

2008

# Minding the IS Soft Skills Gap: Evidence of Discourse Convergence and Organizational Field Structure

Muhammad Adeel Zaffar

*University of North Carolina at Charlotte, mazaffar@uncc.edu*

Susan J. Winter

*Portland State University, sjwinter@pdx.edu*

Follow this and additional works at: <http://aisel.aisnet.org/icis2008>

## Recommended Citation

Zaffar, Muhammad Adeel and Winter, Susan J., "Minding the IS Soft Skills Gap: Evidence of Discourse Convergence and Organizational Field Structure" (2008). *ICIS 2008 Proceedings*. 69.

<http://aisel.aisnet.org/icis2008/69>

This material is brought to you by the International Conference on Information Systems (ICIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ICIS 2008 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact [elibrary@aisnet.org](mailto:elibrary@aisnet.org).

# MINDING THE IS SOFT SKILLS GAP: EVIDENCE OF DISCOURSE CONVERGENCE AND ORGANIZATIONAL FIELD STRUCTURE

*Prêter attention au différentiel de savoir-être en SI : éléments sur la convergence de discours et sur la structure du champ organisationnel*

*Completed Research Paper*

**Muhammad Adeel Zaffar**

University of North Carolina at Charlotte  
9201 University City Blvd, Charlotte NC,  
28223, USA  
mazaffar@uncc.edu

**Susan J. Winter**

Portland State University  
615 SW Harrison St.  
Portland, OR 97201  
sjwinter@pdx.edu

## **Abstract**

*IS continually struggles with the 'gap' between academic preparation and industry needs. To close this gap, we need to better understand its causes. Recent IS research suggests that gaps may arise when issues receive attention in only practitioner or academic discourses. Institutionalism suggests that gaps can be attributed to the structure of the organizational field. We conduct two studies to investigate these rival explanations. In Study 1 we analyze the practitioner and academic discourses on the need for soft skills in IS. In Study 2 we identify important actors in the IS field and the degree to which they are tightly coupled as evidenced by linkages in their discourses. We then present a process model of the identification, development and assessment of requisite IS skills. We conclude that convergence between academic and practitioner discourses alone cannot close the gap between preparation and industry needs in a loosely coupled organizational field.*

**Keywords:** IS skills, soft skills, process-based model, institutions

## Résumé

*La recherche en SI a continuellement identifié un écart entre les avancées académiques et les attentes des acteurs de terrain dans le domaine des savoir-être. Dans ce papier, nous explorons deux explications rivales à ce fossé : (a) est-ce un désaccord entre les discours universitaires et praticiens sur l'importance des savoir-être qui est à l'origine de ce fossé ? ou (b) est-ce que les SI sont un champ organisationnel faiblement couplé qui empêche les universitaires de répondre aux requêtes des acteurs de terrain ?*

## Introduction

Responsiveness to the needs of employers is a particularly important issue for applied professional programs such as Accounting, Engineering and IS because they emphasize the preparation of graduates for employment in a specific area (Nellen, 2003; O'Neil et al., 1999; Tan and Veal, 2005). IS programs were originally created to fill a need for workers with a mix of soft and technical skills. Since then, the IS literature has repeatedly identified gaps between employees' skills and employer needs and called for them to be filled (e.g. Trauth et al., 1993). Among these gaps has been a persistent need for workers with better soft skills (such as interpersonal skills, presentation skills, contract negotiation and management). Despite the evolving nature of the IS area, our review of the literature from the past four decades reveals that this call for a greater emphasis on soft skills is not new, but industry has never been satisfied with the level of preparation IS graduates have in this area (Israel, 1990; Ives, 1981; Ives and Rubin, 1993; Jenkins and Johnson, 1977; Leitheiser, 1992; Miller and Luse, 2004). Recent growth in the outsourcing of technical work has been associated with renewed calls for a greater emphasis on soft skills for IS professionals for contract negotiation and management (Ferguson 2004; Ferguson, 2005; Hirschheim et al., 2005). To close this gap, we must understand its causes. We explore possible explanations for the persistent gap between graduates' skills preparation and industry needs. Using soft skills as an exemplar, the paper explores two alternative explanations: fragmented discourses and the institutionalized structure of the IS organizational field.

Ramiller and colleagues suggested that the ecology of research markets can explain persistent sub-optimal academic research agendas (Ramiller et al., 2008). They argued that the degree of overlap in the academic and practitioner discourses and the order in which these communities focus on issues results in a lack of mutual awareness and unresponsiveness to industry needs. To assess this potential explanation for the gap, we determine if there is convergence between academic and practitioner discourses on soft skills. In contrast, neo-institutional theory suggests that responsiveness is a function of the larger organizational field within which IS programs and IS employers are embedded, (McAdam and Scott, 2005). This potential explanation points toward identifying the components of the organizational field involved in skills development, the knowledge flows within and across these components and the degree to which they are tightly linked. Identifying knowledge flows that could link these components more tightly delineates a research agenda that could enhance IS programs' responsiveness.

Thus, our question is whether the persistent gap between IS graduates' preparation and industry needs is explained by divergence between academic and industry discourses or by the structure of the organizational field. Table 1 presents a summary of two studies conducted to answer this question. Study 1 reviews Ramiller et al.'s (2008) work on overlapping discourses and uses their framework to determine the degree of convergence between the academic and practitioner discourses on the need for IS graduates with soft skills. Study 2 describes the concept of fields and the literature on institutionalism and organizational change and then presents three phases of investigation. In the first phase four major components of the organizational field that are involved in the development and instantiation of IS skills are identified: theory-based recommendations, curricula recommendations, instantiated curricula and skills assessment. In the second phase, empirical evidence of the knowledge flows between these components is assessed to discover how much is known about how they interact to shape the development of skilled IS personnel. In the third phase, we propose a process model of how the components could interact and connect with each other for more responsiveness to industry needs, providing a framework for future research. We then discuss whether the IS skills gap reflects unresponsiveness to industry requirements due to fragmented discourses, or to loose coupling among components of the organizational field.

