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# Courting Multidisciplinary Illiteracy

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# Courting Multidisciplinary Illiteracy

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## **ABSTRACT (REQUIRED)**

This study examines the possibility that our undergraduates may become multidisciplinary illiterates as a result of the increasing breadth of content introduced into the IS field. An analysis of the top IS journals finds IS education isolated and detached from its research. Without a clear body of knowledge built within a succinct codified framework for students, the IS field will continue to struggle in recruiting new members into the field. The multidisciplinary nature of the content exacerbates the situation as students graduate as generalists instead of specialists. The scholarship of teaching and learning (SoTL) is proposed as an approach that will help shift the focus towards more integrated efforts in IS education.

## **Keywords (Required)**

Philosophy of IS education, multidisciplinary illiteracy, scholarship of teaching and learning (SoTL), curriculum development, codification of knowledge

## **INTRODUCTION**

If there is one area that is often taken for granted in the IS field, it will have to be IS education. This study analyzes how the IS field has by and large, ignored the teaching and learning of its body of knowledge and proposes how the field ought to chart the future of its education. A review of the IS curriculum suggests that IS education is dominated by the body of knowledge not of its own. If this state of affairs continues the field risks producing graduates who are multidisciplinary illiterates, graduates who are neither experts in computing nor are they competent managers. This study proposes that the field examines a broader conception of education embodied in the new scholarship of teaching and learning (SOTL).

## **IS EDUCATION IN THE PAST**

Although calls for a serious reexamination of the philosophy and approaches in IS education were made in the past, no serious efforts were ever undertaken, at least not among senior authors and the top IS journals. It is not that IS scholars consider IS education unimportant. Trauth et al (1993) highlighted the glaring mismatch between IS curricula and business needs and in a highly-cited *MIS Quarterly* Special Issue on Curricula and Pedagogy, Lee et al. (1995) proposed a revamp of the IS curriculum at the time to correct such this mismatch. Lee et al. (1995) emphasized the need for the IS curriculum to cover both the breadth and depth required by business managers and to avoid trying to fit a generic curriculum for all needs. Two other articles in the same issue were also highly-cited (Alavi, Wheeler, & Valacich, 1995; Leidner & Jarvenpaa, 1995); unfortunately, the top six IS journals (Association for Information Systems, 2007) were not among those studies citing these articles. It is not surprising that nearly 15 years later, the mismatch between teaching and practice appears unresolved. Stable concepts for teaching IS are by and large still missing and what little concepts we have are problematic and not well grounded in theories from academic research (Dhar & Sundararajan, 2007). IS education continues to struggle between technical and managerial content, and finds it extremely difficult to do justice to both within the restrictions of curriculum (Plice & Reinig, 2007). All of these problems persist despite the many efforts of the curriculum task force to find a better fit (Couger et al., 1995; Davis, Gorgone, Couger, Feinstein, & Herbert E. Longenecker, 1996; Gorgone et al., 1994; Gorgone et al., 2003).

The problems with IS education go far beyond the choice of subjects for a curriculum. They can be traced back to foundations of the IS field:

## **Conceptual Development of the IS Field**

Basic teaching and learning begins with knowing what to teach (Palomba & Banta, 1999). That is why the latest Association to Advance Collegiate Schools of Business (AACSB) accreditation standards demand that not only should the learning outcomes be known and measured, but that the institution applying for accreditation should formulate specific learning goals and administer direct assessments of learning to continuously improve their curricula (AACSB, 2004). For a field that cannot

