

George Mason University

College of Education and Human Development

Ph. D. in Education and Human Development

EDRS 827 - 001: Introduction to Measurement and Survey Development
(3 Credits) Fall 2023

Thursday 4:30 p.m. - 7:10 p.m. Thompson Hall L014 (Fairfax Campus)

I Instructor: Marvin Powell, Ph. D.

Office Hours: by appointment

Office Location: Room 2105 West Building

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Zoom: <https://gmu.zoom.us/j/3739189483>

Prerequisite:

Required Prerequisites: EDRS 811^{B-} or 811^{XS}.

^{B-} Requires minimum grade of B-.

^{XS} Requires minimum grade of XS.

B- or higher and satisfactory completion of EDUC 811 or equivalent required or permission of instructor.

University Catalog Course Description: Develops knowledge and skills related to measurement and survey development and use in research for education, psychology, and related fields.

Course Overview: EDRS 827 introduces students to the classical measurement theory, survey and scale item development, and provides students with hands-on applications. Students require a working knowledge of statistical concepts so that we may determine the degree to which our measurement tools are meaningful (by conducting Exploratory Factor Analysis, Generalizability Theory and Item Response Theory). EDRS 827 provides students with the requisite skills to develop, analyze, and interpret instruments used in educational research. Students will learn through a combination of reading assignments, hands-on experience in developing a measurement tool and using data analysis procedures to assess measurement validity.

Course Delivery Method: Lectures will be used to present quantitative and factual information. Seminar discussions will occasionally be used to clarify and extend knowledge presented in assigned readings. In-class and out-of-class homework, readings, and exercises will be assigned each week and used to clarify lectures or prepare for discussion. **Questions are encouraged.**

Learning Objectives: This course is a one-semester measurement course design to expand students' understanding of organizing, analyzing, and interpreting educational measurement, it is expected that you will be able to:

- a) Evaluate and apply appropriate standards and use of educational and psychological testing as they relate to test construction, fairness in testing, reporting, and use of test scores
- b) Employ test construction practices that include item-writing for various types of assessment procedures;
- c) Demonstrate a conceptual understanding of reliability and validity of educational and psychological measures;

- d) Define and classify procedures used to provide validity evidence for educational and psychological tests
- e) Conduct exploratory factor analysis as a method of assessing validity of a measure;
- f) Read, understand, and interpret scientific articles related to development and validation of educational and psychological measurements

Required Materials:

- (1) DeVellis, R. F., & Thorpe, C. T. (2021). *Scale development: Theory and applications*. Sage publications.
- (2) Fowler Jr, F. J. (2013). *Survey research methods*. Sage publications.
- (3) Access to R software (<https://www.r-project.org>). R is free and open source. R can be installed on almost any computer with any operating system (e.g., Windows, Mac, Linus). There are also computer labs on campus that provide access to R. Also R Studio (<https://www.rstudio.com/products/rstudio/download/>).

Recommended Resource:

- American Psychological Association (2019). *Publication manual of the American Psychological Association* (7th Ed.). APA.
- American Educational Research Association, American Psychological Association, & National Council on Measurement in Education. (2014). *Standards for educational and psychological testing*. Author.
- Crocker, L., & Algina, J. (2006). *Introduction to classical & modern test theory*. Thompson-Wadsworth.
- Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: The tailored design method* (4th Ed.). John Wiley & Sons, Inc.
- **Furr, R. M. (2021). *Psychometrics: An introduction*. SAGE publications.
- **Skaggs, G. (2021). *Test development and validation*. SAGE Publications.