## Data Source

Both studies analyzed the IS literature on soft skills published between 1970 and 2008. IS curriculum and skills related papers were located by searching four major electronic databases (JSTOR, Business Source Premier, ACM

	<b>Study One</b>	<b>Study Two</b>
Purpose	Fragmented Discourses Explanation	Institutionalized structure of the IS Organizational Field Explanation
Research Questions	Is there convergence between academic and practitioner discourses on soft skills?	Phase 1: What are the components of the organizational field that are involved in IS skills development? Phase 2: What are the knowledge flows, within and across these components and are they tightly linked? Phase 3: What knowledge flows could link these components more tightly?
Theoretical Foundation	Discourse analysis	Neo-institutional theory
Data: Source is Published IS Literature	Focus is academic or industry Stated relative importance of soft skills, technical skills and other skills	Phase 1: Themes related to development of soft skills Phase 2: a) Stated hypotheses tested b) Authorship of articles c) Reference lists of articles Phase 3: Actors, temporal order and mechanisms linking components
Analysis	Comparison of importance of soft skills in industry and academic discourses	Phase 1: Identification of 4 components Phase 2: Knowledge flows between components a) Stated tests of relationships b) Overlapping authorship between articles in each component c) Overlapping reference lists between articles in each component Phase 3: Potential knowledge flows between components a) Temporal order of components b) Causal mechanisms linking components
Results	There is shared understanding among academics and practitioners about the importance of soft skills. The discourses fall in the Ecotone of Ramiller et al's framework.	Phase 1: Components involved in IS skills development a) Theory-based recommendations b) Curricula recommendations c) Instantiated curricula d) Skills assessment Phase 2: Little overlap in authorship or reference lists: loosely coupled institutional field inhibits responsiveness to industry needs Phase 3: Increased knowledge flows and better linking

		mechanisms within and across the components could create a more tightly coupled organizational field and therefore increase responsiveness to industry needs
--	--	--

Digital Library Core Package and MetaPress) using various combinations of relevant keywords (requisite IS skills, soft skills, technical skills, curricula recommendations etc.). Articles whose content was not relevant to requisite IS skills were excluded. Relevance was decided based on the following criteria:

- discussed fully or in part the topic of requisite IS skills either from the perspective of industry or academia. This included everything from surveys of employees, practitioners, or academics on required skills to a commentary on the state of the current or predicted skill set for IS workers.
- main objective was to discuss IS skills. We excluded those that only noted how IS skills could be affected by the research study in the conclusions section while presenting ‘implications for practitioners’.
- was the ‘final’ version of a series of reports on a particular issue. Often, when curriculum guidelines were developed by a group of researchers on behalf of AIS or an accreditation board, the preliminary findings or results of these committees would appear in conferences throughout the development process. We included only the final report (published in a journal) of the formal set of guidelines proposed by that committee. The authorship of the interim and final publications was matched to ensure that duplicate efforts were removed from the analysis.

Reference lists from these papers were scrutinized to identify additional sources (see the extended reference list for the 73 papers).

## **Study 1 – Convergence of Practitioner and Academic Discourses on Soft Skills**

### ***Theoretical Foundation***

This study determines whether there is divergence between academic and practitioner discourses on soft skills that can explain the soft skills gap in the IS field. Ramiller et al. (2008) proposed an ecology of research directions in IS and presented a framework that showed three distinct streams of discourses created as a result of interactions between academics and industry. Topics in academic discourses that are not shared by practitioner discourses are considered “esoteric” and topics in practitioner discourses that are not discussed in academic research are considered “excluded”. In these cases, the academic and industry discourses are fragmented and an issue may be recognized and seen as important only by one group and not the other. Under such conditions, the response to industry needs would be inadequate. However, some topics receive attention in both academic and practitioner outlets. These fall into what is referred to as the “Ecotone or zone of mutual discursive interaction”. Such research can converge allowing for both groups to recognize and accept the urgency of the issue and develop a satisfactory response.

### ***Data***

To determine the extent to which the academic and practitioner discourses on soft skills have converged and hybridized Ramiller et al., (2008) argue that “the degree of cross-referencing (or borrowing) of themes, ideas, and language across the corresponding ‘literatures’” be measured. Of the 73 IS skills papers identified, only 66 assessed the importance of various sets of skills and were retained for this analysis.

### ***Analysis***

Our objective was not to duplicate previous taxonomies of requisite skills, but to assess the two discourses to identify whether soft skills and technical skills were treated similarly by both. Through thematic analysis, the papers were categorized on the basis of skills discussed and whether the paper had an industry or academic focus. Papers that conducted empirical studies with managers or that were authored by business professionals were placed under the ‘Industry’ category and made up the industry discourse; otherwise, the paper was placed in the ‘Academic’

category and formed the academic discourse. Papers that involved both academicians and practitioners were grouped in the 'Academic and Industry' group and represent overlapping academic and practitioner discourses (see Table 2). Three categories of skills were discussed: soft skills including (oral and written) communication, interpersonal skills, teamwork, management; technical skills including hardware/software, design and development, systems analysis; and other skills including business ethics, organizational knowledge, business functional knowledge, which were outside the scope of the current analysis and are omitted.

## ***Results***

All papers showed similarity in their terminology and themes, suggesting that the discourses have hybridized. Only 9 of the 66 papers (14%) concluded that technical skills were the most important, and eight of these were at least 13 years old, representing an older stream of the discourse on skills. In contrast, almost 86% concluded that soft skills were at least as important as technical skills, if not more so. Although 61% of these 57 papers were categorized as solely representing industry, about 39% were either academic or included both academic and industry perspectives.

