedded.

Professional Profile

Research Interests

- 1) Role of evidence in educational policy and practice
- 2) Meta-research methods, especially meta-analysis and bibliometrics
- 3) Computational reproducibility and open science practices

Teaching and Public Engagement Interests

- 1) Scientific methods, experimental design, causal inference, and philosophy of science
- 2) Introductory and advanced biology subjects, particularly microbiology and molecular biology
- 3) History of educational psychology and science education
- 4) Statistical and computational research methods using R, esecially computational reproducibility

Western Michigan University — *Kalamazoo, Michigan*

Ph.D. Candidate in Science Education — *2017-present*

- Currently finishing dissertation manuscript; advised and chaired by Dr. William Cobern (concurrently enrolled in Biology MA program until 2021)
- Named the **2023-2024 Department Graduate Research and Creative Scholar**, in recognition of excellence in research and creative scholarship

Projects/Manuscripts in Progress (WORKNG TITLES)

- Dissertation: Beyond Average Effects in Education Research: *Explaining heterogeneity of concept mapping research in science education through meta-regression modeling*
  - **Article 1:** Challenges and Solutions for Knowledge Accumulation in Science Education Research
  - **Article 2:** Concept Mapping in Biology Education: *A Systematic Review and Meta-Analysis*
  - **Article 3:** Explaining Heterogeneity in Science Education Research: *Comparing machine learning models with a priori meta-regression models*
- Mapping the Homeschooling Literature: *A Scoping Review and Source Analysis*

Graduate Research Assistant in Science And Mathematics Program Improvement (SAMPI) — *2021-2023*

- Assisted in program evaluation for clients including NSF-funded Professional development for Emerging Education Researchers (PEER) field school, Kalamazoo Scholars Program, and the Michigan STEM Network (MiSTEM
- Created protocols and evaluation tools (e.g., Qualtric surveys and interview questions)
- Conducted quantitative and qualitative analysis of numerical, ordinal, and textual data
- Wrote internal and external reports summarizing findings

Education

Western Michigan University — *Kalamazoo, Michigan*

M.A. in Biological Sciences — *2017-2021*

- Master's Thesis Project: Engineered Flagellin Disulfide Variants in Salmonella typhimurium. Advised by Dr. Brian Tripp

Cornerstone University — *Grand Rapids, Michigan*

B.S. in Biology-Health Sciences - minors in Chemistry, Ancient (History) Studies — *2011-2015*

- Recipient of the Ronald Meyer Academic Scholar, Dean's list (6 of 7 semesters), and President's Scholarship
- Senior Thesis Project: a meta-study of the neural crest as a mechanism for vertebrate phenotypic diversity
- Internship: Hesse Memorial Archaelogical Laboratory, learned and applied zooarcheological techniques with animal bone remains

Portfolio and Further Education

Software for Statistics and Data Science

R: substantial programming experience with base R, the Rstudio IDE, and common packages such as 'ggplot' (See *ConceptMapping-inBioEd*)
Git and GitHub: substantial experience creating and mangaging projects using Git version control and the GitHub collaboration platform (See my GitHub account for several public projects)
Analysis Pipeline Tools: substantial experience implementing data analysis pipelines with the 'targets' and 'renv' R packages (See *ConceptMapping-inBioEd*)
SPSS and SAS: minor programming experience with both (See *Portfolio/sas*)
Excel VBA: minor programming experience (See *Portfolio/vba*)

Software for Documentation and Reporting

Microsoft Office Suite: extensive experience with Word, PowerPoint, Excel, Outlook, and Teams ()
Quarto: substantial experience creating reports and presentations ()
Rmarkdown: substantial experience creating data analysis notebooks, reports, and other documents such as this CV ()
LaTeX: minor working experience using the TeXworks IDE such as in this CV ()

Other Software

Qualtrics: substantial experience in creating survey forms, distributing to program participants, and processing results
Google Forms: substantial experience in creating survey forms and processing results
Abstrackr and MetaReviewer: substantial experience in these platforms for meta-research studies

Workshops and Online Courses

2023	**Instats: Confirmatory factor analysis and structural equation modeling in R**: Taught by Michael Zyphur and with certificate of completion
2023	**Instats: Meta-analytic structural equation modeling**: Taught by Mike Cheung and with certificate of completion
2023	**Evidence Synthesis and Meta-Analysis in R (ESMAR) Conference**: several workshops including: Advanced GitHub, Screening studies for eligibility in evidence syntheses
2022	**Excel VBA Programming**: video course introducing VBA programming and various applications such as macro implementation, userforms, and webscraping
2022	**Research Transparency Online Course**: put on by the Berkeley Initiative for Transparency in the Social Sciences (BITSS)
2022	**Reproducible Research Tutorial Series**: online course by Dr. Schloss of the University of Michigan, supported by NIH
2022	**Instats: Path analysis with interactions and indirect effects in R**: Taught by Michael Zyphur
2021	**Bibliometrics Training Series**: put on by the NIH Library
2020-21	**AERA-ICPSR PEERS**: attended several in this workshop series including: Modern Meta-analysis, Cutting-edge Quatitative and Computational Methods for STEM Education, and Introduction to qualitative meta-synthesis methods
2020	**Introduction to Systematic Reivew and Meta-Analysis**: a John Hopkins University course hosted by Coursera

Teaching Experience

Western Michigan University

Kalamazoo, Michigan

Teaching Assistant

2017-2021

- Served as instructor of record, teaching science courses for primary education majors
- CHEM 2800 - Physical Science for Elementary Educators: a inquiry-based, activity-centered course covering basic chemical and physical science principles
- BIOS 1700 - Life Science for Non-Majors: a laboratory-lecture-based content course covering major topics in the life sciences; taught first as an in-person course then **independently adapted to a virtual, partially synchronous implementation** for 2020-21 fall/spring semesters
- GEOG 1900 - Exploring Earth Science, the Atmosphere: A laboratory-based course covering basic earth science principles with an emphasis on the atmosphere; taught as a virtual, partially synchronous course

Friday Addition (FA) and Homeschool Ancillary Program (HsAP)

Michigan

Teacher

2015-2017

- Developed and taught 9th grade biology and 7th grade general science classes at FA and HsAP as well as 10th grade chemistry at HsAP

Grants and Professional Experience/Service

2024	**Graduate Student Panel Reviewer** Served as graduate student reviewer for Division D (Measurement & Research Methodologies) and SIG-SRMA (Systematic Review and Meta-Analysis special interest group)	*AERA Annual Meeting*
2021	**Graduate Student Research Grant** Secured for Science Education Research Project	*Western Michigan University*
2019	**Graduate Student Research Grant** Institutional grant secured for biology master thesis project	*Western Michigan University*

Presentations and Publications

1. Wenger, A., & Cobern, W. (2023). *Replication of concept mapping research in biology education: A systematic review and meta-analysis.* [Conference]. Michigan Academy of Science Arts and Letters Annual Conference, Berrien Springs, Michigan. `https://ace-wenger.quarto.pub/masal23-concept-mapping/`
2. Williams, C., & Wenger, A. (2023). *Evaluating the effects of field schools on emerging STEM education researchers.* [Conference]. Michigan Academy of Science Arts and Letters Annual Conference, Berrien Springs, Michigan.