EDUCATIONAL STATISTICS AND RESEARCH METHODS
Ph.D. in Educational Statistics and Research Methods

The ESRM Ph.D. degree program prepares graduates for conducting theoretical and applied research in the fields of quantitative statistical methods, psychometrics, educational psychology, and has recently been expanded to include more training in qualitative research methods. The primary learning goals of the program are centered around the identification, development, and evaluation of quantitative statistical procedures, analyses of data, communicating findings, critiquing research studies, and collaborating effectively with others. With the hiring of our new faculty member in 2020 who specializes in a diverse selection of qualitative research methods, we have been able to expand our primary learning goals to include the selection and application of qualitative methods, and the analysis and interpretation of data for conducting research in educational and behavioral sciences. We believe this is an important expansion of our students' skill sets as it provides for a more holistic approach to research and evaluation in our field. Our program is designed to prepare graduates for employment in academic institutions; local, state, and national educational agencies; research and policy organizations; and business and industry.

An assessment of the effectiveness of the program would include students' ability to:
1. Identify appropriate research designs for research questions,
2. Conducting statistical analyses for research hypotheses,
3. Understand the strengths, weaknesses, and appropriateness of different statistical procedures,
4. Critique statistical analyses completed by others,
5. Conduct simulation studies to evaluate statistical procedures under varying conditions,
6. Submit research proposals or manuscripts to professional conferences and journals,
7. Complete oral research presentations,
8. Use effective pedagogical processes to explain statistical design and processes to others.

In order to assess the effectiveness of our student training this year, we aggregated student data from research projects, candidacy exams, dissertation proposals, professional conference presentations, journal articles, grant submissions, internships, academic or professional awards, and job placements.

Assessment Information

In the 2022-2023 academic year, fifteen students were active in the ESRM Ph.D. program. Two students graduated (The Record show in June 2022), and the remaining 12 students are in the following stages of their program of study:

- ❖ One student (full-time) finished their first-year of study in the program.
- ❖ One student (full-time) passed his comprehensive exam and working on his dissertation
- ❖ Five students (Three full-time and two part-time) will take their comprehensive exams in August 2023.
- ❖ One student (part-time) passed her dissertation proposal in spring 2023 and plan to defense her dissertation in August 2023.
- ❖ Two students (part-time) plan to propose in summer 2023.

Course-Based Data

The quality of course-based research projects and exams (in-class and take-home) provide data for the learning outcomes of identifying appropriate designs, conducting statistical analyses, and identifying strengths, weaknesses, and appropriateness of statistical procedures. Students were rated a 4 if they earned a mastery level of 90% or higher on their project, 3 for 80-89%, 2 for 70-79%, 1 for 60-69%, and a 0 for less than 60%. Students' course performance has been averaged in the following three knowledge areas (courses that offered in the 2022-2023 academic year) and is provided in Table 1:

1. Core statistical design courses: Experimental design, multiple regression, and multivariate.
2. Measurement and Psychometric: Measurement
3. Advanced statistical modeling: Structural equations modeling (SEM), Hierarchical linear modeling, Advanced Multivariate Statistics, and Advanced SEM.

The overall average score was ranged from 3.88 to 4.00 with 18 records (see Table 1).

Table 1.
Average ESRM Ph.D. Student Performance for Learning Objectives 1, 2 and 3.

Learning Objectives	N[d]	Average	Min.	Max.
1. Core Statistical Design Courses[a]	2	4.00	-	4.00
2. Measurement and Psychometrics[b]	5	3.80	3.00	4.00
3. Advanced Statistical Designs[c]	-	-	-	-

Note: [a]it includes three courses; [b]it includes one course; [c]iESRM did not offer any advanced course in FY22-23; [d]it represents the number of ESRM Ph.D. students who took those courses.

Active Research, Internships, and Awards:

A summary of their research presentations, articles, grants, internships, and fellowships are provided in Table 2.

Publications: Many ESRM students work closely with faculty members. Two manuscripts were published in 2022-2023. Two manuscripts are currently under review.

Presentations: Doctoral students were active in research activities, with four students participating on 8 presentations at national and international conferences.

Internship: One student applied and was awarded the Educational Testing Service (ETS) internship (note: highly competitive) in summer 2022.

Admission: ESRM admitted **three** students in fall 2022.

