MEDIA STUDIES AND STATISTICS: REAL-WORLD DEMANDS, CLASSROOM QUANDARIES, AND ON-LINE SOLUTIONS

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Communication professionals include journalists and advertising/public relations executives, faced with an explosive growth of numerical data have to make sense of an increasingly complex world in an ever-changing media environment. We argue that the classroom training in statistical thinking that we offer our students is not currently responding to the challenges coming at us from the real-world media where we hope to place these students. We also recognize our students' interest in hands-on problem-solving and their increasing sophistication with online technologies in building our argument for more discipline-specific training in statistics, and the grounding of this statistical training online, beginning with the integration of online statistical simulations into the curriculum.

INTRODUCTION

Communications professionals, faced with an explosive growth of numerical data have to make sense of an increasingly complex world in an ever-changing media environment. For example, to ensure that their stories are accurate and credible, journalists have to examine a flood of information related to economic, political and social phenomena, including scientific and academic research reports, public opinion data, academic, commercial and political polls, consumer surveys and countless other numerical data that are released on a daily basis.

In a similar vein, to stay competitive, advertising and public relations executives must be able to understand and utilize the latest available business information such as market trends, sales, competitive expenditures, audience ratings, click-throughs and a host of other facts pertaining to consumers, products, companies, and markets.

Given the enormous demand for up-to-date, accurate and actionable information, it is reasonable to suggest that statistical thinking and reasoning (Garfield *et al*., 2002; Butler, 1998; Snee, 1990) should be considered a key learning goal for students of media and communication.

In many disciplines, the aptitude to understand, interpret and critically evaluate research data have become a crucial skill (Gal, 2002; Giesbrecht, 1996).

Today, a diverse array of undergraduate academic programs in American universities and colleges require students gain a basic understanding of concepts and applications in statistics. Most communications and media studies programs however do not require statistical training and even a basic research methods as a core requirement for graduation. The Accrediting Council for Education in Journalism and Mass Communication (ACEJMC) which puts its seal of approval on departments of journalism and mass communication in the United States does not mention quantitative skills as part of its accreditation requirements. Only a handful of undergraduate media studies and communications programs in the United States require completion of a statistics course for graduation. When statistics is part of the graduation requirements, students tend to take it later in their curriculum and our impression is that they don't see any connections between statistics and their major.

This means a large number of graduates of these programs have very little or no exposure to statistics, and we argue here that this limits their understanding of today's world and their professional preparation to work in this world. The question we address here is why this is the case, and we explore in this paper possible solutions.

ARGUMENT

It appears that students of mass communication programs, by and large, enjoy hands-on projects, and tend to avoid abstract and theoretical courses such as statistics and research. Unfortunately, introductory statistics courses tend to be presented in an abstract environment, and therefore it is not surprising that students find them difficult and unpleasant (Garfield *et al*., 2002). Some research in Media studies support the assumption that negative perceptions and

attitudes often translate in either avoidance of a course when students have a choice, or would result in low rate of success in that course (see Fullerton and Umpherey, 2001). For example, Onwuegbuzie and Leech (2003) suggest that behavioral and social science students often perform significantly worse in statistics than in other classes.

According to psychological models of educational performance, academic achievement is typically related to measures of ability and attitude (Haertel, Walbeg, and Weinstein, 1983). The relationship between attitude and achievement in statistics is well documented. Becker's (1996), review of the literature on teaching statistics showed that more than half of empirical studies in this area focused on achievement in statistics courses, and one-third focused on attitude toward statistics.

Past research has clearly linked student attitudes toward statistics to their success in statistics classes. For example, Feinberg and Halperin (1978), Roberts and Bilderback (1980); and Roberts and Saxe (1982) have shown a direct relationship between attitude toward statistics and achievement test in statistics. There is a consensus that positive attitudes toward the subject of statistics may significantly contribute to success in statistical courses.

It appears that media and communications education is confronted with a dilemma: There is a growing need to include statistical understanding, reasoning and thinking (Garfield *et al*., 2002) as learning goals in the curriculum while most communication students have a negative attitude toward statistics and perform poorly in statistics courses and tend to avoid the subject of statistics altogether if they can.

A lack of adequate quantitative skills will undoubtedly affect the quality of the United States media and communications graduates, and will place employers in a less advantageous position in the highly competitive global media and information industries. The purpose of this paper is to provide a series of suggestions in order to successfully integrate statistics as part of the media and communication curriculum. It appears that communication educators can capitalize on two emerging trends: 1- pre-professional media and communication students are more interested in hands-on and practical professional issues. 2- Students are becoming increasingly tech-savvy and feel comfortable with online games and activities. Our proposed solution is to try and integrate these two ideas to generate a more meaningful classroom experience

SUGGESTIONS

Offer statistics education as part of the substantive areas of media and communications classes such a reporting, editing, media planning, campaign or communication management course.

There is a growing consensus in the literature that statistics must be taught in the context of practical problems as opposed to being primarily concerned with computational issues. Chance (1997) has suggested a shifting of focus (Cobb, 1992) from procedural calculations to the ability to interpret, evaluate and application of statistical ideas. Accordingly, such shift must be incorporated in the curriculum and assessment of student learning in statistical courses.

Romeu (1995) suggested that teaching statistics in the context of practical problems through simulation can improve student attitude toward statistics. For example, Menn (1993) found that students remember 90 percent of the subject matter if they do the task themselves even as a simulation, as opposed to 10, 20 and 50 percent if they read, hear or watch someone else do the task respectively.

We have known for more than a decade that statistics education needs to focus on the use of statistics via cases and experiments. (e.g., Bentley, 1992; Cobb, 1992; Hogg, 1990; Landwehr, 1993; Rossman, 1992; Snee, 1993; Wardop, 1992; Willett and Singer, 1992).