agree on its core theories (King & Lyytinen, 2004; Lyytinen & King, 2004; Weber, 2006) or its own identity (Gray, 2003), identifying what to teach undergraduate and graduate students is not a trivial task (Dhar, Alavi, Carr, Frank, & Gurbaxani, 2006). In 2002, references to IS and IT were left out from the AACSB draft accreditation standards due in part to this lack of clarity in learning outcomes (Ives, Valacich, Watson, & Zmud, 2002). Weaknesses in the conceptual development of the field are felt especially in the introductory IS courses where instructors struggle to decide which content suitably represent the best introduction to the IS field (Hassan & Becker, 2007; Kroenke, 1988). The introductory courses are the channel by which academic disciplines communicate their core knowledge. Kuhn (1970, p. 10) notes that it is in the introductory textbooks is where a field is able to “expound the body of accepted theory, [and] illustrate many or all of its successful applications.” Without that “body of accepted theory” teaching and learning becomes nearly impossible without borrowing from other fields. For example, a major portion of the body of knowledge for systems development is borrowed from computer science. Borrowed content per se is not the problem. For instance, an IS student is capable of understanding function point analysis, which originates from computer science, as a means of estimating software projects. The problem lies with the framework from which this content originates. How does function point analysis reconcile with adoption and implementation issues? Students of IS may get confused as to what constitutes ideal practice in IS, not to mention the difficulty they face in critically appraising such content.

### **Codification of Knowledge**

Related to conceptual formation, philosopher Stephen Toulmin (1972) propose that such a process results in a “repertory of concepts and explanatory procedures.” Zuckerman and Merton (1973) call such structures the “codification of scientific knowledge” (p. 506) and define codification as “the consolidation of empirical knowledge into succinct and interdependent theoretical formulation” (p. 507). Such a level of codification not only contributes to the cognitive legitimacy of the discipline, but also explains how the field recruits its members. Highly codified fields such as physics and chemistry facilitate the mastery of their field by linking basic ideas in a framework and reducing the volume of information required making such information easily taught by the new apprentice. For these mature fields, delegating the task of communicating such standard repertory of concepts to PhD students to teach undergraduates becomes a trivial matter. Such is not the case with IS.

David Kroenke (1988) describes the experience of many doctoral students attempting to engage the introductory class with un-codified content:

How long does it take to know how it’s going? Five minutes? Three? Ten? Who knows, but sometime in that range it becomes clear: “They’re with me. Ah, whew.” Or, “What’s going on? They look confused. No, God forbid, they look bored. Bored? Bored?? In my class??? Oh, no. Now what? Maybe an overhead? Hmmm. This stuff is interesting, how could they be bored? Good heavens—how does that young lady yawn and blow bubbles at the same time? This just isn’t working. Shall I stop?? Tough it out? Jam it down their throats? Threaten with the exam?? Ugh.” (p. 2)

### **Multidisciplinary Nature of the IS field**

The multidisciplinary nature of the IS field adds a considerable amount of burden on both the teacher and the student. Because the IS field borrows from as many as three to six different fields of knowledge (Culnan, 1986; Davis & Olson, 1985; Galliers, 2003), the choice of which contributing field takes control of the educational process creates yet another dilemma. The IS field is not the lone field suffering from this dilemma. Other multidisciplinary fields that have yet to coalesce into an integrated whole also face similar issues. If not handled properly, students of these multidisciplinary fields can fall into what Swedish social scientist Torsten Husén (1991) calls “multidisciplinary illiteracy,” a situation where undergraduate students of the field holds only superficial knowledge of the field’s contributing fields and are unable to perform well either in their careers or in graduate schools. If the undergraduate program lack the necessary depth, IS students will graduate as weak “generalists” instead of “specialists.”

Another multidisciplinary field, environmental studies, has at least admitting that their students are becoming multidisciplinary illiterates because of the vast breadth of subjects that are being borrowed from other fields and taught wholesale to their undergraduates (Soulé & Press, 1998). One observer describes it as sending their students out into the world brandishing “the blunted lance of the well-rounded” (Nash, 1977).

### **CHARTING THE FUTURE OF IS EDUCATION**

Other than the conceptual formation issues besetting the field, the issue of faculty time exacerbates the problem. The current reward system favors research. Professors receive little incentive to invest in improving the quality of teaching.

Consequently, students are herded into 100-200 seat classrooms to listen to PhD students render their version of IS. With time pressures, dissertations to be defended and other commitments, these PhD students often resort to textbooks written with pretty pictures that hide their lack of content. If the future of IS is to be preserved, IS education cannot continue on this self-destructive path. Because the issues at stake are more profound than what pedagogical strategies are capable of addressing, the IS field needs to seriously find a solution.

