University of Washington Bothell
Interdisciplinary Arts and Sciences Program
Winter 2009

BIS232: Using, Understanding, and Visualizing Quantitative Data

Lecture 8:40-10:50am MW; UW1 202

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Course Description:
This course will provide an introduction to descriptive statistics and visual representations of quantitative data. We will explore multiple data sets using relevant graphing and statistical software packages. You will learn how to explore information in an area of interest to you, tests ideas, arrive to conclusions and present data in a meaningful way that is accurate, tells a story, and is visually appealing.

Learning Objectives:
- Develop critical thinking skills around presentations of quantitative.
- Learn how to compute and use basic descriptive statistics.
- Learn how to retrieve public data sets and import them into Microsoft Excel to calculate descriptive statistics.
- Learn the basics on how to use Microsoft Excel, SPSS, Illustrator, Photoshop, Powerpoint and other software to perform simple stats or create graphs, charts, tables and other presentations of data.
- Learn how to ask questions of data and pick the significant variables from a data set to answer those questions, provide useful information, tell a story, and make appropriate comparisons.
- Learn how to create a visual, written, and oral presentations of data that clearly demonstrate the important features, are accurate, reveal patterns, and are visually appealing.

Class Readings:
- *Visual and Statistical Thinking: Displays of Evidence for Making Decisions* by Edward R. Tufte; Graphics Press, 1997. AVAILABLE AT THE UNIVERSITY BOOKSTORE.
- *Intuitive Statistics* by Motulsky. AVAILABLE AT THE UNIVERSITY BOOKSTORE.
- Various readings will also be assigned throughout the quarter and made available on e-reserves: https://eres.bothell.washington.edu/eres/coursepass.aspx?cid=1500
- Multiple magazine, internet, scholarly articles, movies and podcasts will also be assigned for review and study. They will be available on, reserve, e-reserve or our blackboard site (see below).

Diversity Statement
The ways of understanding statistics, visual communication and any field of study are as diverse as the people who study them. In order to make productive use of our time together, I ask that you show respect. Respect your peers, your instructor, the material and topics we will be covering. Your different ethnicities, cultures, religions, learning styles, socioeconomic backgrounds and personal experiences make this class richer. You will benefit immeasurably from your classmates' perspective, especially when they are different than your own, so please be patient and supportive. I look forward to a class with a wide range of preparations, and welcome basic questions as a way to refresh everyone's knowledge. Sometime learning requires some unlearning of old knowledge and misperceptions. Challenge your thoughts about what is "normal" or "obvious"! I am always happy to discuss problems that you are experiencing with the class, and to find new ways of approaching a topic during office hours. Approach me about customizing your learning experience, especially if you have special needs.

Support Services
UWB has a number of students services including career services, counseling services, veteran services, services for international students, and services for disabled students (for further information and links, see the UWB website http://www.uwb.edu/students/services/). The library, writing center, and quantitative skills center are also great resources for students.

If you believe that you have a disability and would like academic accommodations, please contact Disability Support Services at 425-352-5307, 425-352-5303 TDDD, 425-352-5455 FAX, or at dss@uwb.edu. They will be happy to provide assistance. You will need to provide documentation of your disability as part of the review process.

Academic Integrity (Avoiding cheating, plagiarism, etc.)
As UW students, you are expected to uphold the highest standards of academic conduct. In this class, you should be particularly aware that instances of cheating on exam or plagiarism in writing will be dealt with very seriously. Please refer to the UW Student Conduct Code for elaboration of this expectation (http://uwb.edu/students/policies/integrity.xhtml). In addition, the UWB student government created a brochure with useful advice on maintaining academic integrity and avoiding plagiarism. I highly recommend reading the brochure or the website thoroughly, and understanding the essential. Of you have any questions, please ask me.

All work on the exams and papers should be strictly your own and without the aid of any materials not specifically allowed. Plagiarism is defined in the UW Bothell catalog as (I have placed a section in bold and underlined it for emphasis):

"Plagiarism is the use of the creations, ideas or words of someone else without formally acknowledging the author or source through appropriate use of question marks, references, and the like. Plagiarizing is stealing someone's work and presenting it as one's own original work thought. Students work in which plagiarism occurs will not ordinarily be accepted as satisfactory by the instructor, and may lead to disciplinary action against the student submitting it. **Any student who is uncertain whether his or her use of the work of others constitutes plagiarism should consult the course instructor for guidance before formally submitting the course work involved**."

