George Mason University
College of Education and Human Development
Educational Psychology

EDEP 622: 001 – Educational & Psychological Measurement
3 Credits, Fall 2024
Hybrid | Thursdays: 4:30 – 7:10 pm | Thompson 1020 Fairfax Campus

Faculty
Name: Dr. Divya Varier
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Prerequisites/Corequisites:

Recommended Prerequisites: Concurrent enrollment with EDRS 621 possible with instructor permission; instructor permission possible with previous statistics experience.

Required Prerequisites: (EDRS 620^{C} and 621*^{C})
* May be taken concurrently.
^{c}Requires minimum grade of C.

Enrollment limited to students with a class of Advanced to Candidacy, Graduate, Junior Plus, Non-Degree or Senior Plus. Students in a Non-Degree Undergraduate degree may not enroll.

University Catalog Course Description

Emphasizes techniques and principles used in the construction, administration, and quantification of measuring devices for evaluation purposes. Discusses interpretation of standardized tests of ability, aptitude, achievement, interest, and personality. Offered by the School of Education. May not be repeated for credit. Equivalent to EDRS 531.

Course Overview

This course is designed to facilitate students acquiring the fundamental measurement concepts, principles, theories, and ethics used in psychological and educational testing. Current models for survey and test construction and the evaluation of psychological measures and standardized and standards-based tests will be examined.

This course supports the mission of the Educational Psychology Program, which is "to develop professionals who:

a. apply principles of learning, cognition and motivation to vital problems in the area of education in a variety of settings;
b. develop a solid understanding of research, assessment, and evaluation methodologies; and
c. develop an analytical and scholarly approach to critically assessing theoretical perspectives, research, and practice within and across content domains."

Course Delivery Method

This course will be delivered using a 50-50 hybrid format. Classes will be in person and virtual using a lecture format, individual, small and large group activities and in-class assignments. The instructor will use Canvas and other web tools to facilitate in class activities. To access the online components of the class, please go to: https://canvas.gmu.edu/login/canvas.

Technical Requirements

To participate in this course, students will need to satisfy the following technical requirements:
· High-speed internet access with updated browsers.
  ▪ Canvas supported browsers: https://guides.instructure.com/a/720329]
· Consistent and reliable access to GMU email and the course LMS, as these are the official methods of communication for this course.
· Speakers and a microphone or a microphone-enabled headset for use with the synchronous web conferencing tools.
· Note that students may be asked to create logins and passwords on supplemental websites and/or to download trial software to their computer or tablet as part of course requirements.

Expectations

Technical Competence: Students are expected to demonstrate competence in the use of all course technology. Students who are struggling with technical components of the course are expected to seek assistance from the instructor and/or College or University technical services.

Technical Issues: Students should anticipate some technical difficulties during the semester and should, therefore, budget their time accordingly. Late work will not be accepted based on individual technical issues.

Instructor Support: Students may schedule a one-on-one meeting to discuss course requirements, content or other course-related issues. Those unable to come to a Mason campus can meet with the instructor via telephone or web conference. Students should email the instructor to schedule a one-on-one session, including their preferred meeting method and suggested dates/times.

Netiquette: The course environment is a collaborative space. Experience shows that even an innocent remark typed in the online environment can be misconstrued. Students must always re-read their responses carefully before posting them, so as others do not consider them as personal offenses. Be positive in your approach with others and diplomatic in selecting your words.

Remember that you are not competing with classmates, but sharing information and learning from others. All faculty are similarly expected to be respectful in all communications.

Learner Outcomes or Objectives

This course is designed to enable students to do the following:
1. Apply the principles of educational measurement to relevant problems in testing
2. Understand basic technical characteristics of standardized tests
3. Interpret technical information presented in standardized test manuals
4. Interpret standardized test results
5. Evaluate published standardized tests and assessment instruments;
6. Knowledge of current professional practices and issues related to educational measurement and assessment;
7. Apply sound principles of measurement and assessment in multicultural settings.