Higher education in the US started out in the late 18<sup>th</sup> century for the sake of education not for research—teaching in all of its variety. As the premier universities began offering PhD programs in the mid 19<sup>th</sup> century, the advancement of knowledge through research as opposed to through teaching took root in higher education. Hence began the unlikely split in expectations—young faculty were hired as teachers but were evaluated and expected to function as researchers (Caplow & McGee, 1958). The first President of the Carnegie Foundation, Ernest Boyer (1990) realized that such a schizophrenic situation could only jeopardize the future of education and wrote about the need to integrate research with teaching in his classic monograph “Scholarship Reconsidered: Priorities of the Professoriate.” In this monograph he broadens the concept of scholarship and adds to the traditional perspective several dimensions of what is currently known as the Scholarship of Teaching and Learning (SOTL). For the IS field, his advice is particularly poignant because of the gap that exists between IS theory and practice. His perspective for the integration of the discipline offers several advantages, several of which will be considered in this paper.

### **Scholarship of Discovery**

The first element of SOTL Boyer calls the scholarship of discovery, which refers to the freedom to discover knowledge wherever it may lead. For the allied computing fields in general, original research has always been a challenge. Richard Hamming (1969, p. 10), a Turing Award winner warned the computer science field of the dangers of duplication in research:

Indeed, one of my major complaints about the computer field is that whereas Newton could say, 'If I have seen a little farther than others, it is because I have stood on the shoulders of giants,' I am forced to say, 'Today we stand on each other's feet.' Perhaps the central problem we face in all of computer science is how we are to get to the situation where we build on top of the work of others rather than redoing so much of it in a trivially different way. Science is supposed to be cumulative, not almost endless duplication of the same kind of things.

Within the context of the IS field, the scholarship of discovery demands that all of us step back from our research to look for connections, to build bridges between theory and practice and to communicate our discoveries, and more importantly to engage in original research. We should refrain from merely borrowing from our parent disciplines and advance towards discovering and inventing our own concepts. The scholarship of discovery addresses this first foundational step in the conceptual formation of our field. As new concepts are studied, they may or may not mature into core elements of our body of knowledge, but when they do, they become the elements that can be convincingly taught to our students.

Recommendation#1: Focus on discovering endogenous IS concepts that clearly represents the IS body of knowledge for the purpose of instruction\

Curriculum Recommendation#1: All curriculum content should be based on stable and generally-agreed IS research content

### **Scholarship of Integration**

The scholarship of integration has to do with interdisciplinary boundary work that connects one discipline to another and build bridges across disciplines. For the IS field, the keyword here is “boundary.” Integration is closely related to discovery because how can we share with others what we have not discovered? Among the difficulties we have had in the past with regard to IS education is our habit of teaching the content of other fields to our students (e.g. teaching software engineering from computer science instead of IS development). No integration is forthcoming unless we have something of value that we can share with other fields. Boundary work involves interpreting and fitting one’s own research into a larger intellectual pattern in order to achieve a greater and more profound understanding, not merely researching content from other fields within our own field.

An example of such a dilemma for boundary work in IS can be demonstrated by the interdisciplinary area of educational technology. The field of education has made leaps and bounds in the area of the use of information technology for education. The IS field claims to have expertise in the use of information technology. Which areas of study belong to education, and which one belongs to IS? What valuable findings do we have concerning the use of technology in education that we can offer that they have not already discovered? What manner of transdisciplinary work is possible for two teams to collaborate

on, one from the education field and another from IS? These are just a few of the questions that need to be answered before we can claim to have any scholarship of integration.

Recommendation#2: Clearly identify our field's contributions to and shared boundaries with other disciplines

Curriculum Recommendation#2: Link pedagogical areas within IS with pedagogical areas of other fields

### Scholarship of Application

This category of scholarship is one that the IS field has been struggling since its inception (Kaplan, Truex III, Wastell, Wood-Harper, & DeGross, 2004; Moody, 2000; Senn, 1998). The scholarship of application finds no such gap between the special fields of knowledge one owns with his professional activity within the larger community. Teaching itself is a praxical activity. Because of the human element inherent in our field, the scholarship of application carries with it a more profound implication. The computer science field is capable of producing the most powerful computer on earth. But its application depends on a successful integration of technology and human factors, expertise that lies in the hands of the IS specialist. Because of the very nature of application, new intellectual understandings can arise from the very act of application itself. In such activities, there are no gaps between theory and practice, no separation between concept and application. This same principle was emphasized over a hundred years ago by Sir Thomas Huxley (1881, p. 155):

I often wish this phrase, "applied science," had never been invented. For it suggests that there is a sort of scientific knowledge of direct practical use, which can be studied apart from another sort of scientific knowledge, which is of no practical utility, and which is termed "pure science." But there is no more complete fallacy than this.