Inclement Weather

- Classes will run as usual unless the University is officially closed.
- You can check information on this at the Alerts tab on the UWB homepage or calling at the campus Information Hotline 425-352-3333.
- In the event that classes' area cancelled, you will be responsible for reading over the material that was to be covered that day (check the blackboard site for specific instructions). During the next class session questions will be addressed concerning this material. We will review the major concepts and reschedule other activities if there is a conflict.
- If there was an assignment that needed to be handed in person that day, the dead line will be extended until our next lecture session. Deadlines to submit material via the blackboard site will not be extended.

I will post information at the blackboard site as a reminder of new deadlines, new assignments or rescheduling of classes. You are responsible of keeping yourself informed.

*****IMPORTANT: Arrive on time (I will start on time!) and turn off your cellphones during class time ****

TIPS FOR SUCCESS

To do well in this class you'll need to acquire:

- Logical, analytical, quantitative and visual skills
- Incorporate new vocabulary
- Master a wealth of concepts and technical detail

Expectations

This course is not about memorizing "facts". The main emphasis is developing critical and analytical thinking skills. I will ask you to identify the similarities, differences and connections between concepts and data and identify unifying concepts. I want you to understand the how and why of data and their interpretations. This sort of understanding requires more active involvement on your part than just taking the facts and formulas and regurgitating them back on exams. Typically, exam questions will have the following framework:

- 1/3 content (e. g. terminology, examples)
- 1/3 conceptual understanding (e.g., understanding the concepts and ideas behind the information)
- 1/3 ability to apply concepts to new situations.

To succeed in this course, then, it is crucial that you develop critical thinking. Not only will you need to understand the concepts involved but you will also need to be able to explain those ideas clearly and concisely and apply them to novel situations.

Attending Lectures

Lectures introduce topics and will be a time to work on exercises, discuss ideas, ask questions and introduce techniques and resources. However, material assigned for reading might go deeper into the topic, and you are responsible for reviewing it. Exams are based on lecture material that is supported with the additional readings.

You are responsible for all material covered in lecture, by the exercises we will perform in computer labs, and the material that invited speakers will present in class. Take detailed notes in all this instances. Challenge yourself by asking questions and by relating the material covered to everyday life. Review your notes as soon after each class session as possible. Fill in any missing information and review the flow of the information so that your notes are complete and logical. You should be able to identify the two or three most important concepts introduced in each class session.

Preparing for Exams

- Study
- The general rule for university classes is that you should expect to spend at least 3 hours out of class for every hour in class; for a 5-credit class, that means you should expect to spend about 15 hours each week beyond in-class time. These hours should be spent reading, writing, studying, or doing other activities related to the class. Don't wait until exam time or the last day of the project to figure things out; cramming will not work in this class.
- Spend time regularly reading the material, reviewing notes, playing with the computer programs, learning vocabulary, applying concept to news or topics that are interesting to you. Reading passively stats and examples will not work.
- Work with the material, apply it to novel situations, solve problems, ask questions and explain it clearly to another person.

- Become familiar with your learning style. What works better for you? What study techniques works better for each specific topic? Can I improve my note-taking abilities?

Study groups and consulting the Quantitative Skills Center

Besides de project that you will be working on during the quarter, study groups can be powerful learning experience and can make studying more efficient, effective, and fun. Focused study with others allows you to pool your ideas and see material from a different perspective. It also gives you a chance to organize, verbalize, and explore your own ideas or questions and get feedback from the group. The Quantitative Skills center is also great resource, and may be able to facilitate study groups, or more individual aids for study.

Some possible study group activities:

- Review lecture notes. Help each other fill in missing bits of information or raise questions or clarify confusing concepts.
- Go over the assigned readings. Make connections between readings, lectures, and material in your daily life.
- View recommended movies or podcast together and critically analyze the aspects that relate to the class content.
- Answer study questions or problems provided, or questions from the text. As you do, concentrate on the reasoning process and the steps involved in reaching an answer. Discuss strategies in how to analyze data, obtain data or information, do graphics, use computer programs and so on.

