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Bridging the Gap between IS Education and IS Research: What Can be done to Help?

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ABSTRACT

This article is a written version of the remarks delivered in a keynote address given at the 2018 joint conference of EDSIGCON and CONISAR. The article examines the problem of the gap between information systems education and information systems research. I cover what the problem looks like, three causes of the gap, three ways to bridge the gap, and three long-term strategies.

Keywords: AACSB, Academic history, IS education, IS research

1. INTRODUCTION

I was invited to give a keynote address at the 2018 joint conference of EDSIGCON and CONISAR. EDSIGCON is the EDSIG Conference on Information Systems & Computing Education, where EDSIG is the Education Special Interest Group of AITP (the Association of Information Technology Professionals). CONISAR is the Conference on Information Systems Applied Research. I readily accepted the invitation because it gave me the opportunity to talk about something I have always considered to be important – the problem of the gap between information systems (IS) education and IS research. It is something that has bothered me ever since I began my career as an IS professor. This text is a written version of the remarks I delivered in my keynote. I will cover what the problem looks like, three causes of the gap, three ways to bridge the gap, and three long-term strategies.

2. WHAT THE PROBLEM LOOKS LIKE

As for what the gap between IS education and IS research looks like, let us first take a look at what we teach. I offer two sample curricula (Figure 1). One is the Master of Science in IS curriculum at my home institution, Virginia Commonwealth

The VCU curriculum
INFO 610: Database Systems
INFO 620: Data Communications
INFO 630: Systems Development
INFO 640: IS Management
+ 6 electives

The West Texas A&M University curriculum (sample courses)
CIDM 6305: Quantitative Analysis in Business
CIDM 6362: Advanced Business Forecasting
CIDM 5310: Business Intelligence & Decision Support Systems
CIDM 6350: Data and Information Management
CIDM 5360: Object-Oriented Analysis and Design
CIDM 6330: Software Engineering and Systems Development
CIDM 6340: Network Management and Information Security
CIDM 6363: Enterprise Process Management
CIDM 6390: Project Management

Figure 1. What We Teach

University, VCU; the other is the Master of Science in Computer IS and Business Analytics curriculum at West Texas A&M University, which is the home institution of Jeffrey Babb, EDSIG's President. The curricula consist of courses that one would expect: database, systems development, data communications, network management, information security, enterprise management, and so on. Second, for a contrast, consider on what we (IS professors) do our research. To provide a general sense of this, I have selected four titles of highly cited articles (Figure 2). These are the real titles, no matter how abstruse the research may appear to be. To demonstrate my objectivity in identifying what I consider to be abstruse research, I am selecting one of my own articles, "Generalizing Generalizability in IS" (Lee and Baskerville, 2003) which has been cited over 1,000 times. It basically takes a highly philosophical approach. The most famous one of the four is "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology" (Davis, 1989) which has been cited over 42,000 times. Let me, as a researcher, admit this: the appropriateness of any one of these four titles in a professional curriculum would be highly questionable. These articles are not written for practitioners and certainly not undergraduate students or even Master's students.

- Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology
- Generalizing Generalizability in IS Research
- Computer Self-Efficacy: Development of a Measure and Initial Test
- Message Equivocality, Media Selection, and Manager Performance

Figure 2. What We Research (Sample Titles)

As a reverse case in point, let me turn your attention to the exemplary research of Steven Alter, professor emeritus at the University of San Francisco. Alter's research on what he calls "work systems" is extremely practical, useful, scholarly, generalizable, and even teachable in the classroom. However, Alter, with a Ph.D. from the Massachusetts Institute of Technology, fought an uphill battle for years trying to get his articles published in top research journals. This is just another dramatic indication of the gap between IS education and IS research.

Of course, I am not the first business school professor to cry out against this problem. Warren Bennis and James O'Toole, in *Harvard Business Review* (2005, p. 98), complained about how business school teachers "measure themselves almost solely by the rigor of their scientific research" which they describe as a form of "physics envy." They state: "Today it is possible to find tenured professors of management who have never set foot inside a real business, except as customers" (p. 100). They also state, "by allowing the scientific research model to drive out all others, business schools are institutionalizing their own irrelevance" (p. 100).

3. THREE CAUSES OF THE PROBLEM

There are likely more than three causes of the gap between IS education and IS research, but I will identify and highlight three of them.

