

Ph.D. in Educational Statistics and Research Methods

Assessment Report 2019-2020

The doctoral program of Educational Statistics and Research Methods (ESRM) in the Department of Rehabilitation, Human Resources and Communication Disorders at the University of Arkansas prepares graduates for conducting theoretical and applied research in the fields of quantitative statistical methods, psychometrics, educational psychology, and education-related fields. Graduates are prepared for employment in higher education; local, state, and national educational agencies; research and policy organizations; and industries with internal data needs. The primary learning goals of the ESRM Ph.D. program are centered around the identification of statistical procedures, analyses of data, communicating findings, critiquing research studies, and collaborating effectively with others.

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

Course-Based Data

The quality of course-based research projects and components of take-home exams provided data for the learning outcomes of identifying appropriate designs, conducting statistical analyses, and identifying strengths, weaknesses, and appropriateness of statistical procedures. Student projects and take-home examinations have been averaged (i.e., their final grades) for core coursework in the following three objects:

- Objective 1 – Core Statistical Design Courses:* educational statistics, experimental design, multiple regression, multivariate analysis
- Objective 2 – Measurement and Psychometrics:* measurement, item response theory (IRT)
- Objective 3 – Advanced Statistical Design:* hierarchical linear modeling (HLM), structural equations modeling (SEM), advanced multivariate analysis, and seminar.

The course-based performances were graded a 4 if they earned a mastery level of 90% or higher on their project/assignment/exam, 3 for 80-89%, 2 for 70-79%, 1 for 60-69%, and a 0 for less than 60%. There were 19 students (included two new admitted students) in the ESRM Ph.D. program at varying stages of progress in 2019-2020. There were nine ESRM doctoral students who took at least one learning objective course during the 2019-2020 academic year and the overall average score was ranged from 3.97 to 4.00 with 19 records (see Table 1).

Table 1.

Identifying Research Designs, Conducting Statistical Analyses, Evaluation Procedures

Learning Objectives 1, 2, and 3	Record	Average	Minimum	Maximum
Core Statistical Design Courses	1	4.00	-	4.00
Measurement and Psychometrics	1	4.00	-	4.00
Advanced Statistical Designs	17	3.97	3.00	4.00

Currently, five students who already passed their comprehensive exam are actively working on their dissertation proposal topics. One is considering switching his major to the department of mathematics and statistics due to research interests change. One student successfully passed the dissertation proposal defense stage in 2019-2020 academic year and is planning to defend summer 2020. Four students will take their comprehensive exam in coming 2020-2021 academic year.

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. Nine manuscripts which either were published or are in-press in 2019-2020. Four manuscripts are currently under review.

Presentations: Doctoral students were active in research activities, with five students participating on 23 presentations at national and international conferences. Unfortunately, due to COVID-19, many conferences were either moved to virtual formats or cancelled. Therefore, many did not have the chance to physically attend conferences in 2020, however some participated in virtual conferences.

Internship: We had two students apply for internships (note: both internships are highly competitive) in 2019. Both were awarded with one student with the National Board of Medical Examiners in summer 2020 and the other with the Educational Testing Service (ETS) for 2020. Unfortunately, ETS internship was cancelled due to COVID-19. ETS notified the student and encouraged him to apply for 2021 if he is still interested in this internship.

Award & Admission: One student was selected for Southern Regional Education Board-State Doctoral Scholars Program in 2019. ESRM admitted two new students in 2020, and one was awarded a Walton Distinguished Doctoral Fellowship (DDF) which will support her study from 2020 to 2024.

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

Learning Objectives 6 and 7	Number
Research Presentations	23
Journal Articles (published or in press)	9
Manuscript under review	4
Internships	2
Fellowships	3*

* 1 awarded in spring 2020

Training Others and Collaborating with Professionals in Other Fields:

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

Tutoring: Four of our graduate students provided instructional support and tutoring to our undergraduate and graduate level courses in the computer/statistics lab. In addition, two of our doctoral students assisted ESRM faculty with their courses and Blackboard management.

Consulting Center: One student who worked closely with an ESRM faculty member developed a research consulting center in 2019. This center provides statistical consulting service to help COEHP faculty and graduate students who had questions related to their research, grants, and publications. Three additional ESRM students began working with the consulting center in May 2020.

Others Assistantships & Grant Work: One doctoral student works for the Nursing department to assist and conduct research analyses, interpret, and write results for faculty. Two graduate students worked on an externally funded grant in 2019-2020. Three of our graduate students served as adjunct instructors for selected courses in 2018-2019. 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

Student performance in classes and on skills-based evaluations have been appropriate. For meeting our program's goals, we emphasize a research-intensive environment with training in pedagogy and presentation skills. We are fortunate in hiring a new tenure-track faculty member whose expertise is in qualitative methodology in 2020. This will help expand our students' training in complementary qualitative methods. In the 2019-2020 academic year, we are in the process of program coursework realignment and the development of a more heavily research-intensive degree program. We are designing new program requirements to engage more students in research in years 1 and 2 of the program, as well as modifying our comprehensive exam's format and procedure. All five faculty members are working on internal and external grants or grant proposals, with three of these grants supporting graduate assistant lines. For grant activities, our faculty members are collaborating not only within our college, but also across campus and on multi-institution projects.

