

Statistics in B-Schools: Millstone or Cornerstone?

by J. Keith Ord, Georgetown University

Scene: A social gathering

Me: Hi there, it's a nice get-together.

Interesting Other Party: Yes, it is always nice to meet people and to find out what they do. What's your line of work?

Me: I'm a faculty member in a business school.

IOP: Cool. What do you teach?

Me: Business statistics.

IOP: (*awkward pause*) Gee, that's—er—interesting. I wasn't very good at Stat in college. I worked really hard but I only got a B-minus. The professor was really weird. He kept talking about some central limit theme but I never knew what he meant. (*Looks anxiously around room, sees no familiar faces and then looks at watch*). Gee, is that the time already? Hey, it's been nice talking to you but I've got to run. Bye.

Well, maybe such conversations don't go downhill quite so quickly, but many of us have had interactions involving at least some of those elements. Why is statistics (or, more generally, quantitative methods) the Rodney Dangerfield of the business school? My aim in this essay is to explore possible explanations and then, in keeping with the theme of rejuvenation at the 2010 Decision Sciences Annual Meeting, to start to chart a way forward.

How Did We Get Here?

First, let us consider a brief history of quantitative studies in business schools; a more detailed account is provided by Benson (2004). In 1959, the Ford (Gordon & Howell) and Carnegie (Pierson) reports were sharply critical of the lack of rigor in business schools, both in teaching and in research. In the years that followed research programs developed along more scientific lines and course offerings im-

proved in quality and content, as well as embracing new pedagogy, notably the use of cases. However, as the emphasis on rigor increased, a communications gap opened up between academia and the world of business. Criticism of the direction that business schools had taken was most famously laid out in Porter and McKibbin (1988), in a report sponsored by the AACSB. These authors argued for greater emphasis on strategic thinking. Porter and McKibbin did not dismiss quantitative methods as unimportant, but in a degree program of fixed length, if topic A has more time devoted to it, topic B will get less. Unfortunately, statistics and quantitative methods fell in the "B" category.

Around the same time, the late 1980s and the '90s also saw the rise of the infamous rankings, notably those published by *Business Week*, *U.S. News and World Report* and *Financial Times*. We all love to hate these rankings and can provide reasons why our own schools deserve higher ratings, at the same time professing that we ignore such perverse measurements of academic quality. But, of course, we cannot ignore them; for better or worse, they represent almost the only widely available independent assessments of a school's quality, and prospective student choices are guided by this information. The primary focus of these published rankings has been MBA programs and arguably this emphasis has led to the diversion of resources away from undergraduate and doctoral programs and towards MBA programs. That shift is correlated with a relative reduction in quantitative course offerings; cause and effect may be unproven but the outcome has not been good for the "quant jocks."

To the extent that the rankings place weight on research, they tend to include few if any statistics journals and to list



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many more that focus on management and strategy. What are smart business school deans to do? They join the dots and cut back on the number of statisticians in the school by having non-statisticians within the school or adjunct faculty teach core courses, or by out-sourcing statistics teaching to our colleagues in the arts and sciences. In this way, deans release more resources for those areas that count in the rankings. It should also be noted that our colleagues have become much more statistically savvy, especially in finance and marketing, thereby making them available resources for the dean seeking to staff the introductory statistics course. Hey, we teach students about the virtues of outsourcing, so we can hardly complain if it happens when we are perceived as not providing sufficient added value. However, this strategy carries an inherent risk: when people from a functional area teach the statistics course, the emphasis tends to shift from an overview of statistics to the statistical methods used in the instructor's functional area.

What do these developments mean for statistics and quantitative methods? Many operations researchers have shifted in the direction of supply chain management, to the lasting benefit of that field. Statisticians had an opportunity in the 1990s in the area of quality management, but that fish swam away, either to engineering schools or to operations. As statisticians we must add value to both the research and teaching missions of the B-school. We now explore what might be done to reverse the tide.

Rejuvenating Teaching

We begin by examining some of the criticisms leveled at the teaching of business statistics and how such issues might be addressed, recognizing that in many cases the solutions exist, but that we sometimes fall short on implementation.

The statistics course is irrelevant. The first statistics course is typically taken before any of the functional area courses, except possibly accounting. Thus, teaching materials need to include examples or short cases that can illustrate the

value of statistical methods to managerial decision making. Our functional area colleagues can be a useful source of real data and stimulating mini-cases.

The course is all about techniques and not about understanding. It is all too easy to "teach" statistics by "plug and chug" or by "point and click" methods. The availability of test banks and the widespread use of non-specialist or adjunct faculty sometimes push statistics courses in one of those directions. Furthermore, (weaker) students often prefer the security of closed-form examination questions that allow rote learning to substitute for understanding. In turn, if faculty salaries are based in part on student evaluations, the high tech(nique) road is a tempting one to follow. Nevertheless, if students are to see value in studying statistics, we need to adopt a problem-solving approach to the subject, even though that may involve more preparation time and (groan) more difficult grading.