Table 2.
Student Research Proposals, Manuscripts, Grants, and Internships

Learning Objectives 6 and 7	Number
Research Presentations[a]	8
Journal Articles (published or in press)	2
Manuscript under review	2
Internships	1
Fellowships[b]	5

[a]Four more presentations are not included in this report because they will be presented in summer 2023 (July and August, 2023)
[b]1 DDF, 2 DAFs, 2 SREB

Training Others and Collaborating with Professionals in Other Fields:

Assistantship	Number
Departmental Graduate Assistant:	3
Funded by Grant:	2
Funded by other program:	1

Teaching: Doctoral students gain experience in using pedagogical methods to explain statistical processes to others through course instruction and tutoring in the statistics laboratory. **Three** of our graduate assistants teach undergraduate sections of ESRM 2403 Statistics in Nursing.

Tutoring: Three of our graduate assistants provided instructional support and tutoring to our undergraduate and graduate level courses in the computer/statistics lab.

Consulting Center: One graduate assistant who worked closely with an ESRM faculty member at the research-consulting center in 2022-2023. This center provides statistical consulting service to help COEHP faculty and graduate students who had questions related to their research, grants, and publications.

Others Assistantships & Grant Work: Two more ESRM graduate assistants worked on an externally funded grant in 2022-2023. One ESRM student worked with the OT program as a graduate assistant. Our students have been active in collaborating on research projects with students and colleagues in other fields within our university. This is a valuable practice within our field.

Changes Planned Based on Assessment Findings

ESRM passed self-study in the 2022-2023 academic year. The detail plan is listed in the final report.

Appendix

ESRM Student Publications (student name in bold)

1. **Ezike, N**., Ames Boykin, A., Dobbs, P. D., Mai, H., & Primack, B. A. (2022). Unobserved components model: An application to Twitter surveillance about marketing of e-cigarette products. *Journal of Medical Internet Research Infodemiology, 2*(2), e37412, doi: 10.2196/37412.

2. **Edeh, E**., Lo, W. J., Khojasteh, J. (2023). Review of partial least square structural equation modeling (PLS-SEM) using R: A workbook. Structural Equation Modeling: A Multidisciplinary Journal, 30(1), 165-167.

ESRM Student Presentations (student name in bold)

1. **Asamoah, N**. **A.**, Turner, R. C., Lo, W., Crawford, B., & Jozkowski, K. (2022, July). *Evaluating the Rasch Tree Method for balanced and unbalanced DIF.* Accepted for presentation at the annual International Meeting of the Psychometric Society, Bologna, Italy.
2. Boykin, A., Leventhal, B., & **Asamoah, N**. **A.,** Ezike, N., (2022, July). *Evaluating item parameter drift for Bayesian longitudinal item response theory models.* Annual Conference International Meeting of the Psychometric Society (IMPS), Paper presentation, Bologna, Italy.
3. Lo, W. J., **Asamoah, N.A., Wang, X.,** Turner, R. C., Crawford, B. L., & Jozkowski, K. N. (2022, November). *Comparing binary and 4- and 6-point Likert scale formats.* Presentation at the Midwest Association for Public Opinion Research annual conference, Chicago, IL.
4. Turner, R. C., **Wang, X.,** Lo, W.-J., Crawford, B., & Jozkowski, K. (2022, November). *Investigating how different item formats can meet different reliability needs in attitude measurement*. Presentation at the Midwest Association for Public Opinion Research annual conference, Chicago, IL.
5. **Asamoah, N. A.,** Turner, R.C., Lo, W.J., Crawford, B.L., & Jozkowski, K.N. (2023, April). Evaluating Rasch tree purification to improve DIF detection in unbalanced item conditions. Presentation at the National Council on Measurement in Education annual conference, Chicago, IL
6. **Edeh, E**., Liang, X., & Cao, C. (2023, April). Prior Sensitivity of Bayesian SEM Fit Indices with Model Misspecification [Paper Session]. American Educational Research Association, Chicago, IL.
7. **Harris, E.** (2023, April). Parameter Detection and Recovery Utilizing Bayesian Structural Equation Modeling: A Simulation Study [Poster Session]. American Educational Research Association, Chicago, IL.
8. **Asamoah, N.A**., Turner, R.C., Lo, W.J., Crawford, B.L., & Jozkowski, K.N. (2023,

May). Do Demographic Predictors of Neutral Response Options Differ By Topic? Presentation at the American Association for Public Opinion Research annual conference, Philadelphia, PA.

ESRM Student Fellowships:

Nana Amma Asamoah	Distinguished Doctoral Fellowship (DDF),	2020-2024
Merlin Kamgue	Southern Regional Education Board-State Doctoral Scholars Program (SREB)	2019-2024
Ejike Eden	Southern Regional Education Board-State Doctoral Scholars Program (SREB)	2021-2026
Ethen Harris	Doctoral Academy Fellowship (DAF),	2021-2024
Xixi Wang	Doctoral Academy Fellowship (DAF),	2022-2025

ESRM Student Internship:

Ejike Eden	The Educational Testing Service (ETS) Summer Internship 2023