Professional Standards

Upon completion of this course, students will have met the following professional standards: Masters of Science (MS) Educational Psychology Program Standards

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Standard 2. Candidates will apply their knowledge of quantitative and qualitative research methods, including basic concepts, principles, techniques, and ethical issues, to read and critique relevant products of research.

Standard 3. Candidates will apply their knowledge and skills of quantitative and qualitative research methods, including basic concepts, principles, techniques, and ethical issues, to conduct research and/or inform practice in diverse applied settings.

Standard 4. Candidates will demonstrate oral and written communication relevant to educational psychology, including knowledge and use of APA style and professional formats (e.g., oral presentations, poster presentations, article abstracts, literature reviews, research proposals, reports).

Standard 5. Candidates will demonstrate professional dispositions relevant to educational psychology such as critical thinking, collaboration, interpersonal communication, intercultural competence, ethical leadership, professionalism, and technological skills.

Standards for Educational and Psychological Testing (American Educational Research Association [AERA], American Psychological Association [APA], & National Council on Measurement in Education [NCME], 2014)

The lens through which each topic will be viewed and understood are grounded in the Standards for Educational and Psychological Testing (AERA, APA, & NCME, 2014); NCME's Code of

[Professional Responsibilities in Educational Measurement](#) (NCME, 2015); and in addition, the learning objectives correspond to two additional sets of standards for teachers. The Joint Committee for Standards on Educational Evaluation address understanding the foundational assessment principles, appropriate use of test results, and assessment quality. The second set of competency standards were developed jointly by the American Federation of Teachers (AFT), NCME, and the National Education Association (NEA): [Standards for Teacher Competence in Educational Assessment of Students](#) (1990). These professional associations asserted that educators should be skilled in:

> • Choosing assessment methods appropriate for instructional decisions.
> • Developing assessment methods appropriate for instructional decisions.
> • Administering, scoring and interpreting the results of both externally-produced and teacher- produced assessment methods.
> • Using assessment results when making decisions about individual students, planning teaching, developing curriculum, and school improvement.
> • Developing valid pupil grading procedures which use pupil assessments.
> • Communicating assessment results to students, parents, other lay audiences, and other educators.
> • Recognizing unethical, illegal, and otherwise inappropriate assessment methods and uses of assessment information.

Required Texts

Coaley, K. (2014). *An introduction to psychological assessment and psychometrics* (2nd ed.). Sage.

Other readings will also be assigned for the course and made available on Canvas.

Recommended Texts

American Educational Research Association, American Psychological Association, and National Council on Measurement in Education. (2014). *Standards for Educational and Psychological Testing.* Author.

American Psychological Association. (2019). *Publication manual of the American Psychological Association. (7th Ed.).* Author.

Furr, M. (2018). *Psychometrics: An introduction* (3rd ed.). Sage.

Course Performance Evaluation

Students are expected to submit all assignments on time in the manner outlined by the instructor. **Late assignments will not be accepted without prior instructor approval**.

- **Class Participation (15%, ~14 class sessions)**. Students are expected to participate in in-class activities that are individual or small group assignments. Assigned readings are to be completed. Attendance is required.

- o Attend all class sessions on time.
- o Use your MASON e-mail account for all correspondence with the instructor.
- o Complete readings in advance of the class and participate fully in discussions, group, or individual classwork.
- o Submit all assignments on time.

- **Mid-Term Examination (30%)**: The material will address readings, class, and homework materials. The exam will be 2.5 hours in duration, open book, and will include application-type test items (multiple choice, short answer, etc.) on core measurement concepts.

- **Measurement Project (55%), 200 points:** You have one major project in this course which is to develop and pilot test a psychological or educational measure. This project has six parts (see below). Drafts for each part are due throughout the course, with the final paper integrating all revised or updated project parts.

    - o **Five percentage points** are allotted to timely completion and participation in the checkpoint assignments related to the measurement project. The purpose of the checkpoint is to facilitate instructor and peer feedback.

