

EDPS632: Hierarchical Linear Modeling in Education

Instructor information

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Course Information

Spring, 2018
Class Time: MWF, 11:30 am-12:20 pm
Class Location: UNIV 103
Course Credit Hours: 3 credits

Course Description

This course is an introduction to hierarchical linear modeling, which is an advanced statistical method. The course is designed to provide you with an understanding of both the statistical underpinnings and the application of hierarchical linear models (HLMs) in educational research. The course is not focused on the mathematical mechanism of statistical methods. Emphasis is placed on the conceptual understanding of models, the interpretation of model results, and the applications of HLM in empirical studies.

The course will introduce the basic two-level HLM, three-level HLMs, and longitudinal data situations. After finishing the course, students will have the ability to apply HLMs to their substantive research.

Prerequisites

STAT512/STAT 502 or equivalent

Learning Outcomes

By the end of this course, students will be able to:

- 1) Identify the model notation, structure, and hypothesis testing in HLM
- 2) Explain the benefits and limitations of using HLMs
- 3) Conduct HLM using SAS
- 4) Use HLM methods to test research questions using real data
- 5) Present results, interpret, and discuss the findings of HLM

Required Texts and Software

Text book: Raudenbush, S. W. & Bryk, A. S. (2002). Hierarchical linear models: Applications and data analysis methods (2nd ed.). Thousand Oaks, CA: Sage Publications.

Software: SAS

We will use the SAS statistical software on Windows personal computers to complete homework assignments. You should know some SAS coding from your prerequisite course. If this is not the case, see me immediately, it is possible to catch up with some extra effort.

You may obtain a copy to put on your own personal computer at the ITAP software distribution center in Stewart Center Room G31, their phone number is 494-5100. You may also access it remotely via the internet at <http://www.itap.purdue.edu/learning/> under Software Remote. Otherwise, you may always complete your work in one of the ITAP computer labs on campus.

Course Requirements

Homework: There will be six homework assignments. These generally will involve application of HLMs to real data using SAS or other software. Homework will account for 50% of your final grade.

A **hard copy** of the homework is due at the beginning of class, and the dates will be on the schedule. Late homework will be accepted within 24 hours after the due date, however 20% of the earned grade will be deducted. No homework will be accepted more than 24 hours after the due date.

At this level discussing the homework with others is beneficial and encouraged, but the homework should be completed individually. Copying solutions is not allowed and will be reported if found.

Midterm-Exam: There will be one exam during the course of the semester. The exam will represent 20% of your final grade.

Quizzes: There will be seven pop quizzes. The quizzes are short and shouldn't take more than 10 minutes. If you miss a quiz there will be no makeup quiz. The lowest quiz score will be dropped. The dropped assignment is intended when you are ill, out of town, or whatever reason. Remember everyone only gets **one** dropped quiz.

Final paper: There will be a final research paper related to HLMs for this course. The paper will include a short introduction, a detailed methods and results, and a brief conclusions. You may use a data set of your choosing. The paper should not be more than 10-15 pages, double spaced. The final paper will represent 20% of your final grade.

How to Succeed in This Course

To succeed in this course, you will need to complete the **readings** before coming to class and become familiar with the slides I provide before the class. Start looking for an appropriate data set which you will use to complete your final paper. Plan ahead!

If you select the right data set and the right research question, you will end up with a publishable product at the end of the semester.

Policies

Attendance: Class attendance is not mandatory, but you are required to complete all course assignments on time regardless of absence. You **MUST ATTEND all scheduled exams**, at the scheduled time. If you have an academic conflict or life issues, please inform me about it beforehand.

Computing Labs: Most Mondays we will spend in the computer lab. We will practice running HLM models using SAS software and on some occasions work on models for the homework. We will also spend the last week of class in the lab to work on final papers.