3.1 Historical Events

The first cause has to do with historical events going back to the 1950s as they pertain to the Ford Foundation and the Carnegie Corporation. I blame them for setting us on the wrong path in the first place. The Ford Foundation requested and funded an extensive report, *Higher Education for Business*, by Robert A. Gordon and James E. Howell (1959). The report was about "education for business at the college or university level, primarily although not exclusively as it is offered by university schools of business administration" (Gordon and Howell, p. vii). The Ford Foundation report stated, "There has been too little pure research" (Gordon and Howell, p. 382), "business research needs to become more analytical, to develop a more solid theoretic underpinning, and to utilize a more sophisticated methodology" (p. 384), and "this in turn requires that the business schools turn to the underlying disciplines such as the behavioral sciences and mathematics and statistics" (pp. 384-385). At the same time, the Carnegie Corporation of New York initiated and underwrote a report, *The Education of American Businessmen*, by Frank C. Pierson (1959), which was a "study of higher education in business administration" (p. viii). The Carnegie Corporation report stated (Pierson, p. 313): "business schools need to concentrate on developing a body of widely applicable generalizations which have been scientifically tested," "both hypothesis forming and hypothesis testing are essential," and "very rarely [in 1959] is emphasis placed on developing analytical findings which can be fitted into a general system of principles and tested in a scientific manner." Thus, the seeds of today's (overly) rigorous scientific approach to research can be found in the Ford Foundation report and the Carnegie Corporation report.

It is also worth mentioning that the Ford Foundation guaranteed the impact of its report by providing funding (Final Report of the AACSB International, Impact of Research Task Force, 2008):

> During the 1960s, the Ford Foundation committed $35 million (worth more than $250 million today [2008]) to help schools transition away from a focus on anecdotal data and descriptive analysis to more systematic, social science based approaches. True, only a minority of top schools could claim differentiation through an emphasis on research in the 1960-1970 time frame, but by 1988, 26% of American deans reported emphasizing research at least as much as teaching. In 2005, the percentage had risen to 43.3%, and U.S.-based AACSB-accredited business schools reported spending a total of $320 million annually to support faculty research.

3.2 Emphasis on Science and Statistics

The second cause of the problem has to do with the emphasis on science and statistics. Science has its place; however, one may ask if the so-called scientific method is appropriate for all things. To explain this, I first distinguish two types of research:

research that describes or explains what exists or has existed and research that describes or explains *how to create* what does not now exist or has not yet existed, *including how to solve problems*. These two types of research are radically different. Second, I distinguish two more types: research that studies the physical world and research that studies the world of people and their institutions. Where each of the two types is considered a dimension, the result is a 2 x 2 table (Table 1) where each of the four cells is a category of research. The natural sciences fall in category I. Physics, astronomy, chemistry, biology, and geology have reputations as the "real sciences," where physics is often considered the most scientific of all; hence, "physics envy." Next, in category II, there are the social sciences, and they try to model themselves on the natural sciences. Hence you have what has been called "the natural-science model of the social sciences," or the social-science practice of physics envy.

Notice that in categories III and IV, we don't have the sciences anymore. We have the *professions*: engineering, medicine, law, and clinical psychology, among others. They might very well use science and apply science, but they are about much more than just science. They have to go about solving problems and getting the job done even when the needed scientific findings have not yet been discovered and are not available to be applied. The *professions* aren't about describing and explaining what exists; the *professions* are about *changing* what exists in the interests of *problem-solving*.

Even though business research should fall into category IV, business school professors have treated business school research as if it falls into category II, which means that they really envy the research being done in category I. The result is this: when business school researchers aspire to be in category I, but really belong in category IV, the result is a wider gap between IS research and IS education. We end up doing research in ways that are not relevant at all to what needs to be taught.

Related to the emphasis on science is the emphasis on statistics – in particular, statistical significance. The idea of statistical significance has gotten all mixed up with the idea of science. I will quickly review what statistical significance is and examine its overall importance.

Consider the exercise of tossing a coin 100 times. The purpose of the exercise is to find out if the coin really is a fair coin. If the evidence is around 50 heads when we toss the coin 100 times, then it is probably a fair coin; but if the evidence is 90 or more heads when we toss the coin 100 times, then the probability that it is a fair coin is very small. In other words, consider the belief that the coin is a fair coin. The probability of obtaining 90 or more heads, if the belief is assumed to be true, is so small as to be considered *statistically significant*, hence allowing us to feel confident in rejecting the assumed belief as true.

The reasoning that pertains to statistical significance is, of course, valid, but it is a very narrow, specialized type of reasoning and a small part of scientific reasoning. Indeed, must research be statistical in order to be considered scientific?