The final report should include the introduction, a review of relevant literature, methods, findings, a discussion that interprets the findings in terms of the research and includes recommendations for how the new measure can be used and the information that can be learned from the data. Include a reflection of what you learned by doing this project and how you would improve your processes and products if you were to develop another measure.

a. Overview/Introduction (25 points): Prepare a brief report about a current area of interest in educational psychology. The overview should address a current issue that has implications for developing a new measure. The overview needs to include an overview of the issue, an introduction to pertinent literature related to the construct under investigation. You must include at least three (3) research studies discussing your construct in this section. Based on this review, provide the conceptual definition of the construct you will measure: (1) conceptually define your construct (2) operationally define the construct. You also need to provide a brief introduction to the existing measures and discussion of the need for a new measure. Provide a context for the measure, including but not limited to the population that will take the measure, how the measure can be used, and by whom.

b. Literature Review (25 points): Write a literature review extending the themes from the introduction. The literature review must expand the number of studies that you included about your construct. In addition, you need to have a section that examines a minimum of two (2) measurement studies or measurement reviews about existing measures. You need to analyze the measures critically addressing strengths and weaknesses. The critical analysis should address: (1) the validity and reliability data for the existing measures; (2) problems with or gaps associated with the existing measures. A justification for your new measure needs to be provided. This section will address the following questions: *How are the items in the existing measures similar to and different than each other? How are the scales similar*

to or different than each other? That is, what gaps or problems does your scale address? Identify whether your measure will include sub-constructs. The literature review should include a revised introduction in track changes.

c. Development and Methods Plan (50 points): This section is the methods section for your final report, describing how you developed and validated your measure. It is also a planning document for development and pilot-testing of your measure. Develop a plan to write your items for your measure. You need to include a minimum of ten (10) items. You will need to develop a plan identifying the number of items that you will include for each of the sub-constructs. You also need to describe the scale that you will develop. The plan should also include directions for administering the measure. Identify how you will select your sample for pilot tests. Please contact the instructor if you plan to develop a measure intended for minors (under the age of 18 years). Indicate the methods that you will use to establish validity and reliability for your measure, including the types of analyses that you will conduct. The plan should include any revisions to your overview and literature review in track changes.

d. Pilot Study (50 points): Pilot test your measure with at least 25 participants. Report out your results for descriptive statistics, reliability, and validity. Examine your findings and discuss whether you need to change your measure in any way and provide a rationale. Compare your results to those of the measures you examined in your literature review. Include an updated methods section and an updated measure in your final report and track changes.

e. Reflection (25 points): Reflect on your work on the project in relation to what you have learned about the measurement development process. Discuss limitations of your plan. Provide specific details about how you would improve the process and the measure. Reflect on how you could enhance reliability and validity evidence. Include updated sections in track changes.

f. **Adherence to APA 6th guidelines, grammar, and mechanics (25 points)**: The drafts and final report are written in accordance to APA writing and formatting guidelines.

Grading scale:
A+ = 98 – 100%
A = 93 – 97.9%
A- = 90 – 92.9%
B+ = 88 – 89.9%
B = 83 – 87.9%
B- = 80 – 82.9%
C = 70 – 79.9%
F = 69.9 or less

Use of Generative AI

Use of Generative AI tools should be used following the fundamental principles of Mason's Academic Standards. This includes being honest about the use of these tools for submitted work and including citations when using the work of others, whether individual people or Generative AI tools.

Professional Dispositions (CEHD Student Guide)
Throughout study in the College of Education and Human Development, students are expected to demonstrate behaviors that reflect the positive dispositions of a professional. See https://cehd.gmu.edu/current-students/cehd-student-guide.

Class Schedule

Note: Faculty reserves the right to alter the schedule as necessary, with notification to students.