Thus, research on soft skills falls within the ecotone of discourse shared among academics and practitioners (Ramiller et al., 2008). However, the calls for more emphasis on soft skills continue. It appears that shared discourse is a necessary, but not sufficient condition for responsiveness to the needs of industry. An alternative explanation of this persisting gap lies in an understanding of the institutional structure of the IS organizational field. With this in mind, Study 2 explores the concept of an organizational field and responsiveness to change.

## **Study 2 – Institutionalization and the Organizational Field**

### ***Theoretical Foundation***

New Institutional Theory focuses on the field as an important unit of analysis in its role as the central arena of organizational action. A field is a system of related organizations who consider each other as they carry out their actions and may include suppliers, customers/consumers, regulatory agencies and potential competitors (DiMaggio and Powell, 1983; McAdam and Scott, 2005). Scott emphasizes organizational fields as communities of frequently interacting organizations that share a common meaning system and affect one another (Scott 1994). Furthermore, Scott states that one example of an organizational field could be an educational system 'comprising of a set of schools' and 'related organizations' (Scott, 2001). Hence we refer to the universities with IS programs, organizations hiring IS workers, publishers of IS texts and accreditation boards or affiliation groups generating and disseminating guidelines for IS programs as the IS organizational field (henceforth, the IS field).

Some researchers have argued that understanding organizational change requires a field-level approach (Davis and Marquis, 2005). According to DiMaggio and Powell 'the virtue of this unit of analysis is that it directs our attention ... to the totality of relevant actors (DiMaggio and Powell, 1983: p. 64-65). The actors involved in the IS field and their roles are: a) Academicians and researchers: these include teaching faculty, IS researchers, and developers of pedagogical material (i.e. curricula guidelines, university curricula, textbooks, etc.). They interact with each other through workshops, conferences, research publications and joint research ventures; b) Practitioners: they assess their hiring needs and form opinions about the distribution of desired skills among potential employees during the hiring process and about current employees. They know their firms' employment needs and the skill mix of their IS workers. Practitioners also provide feedback to University boards and are often included in studies regarding the needs of the industry; c) Accreditation boards and professional affiliation groups: these can be composed of a combination of these actors and evaluate and provide educational guidelines for IS workers.

Organizational fields influence and constrain organizations just as cultures influence and constrain individuals by providing a set of norms and meanings (Davis and Marquis, 2005). Furthermore, just like some cultures may be more adaptive, fields may be loosely or tightly structured and provide more or less freedom within their framework. It is easier to make changes more consistently and efficiently in tightly coupled fields in which the most influential actors and their responsibilities are known. Thus, although prone to inertia, once motivated, highly institutionalized fields are able to create a faster and more coordinated response to the demands of influential actors.

This brings us to the question of the structure and degree of institutionalization of the IS field. DiMaggio and Powell state that 'the structure of an organizational field cannot be determined a priori but must be defined on the basis of

empirical investigation' (DiMaggio and Powell, 1991) so we performed such an investigation. In the next section we explore the structure of the IS field in more detail through empirical investigation. We build a process model based on the way soft skills have been identified, instantiated and evaluated over the past four decades and present that as a reflection of the institutionalized process in the IS field. This description is followed by our understanding of how the process would play out for the identification, instantiation and evaluation of IS skills in a tightly coupled institutionalized field.

**Table 2. Academy and Industry discourses on importance of soft and technical skills for IS professionals**

Focus	Soft most important	Soft & technical equal	Technical most important
Academic	Jenkins & Johnson 1977	McLeod 1985; Longenecker & Feinstein 1991; Ives & Rubin 1993; Ross & Ruhleder 1993; Longenecker et al 1995 ; Cougar et al 1995 ; Gorgone et al 2000 ; Tang et al 2000	Igersheim & Swanson 1974; Adams & Song 1989; Gupta & Seeborg 1989
Industry	Henry et al 1973; Werner 1979; Benbasat et al 1980; Ives & Olson 1981; Albin and Otto 1987; Israel 1990; Cheney et al 1990; Leitheiser 1992; Jiang et al 1994; Lee et al 1995; Richards et al 1998; Weber et al 2001; Turner & Lowry 2002; Miller & Luse 2004; Navarro 2004; Ferguson 2004; Ferguson 2005; Goles et al 2008	Cheney & Lyons 1980; Green 1989; Watson et al 1990; Applegate and Elam 1992; Davis 1995; Feeny & Willcocks 1998; Cappel 2001; Kwak 2001; Woratschek & Lenox 2002; Abraham et al 2006; Lee and Lee 2006; Willcocks & Feeny 2006; Zwiag et al 2006; Loebbecke et al 2007; McGee 2006; 2007; Lee and Han 2008	Vitalari 1985; Nelson 1991; Athey et al 1995; Todd et al 1995; Prabhakar et al 2005
Academic & Industry	Nunamaker et al 1982; Trent et al 1988; Turner & Lowry 2003; Fulbright & Routh 2004	Ashenhurst 1972; Couger 1973; Trauth et al 1993; Hingorani & Sankar 1995; Davis et al 1997; Sumner 2001; Chrysler & Auken 2002; Gorgone et al 2002; 2006	Farwell & Kuramoto 1992

### *Phase 1 - The Components Involved in Developing IS Skills*

#### **Research Question and Data**

The research question addressed in phase 1 is, What are the components involved in the skills development at the level of the organizational field? A total of 72 out of 73 papers previously identified in the Data Source section were used. One of the papers (Litecky et al, 2004) was excluded from this phase since it developed a model for using both technical and soft skills in the IS hiring process and could not be categorized into one of the 4 components.