There are no good textbooks. This statement may have been true in the 1960s and '70s but it really does not hold up anymore. Even if you have not yet written the perfect text, there are plenty to choose from and abundant supporting materials, even test banks. Further, modern technology allows you to mix and match material from different books and to create a custom text. Careful selection of the right course text may be a tricky business, but it is worth spending time to get it right.

Classes are boring. The current generation of students is not noted for its long attention spans, but the advent of applets and clickers, combined with the availability of business statistics cases can all make for greater interest in the classroom.

We only get to teach introductory courses. Many lists of course offerings do indeed show a scant selection of upper-level electives in the quantitative area.

It has not always been so. The '80s and early '90s saw a focus on quality and this topic continues to attract con-

siderable attention under the label of six-sigma methods. Quality topics still appear in statistics textbooks, although the subject tends to be relegated to the "if there is time at the end of the course" category. Since many introductory courses have been reduced in length, time often runs out before the topic is addressed. We need to learn from this example and be innovative in the development of courses in emerging areas. Further, if we are going to sustain statistical interest in such areas, we need both to build the infrastructure and to collaborate with our functional areas colleagues to integrate such topics into their discussions.

Rejuvenating Research

Effective statistical research within a B-school requires both functional area expertise and the ability to be innovative in terms of statistical theory. When deans recruit faculty members with strong quantitative skills into the functional areas, the research effort can be sustained, provided these faculty members are able to interact with statisticians in the B-school or through joint appointments with statistics departments. Unfortunately, such opportunities are not pursued as vigorously as they should be, perhaps because leading statistics journals rarely "count" in the dreaded rankings. Thus, the net impact of all the factors just described is that the number of bona-fide statisticians within B-schools has diminished and the remaining population is graying.

Statistics gets no respect in a business school. There is an old adage that states "That which is measured will be honored." The complementary statement "That which is not measured will not be honored" also tends to be true in the present context. As we noted at the outset, statistical research tends to get short shrift in current ranking exercises. We also noted that the rankings are important to prospective students as they provide almost the only form of independent evaluation, however flawed. As statisticians we need both to demonstrate that we are creating added value and two ensure that these contributions are properly recognized. In particular we must grasp opportunities to

become more involved in program assessment exercises.

My functional area colleagues have strong statistical backgrounds. Improvements in statistical computing and in the statistical training in doctoral programs make this statement true, at least approximately. From one perspective, this development makes it easier to use other business faculty to teach introductory statistics courses. However, this development also provides a path to greater productivity in that it provides greater opportunities for jointly published research. Those recruiting new faculty members also need to keep in mind that a functional area specialist is unlikely to have the time to stay current with new developments in statistics.

Statistical research is not valued in the B-school setting. We need to demonstrate the added value that statisticians can bring. A search for successful paradigms in other disciplines naturally leads to the field of biostatistics, where biostatisticians are routinely members of research teams, in academia, industry and government. Some of their activities may involve the provision of technical advice to other researchers, an area that is also important in business research, albeit typically under-valued. But biostatisticians also publish quality theoretical papers relevant to the medical and biological sciences and statisticians in B-schools are, or should be, doing the same in the management area. Closer to home, the field of econometrics has succeeded in blending theory and applications quite well, which suggests financial econometrics as another fruitful area for joint activity.

What Needs To Be Done?

The first and perhaps most crucial step that needs to be taken is to nurture new (and not so new) areas of research and teaching that will provide added value. Notable opportunities that exist at the present time include:

- **Data mining**, which involves both the analysis of large data sets and their use in market research and other functional areas;

- **Business analytics**, which involves quantitative approaches to the analysis of business data in support of decision making; and
- **Risk analysis**, designed to identify and evaluate factors that may have an impact on the potential success of a business project.

If we are going to sustain activity in these areas we need both to build the infrastructure and to collaborate with colleagues to integrate such topics into their functional areas. To the extent that we are successful in such ventures teaching and research opportunities will expand.

The second component of our redevelopment strategy involves working with our B-school colleagues to ensure that promotion and tenure criteria are better at acknowledging contributions to statistical theory and methods that are germane to business research. Likewise, we need to lobby to correct the current imbalance in the rankings, both in terms of their lack of recognition of statistical research and their overemphasis on (full-time) MBA programs at the expense of undergraduate, doctoral and specialized masters programs.

Next on the agenda is the restructuring of the rankings system as a whole. Current rankings are produced by commercial publishers and, by all accounts, they attract a lot of interest. There is no harm in such endeavors, but they should not be the only source of independent information available to prospective students. Current AACSB (re)accreditations are essentially “pass/fail,” but it would not be impossible to convert these time-consuming and constructive activities into detailed evaluations of program performance. Since AACSB-accredited schools are re-evaluated every 10 years or so, such information could provide a platform on which to build objective ratings of a school’s programs. Annual updates could then account for new developments. At the very least, such an exercise would provide a second, and arguably much more reliable independent evaluation of program quality.

