

# **Statistics and Educational Assessment**

**91-842**

**©Professor Robert P. Strauss**

**H. John Heinz III School of  
Public Policy and Management**

**HH A007 and  
HH A001 Computer Cluster**

**M: 5:30-8:20 PM**

The purpose of this fall, 2003, 12-unit course is to build on the first statistics course a MSETM certificate or masters' student has taken with a focus on making inferences about alternative intervention strategies that may use technology to address learning shortfalls. It is expected that the course will also be of interest to Heinz students enrolled in the Educational Leadership program, and those interested in education policy.

Each lecture session will be followed by a practicum in the Heinz computer laboratory setting that involves using statistical visualization tools (*DataDesk* statistical package) to explore actual student test results.

The course will: (1) review basic statistics concepts, (2) examine assessment test items, (3) explore validity and bias in assessment instruments, (4) explore reliability and uncertainty, (5) analyze summarization and aggregation techniques and results, (6) review norm-referenced vs. criterion-referenced tests, and (7) examine issues surrounding the scoring of each student and the development of intervention strategies. The major commercially available tests are examined in the course in conjunction with Pennsylvania's System of School Assessment (PSSA).

The practicums and problem sets in the course will be drawn from a variety of standardized tests and made available to the class via **Blackboard**:

- Anonymous student and item level results from the Pennsylvania System of School Achievement (PSSA);
- Anonymous retired questions at the student and question level from the American College Testing (ACT) achievement examination for high school juniors;
- Anonymous retired questions at the student, question and item level from the Educational Testing Service Student Achievement Test (SAT);
- Anonymous retired questions at the student, question, and item level from Harcourt’s SAT10 battery of examinations; and,
- A 3-year panel of anonymous student assessment results that includes internal formal and informal educational assessments, results from the Terra Nova test for 1999-2002 from a Great Urban School District.

The course is not only designed to bring together general statistics and the concepts from psychology involved in the development and implementation of standardized testing, but also to develop data analysis skills on a personal computer with general office software such as the Excel spreadsheet. The course will utilize two additional tools that “bolt on” to Excel and allow the user to quickly visualize data:

*ActivStats* and the student version of *DataDesk* that comes with *ActivStats*.

by Data Description, Inc., of Ithaca, New York. *ActivStats* contains a stand-alone statistics tutorial (including audio) so that a student taking ***Statistics and Educational Assessment*** and who has not had a statistics course will be able to brush up on basics statistics. It contains audio so you will need to have a set of headsets for the CD in the personal computer.

The course is designed to prepare technology coordinators and others to assist their school and district to both understand and comply successfully with emerging federal testing requirements in the *No Child Left Behind* legislation.

The required textbook is:

Kenneth D. Hopkins. ***Educational and Psychological Measurement and Evaluation***. Eighth Edition. (Boston: Allyn and Bacon), 1998.

Additional readings will be selected from other sources, including:

Linda Crocker and James Algina. *Introduction to Classical and Modern Test Theory*. (Belmont CA: Wadsworth Group), 1986.

Robert L. Linn (Editor). *Educational Measurement*. Third Edition. National Council on Measurement in Education. American Council on Education. (New York: Collier McMillan, 1989).

The course is divided into four sections:

**Section 1:**

Looking at the data with Excel, DDXL, and DataDesk: What do assessment results tell us? Which statistical techniques are appropriate?

**Section 2:**

Examining tests more closely: What do the assessments assess and how well do they do it?

**Section 3:**

Applying these skills: How do we interpret assessment results from the real world?

**Section 4:**

Using assessment to improve learning and educational outcomes: What should we change, and how?