Media and communications classes provide a variety of opportunities for simulating real-life professional activities that may range from writing or editing a story in a journalism class to developing promotional campaigns to making presentations to case analysis in an advertising or public relations class. It is reasonable to assume that when statistical concepts are utilized as professional decision tools they tend to be much more palatable to students. It must be noted that communications students, unlike those of business schools have very little prior mathematics and statistical training.

Given their orientation to professional settings, introduction of statistics in the context of practical applications would enhance their attitude toward and learning of statistics as opposed to when these concepts are introduced in an abstract and theoretical manner.

As Yilmaz (1996) has noted, advanced understanding of statistics in an introductory course may not be possible. However, introducing the statistical concepts within journalistic or marketing communication problems may strongly facilitate development of positive attitudes toward statistics. That is to say, students are much more likely to be receptive to statistics training and understand statistics when they see its utility in solving practical problems in the context of reporting, case analysis or promotional projects.

For example, journalism students would be more interested in learning about the concept of margin of error when discussed in relation to a president's approval ratings as opposed to introducing the concept directly in a vacuum . Similarly, the notion of statistical significance would make more sense to students when discussed in the context of difference of average income between men and women and other concrete and course-relevant examples.

In addition, advertising students will be much more interested in learning the notion of correlation when dealing with program ratings and sales of a product, and relationships of that nature. It is needless to say that histograms and scatterplots are more easily understood and appreciated when they are linked to relevant data about cases and projects.

Make use of the available Web simulations in the context of media and communication courses. Most consumer research companies such as A.C. Nielsen; Market Research Inc; or Simmons provide an educational version of their data bases either online or on a CD format to college and universities. Instructors of media and communication have access to growing number of software that would allow them to simulate real-life professional situations.

Gokhale (1996) has shown that effective integration of computer simulation into traditional lecture-lab activities enhance student's motivation and reasoning skills.

Ward (2004) showed that students demonstrated greater academic motivation toward statistics when an online component was added to a traditional statistics course. Gilbert (1993) suggests that statistics modeling and simulations have almost the same underlying logic. One can assume that using simulations for teaching statistics should come naturally. Chi, Pepper and Spedding (2004) have demonstrated the utility of Web-based virtual factory for teaching industrial statistics. Rivers and Vockell (1987) and Mayes (1992) have suggested that computer simulation exercises can provide motivation, expose misconceptions and enhance learning.

Magnusson and Palincsar (1995) have shown that simulations are powerful tool to teach not only the content but also thinking or reasoning skills for problem solving. Web-based simulations have been used successfully in teaching in a variety of fields, including conflict assessment and frame analysis (Elliot *et al*., 2002). Welman and Larson (2002) have shown that web-based computer simulations facilitate learning in the field of Pharmacy. In addition, Bell (1999) has shown that simulations enhance learning in biology.

Without a doubt, the combination of computer-based simulations and the Web provide a powerful tool for teaching and learning in a variety of fields, including research and statistics. In addition to traditional stand-alone simulations capabilities from traditional statistical packages such as *Minitab*, *SAS* and *SPSS*, there are a growing number of sites on the Internet, which provide statistical simulations in a variety of fields. Today, instructors have ready access to numerous interactive simulation programs such as teachware tools, electronic textbooks, and statistical software on the Web.

For example, Mills (2002) through an extensive review of the literature has shown that computer simulation methods are being used in all areas of statistics to help students understand difficult concepts from mathematics to education to business and medicine. The concepts range from the Central Limit theorem, *t*-Distribution, Confidence Intervals, Bimodal Distributions, Regression Analysis, Sampling Distributions, Hypothesis Testing, Survey Sampling , etc.

Ted Hodgson and Maurice Burke have suggested that the use of simulation as a learning tool can provide accurate conceptual understanding of statistics, but it may also lead to deep misunderstanding. They suggest that instructors must be educated about the misperceptions that may arise and structures their classes and activities in order to is take the optimum advantage of the power of simulation for learning.

The authors strongly feel that the task of integrating the teaching of statistics concepts and applications into the curriculum can not be solely the responsibility of instructors. College deans and department chairs must provide the following support:

- Work closely with the relevant industries in order to acquire and receive training in the use of the emerging databases and simulation software. An ongoing partnership between the universities and colleges and the media industry is a necessary ingredient of this proposal. To simplify administration of faculty internship programs, they must be linked to student internships and such participations must be formally acknowledged and rewarded within tenure and promotion policies and procedures.
- Provide the interested and qualified faculty with adequate release time so they can brush up on their statistics, and become familiar with the available professional software and simulations in their fields, as well as revamping their existing courses.
- Help provide statistics workshops for faculty and provide incentives for improving the attendance of these workshops.
- Provide faculty and students with access to labs, the Internet and technical support so they can become familiar and work comfortably with simulations.
- Encourage team teaching of certain professional courses where the statistical expertise of a faculty member can be shared among different classes by covering the quantitative portion of those classes.
- Include understanding, interpretation and critical evaluation of research data as part of the program learning goals and ensure that they are followed in relevant pre-professional courses. In addition, statistical thinking should be included in the assessment portion of the course.

CONCLUSIONS

This paper has reviewed problems we see in statistics education in media studies programs. We have argued that statistics education should be located within professional disciplines. Further, the increasing technological sophistication of our students with regard to their online behaviors, for example video gaming, suggest that a start could be made with the introduction of Web simulations of statistical concepts embedded in the respective professional disciplines. This issue has been widely studied in other domains, but the evidence suggests that media studies come late to this idea. We encourage its development and further study.

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