Guidelines for a successful study group (either fro the group work or for studying):

- Respect each other. Come prepare to work. Be sure that you've read the relevant material, worked through study questions, problems assignments or finish tasks that you were committed to accomplish.
- Have an agenda. Remind each other of the agreed-upon goals, procedures, and time limits at the beginning of each meeting.
- Take turns explaining ideas or problems to each other. One of the best ways to check your own understanding of a topic or to see if all members of the group are in the same track is to explain your ideas to someone else. Make sure that everyone participates.
- Take a few minutes at the end of each meeting to summarize what you've accomplished. Decide what questions need follow-up and how that is going to be done. Look ahead and set the agenda for the next meeting. Make assignments or agree on what each person needs to do for the next time.

Tools:

- We will be doing lots of in-class work. You will find a **calculator** useful to have on hand. You may also want to purchase a pad of **graph paper**.

- We will be using **Microsoft Excel** for many extensive examples, labs, and homework problems. Excel is available at all campus computer labs. You can also purchase MS Office software after the 10th day of class from the cashier's office. See http://www.uwb.edu/students/discounted_software.xhtml

- A course website has been created on the university's **Blackboard** system at http://bb.uwb.edu/ This site will be used for:
  - Posting assignments and data sets
  - You will handing-in and I will return most of the assignments via blackboard

- Keeping track of the points you earn in this class
- Discussion Boards (which will add points to your total)
- Provide useful links
- Classroom assessments such as surveys and quizzes

You can get a blackboard account by going to the above website and selecting enroll. You must enroll for the course as well. It is not automatic with registering for this course.

ASSESSMENT

Your final grade in this course will be based on **520 possible points** as outlined below:

- **Exams**: Two exams will be given to assess your understanding of the key ideas and concepts from readings, labs, and coursework. Exams are 1 hour long. They will be problem or short-essay type, as illustrated by the study questions and bu other questions that are gien fro guidance at intervals during the course. There will be no multiple-choice questions. 2 exams, 100 points each = **200 points**

- **Project**: During the quarter you will develop a group project based on one topic of your choice within the bigger framework of "Food". More details about this project will be available the third week of the quarter and posted on blackboard. = **200 points**.

- **Informal writing, computer labs, worksheets, and homework assignments**: Multiple informal writing assignments, worksheets, and similar homework assignments will be given throughout the quarter, both in and outside of class. The sum total of these assignments will be = **100 points**.

- **Participation points**: You will earn participation points in class and via blackboard discussion board. =**20 points**

Your grade will be calculated as a percentage of the total number of points possible, 520, using the scale below.

4.0 => 95%			
3.9 = 94%	**2.9 = 84%**	**1.9 = 74%**	**0.9 = 64%**
3.8 = 93%	**2.8 = 83%**	**1.8 = 73%**	**0.8 = 62%**
3.7 = 92%	**2.7 = 82%**	**1.7 = 72%**	**0.7 = 60%**
3.6 = 91%	**2.6 = 81%**	**1.6 = 71%**	
3.5 = 90%	**2.5 = 80%**	**1.5 = 70%**	**0.0 < 60%**
3.4 = 89%	**2.4 = 79%**	**1.4 = 69%**	
3.3 = 88%	**2.3 = 78%**	**1.3 = 68%**	
3.2 = 87%	**2.2 = 77%**	**1.2 = 67%**	
3.1 = 86%	**2.1 = 76%**	**1.1 = 66%**	
3.0 = 85%	**2.0 = 75%**	**1.0 = 65%**	

This grading scheme is non competitive. If almost everyone got just a couple points below the top 5% of the class then almost everyone would get a 3.8 or 3.9.

Incompletes:
A student who cannot complete a course is not automatically granted an incomplete. University rules state, "An incomplete is given only when the student has been in attendance and has done satisfactory work until within two weeks of the end of the quarter and has furnished proof satisfactory to the instructor that the work cannot be completed because of illness or other circumstances beyond the student's control."