How Do We Move Forward?

There are various ways in which we could tackle these issues but, assuredly, we need to “hang together so that we do not hang separately.” One possible vehicle for such action is the group that goes under the mnemonic MSMESB (Making Statistics More Effective in Schools of Business). As the name suggests, the mission of MSMESB is to improve the teaching and practice of statistics in both B-schools and the business community. More specifically, MSMESB aims to encourage interaction between business faculty and others involved in teaching business statistics with professionals from industry and government.

The first MSMESB conference was held at the University of Chicago in 1986. The conference was organized by three professors at the Graduate School of Business: Harry Roberts, George Easton, and George Tiao. The motivation for the conference was that the practice and teaching of statistics in business schools left much to be desired. In particular, introductory textbooks and courses did not focus upon business issues, and faculty research often failed to identify themes important to the business community.

In the intervening years, considerable progress has been made in several directions:

- Textbooks are more innovative, relate better to business students and provide a better basis for active learning;
- Software packages have become much more user friendly and are integrated both into textbooks and most courses;
- The quality of statistical input into business research has improved considerably; and
- Computer simulations (e.g., via applets) enable more graphic presentations of statistical concepts such as sampling distributions.

MSMESB would certainly not pretend to be the sole source of these developments; however, the conferences have been a forum for continuing constructive discussions among academics, business

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can't take a picture of a barcode and do a price check to see whether I'm getting a bargain, or whether I can buy an item less expensively at a different local store or on the Internet.

It's still easier to pull out an iPhone and look at a subway map or an airport map than it is to take the iPad out of the case to complete those tasks. And when I use an app to hail a taxi (an app called **Taxi Hold 'em**), it would be awkward to hold up a big flashing sign on the iPad that says "Taxi," then fold it down and quickly jump into the hailed cab.

So is the iPad a Game Changer or Not?

When asking the question whether the iPad is a major advancement, columnists in the computer blogs have focused on e-mail, browsing the Web, and playing games. I have avoided these topics because they represent incremental

improvements, but not major changes, to how we conduct our lives (to be fair, my earlier discussion about Zagat To Go dealt with incremental changes).

One of the first things I did after setting up the iPad was use an app called **WeatherBug Elite for iPad** to check the weather before leaving the house. The opening screen on WeatherBug has an 8" x 8" visual depiction of full color radar. It was obvious that a powerful thunderstorm was heading my way and since my mission wasn't critical, I decided not to go out and brave the weather.

I later found out that there was a massive auto pileup on the main street just outside my neighborhood. That experience alone gave me the feeling that it was a good decision to purchase the iPad.

It is the convenience and the encouraging interface that makes me love the iPad. The iPad allows me to do many

different things faster than I can do them on a desktop. Secondly, I'm able to do more things at once. Thirdly, I do different activities than I typically would on a desktop. For example, I could always have a "to-do list" on my desktop, but it would remain on my desktop, not where I am when I need to consult it.

So, in the end, the iPad has, and will continue to change the way I do my normal routine, my travel, my writing, and my time in the classroom. ■

Reference

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http://www.decisionsciences.org/DecisionLine/Vol41/41_3/dsi-dl41_3ecom.pdf

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professionals, book publishers, and software vendors. Unfortunately, progress has been uneven. Many courses in business statistics remain passive learning experiences.

As time progressed the MSMESB conferences hit a plateau. Familiar friendly faces appeared each year but there was an increasing sense that we were "preaching to the choir" and not reaching faculty who were perhaps isolated from statistical colleagues and practicing statisticians and therefore were unaware of recent research developments and current relevant applications. For a number of years MSMESB had arranged sessions at the DSI meetings (and also at the Joint Statistical Meetings) but it was felt that broader outreach was needed. Under the leadership of Bob Andrews of Virginia Commonwealth University, a one-day miniconference was organized at the 2008 DSI Annual Meeting in Baltimore. The sessions were well attended and evoked a strong positive response from participants, so a second miniconference was organized at the 2009 Annual Meeting in New Orleans.

A further round of positive reactions led to the establishment of MSMESB as a special interest group within DSI and a one-day miniconference for 2010 in San Diego (for details, see link below or *Decision Line*, March 2010, p. 30). The 2010 miniconference will address a number of the topics raised in this article.

Conclusions

Statistics has always been a core requirement in business degrees and the basic assumption underlying this article is that the field continues to hold much potential benefit for business research and practice. That assumption is not a "given" but it is worthy of more serious consideration than it has perhaps received in recent years. However, if the claim is to be sustained we as statisticians must be more effective both as teachers and researchers in a B-school setting. Further, we must make our case more proactively to our colleagues. Whether the proposals outlined in this article are the way to go remains to be seen, but hopefully they will at least

stimulate vigorous and constructive discussions. ■

Article Links

Details on MSMESB miniconference at the 2009 DSI Annual Meeting:

http://www.decisionsciences.org/DecisionLine/Vol41/41_2/dsi-dl41_2meet.pdf

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