Appendix

ESRM Student Publications (student name in bold)

- Ames, A. J., & **Myers, A. J.** (2019). Digital Module 06: Posterior predictive model checking. *Educational Measurement: Issues and Practice*, 38, 116 – 117.
- Ajemigbitse, A. A., Omole, M. K., **Ezike, N. C.**, & Erhun, W. O. (2013). Assessment of the knowledge and attitudes of intern doctors to medication prescribing errors in a Nigeria tertiary hospital. *Journal of Basic and Clinical Pharmacy*, 5(1), 7.
- Ames, A. J., Leventhal, B. C., & **Ezike, N. C.** (2020). Monte Carlo simulation in item response theory applications using SAS. *Measurement: Interdisciplinary Research and Perspectives*, 18(2), 55-74.
- Liang, X., Kamata, A., & **Li, J.** (in press). Hierarchical Bayes approach to estimate the treatment effect for randomized control trials. *Educational and Psychological Measurement*.
- Myers, A. J.**, & Finney, S. J. (2019). Does it matter if examinee motivation is measured before or after a low-stakes test? A moderated mediation analysis. *Educational Assessment*. doi:10.1080/10627197.2019.1645591
- Myers, A. J.**, & Ames, A. J. (in press). Validating rubric scoring processes: An application of an item response tree model. *Applied Measurement in Education*.
- Myers, A. J.**, & Finney, S. J. (2019). Examining the effect of self-protective attributions on self-reported test-taking motivation. *The Journal of Experimental Education*. doi:10.1080/00220973.2019.1680942
- Roessger, K. M., Roumell, E. A., & **Weese, J.D.** (in press). Rethinking andragogical assumptions in the global age: How preferences for andragogical learning vary across people and cultures. *Studies in Continuing Education*.
- Williams, B., Lo, W. J., Hill, J., **Ezike, N.**, & Huddleston, J. (2019). Employment supports in early work experiences for transition-age youth with disabilities who receive Supplemental Security Income (SSI). *Journal of Vocational Rehabilitation*, 51(2), 159-166.

ESRM Student Manuscripts Under Review (student name in bold)

- Ames, A. J., & **Myers, A. J.** (under review). Explaining variability in extreme response style traits: A covariate-adjusted IRTree.
- Ezike, N. C.**, & Ames, A. J. (under review). The Diagnostic Rating System: Rater behavior for an alternative performance assessment rating method. *Journal of Applied Measurement*.

Roessger, K. M., Liang X., & **Weese, J.**, Parker, D. (Under Review) *Examining moderating effects on the relationship between prison education and post-release outcomes.*

Turner, R., **Reimers, J.**, Lo, W.-J, Jozkowski, K.N., & Crawford, B. (under review). Data quality indicator effectiveness with unidirectional vs. bidirectional scales. *Applied Psychology: An International Review*

ESRM Student Presentations (student name in bold)

Ames, A.J., & **Ezike, N. C.** *The Diagnostic Rating System: Rater behavior for an alternative performance assessment rating method.* Annual Conference of the American Educational Research Association, San Francisco, CA (April 2020).

Ames, A.J., Linde, J., & **Myers, A.J.** (2020, April). *Validity evidence for response process models.* Paper to be presented at the annual meeting of the National Council on Measurement in Education, San Francisco, CA.

Ames, A. J., & **Myers, A. J.** (2019). Digital Module 06: Posterior Predictive Model Checking. <https://ncme.elevate.commpartners.com/>.

Ames, A. J., & **Myers, A. J.** (2019, July). *Modeling changes in response style with longitudinal IRTree models.* Paper presented at the annual International Meeting of the Psychometric Society, Santiago, Chile.

Crawford, B., **Reimers, J.**, Willis, M., Turner, R., Jozkowski, K.N., & Lo, W.-J (November, 2019). “Roe v. Wade” versus “Legalized Abortion”: Wording effect influences on survey responses. Paper presented at the American Public Health Association (APHA) Annual Conference, Philadelphia, PA.

Ezike, N. C., Ames, A. J., & Leventhal, B. B. (April 2020). *Evaluation of the SAS IRT Procedure: Parameter Recovery and Item Fit.* Annual Conference of the National Council on Measurement in Education, San Francisco, CA

Ezike, N.C. & Ames, A.J., (July 2020). *Evaluation of SAS IRT and MCMC Procedures for the GPCM.* Annual Conference of the International Meeting of the Psychometric Society, College Park, Maryland

Ezike, N. C. & Lo, W. (April 2020). *Programme for International Student Assessment (PISA) 2015: Cross-Mode Comparison between Paper- and Computer-Based Assessments.* Annual Conference of the American Educational Research Association, San Francisco, CA

Myers, A. J., & Ames, A. J. (2019, July). *Multilevel item response tree for examining heterogeneity in response styles.* Paper presented at the annual International Meeting of the Psychometric Society, Santiago, Chile.

