POPULAR MEDIA AND INTRODUCTORY STATISTICS

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BAD STATISTICS?

- Research presented in the popular media can be purposefully vague, exaggerated, or misleading in order to achieve a particular response from the reader.
  - The Average Age of the Homeless is 9?
  - Do Women Really Talk More Than Men?
  - Public Schools Outperform Private Schools in Math Instruction

OVERVIEW OF PROJECT

The student

1. finds a popular media article that discusses scientific research with statistics-based conclusions.
2. uses technology and library resources to acquire the research article(s) either in print or online.
3. contrasts the conclusions reported in the media article versus the research article.
4. use class concepts to evaluate the validity of the statistical argument reported in the media article.
5. reflects upon how the process of gathering relevant information and using statistical knowledge has changed/strengthened the student's opinions and values.

ORIGIN OF THE PROJECT

- Information Literacy (IL) is the theme of North Georgia College & State University's QEP (Quality Enhancement Plan)
- Information Literacy is the ability to **know** when information is needed and to **access**, **evaluate**, and **use** information effectively and **ethically**.
- Incorporate Information Literacy throughout the academic and co-curricular experience.
- Statistical Literacy Project

KNOW

- IL Outcome 1: "*The information literate student determines the nature and extent of the information needed.*"
  - The student finds a popular media article that discusses scientific research with statistics-based conclusions.
  - Article should be of personal interest to student.
  - Article should include citations, either formal or informal.

ACCESS

- IL Outcome 2: "*The information literate student accesses needed information effectively and efficiently.*"
  - The student uses technology and library resources to acquire the research article(s) either in print or online.
  - If student finds a topic of interest in the popular media article which gives no citations, search for another related media article that does.

EVALUATE

- IL Outcome 3: "*The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system*."
  - In a written report, the student contrasts the conclusions reported in the media article versus the research article.
  - How accurately did the popular media article summarize the research article?
  - Did the media article under- or overstate the research conclusions?
  - Did the media article point out potential flaws in the research article?

USE

- IL Outcome 4: "*The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose*."
  - The student will use class concepts to evaluate the validity of the statistical argument reported in the media article.
  - Discuss the formal statistical method used.
  - Include relevant graphs and tables.

ETHICAL / LEGAL

- IL Outcome 5: "*The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally*."
  - The student reflects upon how the process of gathering relevant information and using statistical knowledge has changed/strengthened the student's opinions and values.

IMPLEMENTATION

- Fall 2009 – Math 3350 Probability and Statistics
  - Taught by Robb Sinn
  - Approximately 25 undergraduate math majors
- Spring 2010 – Math 2400 Elementary Statistics
  - Core curriculum course
  - Approximately 32 students enrolled
  - Biology, Psychology, Business, Education, Political Science, Criminal Justice, Nursing students
  - Three students from Math 3350 serving as undergraduate assistants.

EXAMPLE 1

- Popular media article: "Public Schools Outperform Private Schools in Math Instruction," from *Science Daily*.
- Research article: "Achievement Differences and School Type: The Role of the School Climate, Teacher Certification, and Instruction," from *American Journal of Education*.
- Course topic: Correlation
- " It became increasingly apparent that the popular media was more interested in placing blame than on reporting findings. … Science Daily speculated that private religious schools focus too much on religious education and this took away from other academic pursuits. I was unable to find anything in the research study to suggest this conclusion."

EXAMPLE 2

- Popular media article: "Eating Vegetables Doesn't Stop Cancer," appeared in the *New York Times*.
- Research article: "Fruit and Vegetable Intake and Overall Cancer Risk in the European Prospective Investigation Into Cancer and Nutrition," published in *Journal of the National Cancer Institute*.
- Course topics: Regression and Confidence Intervals.
- "Originally, I thought all media articles would only show part of the facts and display them in a way that made the conclusion appear entirely different from what it actually was….Surprisingly, the numbers and the conclusion in the media article are the same as those in the research article."

EXAMPLE 3

- Popular media article: "Obese Men Fare Worse in Car Crashes," appeared on NPR website.
- Research article: "BMI and Risk of Serious Upper Body Injury Following Motor Vehicle Crashes: Concordance of Real-World and Computer-Simulated Observations," published by Public Library of Science Medicine.
- Course topic: Hypothesis testing and Confidence Intervals
- "The media article focused on the fatalities in car crashes of obese men without talking about statistical information or actual data. I feel that the media article took the data and sensationalized it into something someone would read, rather than reporting what the research article said."

STUDENT REACTIONS

- " Prior to this class, I was one of those people who would read something in a news article claiming things like 'Boys are More Likely to Have ADHD' or 'Increased Injuries in High School Sports' and if it seemed plausible, then I would automatically believe it. I now value facts more when I can see how the statistics are found and that they are truly showing a valid conclusion."
- "I have learned to be weary when a media article confirms something statistically, since we have learned that statistics support hypotheses rather than prove or disprove things."
- "After this project, I feel more inclined to 'dig a little deeper' into the popular media articles to discover for myself what statistical information is really being presented."

CHALLENGES

- Students look for any article with numbers such as sports statistics.
- Some students had a difficult time finding media articles with (formal or informal) references.
- Students had a difficult time distinguishing between media and research articles.
  - "In my research, I found that both articles portrayed accurate information."
- Some students tried to compare any two (media) articles on the same topic.
- Research articles can be quite technical.

INSTRUCTOR'S PERSPECTIVE

- Positive Outcome:
  - Project gives students hands-on experience connecting statistics to the outside world.
  - Students learn how to think critically about information provided by the media.
  - Students learn how to use the library resources.
  - The submitted projects serve as a great resource for class examples.

REFERENCES

- "Student Projects on Statistical Literacy and the Media," by Andrew Gelman and Deborah Nolan. The American Statistician, May 1998, Vol. 52, No. 2, p. 160 – 166.
- "Statistical Literacy: Thinking Critically About Statistics," by Milo Schield, Of Significance, produced by the Association of Public Data Users.

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