WEEK	Date	READINGS/MULTIMEDIA	ACTIVITES/ASSIGNMENTS DUE
1	Aug 29	Introduction	Reading: Chapter 1 In-Class Activity
2	Sep 5 (online)	Ethical considerations The Basic Components	Reading: Chapter 2, Chapter 10 In-Class Assignment
3	Sep 12	Development of Assessments	Reading: Chapter 3 In-Class Assignment **Introduction Draft**
4	Sep 19 (online)	Statistics for Measurement	Reading: Chapter 4 In-Class Assignment
5	Sep 26	Overview of Reliability, Validity, Utility Reliability	Reading: Chapter 5 In-Class Assignment
6	Oct 3 (online)	Reliability in Context Personality Assessment	Reading: Chapter 8 **Lit. Review Draft** In-Class Assignment
7	Oct 10	Validity	Reading: Chapter 7 In-Class Assignment
8	Oct 17 (online)	Validity in Context Measurement of Intelligence	Reading: Chapter 11 In-Class Assignment
9	Oct 24 (online)	**Mid-Term Exam**	No Class Meeting
10	Oct 31	Item Analysis/Test Development Item Development	In-Class Assignment
11	Nov 7 (online)	Item Response Theory, Generalizability Theory	Reading: Chapter **Project: Plan**
12	Nov 14 (online)	Data Analysis Techniques	No Reading In-class activity

13	Nov 21	Utility, Utility in Context	Reading: TBD **Project: Pilot Test**
		THANKSGIVING HOLIDAY – NO CLASS	
14	Dec 5 (online)	Measurement in Organizations Measurement Careers	
16	Dec 12	**Project: Reflection & Final Paper**	

CEHD Commitments

The College of Education and Human Development is committed to fostering collaboration and community, promoting justice and equity, and advancing research-informed practice. Students are expected to adhere to, and contribute to, these commitments, the CEHD Mission, and Core Values of George Mason University. More information can be found here: https://cehd.gmu.edu/about/culture/

GMU Policies and Resources for Students

Policies

- Students must adhere to Mason's Academic Standards (see https://catalog.gmu.edu/policies/academic-standards/)

- 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 your LMS should be directed to:
  - Canvas: https://its.gmu.edu/service/canvas/

- For information on student support resources on campus, see: https://ctfe.gmu.edu/teaching/student-support-resources-on-campus

- o TimelyCare: https://caps.gmu.edu/timelycare-services/
- o Writing Center: https://writingcenter.gmu.edu/

- For additional information on the College of Education and Human Development's Student Success Resources, please visit: https://cehd.gmu.edu/students/.

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.

Rubric: In-Class Assignments

Criteria	Unsatisfactory (0-2)	Minimal (3)	Competent (4)	Outstanding (5)
Connections to Coursework *Demonstrate connections to course concepts in the task*	does not include connections to course concepts	some connections to course concepts that may not be relevant.	adequate connections to relevant course concepts	clear and insightful connections to relevant course concepts
Analysis *For tasks that require analysis*	Analysis is incomplete or missing.	Analysis is general and addresses only some aspects of the task requirements	Analysis is complete and adequately addresses task requirements	Analysis is thorough and detailed; fully addresses task requirements
APA Style *Use APA style and formatting*	Uses concise, coherent, well-organized writing with correct APA style.	Writes with some lack of clarity and/or inconsistent APA style with some errors.	Writes with a lack of clarity and coherence, many errors, or incorrect APA style.	Writes with little clarity or coherence, many errors, and/or no use of APA style.

Note: The criteria will vary depending on the nature of the assignments/tasks.

EDRS 622 Measure Project

<table>
<tr><th colspan="7">Rubric: Measurement Project</th></tr>
<tr><th>Project Component</th><th>Program Standard</th><th>Does not meet standard</th><th>Approaching standard</th><th>Meets standard</th><th>Exceeds standard</th><th>Score</th></tr>
<tr><td colspan="7">Introduction/Literature Review:</td></tr>
<tr><td>Definitions</td><td>2</td><td>Conceptual and operational definitions not present.</td><td>Conceptual and operational definitions are limited, incomplete, or one is missing.</td><td>Conceptual and operational definitions are present but could be strengthened by supporting empirical literature or explanation with citations.</td><td>Conceptual and operational definitions are fully developed with supporting empirical literature.</td><td></td></tr>
<tr><td>Analysis of the Literature</td><td>2</td><td>Does not include at least two measurement studies on construct.</td><td>Summary of at least two measurement studies is included but discussion of strengths and weaknesses is limited or incomplete.</td><td>At least two measurement studies are analyzed fully, including reliability and validity as well as strengths and weaknesses.</td><td>At least two measurement studies are synthesized with thoughtful connections between them.</td><td></td></tr>
<tr><td>Argument for Measure</td><td>2</td><td>The need for the measure is not described.</td><td>The need for measure is described but lacks clarity and its use is not justified or grounded in the literature.</td><td>The need for the measure and intended use are described but could be strengthened by drawing on the previous analysis of the measurement studies.</td><td>The need for the measure and intended use are fully described and effectively draws on the previous analysis of the measurement studies.</td><td></td></tr>
<tr><td colspan="7">Methods:</td></tr>
</table>