- Myers, A. J., & Ames, A. J.** (2020, July). *A non-compensatory and compensatory MIRT model for modeling response styles*. Paper to be presented at the annual International Meeting of the Psychometric Society, College Park, MD.
- Myers, A. J., & Bashkov, B.** (2020, April). *Evaluating use of an online open-book resource in a high-stakes credentialing exam*. Paper to be presented at the annual meeting of the National Council on Measurement in Education, San Francisco, CA.
- Myers, A. J., Marcantonio, T.L., Lo, W.J., Ames, A.J., Turner, R., & Jozkowski, K.** (2020, April). *Using IRTrees methods to assess response styles in college student's abortion attitudes*. Paper to be presented at the annual meeting of the National Council on Measurement in Education, San Francisco, CA.
- Li, J., Zhang, Q., & Lo, W.** (2019, Aug). *Comparison Different Correlation Methods for Interaction Effects Screening in Generalized Model*. Paper presented at the annual meeting of the *American Psychological Association*, Chicago, IL.
- Lo, W.-J., Ezike, N.C.** (August 2019). *Comparing searching procedures and differences in fit indices for identifying measurement invariance*, American Psychological Association Conference, Chicago, IL, United States.
- Lo, W.-J., Turner, R.C., Crawford, B.L., Jozkowski, K.N., & Weese, J.D.** (2020, June). *Change We Can, or Change We Can't: Sequence Effects for Abortion Item Sets that Incorporate Gestational Timing*. Presentation accepted for the American Association for Public Opinion Research Virtual conference. (AAPOR annual conference transitions to virtual format during 2020 coronavirus pandemic)
- Reimers, J., Turner, R. C., Jozkowski, K.N., Lo, W.J., Crawford, B.L., & Weese, J.** (2020, June 1 – September 1). *Comparing Neutral Response Options and Location in Item Formatting for Social Surveys*. Poster presented at the Association of Psychological Sciences Virtual Poster Showcase (*APS national conference transitioned to virtual format during 2020 coronavirus pandemic*).
- Reimers, J., Turner, R., Lo, W.-J., Jozkowski, K.N., & Crawford, B.L.** (2020, April). "Demographic Comparisons for Various Types of Low Cognitive Effort Survey Responses". Invitation (and intent) to present at the American Educational Research Association Annual Meeting, San Francisco, California (canceled due to 2020 coronavirus pandemic).
- Turner, R.C., Lo, W.J., Reimers, J., Crawford, B.L., Jozkowski, K.N., & Weese, J.** (2020, June 1 – September 1). *Impacts of Item Formatting on Self-Reported Support for Abortion Legality*. Poster presented at the Association of Psychological Sciences Virtual Poster Showcase (*APS national conference transitioned to virtual format during 2020 coronavirus pandemic*).
- Turner, R., Reimers, J., Jozkowski, K.N., Crawford, B. L., & Lo, W.-J.** (2020, April). "Comparison of Data Quality Indicator Effectiveness with Unidirectional vs. Bidirectional Scales in Survey Research". Invitation (and intent) to present at the

American Educational Research Association Annual Meeting, San Francisco, California
(canceled due to *2020 coronavirus pandemic*).

Roessger, K. M., Liang, X., **Weese, J.D.** (2020, April). Examining the effects of moderating factors on the relationship between Arkansas correctional education and recidivism. Paper accepted to the annual conference of the American Educational Research Association. San Francisco, California. (Conference canceled)

Weese J.D. (2020). SIBTEST Cut-Scores: Reevaluating the classification guidelines for dichotomous DIF. Paper accepted for the National Council on Measurement in Education Virtual Meeting. (NCME annual conference transitions to virtual format during 2020 coronavirus pandemic)

Weese, J.D., Lo, W-J., Crawford, B.L., Jozkowski, K.N., & Turner, R.C. (2020, June). How Does Inclusion of Gestational Length and Order Effects Impact Factor Structure of Medical and Social Abortion Item Sets? Presentation accepted for the American Association for Public Opinion Research Virtual conference. (AAPOR annual conference transitions to virtual format during 2020 coronavirus pandemic)

Weese J.D., & Turner, R.C. (2019, July). Designing an effect size to standardize polytomous item DIF. Poster presented at the International Meeting of the Psychometric Society. Santiago, Chile.

ESRM Student Fellowships:

John Linde	Doctoral Academy Fellowship,	2018-2022
Nnamdi Ezike	Doctoral Academy Fellowship,	2018-2022
Nana Amma Asamoah	Distinguished Doctoral Fellowship,	2020-2024
Merlin Kamgue	Southern Regional Education Board-State Doctoral Scholars Program	

ESRM Student Internships:

Aaron Myers	Office of Research, National Board of Medical Examiners 2020
Nnamdi Ezike	The Educational Testing Service (ETS) Summer Internship 2020