Anti-Racism Statement

I affirm that in this class, faculty and students will work together to cultivate a more equitable, inclusive, accessible, and just learning environment for all participants, regardless of racial/ethnic background or other marginalized or minoritized positionalities. We will actively seek ways to:

- Make constant, conscious decisions to interrupt racism, other oppressive forces, and cultivate equity, inclusion, and justice for people of all racial/ethnic backgrounds, and in particular those from Black communities, Indigenous communities, immigrant communities and other communities of Color, who are most likely to bear the direct and indirect costs of systems of White supremacy;
- Interrogate histories of White supremacy and White-dominant culture, and to examine the ways in which these histories have impacted our individual beliefs, our interpersonal relationships, our institutional and structural policies and processes, and our entire society;
- Make a commitment to being responsible for our own relationships to, and actions within, systems of White supremacy; and
- Cultivate a practice of self-awareness and self-reflection that allows us to critically evaluate our own role in upholding White supremacy and identify the ways we can interrupt cycles of racism at the individual, interpersonal, institutional, and structural levels.

Diversity and Inclusion Statement

The College of Education and Human Development, an intentionally inclusive community, promotes and maintains an equitable and just work and learning environment. We welcome and value individuals and their differences including race, economic status, gender expression and identity, sex, sexual orientation, ethnicity, national origin, first language, religion, age, and ability status.

- We value our diverse student body and desire to increase the diversity of our faculty and staff.
- We commit to supporting students, faculty and staff who have been the victims of bias and discrimination.
- We promote continuous learning and improvement to create an environment that values diverse points of view and life experiences.
- We believe that faculty, staff and students play a role in creating an environment that engages diverse points of view.
- We believe that by fostering their willingness to hear and learn from a variety of sources and viewpoints, our students will gain competence in communication, critical thinking and global understanding, and become aware of their biases and how they affect their interactions with others and the world.

Names and Pronouns Use Statement

If you wish, please share your name and gender pronouns with me and how best to address you in class and via email. I use he/him/his for myself and you may address me as “Dr. Powell” in email and verbally. Additionally, I invite students to approach me before or after class and during office hours. I recognize that a student’s name and pronoun(s) can change during a semester if they are in transition. I encourage students to use the tools Mason provides to change your name and pronouns on Mason records if you so choose: <https://registrar.gmu.edu/updatingchosen-name-pronouns/>

Course Performance Evaluation:

Homework Assignments (20%): Assignments and exercises will be given on a regular basis and will include (a) Questions from readings, (b) Homework Problems, and/or (c) Data Analysis Assignment. These assignments will be used as a record of attendance and participation in class discussions.

Article Reviews (20%): You will review (as though you were peer reviewing) **two** empirically-based articles (will be provided) and write a 1-2 page **critical** review of the article. Your review should address the nature of the study, literature reviewed, methods (appropriateness), hypotheses, data, or conclusions.

Individual Presentation (15%): You will select a topic from a list of survey issues. You will conduct a 15-minute presentation on this topic during class. Topics will be provided by instructor.

Test Construction Project (25%): You will be assigned to groups. Groups will choose content from the following areas:

- A. Survey of Thoughts, Feelings, Opinions
- B. Educational Content Assessment
- C. Psychological Domain Functioning

Each group will then follow appropriate procedures for constructing an assessment, collect data from a sample of individuals, and critically analyze the instrument created to determine the assessment's properties, strengths and weaknesses. The purpose of this project is to focus and integrate the concepts covered in class. You will submit a document that simulates a complete manuscript for publication.

Group Presentation (20%): The results of the project will be presented in class.

Other Requirements:

Class Readings: The readings for this course come from the required textbook as well as journals and other books which provide insight or examples of the topic. Readings, when possible, will be made available to you for download from the Blackboard course website.

Class Attendance & Participation: Students are expected to come to class on time, complete assignments, and participate in class discussions.

Grading Policies:

Grades will be assigned based on the following:

A+	98-100%	B+	88-89%	C	70-79%
A	93-97%	B	83-87%	F	below 70%
A-	90-92%	B-	80-82%		

Final grades are based in the assessments described above. "Extra credit" is not available.

Late Assignments: *As a general rule, late assignments will not be accepted.* If you believe you have EXCEPTIONAL circumstances and wish to negotiate to have extra time to complete course work, you must discuss this with me before the day the assignment is due. (Negotiating means that you will be sacrificing a portion, perhaps substantial, of your grade for extra time).