#### **Analysis**

Relevant papers were reviewed for similarities in thematic coherence, methodology, and conclusions. Each author read the papers and did a preliminary identification of themes. Alternative categorization schemes were considered for their explanatory value. The authors then compared categorization schemes, identifying the contributions to understanding made by each.

## Results

The analysis revealed that researchers have favored a more descriptive research methodology which was used primarily to identify required skills based on the theoretical bases or feedback from practitioners and academicians. Generally, they concluded that in the future more emphasis would be placed on 1) soft skills such as interpersonal/management skills, 2) technology management knowledge and 3) 'other skills' such as business functional knowledge. There was also broad agreement that IS jobs in industrialized countries would require less technical knowledge (Lee et al., 1995).

Ultimately, four explanatory themes were identified: theory-based recommendations, curricula recommendations, instantiated curricula, and skills assessment. A later perusal of curricula development and instantiation studies in other areas found similar categories in use, providing evidence of external validity for our categorization. For example, literature on medical education redesign discusses the need for theory-based curriculum development in surgical residency and health education (DaRosa and Bell, 2004; Nagy, 2002).

Theory-based recommendations – Papers categorized here were those that recommended inclusion of sets of skills based on a high level analysis of the nature of the job and its requirements. For example, Jenkins and Johnson (1977) argued that since communication skills are important for information analysts, communication theory should be used to elucidate the nature of these skills. Based on communication theory, then, this skill set would include the ability to exchange and elicit information from the end user using verbal and nonverbal means such as body language and should include a well-developed understanding of other contextual factors.

Similar theory-based recommendations could be made regarding the skill dimensions for such areas as systems thinking, leadership, worker motivation, etc. These dimensions could then be mapped to job families within the IS field showing which skill sets are relevant for each type of IS job, based on existing academic theory.

Curricula recommendations – papers within this category were mostly formal guidelines containing skills recommended by recognized research committees and accreditation boards (see, for example, Gorgone et al., 2006). The curriculum guidelines were presented with the aim of imparting skills, knowledge and values to IS workers such as core IS management and technology knowledge, communication, interpersonal and team skills etc. For example, the IS 2002 guidelines for undergraduate IS curriculum state that the graduate's skill set should draw from the following broad areas of knowledge: business fundamentals; interpersonal, communication and team skills; technology; analytical and critical thinking (Gorgone et al., 2006). Guidelines then identified a pool of potential sets of course content that could be included in a program, and discussed how each of these courses could help in developing the required set of skills. Usually, guidelines were provided for the core areas within the field and for subsets of courses with varying emphases.

Instantiated curricula – papers within this category look at the set of skills actually imparted by IS schools and colleges. For example, Gupta and Seeborg (1989) conducted a survey of AACSB schools and colleges of business to find out about the content of and differences between their undergraduate and graduate MIS programs. Additional studies could investigate the nature of the teaching materials widely available from publishers in the form of textbooks and other sources.

Skills assessment – papers within this component were evaluations of the effectiveness of the skills held by potential or current IS employees as compared with the current requirements of the industry. For example, Lee et al., (1995) surveyed a group of IS managers, user managers and IS consultants about the skills and knowledge requirements of IS professionals. Some papers also investigated the anticipated future skills required. Most made a distinction between technical and non-technical skills, and called for more of the latter.

Table 3 shows the relevant papers and the categories to which they belong, based on our analysis of the literature. The earliest paper was published in 1972 and provided curricula recommendations for the nascent MIS field (Ashenhurst, 1972). The first skills assessment paper was published the following year (Couger, 1973). The majority of papers (55 of 72) were either assessing IS skills or providing theory-based recommendations, with approximately twice the number of papers in the former than in the latter category. Only 6 studies looked at instantiated curricula.

Table 3 also documents a decade-wise timeline of the papers to see how attention to these various categories has changed over time. Theoretical aspects of the IS worker's job has received attention in every decade with 2, 8, 4, and 5 papers appearing in the 70s, 80s, 90s and 00s respectively. Most of the research on theory-based recommendations was clustered in the 1980s, but there may be a resurgence of interest this decade if the current trend continues. Curricula based recommendations have appeared consistently throughout these decades. It is



important to note that curricular recommendations do not appear only once every 10 years. As new guidelines are being developed intermediate reports are presented in various conferences and workshops. However, to avoid duplication, we included only final reports published in major conferences or journals. In the case of skills assessment studies, it appears that interest has grown throughout the 1990s and the beginning of this decade. Surprisingly, across the entire timeline, very few publications examined what skills the Business schools and colleges have actually been imparting to IS graduates.

It is worthwhile to note that skill sets have sometimes been talked about in the context of different jobs within IS (Cheney and Lyons, 1980; Henry et al, 1973) as well as in a general context of the IS function (Ferguson, 2004; Ferguson, 2005). However, it was observed in these papers that the call for soft skills persisted whether the jobs under discussion were those of junior/senior level programmers, systems analysts or IS managers.

## ***Phase 2 – Knowledge Flows Among Categories***

### **Research Question and Data**

The research questions addressed in phase 2 are, “What are the knowledge flows within and across the components of the IS field that are involved in the development of IS skills?” and “Are components tightly linked?” Answering these questions shows how the process of IS skills development actually works in the IS field, which enhances our ability to systematically manage the mix between technical and soft skills among IS graduates. As in phase one, 72 papers were used in this phase.

### **Analysis**

The discourse on IS skills development was scrutinized for evidence of a flow of knowledge between the components. Such evidence was broadly and variously defined. The most stringent evidence would be the existence of articles that explicitly tested relationships among the categories. Less direct evidence would be overlapping authorship between articles in various categories. The most indirect evidence that the discourse in each of these components was informed by one another would be overlapping reference lists.

