

HONR 212-042
“Issues in the Natural Sciences: *Statistics through Baseball*”
Spring 2014

Overview and Policies

Professor: E. Lee May, Jr., Ph. D.

Office: Henson Science Building, Room 138

Office Phone: 410-543-6464 Cell/Text: 443-735-7351 E-mail: elmay@salisbury.edu

Office Times

9:00 - 9:50 a.m. on Monday, Wednesday, and Friday

3:30 - 4:30 p.m. on Tuesday and Thursday

Other times by appointment (Don't hesitate to ask for one)

The Subject

Mathematics is...what, exactly? Is it learning multiplication tables? Solving equations? Proving theorems in geometry? Is it balancing your checkbook? Does it include deciding whether Ryan Zimmerman or Nick Markakis is “due for a hit”? Is statistics a part of mathematics? In a similar vein, what are the “liberal arts”? Does baseball have anything to do with them? The purpose of this course is to help you arrive at answers to questions such as these. In particular, the main issues considered will be those below.

What is statistics?

What are the liberal arts?

What is culture? Is baseball a part of American culture?

What, if anything, do statistics and the liberal arts or culture have to do with each other? Is the relationship beneficial, antagonistic, some of both, or neither?

Let us define two terms immediately. **Probability** is the mathematical theory of random phenomena. One example of a random phenomenon is the act of flipping a coin and noting whether it lands “heads” or “tails.” Another is observing a trip to the plate by a major-league baseball player. **Statistics** is a theory of information that has inference – that is, the drawing of conclusions – as its objective. Statistics employs the concepts of probability in its theory and practice. In this course we shall study those aspects of statistics that are fundamental to the making of decisions about baseball; but they happen, as well, to be very important to sound decision-making in the wider world.

There are three fundamental skills that it will benefit you to develop as you work and play with the concepts of this course. Those skills are **recognition**, **computation**, and **interpretation**. Given a phenomenon – for example, the **experiment** of deciding whether a given batter is truly on a “hot streak” – **recognition** is the act of choosing a probabilistic **model** or replica of the phenomenon. Thus, recognition is translating the original language of a problem into mathematics (in our case, probability). **Computation** is the act of performing the calculations required by the chosen model. **Interpretation** is the act of translating the mathematical results back into the language in which the task or problem was originally stated.

Note 1: A Matter of Critical Importance

In keeping with its theme, this course will be conducted in a manner very similar to the way in which a baseball team is managed. In particular, it will not be taught by the lecture method (see the figure on the next page). Instead, the focus of almost every meeting of the class will be the presentation, by other students and you, of solutions to homework problems. I shall make assignments, introduce topics, and sometimes lecture. You will work on the assignments outside class. I will provide hints or solutions whenever there seems to be no better way for our study to proceed. An approach such as this demands, for its success, diligent, deep, and consistent work and play with the material of the course *by everyone*. This means your devoting to your homework a minimum of eight hours during each week of the semester. I recommend strongly that these hours be apportioned into at least three sessions, one shortly after each class and one close to the beginning of the next class.

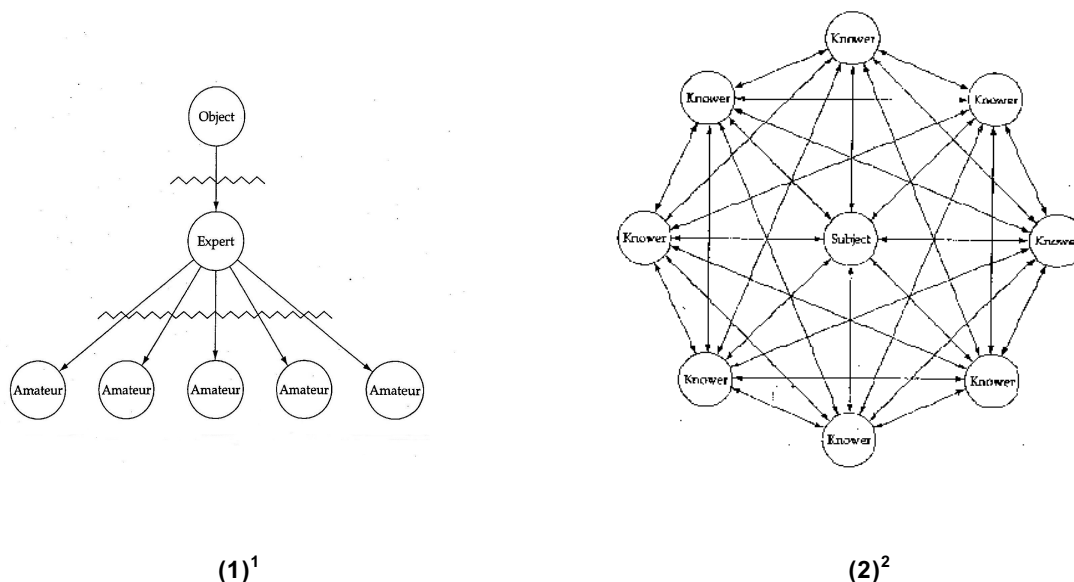


Figure. Learning by (1) Lecture and (2) Inquiry.