Grading

Your grade will be weighted based on the following course component percentages:

Homework: 50%
 Midterm-exam: 20%
 Quiz: 10%
 Final paper: 20%

Final grades will be assigned according to the following scale:

A: $\geq 90\%$
 B: 80% - 89%
 C: 70%- 79%
 D: 60%-69%
 F: below 60%

Academic Dishonesty

Purdue prohibits "dishonesty in connection with any University activity. Cheating, plagiarism, or knowingly furnishing false information to the University are examples of dishonesty." [Part 5, Section III-B-2-a, University Regulations] Furthermore, the University Senate has stipulated that "the commitment of acts of cheating, lying, and deceit in any of their diverse forms (such as the use of substitutes for taking examinations, the use of illegal cribs, plagiarism, and copying during examinations) is dishonest and must not be tolerated. Moreover, knowingly to aid and abet, directly or indirectly, other parties in committing dishonest acts is in itself dishonest." [University Senate Document 72-18, December 15, 1972]

Students will receive no credit for work that violates the principles of academic integrity, and violations will be reported to the graduate chair of the student's program. The instructor reserves the right to utilize iThenticate's plagiarism detection software on assignments submitted electronically.

Emergencies

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. I will notify all class members of any changes to the course due to an emergency situation via campus email.

Emergency information and updates will be posted on Purdue's homepage at <http://www.purdue.edu>. Students should sign up for emergency text messages here: <http://www.purdue.edu/securepurdue/>. Also, the following webpage details university policies and procedures during various emergency events: https://www.purdue.edu/emergency_preparedness/flipchart/index.html.

Students with Disabilities

If you are eligible for academic accommodations because you have a documented disability that may impact your work in this course, please schedule an appointment with me to discuss your needs. To notify the Disability Resource Center of an impairment or condition that may require accommodations and/or classroom modifications, please visit <http://www.purdue.edu/drc>

Nondiscrimination

Purdue University prohibits discrimination against any member of the University community on the basis of race, religion, color, sex, age, national origin or ancestry, genetic information, marital status, parental status, sexual orientation, gender identity and expression, disability, or status as a veteran. The University will conduct its programs, services and activities consistent with applicable federal, state and local laws, regulations and orders and in conformance with the procedures and limitations as set forth in Purdue's Equal Opportunity, Equal Access and Affirmative Action policy which provides specific contractual rights and remedies. Additionally, the University promotes the full realization of equal employment opportunity for women, minorities, persons with disabilities and veterans through its affirmative action program.

Adaptive Program Statement

Purdue University is required to respond to the needs of the students with disabilities as outlined in both the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 through the provision of auxiliary aids and services that allow a student with a disability to fully access and participate in the programs, services, and activities at Purdue University.

Any student with a documented disability who may require special accommodations should notify me as early in the quarter as possible to receive effective and timely accommodations. Special accommodations cannot be made for students who do not inform the instructor in a timely fashion or who do not involve the Disability Resource Center. Accommodations cannot be made retroactively!

Class Schedule

Dates	Topic	Readings	Due
Jan 8 10 12	Course Overview	Chapter1	

	Introduction		
Jan 15	No class-MLK day		
Jan 17 19	Basic HLM structure	Chapter 1	
Jan 22	Lab: SAS introduction		
Jan 24 26	Centering and generalizing	Chapter 2	
Jan 29	Lab: basic HLM example		
Jan 31 Feb 2	Hypothesis testing	Chapter 3	
Feb 5	Lab: HW1		HW1
Feb 7 9	Hypothesis testing	Chapter 3	
Feb 12	Lab: HW2		HW2
Feb 14 16	Catch up and review		
Feb 19	Answering questions		
Feb 21	Midterm-exam		
Feb 23	Debrief exam		
Feb 26	Lab: two level HLM		
Feb 28 Mar 2	Application	Chapter4 Paper	
Mar 5	Lab: HW3		HW3
Mar 7 9	Three level models	Chapter8	
Mar 12-16	Spring break		
Mar 19	Lab: three level HLM		

Mar 21 23	Application of three level	paper	
Mar 26	Lab:HW4		HW4
Mar 28 30	Longitudinal data	Chapter 6	
Apr 2	Lab: longitudinal data		
Apr 4 6	Application of longitudinal study	Paper	
Apr 9	Lab: HW5		HW5
Apr 11 13	Model assumptions	Chapter 9	
Apr 16	Lab: model assumptions		
Apr 18 20	Model assessment	Chapter 9	
Apr 23	Lab: HW6		HW6
Apr 25 27	Review		
Apr 30	Answering questions of final paper		
May 4			Final paper

The instructor reserves the right to modify, supplement, or otherwise alter this syllabus throughout the course of the semester as needed.