The articles were read and coded for evidence that a) they specifically tested the relationships among these categories b) there was overlapping authorship between articles in various categories c) articles in one category listed articles in another category in their references.

### **Results**

The discourse predominantly contains articles that describe the state of each of the 4 components. There were no empirical studies that tested the relationships between one category and another.

A second possible indication of a flow of knowledge between components would be articles that address different issues but share authors. The 72 publications were authored by 140 unique authors.

As shown in Figure 1, of the 72 publications 36 focused on skills assessment, 19 on theory-based recommendations, 11 on curricula recommendations, and 6 on instantiated curricula. Only 17 were authored by contributors that wrote in different categories; 9 papers had joint authors that published in the ‘Skills Assessment’ and ‘Theory-based Recommendations’ categories; 7 papers had joint authors that published in ‘Theory-based Recommendations’ and ‘Curricula Recommendations’; 4 papers had joint authors that published in ‘Instantiated Curricula’ and ‘Skills Assessment’. None of the authors contributed to literature belonging to more than two components. Furthermore, of the 140 authors, only 6 contributed to these joint publications which suggests very limited knowledge flows within and across the different components.

A third indication that papers in one discourse category were informed by those in another would be papers that shared references. As shown in Table 4, it appears that most of the papers in one category have not referenced work in another area; although the authors may be aware of it.

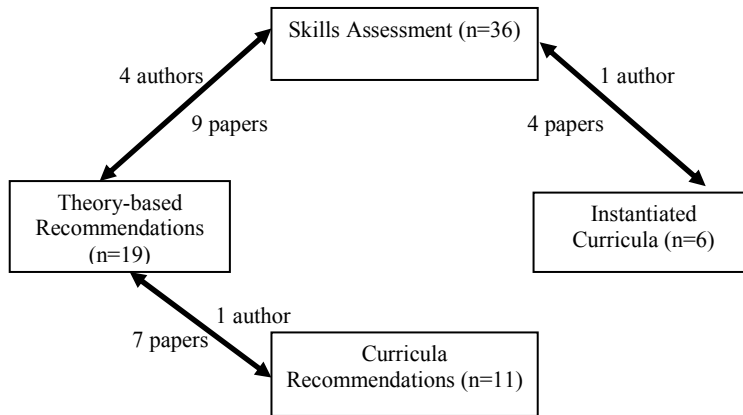
Reading from left to right, in the first cell, Vitalari (1985) and Willcocks and Feeny (2006) are theory-based recommendation papers that have each referenced one or more other theory-based recommendation papers.

Similarly, Benbasat et al. (1980) is a theory-based recommendation paper which has referenced one or more papers in the curricula recommendations category (hence it appears underneath the curricula recommendations column in the first row) and papers in the skills assessment category (hence it appears again underneath the skills assessment column in the first row). The letters in bold are the Figure 2 arrow labels showing these results graphically.

Although it appears that there is little influence across categories, it is important to note that authors may have been influenced by work that did not appear in their reference lists.

**Table 3: Papers categorized by component and decade of publication**

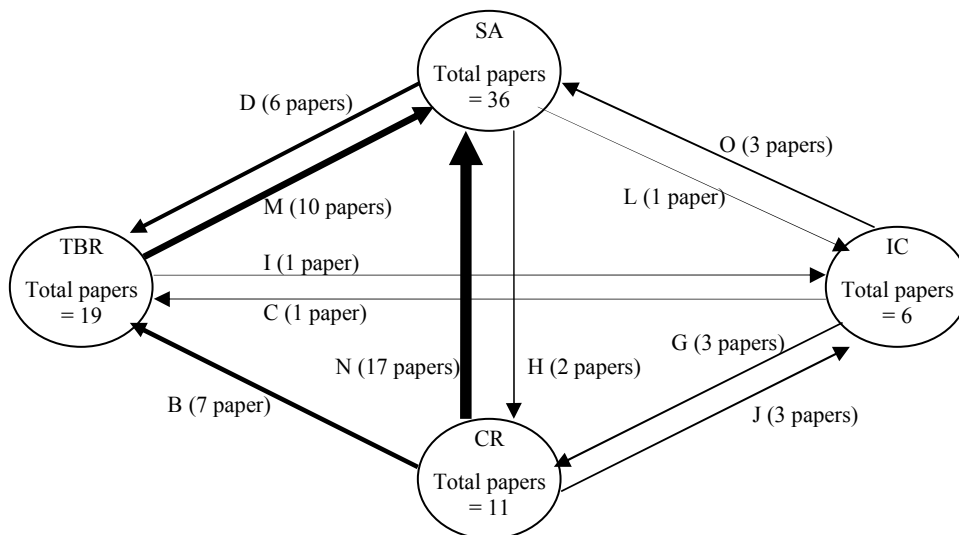
	Theory-based recommendations	Curricula recommendations	Instantiated Curricula	Skills Assessment
1970	Jenkins & Johnson 1977; Werner 1979	Ashenhurst 1972; Couger 1973; McFarlan & Nolan 1973	Igersheim & Swanson 1974	Henry, et al. 1973
1980	Benbasat et al. 1980; Cheney & Lyons 1980; Ives & Olson 1981; Benjamin et al 1985; Vitalari 1985; Trent, et al 1988; Adams & Song 1989; Couger 1989	Nunamaker, et al. 1982	McLeod 1985; Gupta & Seeborg 1989	Albin & Otto 1987; Green 1989
1990	Israel 1990; Farwell & Kuramoto 1992; Ross & Ruhleder 1993; Feeny & Willcocks 1998	Couger et al. 1995; Gorgone et al 1995; Longenecker et al. 1995; Davis et al 1997	Longenecker & Feinstein 1991	Cheney, et al. 1990; Watson, et al. 1990; Nelson 1991; Applegate & Elam 1992; Leitheiser 1992; Ives and Rubin 1993; Trauth, et al. 1993; Davis 1993; Jiang et al 1994; Athey et al 1995; Hingorani & Sanakar 1995; Lee, et al. 1995; Todd, et al. 1995; Richards et al 1998
Skills Assessment	Roepke et al. 2000; Miller & Luse 2004; Fulbright & Routh 2004; Turner 2004; Willcocks & Feeny 2006	Gorgone, et al. 2000; Gorgone, et al. 2002; Gorgone, et al. 2006	Navarro 2004; Tang et al 2000	Cappel 2001; Kwak 2001; Sumner 2001; Weber et al 2001; Chrysler & Auken 2002; Turner & Lowry 2002; Woratschek & Lenox 2002; Turner & Lowry 2003; Ferguson 2004; Ferguson 2005; Prabhakar et al 2005; Abraham et al 2006; Lee and Lee 2006; Zweg et al 2006; McGee 2006, 2007; Loebbecke et al 2007; Goles et al. 2008; Lee and Han 2008
Total	19	11	6	36