Administrative Matters

Evaluation of Your Work. Your performance in the course falls into four categories: homework and class participation, a project, and midterm and final examinations. I will handle homework and class participation primarily by observing your performance during meetings of the class, grading some of your homework, and possibly administering one or more quizzes. The total of all of this work will count as $h\%$ of your final average, where h will be defined below.

Your homework and class participation will be graded by means of my computing your “slugging average” (see Page 8 of the course’s text). Each day of class will count as one at-bat. If you miss a class, you will be making an out on that at-bat; if you attend class, you will be “hitting a single.” If you make a comment from your seat during that class, you will have “doubled.” If you present something at the front of the classroom or make a particularly good comment from your seat, you will be “tripling.” Finally, if you do an exceptional job in front of the room or offer a stunning insight from your seat, you will have “hit a home run.” Conveniently, slugging average and grade-point average are mathematically identical. For example, the lowest possible slugging average is 0.000, and the highest possible is 4.000. A slugging average of 1.000 earns you a *D* in the “homework and class participation” category; a 2.000 earns a *C*; a 3.000, a *B*; and a 4.000, an *A*. Decide what grade you wish to earn in homework and class participation, and then amass an appropriate slugging average.

For those who choose to take it, there will be a midterm examination. It will count as $m\%$ of your final average, where m , like h , will be defined below.

You will conduct a project on a topic relevant to the course. Examples of projects are a paper or presentation developed from an exercise in the course text or a question raised in class; an analysis of a newspaper, magazine, journal, or web article on a pertinent topic; and a statistical experiment that you perform yourself. (A sheet of suggested topics for projects will be handed out soon.) The following conditions apply to the project:

1. Parker Palmer, *The Courage to Teach* (San Francisco: Jossey-Bass, 1998) 100.

2. *Ibid.*, 102.

- (1) By Thursday, February 27, you will propose to me what you plan to do for your project. Your proposal will include a working title, an outline of what your project will involve, and a (tentative) decision as to whether you plan to present your project to the class (this will bring you extra credit on the project).
- (2) You will turn in your completed project no later than Thursday, April 10.

Your project will count as $p\%$ of your final average.

The final examination will count as $e\%$ of your final average. The numbers h , m , p , and e must be integers (counting numbers or 0) satisfying the following conditions:

each of h and p is at least 30 and at most 70; each of m and e is at most 20;

and

$$h + m + p + e = 100.$$

You have two “windows of opportunity” regarding your choice of the grade-weights h , m , p , and e . The first window opens on the first day of class and closes one week later. After that time, I shall myself choose the values of h , m , p , and e for anyone who has not informed me of his or her choices. The second (and final) window of opportunity, this one for changing your weights, opens on the date of midterm and closes one week later. You will not be allowed to change your weights after the second window has closed.

NOTE 2: OTHER THAN THE FINAL EXAMINATION, NO WORK OF ANY SORT MAY BE TURNED IN FOR A GRADE AFTER TUESDAY, MAY 6.

The grading-scale for the course is the usual one:

90 - 100, A;
80 - 89, B;
70 - 79, C;
60 - 69, D;
< 60, F.

Course policies. (1) The Integrity of Your Work. The Salisbury University Promise, which most of you have publicly taken, says the following:

As a Salisbury University student –

I will connect what I learn to how I live.
I will demonstrate personal and academic integrity.
I will respect diverse groups and individuals.
I will strive to bring honor to myself and the University.

I shall hold you to that promise. By presenting or turning in a piece of work, you will be pledging that you have neither given nor received any unauthorized help on the work. My response to a violation of the pledge might include, but will not necessarily be limited to, the following:

- Receipt of a score of 0 on any offending work;
- Receipt of a grade of F for the course;
- Being reported to an appropriate authority, such as the provost.

(2) Attendance. Just as a major-league baseball player is expected to show up at the ballpark 162 times during the regular season, prepared to give his best effort, so regular attendance of class is an important part of this course. Nevertheless, because I believe that university students should make their own decisions, attendance at the class meetings of this course is optional, subject to the following conditions:

- The student and not the professor is responsible for the consequences of an absence. This means, for example, that I will not be obligated to repeat for an absentee material that has already been covered.
- Assigned work that is late will not be accepted unless I can be convinced, preferably in advance, of the

necessity of and justification for granting an extension.

Regarding Learning Styles and Difficulties. There are many styles of learning. Some people learn better with their eyes, some with their ears. Others have still other effective ways in which to acquire knowledge. If, however, you have a learning style that seems to you to be significantly different from that of most people – in particular, if you have a learning disability – please let me know. If, for example, taking notes in class hampers your learning, we can find a good note-taker for you.

Some Thoughts at the Beginning of a Semester

I want to help you learn. I will help you with any legitimate academic need. I will not do for you anything that you need to do for yourself. I want this course to be an enjoyable experience for all of us, and I will do all I can to make it so.

I am making certain assumptions about you. You have enrolled in this course of your own free will, if only to satisfy a requirement. You want to learn the material of this course, at least to the point of earning a grade of C. You are willing to work and study. *In particular, you will conduct yourself in accord with the principles set down in the paragraph, “A Note of Critical Importance”, on Page 1. If one or more of these assumptions fails to apply to you, you should drop this section of the course.*

If at any time you would like to discuss this course or any other aspect of your life at this university, please come visit me. I would be happy to talk with you.

E. Lee May, Jr., Ph. D.
Professor of Mathematics and Computer Science