1

Description of Measure	3	Description of measure is not included.	Description of measure is incomplete. Open-ended items are not included.	Description of measure is present but the clarity and organization could be improved. Appropriate open-ended items are included.	Description of measure is complete and well organized, including target population, intended users, and structure of the measure (i.e., subscales, number of items, response options/scale). List of items, including appropriate open-ended items and relevant background/demographic items, are included as table or in appendix.	
Item Development	3	Description of item development is not included.	Description of item development is incomplete.	Description of item development is present but the explanation could be more thorough or the clarity could be improved.	Item development is fully described, including writing of items or adaptation of existing items, gathering expert feedback, and determination of response scale.	
Procedures for Data Collection	3	Description of procedures for collecting data is not included.	Description of procedures for collecting data is incomplete.	Description of data collection is present but could be more thorough or the clarity could be improved.	Description of data collection is detailed and clear including sample/participants; instructions; recruitment; pilot administration (e.g., online/in-person, timeline); ethical considerations.	
Analysis Procedures	3	Description of data analysis is not included.	Description of data analysis is incomplete.	Description of data analysis is present including descriptive statistics, evidence of validity, and evidence of reliability but could be strengthened with additional explanation.	Description of data analysis is detailed and appropriate, including descriptive statistics, evidence of validity, and evidence of reliability.	
Results:						

Descriptive Statistics	3	Presentation of descriptive statistics is not included.	Descriptive statistics are presented but incomplete and/or inaccurate.	Descriptive statistics are presented with minimal inaccuracies but could be strengthened with additional explanation or further details.	Descriptive statistics, including demographic/background information and item-level statistics, are presented with a detailed and appropriate explanation of results.	
Reliability	3	Presentation of reliability evidence is not included.	Reliability evidence is presented but incomplete and/or inaccurate.	Reliability evidence is presented with minimal inaccuracies but could be strengthened with additional explanation or further details.	Relevant reliability evidence is presented with a detailed and appropriate explanation of results.	
Validity	3	Presentation of validity evidence is not included.	Validity evidence is presented but incomplete and/or inaccurate.	Validity evidence is presented with minimal inaccuracies but could be strengthened with additional explanation or further details.	Relevant validity evidence is presented with a detailed and appropriate explanation of results.	
Discussion & Reflection:						
Discussion of Measure	3	Discussion of the measure is not included.	Discussion includes basic comments on the measure but should be developed with critical analysis of strengths and weaknesses and/or with the inclusion of a revised measure.	Discussion provides a critical analysis of the measure's strengths and weaknesses. Presents revised measure, but could be strengthened by drawing more closely on the relevant results of the pilot study.	Discussion provides a critical analysis of the measure's strengths and weaknesses. Presents revised measure with detailed and appropriate connections to the results of the pilot study.	

| Reflection | 5 | Reflection on the measure development process is not included. | Reflection includes basic comments that should be developed with more connections to the measure development process. | Reflection provides a thoughtful analysis of the measure development process but could be strengthened with additional explanation and connection. | Reflection provides insightful analysis of the measure development process including limitations/constraints and suggestions for improvement with direct connections to course content. | |

Format & Writing:

| APA Style | 4 | Writes with a lack of clarity and coherence, many errors, or incorrect APA style. In-text and full references are not accurate or complete. | Uses concise, coherent, well-organized writing with correct APA style. In-text and full references are accurate and complete. | |