Evidence from other mature disciplines has shown that in reality there is no separation between theory and practice. The synthetic-dye industry in the 19<sup>th</sup> century that became the precursor to modern chemistry originated from the intermingling of science and technological crafts of the 18<sup>th</sup> century (Klein, 2000). Quantitative bibliometric analysis of scientific sources used in patents show that there is no direct linkage between the scientific sources cited and the patent published. In other words, theory does not necessarily push technology (Meyer, 2000), but is instead inextricably linked with it (Narin & Noma, 1985). Even earlier discoveries are not necessarily the result of theory or pure science. The windmills that made possible changes in agriculture came from India and Iran, not from any theoretical contemplation. The arches that took higher support functions in buildings and became the standard for architecture came from Middle East architecture. Leonardo da Vinci's incredible (and essentially unscientific) designs of machines for warfare, flying and submarine purposes were not based on any pure science research. In many instances, practice preceded science.

Recommendation#3: Clearly identify application knowledge with potential for generating theory

Curriculum Recommendation#3: Expand existing areas within the curriculum which address IS as a profession and introduce an IS-based certification program

### Scholarship of Teaching

In higher education today including the IS field, teaching is often viewed as a routine function capable of being performed by almost anyone. Faculty are hired and thrown into classrooms to teach without as much as a certificate, even though the same cannot be done in the case of K-12 without at least a two-year training certification. As Boyer (1990) writes, "As a scholarly enterprise, teaching begins with what the teacher knows. Those who teach must, above all, be well informed and steeped in the knowledge of their fields...inspired teaching keeps the flame of scholarship alive" (p. 23-24). Scholarship of teaching means not just communicating ideas to students, but also transforming, learning and extending, and ultimately synthesizing practice and research. But how does this differ from pedagogical strategies or "teaching tips?" Perhaps here lies one major flaw in the past with IS education. Not only do we find little interest from major journals in IS focusing on the scholarship of teaching, the few journals that do publish studies on IS education publish mostly "teaching tips" and not research on IS education. The focus of journals in other fields writing about their education is somewhat different. For example, two of the most cited articles (Adsett, 1968; Asken & Raham, 1983) in the *Journal of Medical Education* are not about how to apply techniques in the classroom when teaching medicine, but on student issues such as sleep deprivation and other psychological problems faced by medical students undergoing the grueling educational process of medical education. In the case of the *Journal of Economic Education*, the focus of their studies revolves around designing an instructional environment that best fit the nature of economic content to improve student outcomes as they relate to

theoretical model building (Becker, 1983a, 1983b). In other words, what is lacking with IS education is the *research* in IS education.

Recommendation#4: Introduce a new IS education journal that publishes research on IS education philosophy, theory and approaches

Curriculum Recommendation#4: Continuously update curriculum based on theory-based research in IS education

## CONCLUSION

Besides seriously engaging the issues surrounding teaching and learning, the IS field can take some practical steps towards stemming multidisciplinary illiteracy. First, work towards a stable conceptual foundation of the field should begin as soon as possible. The concept of a stable body of knowledge (BoK) needs to be examined seriously and tested not only in academic environments but also in practice. Second, boundaries need to be erected to define the field clearly to our students so that they recognize who they are professionally and what they do (and, of course, for others to recognize them). Finally, the IS field can start building disciplinary depth by imposing requirements in addition to specified coursework. This means the curriculum should involve mastery of certain content such that the student can be considered proficient within the area of the contributing field. This level of competency represents the boundaries surrounding the discipline such that students need to fulfill the conditions of considerable prior technical training before they can be considered a member of the field.

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