Two founders of statistics, Jerzy Neyman and Egon Pearson, introduced the idea of a confidence interval only in 1928 and the procedure for hypothesis testing only in 1933 (Upton and Cook, 2008). So, if research must do statistical hypothesis testing and apply statistical significance in order to be considered scientific, then this would mean that there was no science before 1933! In other words, this would mean that Einstein, Darwin, Newton, Copernicus, and Galileo were not scientific. But they were.

A fair conclusion is that the use of statistical significance can be helpful in science, but is not required for research to be scientific.

Misconceptions about statistical significance are so widespread that the American Statistical Association issued a letter in 2016 about the misuse of statistical significance (Wasserstein and Lazar, 2016). The letter states, quoting other authorities (p. 129): "The 'scientific method' of testing hypotheses by statistical analysis stands on a flimsy foundation," there are "'numerous deep flaws' in null hypothesis significance testing," "statistical techniques for testing hypotheses … have more flaws than Facebook's privacy policies," and "the problem is … that the vast majority of data analysis is not performed by people properly trained to perform data analysis."

How does the emphasis on statistical significance in IS research hurt IS education? The answer is that statistical

	Research that studies the physical world	Research that studies the world of people and their institutions
Research that describes or explains what exists or has existed	I physics, astronomy, chemistry, biology, geology	II economics, anthropology, sociology, history, social psychology
Research that describes or explains how to create what does not now exist or has not yet existed, including how to solve problems	III electrical engineering, chemical engineering, medicine	IV social work, education, public policy, law, clinical psychology

Table 1. Research Categories Based on Table 1 in Lee (2014, p. 350)

significance is irrelevant to the traditional IS curriculum, except for perhaps two or three courses. This applies to the courses that were mentioned earlier in the curricula at VCU and West Texas A&M. The emphasis on statistical significance in IS research has therefore only served to widen the gap between IS research and IS education.

3.3 The Tenure and Promotion System

The third cause of the gap between IS education and IS research is the tenure and promotion system. The tenure and promotion system strongly encourages professors to pay more attention to research than to education. A major hurdle here is the journal rankings. IS professors are pressured to publish articles in journals that are included in one or another listing of top journals. First, there is the *Financial Times*' list of 50 journals. Of these 50 journals, those which can be considered IS journals (*Information Systems Research*, *Journal of Management Information Systems*, *Management Science*, and *MIS Quarterly*) are all heavily research-oriented journals. Only 2 of the 50 journals publish articles that one would assign to M.B.A. or M.S. students. They are the *Harvard Business Review* and the *Sloan Management Review*. That is only 2, out of 50.

Another famous journal list is the UT Dallas list. All 24 of its journals are research-oriented. Its IS journals do not publish articles that, in my view, one would assign to Master's students, much less undergraduate students.

Next, there is the list of journals from the Association for Information Systems, or AIS. The AIS Senior Scholars have composed a list of what they consider to be the top eight journals, a purpose of which is to guide tenure and promotion decisions. In my opinion, not a single one of the eight journals typically publishes articles that one would assign to undergraduate or Master's students.

And then, individual business schools have their own lists. At my own institution, the School of Business at Virginia Commonwealth University, publishing an article in a journal on its list would not only help a professor get tenure or promotion, but also provide a bonus in the form of a research grant. But again, for the IS journals on this list, one would not assign any of the articles to undergraduate students or Masters' students.

These journal lists are harmful, not only to IS education, but to the health and well-being of IS professors in general. As a case in point, consider the situation at a prestigious business school that I recently visited. At that school, an assistant professor of information technology is given the tenure and promotion goal of publishing four articles in a list of just four journals, which are: *MIS Quarterly*, *Information Systems Research*, the *Journal of MIS*, and the *Journal of the Association for Information Systems*. Let's say the acceptance rate at each of these journals is 10%. Well, if an assistant professor can write 10 papers, which is a generous over-estimate and submits each paper to one of the journals, then the chances that a professor will succeed in reaching 4 acceptances in any or all of the 4 journals is only 1.3%. So, no wonder there is extreme pressure to focus on research which competes with the time and effort that is put into teaching.

With regard to the tenure and promotion system, also worth mentioning is the role of teaching. Bad teaching will cause a denial of tenure. In my view, however, excellent teaching is only considered to be nice. That's why I regard excellent teaching as only a hygiene factor in the tenure and promotion system. What is needed for tenure and promotion is excellent research. Sure, on paper, tenure and promotion guidelines can say that research and teaching receive equal weight. However, voting on a tenure case can be by secret ballot, where the person voting uses whatever criteria he or she wants to use – where research can be emphasized over teaching.

I emphasize that I am subjectively characterizing the academic culture in business schools *in general*. There are universities where business schools do reward excellent teaching.