**Figure 1. Number of authors and number of papers published in more than one component of the IS field**

Figure 2 shows linkages among references and components in published research (line thickness is proportional to the number of papers sharing references). The directional arrows in Figure 2 indicate a connection between two components based on a paper in one discourse category referencing a paper in another discourse category. The number on each arrow indicates how many papers in the target component (if an arrow is pointing towards it) referenced papers from the source component (if an arrow is coming out of it). For example, the link D indicates that 6 papers from the ‘Theory-based Recommendations’ discourse component referenced papers from the ‘Skills Assessment’ discourse component.

As shown in the bottom row of Table 4 and in Figure 2, most (30) of the skills assessment studies reference studies in other areas including the theoretical aspects of the job (10 papers), curricula recommendations (17 papers) and instantiated curricula (3 papers). This makes intuitive sense as the field tries to match curriculum offerings with industry needs and since journals are more likely to publish papers with a theoretical dimension. Similarly, link J is indicative of instantiated curricula being based on curricula recommendations. Also, link D indicates that theory based recommendations develop over time as IS jobs evolve and IS skills are assessed. Most of the papers reviewed in the first two phases identified gaps between industry and academia’s expectations regarding the need for better soft skills among graduates and provided various guidelines for reducing these gaps. These contributions are important because they reflect an appreciation by both academics and practitioners of the existence of a major problem suggesting that this issue falls within the ecotone. However, they do not appear to have allowed us to successfully solve this problem and the call for more soft skills continues unabated.



**Figure 2: Number of shared references (line thickness is proportional to the number of papers sharing references)**

**Table 4: Cross referencing within and between the categories**

	Theory-based recommendations (TBR)	Curricula recommendations (CR)	Instantiated Curricula (IC)	Skills Assessment (SA)
Theory-based recommendations	Vitalari 1985; Turner 2004; Willcocks & Feeny 2006  <b>A (3 papers)</b>	Jenkins & Johnson 1977; Benbasat et al 1980; Cheney et al 1980; Vitalari 1985; Adams & Song 1989; Miller & Luse 2004; Turner 2004  <b>B (7 papers)</b>	Turner 2004  <b>C (1 paper)</b>	Benbasat et al 1980; Cheney Lyons 1980; Vitalari 1985; Feeny and Willcocks 1998; Miller & Luse 2004; Turner 2004  <b>D(6 papers)</b>
Curricula recommendations	  <b>E (0 papers)</b>	Couger 1973; Nunamaker et al 1982; Couger et al 1995; Gorgone et al 1995; Longenecker et al 1995; Davis et al 1997; Gorgone et al 2000; Gorgone et al 2002; Gorgone et al 2006  <b>F (9 papers)</b>	Longenecker et al 1995; Davis et al 1997; Gorgone et al 2002  <b>G (3 papers)</b>	Davis et al 1997; Gorgone et al 2002  <b>H (2 papers)</b>
Instantiated Curricula	Tang et al 2000  <b>I (1 paper)</b>	Gupta & Seeborg 1989; Longenecker & Feinstein 1991; Tang et al 2000  <b>J (3 papers)</b>	Gupta & Seeborg 1989  <b>K (1 paper)</b>	Tang et al 2000  <b>L (1 paper)</b>
Skills Assessment	Green 1989; Watson et al 1990; Cheney et al 1990; Nelson 1991; Applegate & Elam 1992; Leitheiser 1992; Lee et al 1995; Todd et al 1995; Lee & Han 2008; Litecky et al 2004  <b>M(10 papers)</b>	Henry et al 1973; Albin & Otto 1987; Cheney et al 1990; Watson et al 1990; Nelson 1991; Leitheiser 1992; Trauth et al 1993; Hingorani & Sankar 1995; Lee et al 1995; Todd et al 1995; Cappel 2001; Weber et al 2001; Woratschek & Lenox 2002; Turner & Lowry 2003; Litecky et al 2004; Abraham et al 2006; Lee & Han 2008  <b>N (17 papers)</b>	Cappel 2001; Lee and Han 2008; Woratschek and Lenox 2002  <b>O (3 papers)</b>	Watson et al 1990; Nelson 1991; Leitheiser 1992; Trauth et al 1993; Hingorani and Sankar 1995; Lee et al 1995; Todd et al 1995; Richards et al 1998; Cappel 2001; Weber et al 2001; Chrysler & Auken 2002; Turner & Lowry 2002; Woratschek & Lenox 2002; Turner & Lowry 2003; Litecky et al 2004; Ferguson 2005; Abraham et al 2006; Lee & Lee 2006; Goles et al 2008; Lee & Han 2008  <b>P (20 papers)</b>

In the next phase of Study 2 we consider whether the IS field could benefit from including new approaches to investigating and addressing the gap between the expectations of industry and the skills imparted in academia based on an understanding of institutionalized fields.