Professional Dispositions: Students are expected to exhibit professional behaviors and dispositions at all times. See <https://cehd.gmu.edu/students/policies-procedures/>

Tentative Course Schedule

Date	Class	Topic	Reading	Due
Intro to Measurement				
8/24	1	Course Overview What is Measurement?	D&T Ch.1	
8/31	2	Latent Variables Basic/Essential Statistical Concepts	Michell (2003)	
9/07	3	Sampling problems Basic/Essential Statistical Concepts Legal and Ethical Considerations	Standards...	PT1 PT2
9/14	4	Classical Test Theory and Reliability	Allen & Yen Ch. 3 D&T Ch. 3 Henson (2001) Streiner (2003) Revelle & Condon (2019)	
9/21	5	Validity	D&T Ch. 4 Randall et al. (2022) Cronbach & Meehl (1955) Messick (1995)	PT3
Survey Development				
9/28	6	Planning and Sampling	Fowler Ch. 1-3	PT4 PT5
10/05	7	Implementation procedures and multiple survey modes	Fowler Ch. 5	PT6
10/12	8	Test Development & Construction Crafting good questions	Fowler Ch. 6 D&T Ch. 5 & 9 Randall (2021)	
10/19	9	Delivery, sponsorship and other survey issues	Fowler Ch. 11-13	PT7 PT8
Analyzing Survey Data				
10/26	10	Exploratory Factor Analysis	Fowler Ch. 9 Ziegler & Hagemann (2015)	
11/02	11	Exploratory Factor Analysis	RFD Ch. 6 Watkins (2018)	PT9 PT10
11/9	12	Exploratory Factor Analysis	D&T Ch. 6 Flora (2020)	
11/23	13	Thanksgiving NO CLASS		
11/30	14	Item Response Theory	D&T Ch. 8 Reise et al. (2005)	PT11 PT12
12/07	15	Research Project Presentations		

Note: Faculty reserves the right to alter the schedule as necessary, with notification to students. Purple names represent a reading for which students are required to write a one-page response (reflection). PT – Presentation Topic

Core Values Commitment

The College of Education and Human Development is committed to collaboration, ethical leadership, innovation, research-based practice, and social justice. Students are expected to adhere to these principles: <http://cehd.gmu.edu/values/>.

GMU Policies and Resources for Students

Policies

- Students must adhere to the guidelines of the Mason Honor Code (see <https://catalog.gmu.edu/policies/honor-code-system/>).
- Students must follow the university policy for Responsible Use of Computing (see <https://universitypolicy.gmu.edu/policies/responsible-use-of-computing/>).
- Students are responsible for the content of university communications sent to their Mason email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students **solely** through their Mason email account.
- Students with disabilities who seek accommodations in a course must be registered with George Mason University Disability Services. Approved accommodations will begin at the time the written letter from Disability Services is received by the instructor (see <https://ds.gmu.edu/>).
- Students must silence all sound emitting devices during class unless otherwise authorized by the instructor.

Campus Resources

- Support for submission of assignments to VIA should be directed to viahelp@gmu.edu or <https://cehd.gmu.edu/aero/assessments> . Questions or concerns regarding use of Blackboard should be directed to <https://its.gmu.edu/knowledge-base/blackboard-instructional-technology-support-for-students/>.
- For information on student support resources on campus, see <https://ctfe.gmu.edu/teaching/student-support-resources-on-campus>

Notice of mandatory reporting of sexual assault, sexual harassment, interpersonal violence, and stalking:

As a faculty member, I am designated as a “Non-Confidential Employee,” and must report all disclosures of sexual assault, sexual harassment, interpersonal violence, and stalking to Mason’s Title IX Coordinator per [University Policy 1202](#). If you wish to speak with someone confidentially, please contact one of Mason’s confidential resources, such as [Student Support and Advocacy Center](#) (SSAC) at 703-380-1434 or [Counseling and Psychological Services](#) (CAPS) at 703-993-2380. You may also seek assistance or support measures from Mason’s Title IX Coordinator by calling 703-993-8730, or emailing titleix@gmu.edu.

For additional information on the College of Education and Human Development, please visit our website <https://cehd.gmu.edu/students/> .