Finally, publishing in journals means giving the journals what they want, which is research, which is different from the material that the classroom needs. But, there is one exception. It is the *MIS Quarterly Executive*, which publishes research conducted by IS professors who write for practitioner audiences. The articles are perfect for M.B.A. students and M.S. students, but IS professors encounter one big catch with publishing in *MIS Quarterly Executive*. The catch is that a professor might not get any credit toward promotion or tenure for publishing in *MIS Quarterly Executive*. The reason is that it is not considered to be a research journal – it is considered to be a practitioner journal.

Now, how may we bridge the gap between IS education and IS research?

4. THREE WAYS TO BRIDGE THE GAP BETWEEN IS EDUCATION AND IS RESEARCH

I will offer three potential solutions. In each case, it is easier said than done.

4.1 Do What We Teach

First, according to Bennis and O'Toole, "every business school should run its own business" (2005, p. 102). Bennis and O'Toole credit Edwin Land for this suggestion. This would be a structural change. It would take care of their concern, already mentioned, that "[t]oday it is possible to find tenured professors of management who have never set foot inside a real business, except as customers" (p. 100).

Furthermore, professors could publish case studies from their experience as participant observers in the business that their school runs. Today, it is completely respectable in the IS discipline to publish cases of qualitative field studies. Such field studies would not simply report war stories that executives tell us. We have decades of completed field studies that separate first-level constructs (which can include war stories and other things that informants tell us) from second-level constructs (which are the general theories we create that can apply to multiple settings, not just the original case setting where we gather the data) (Schutz, 1973). The result could include not only good lessons in IS research, but also good lessons we could teach in IS education.

4.2 Action Research

A second way to bridge the gap is through action research. Figure 3 depicts an action research project of which I was a team member. One of my teammates helped a company save its knowledge management system from failure. We used three theories from the scientific literature: knowledge validation theory, attribution theory, and persuasion theory. Not only is the company reaping the benefit of its multi-million dollar

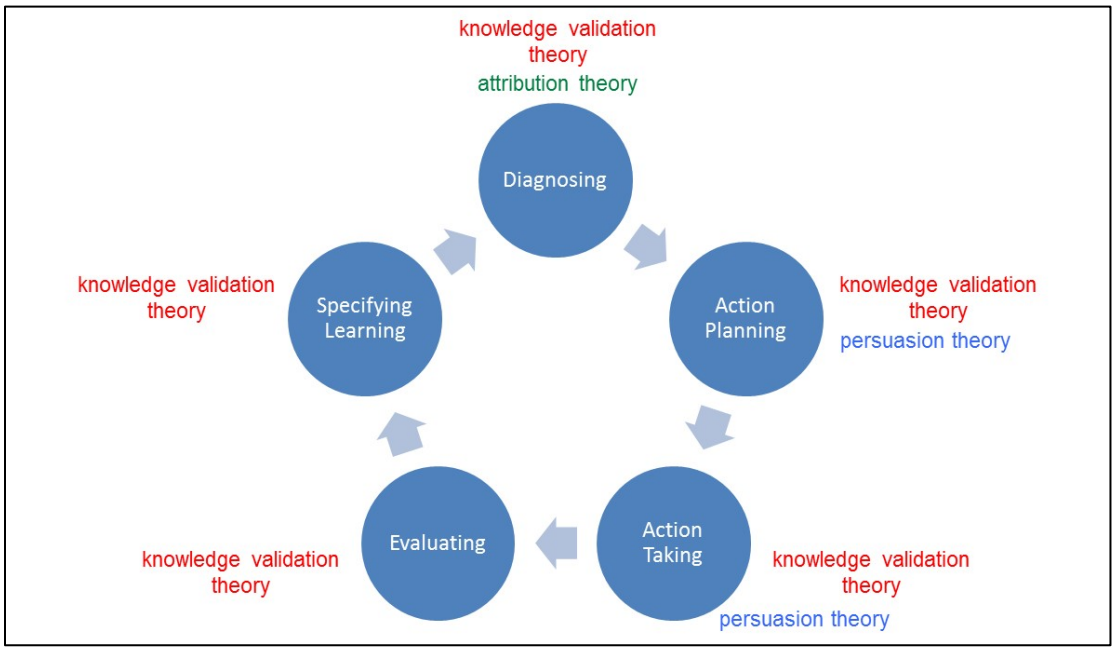

Figure 3. Sample Action Research Project. Reproduced, with permission, from Durcikova, Lee, and Brown (2018, p. 258)

investment in the knowledge management system, but my two teammates and I succeeded in publishing the research results in *MIS Quarterly* (Durcikova, Lee, and Brown, 2018).