### ***Phase 3 – Developing a Process-Based Model***

#### **Research Question**

Phase 3 addresses the question, “What knowledge flows could link these components more tightly?”

#### **Data and Analysis**

It is a commonly held understanding that ‘good theory must guide practice’ and conversely good practice must be based on theory (Da Rosa and Bell 2004). This view suggests that the linkages between components are particularly valuable in ensuring the accuracy and relevance of each. It also implies that theory must guide the curricular recommendations and the instantiated programs that produce the workforce which will put that theory into practice. However, research suggests that this temporal order of interaction between curricula development and instantiation is often ignored in many areas (Nagy, 2002), and IS may be no exception. When curricular materials are examined from a theoretical framework, experts are frequently consulted after the fact to identify the theoretical rationale that justifies the curricular approach (Lorig and Gonzalez, 1992), rather than before the materials are developed. Therefore, in this phase we proposed how the process of skills development could work more efficiently and effectively to bridge the gap between academic preparation and industry expectations.

Process models are concerned with highlighting the major actors and agents that affect possible outcomes at different times and identifying the sequence of necessary conditions for an outcome (Mohr, 1982; Markus and Robey, 1988; Newman and Robey, 1992). They investigate possible precursors and show how they could lead to a desirable outcome. They can also be used to provide a broad overview of a phenomenon and reveal why or how a phenomenon takes place (Orlikowski, 1993).

Given this understanding, process models are inherently more suited to the investigation of the IS pedagogical field to identify who can intervene, and how, in creating a better prepared IS worker. Further, the non-IS literature on curriculum design, delivery and assessment suggests a temporal order as the defining logic for a process model of IS skills development.

Sensitized to issues of temporal order and linkages among components, we considered whether a more holistic and complete theoretical view of institutional change would provide better guidance in putting theory into practice. We developed a process-based theoretical model of the relationships among the components involved in the development and instantiation of skills in the IS field. The following subsections provide a brief review of the literature on process-based models followed by a description of our process model of skills development in the IS institutional field.

#### **Results**

Curricula recommendations should rest on theoretical bases and provide the roots for the instantiated curricula to which the skilled workforce in the field would be exposed. Skills assessment can, in turn, inform theory development. However, the results of phase 2 indicated that such a temporal order in the development and instantiation of skills through curricula is not visible from the published discourse. Therefore, we believe that a process model of IS curricular development and delivery can 1) lead to a better understanding of our past and 2) help us identify fruitful avenues for improving our pedagogical development and delivery processes to help close the gap between academic preparation and industry needs. We propose a process model that highlights how the different components of the IS field could be connected to each other. However, this model will require further empirical testing for validation.

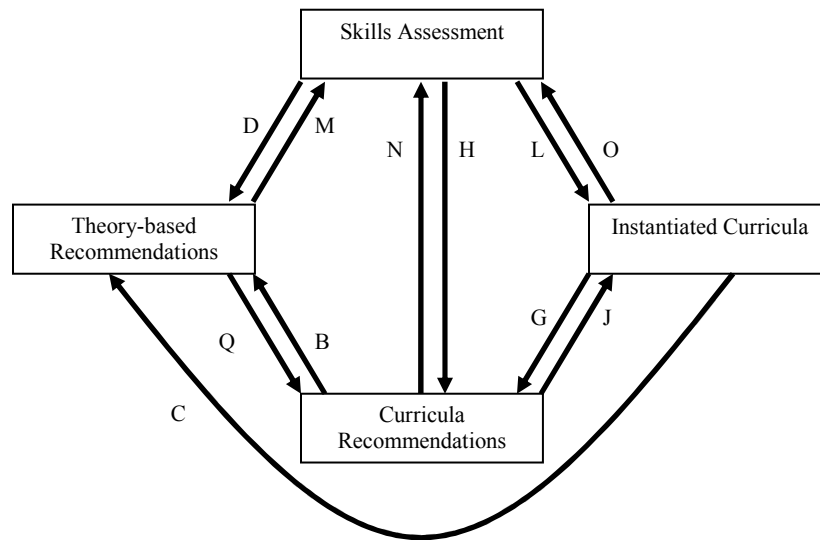
As we discussed earlier, there are three partially overlapping sets of major actors in the IS field. Academicians and researchers develop curricula guidelines, design and deliver instantiated curricula in educational institutions. Practitioners assess their hiring needs and form opinions about the distribution of desired skills among potential employees and current employees. Accreditation boards and research committees are made up of academicians and

practitioners and evaluate and provide guidelines for developing the IS workers. Figure 3 shows our proposed model. Where possible, the same arrow labels have been used in Figure 3 that were used in Figure 2.

Moving counterclockwise and starting on the left side, our process model shows linkages between all of the four categories that could be studied. Theory can help enumerate the various dimensions of the skills required of IS workers and can be used to create theory-based curriculum recommendations (link Q). For example, communication theory could be used to identify important categories or dimensions of communication skills. These could be combined with pedagogical theory and research on the development of communication skills. Doing so would improve the probability that the ensuing curricula recommendations for developing communication skills in IS programs are a more accurate reflection of the theory based recommendations.

These recommendations then can be used in the creation of pedagogical materials to create and deliver courses that represent the curricula recommendations and reflect the theory-based recommendations (link J). To the extent that students learn the material included in each course, they should be developing the desired skills, a fact that should become evident in skills assessment (link O). Skill assessment could in turn have an impact on our current understanding of the nature of the job or field of IS (link D) and inform theory.