BIS 232 TENTATIVE CLASS SCHEDULE

wk	*Date*	*Lecture Topic*	*Readings*	*Assessment/ Deadlines*	*Notes*
1	M Jan 5th	Introduction. Class logistics. What do you know about visualizing information?	----		Assignment 1 posted: Learning styles test and reflection paragraph.
	W Jan 7th	A Brief History of Data Visualization I & the Basics of Drawing.	Pdf-e-reserve: Handbook of data visualization (pg-15-56)		Assignment 2 posted drawing and visualization exercises.
2	M Jan 12th	Good Graphics and Bad Graphics I	- Tufte- Visual and Statistical Thinking - Pdf-e-reserve: Handbook of data visualization (pg-57-78)	Deadline Assignment 1 & 2. (hand in-class)	
	W Jan 14th	Good Graphics and Bad Graphics II - class exercise: looking at newspaper graphics.	Revise previous reading: - Tufte- Visual and Statistical Thinking - Pdf-e-reserve: Handbook of data visualization (pg-57-78)		- Project instructions posted. - Proposal of project ideas posted
3	M Jan 19th	*HOLIDAY- Martin Luther King*		Deadline: Proposal of project ideas (hand-in Blackboard)	
	W Jan 21st	- Short movies: "Power of ten", "Bach's little fugue" -Work project groups -LIBRARY WORKSHOP			Assignment 3 will be posted on January 22nd posted: Data & Data sets LIBRARY WORKSHOP
4	M Jan 26th	CLASS CANCELLED		Deadline Assignment 3 is on Wed Jan 28!!! (hand-in via Blackboard)	Practice Exam posted.
	W Jan 28th	Data types, sampling, datasets and databases. Where they come from?			
5	M Feb 2nd	Review of material for exam. Descriptive stats I. Why do I need statistics? Basic stats. How to use basic stats effectively.	- Intuitive Biostatistics. Ch1, Ch38 - "The Median Isn't the Message" by Steven Jay Gould. (available at course materials in blackboard) Intuitive Biostats		
	W Feb 4th	**Exam1.** Discussion Project Ideas I and descriptive stats II.	Ch2, Ch5	Exam 1	Assignment 4 posted: stats and your data
6	M Feb 9th	Descriptive stats III.	Intuitive Biostats Ch3, Ch10, Ch11, Ch12 e-reserve: chap2 of "Reading Statistics and Research"	Deadline Assignment 4 (hand-in hardcopy)	
	W Feb 11th	COMPUTER LAB –Workshop QSC Asking your research questions, identifying key variables and using your data in Excel.			- Hand back Exam I - Assignment 5 posted
7	M Feb 16th	*HOLIDAY- Presidents' Day*			
	W Feb 18th	Descriptive stats IV Reading and writing about statistics	Intuitive Biostats Ch3, Ch10, Ch11, Ch12		-Deadline Assignment 5 (hand-in Blackboard)

		Invited Speaker: Kevin Ramsey	e-reserve: chap2 of "Reading Statistics and Research"		- Sign in for meetings.
8	M Feb 23th	Discussion on grading rubric for final project. Review session at computer lab (UW1 120)			
	W Feb 25th	**Exam 2.** (UW1 120 and UW1 121) Invited speaker: Jevin West		**Exam 2** (UW1 120 and UW1 121)	Invited speaker: Jevin West
9	M Mar 2nd	How to present data. Adobe Illustrator workshop	Tufte- Visual and Statistical Thinking (revise)		-Hand back Exam II - Assignment 6 posted (Adobe Ilustrator)
	W Mar 4th	Putting it all together. SPSS- some analyses.		Deadline Assignment 6	
10	M Mar 9th	**Final presentations I** (Oral Presentations)		Deadline: Submission of first draft of Final Project Paper.	Peer Review (From final project) assigned
	W Mar 11th	**Final presentations II** (Creative Projects presentation)			Deadline March 13th Peer Review
Exam week	W Mar 18th	**Submission of final Project paper via Blackboard site** (It should incorporate the corrections of the First draft)			

*****This Schedule will be constantly updated in the Blackboard site. Check frequently for updates!!!!*****