Methodologies for action research have been well worked out in the social sciences and are well known among IS researchers. Action research involves five stages: diagnosing, action planning, action taking, evaluating, and specifying learning.

And because of the down-to-earth, field-based, realistic nature of action research, it is possible to derive lessons that could also be taught in the classroom.

4.3 Research Journals Modeled on Law Reviews

For a third possible solution, let's look to law schools to provide a model. In particular, I am talking about what they call "law reviews," journals for which *students themselves* are the editors. I am proposing that, in business schools, as is already the case in law schools, it would be graduate students – the ones with the highest grades, who get to be the editors. Articles are written, and read, by practitioners *and* professors. The presence of the best M.B.A. and M.S. students as the editors would be decisive in making sure that the published research is relevant to IS education.

5. THREE LONG-TERM STRATEGIES

What long-term strategies might help implement the potential solutions?

First, I recommend mobilizing an outside agency, like the Ford Foundation or the Carnegie Corporation. Why? It worked before. In fact, it put us on the path that we are on today. Another reason is that I believe a jolt from the outside is needed. With just universities in charge, the gap between IS education and IS research – or more generally, the gap between business education and business research – has only been lingering and not getting better. A change agent from the outside would help and is needed.

Second, and related to the first long-term strategy, is this: real change requires big money, so there is the need for a great deal of funding.

Remember, we can credit or blame the Ford Foundation for putting business schools on the wrong path in the first place, and the Ford Foundation did it with $35 million, where $35 million in 1960 would be worth $299 million today. And if we also account for the fact that the U.S. population is over 80% greater today than in 1960, then this would mean that over $538 million would be needed to equal the impact of the Ford Foundation's contribution in 1960. A goal of $538 million requires that there be an organized effort behind it. What might a starting point for this be?

This takes us to the third long-term strategy. The Association to Advance Collegiate Schools of Business (AACSB), our accreditation body, would need to be involved in any effort to change business school education and business school research. The AACSB is either aware, or should be made aware, of the situation where business school research is overly rigorous to the point of being irrelevant. The AACSB revisits accredited business schools every five years for the purpose of reaccreditation. The AACSB wields considerable power because no business school wants to lose accreditation. It would be useful for the AACSB to hear some specific suggestions, such as business schools needing to run their own business, business schools sponsoring action research, and business schools starting business reviews similar to law reviews. It is difficult to envision a fundamental change in business schools occurring without the AACSB in a leadership role.

6. CONCLUSION

The problem is not a pretty one. There is little correspondence at all between what IS professors teach in the professional curriculum and on what IS professors do research.

The causes are deep-seated. It is not a matter of blaming any individuals with bad attitudes. There are no villains. We are all caught up in a system where, right now, each person is just doing his or her job. It is a matter of a problem embedded in structural, historical forces.

The solutions are not easy. How many business schools are already equipped to run their own business, to learn how to do action research, or to start their own scholarly business review? And where will the funding come from to implement these changes, including refocusing how we do our research?

Bridging the gap between IS education and IS research will not be easily or readily achieved. However, until the gap is bridged, it will remain an uncomfortable reminder of the larger problem of the lack of relevance of our overly rigorous research in the IS discipline.

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Allen S. Lee is professor emeritus of information systems at Virginia Commonwealth University. He served as associate dean at both VCU and McGill University, as editor-in-chief of *MIS Quarterly*, and as a founding senior editor of *MIS Quarterly Executive*. His research program over more than three decades has involved identifying basic lessons from the philosophy and history of science and extending them, in the information systems discipline, to show not only how qualitative research can be done rigorously, but also how quantitative research equally needs to live up to the requirements of science. He is a Fellow of the Association for Information Systems, a member of the Circle of Compadres of the Information Systems Doctoral Students Association (ISDSA) of the KPMG Ph.D. Project, and a founder of Chinese American Professors of Information Systems. In 2015, he received the LEO Award for "lifetime exceptional achievement in information systems" from the Association for Information Systems

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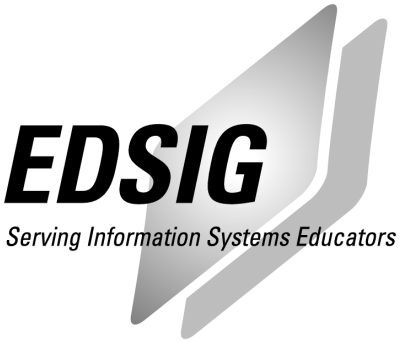

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