We have included arrows showing feedback between these categories. For example Skills Assessment could be informed by the current curriculum guidelines, relevant theory, and the instantiated curriculum (links M, N and O). Given a natural time lag between incorporating skills assessment into curricula recommendations (link H), some universities or colleges in consultation with their Advisory Boards may also decide to directly incorporate practitioner recommendations into their instantiated curricula (link L).



**Figure 3. Proposed process model for development and instantiation of IS skills**

Link G would indicate that the experiences of faculty with their respective institutions and industry could also cause changes in the instantiated curricula. Link B would indicate that the cooperation and consultation amongst academicians and practitioners in the process of developing the curricula guidelines may result in a modification of the theoretical bases of the IS workers' job. Furthermore, it can be expected that experienced academicians associated with curricula development at educational institutions (instantiated curricula) may also develop a different understanding of the nature of the job of the IS worker based on changes in industry requirements (link C). This would represent a direct change in the ongoing evolution of the skill set from the practitioner's perspective. It can be argued that changes in the theoretical bases of the IS workers skill sets can be directly incorporated in the instantiated curricula. This would be depicted in the shape of an arrow going from theory-based recommendations to instantiated curricula. However, research on curriculum design suggests a more intuitive path where the theoretical bases are incorporated into guidelines and then incorporated in formal IS programs. If however, there are such

dynamic changes in the requirements that they are immediately incorporated into the programs by academicians then they would have a direct impact on subsequent curricula recommendations. Although actors can skip some of the steps in our model, this might lead to less well-prepared IS workers.

## Conclusion

The skills assessment discourse in IS has repeatedly identified the need for more soft skills among IS workers and despite being specified in the curricula recommendations, we have not seen a widespread integration of soft skills into instantiated curricula and the development of a cadre of IS workers with adequate soft skills. Consequently, we continue to see recurring calls for more soft skills. Although a relatively small subset of academics and practitioners work together to develop curriculum guidelines and to assess the needs of industry, the published IS literature does not provide evidence that the tightly linked and fully integrated model presented here is a reflection of current practice in our field. In contrast, other professional degrees such as accounting seem to have a more tightly integrated institutional field that enables faster and more efficient conformity to changing industry needs. This suggests that the IS field lacks mechanisms for integration among the different components. Integration mechanisms could include such options as high quality publication outlets for research on linkages among the components, a widely accepted exam to test skill mastery for licensure, or formal of pedagogical materials for consistency with curriculum guidelines, etc.

## Limitations

There are two primary limitations of this research. First, our main source of information on the IS pedagogical process in this case was the discourse in academic journals and conference proceedings. We did not analyze the content of IS textbooks, nor did we interview practitioners and academicians which in some ways limits our data and hence our results. However, we did interview sales representatives and IS editors from well-respected publishers regarding the processes used to choose textbook content. They indicated that authors rarely attend to IS curriculum guidelines provided by professional groups and are instead driven by faculty expectations regarding topic coverage. Furthermore, prospective new textbooks are not evaluated for their conformance to curriculum guidelines. The usual quality control process is for IS professors to evaluate them using their own criteria. Future research should investigate the roles of publishers and authors of pedagogical materials (whether they be academicians or practitioners) in the instantiation and development of skills in the IS field.

Second, we used the reference lists as the primary tool and the content as the supporting tool to establish linkages between publications in the various discourse components. However, we must concede that oftentimes authors assume the theoretical bases in their work and do not feel compelled to state their sources. Therefore, it is likely that reference lists of curricular guidelines do not explicitly refer to the theoretical foundations of the field and that book authors do not feel compelled to draw explicit connections between the contents of their books and curricular guidelines. Perhaps, a more formal content analysis similar in depth to grounded-theory-based research or a quantitative cluster analysis would provide additional insights.

## Discussion

The call for more soft skills has been consistent and widespread from the inception of the IS field (Cheney and Lyons, 1980; Henry et al, 1973). It has grown due to the recent increases in outsourcing and offshoring. Our research suggests that the need for soft skills falls within the 'Ecotone' identified by Ramiller et al. (2008) in that it is a research topic that attracts interest from both academics and practitioners. These discourses have converged and hybridized, sharing common themes, ideas and language. However, continued call for more emphasis on soft skills among IS graduates suggest that convergence of academic and practitioner discourses may be necessary, but is not sufficient to ensure responsiveness to industry concerns.

We presented evidence that the IS institutional field is loosely coupled with little cross-referencing between the four components involved in the process of sensing and responding to the needs of industry. In addition, we have presented a framework for future research on the linkages between these components. A more coherent process would enable *theory development* to benefit from the evolving nature of the field as indicated by industry needs. *Theory development* could then exert a more direct influence on the development of curricular guidelines which, in



turn could better support the academics who create and deliver programs that produce IS professionals with the skill sets required by industry.

Finally, it is worthwhile to mention an important perspective discussed in the recent literature on institutionalism in education: “studies suggest that the subject is a key variable in understanding the extent to which instruction is loosely or tightly coupled with the wider institutional environment” (Spillane and Burch, 2006: p. 93). This means that perhaps in other subject matters, such as technical skills, the IS field may exhibit a different degree of coupling within and across the components of our process model. Future research could look into this direction.

## **Implications**

These results have important implications for theory. We have shown that the concept of an ‘ecotone’ of convergence (Ramiller et al., 2008) in academic and practitioner discourses is useful in better understanding the identification of important issues in the IS field. However, development and implementation of solutions to these important issues appears to require more than just convergence of the two discourses. Despite a shared understanding amongst both academics and practitioners that IS workers need better soft skills, the gap between preparation and industry needs persists. Apparently, academia has not been able to respond in a timely manner to the needs of the industry.

New institutional theory suggests that this lack of responsiveness stems from the fact that IS is a loosely coupled institutional field with few mechanisms in place to enforce integration among its components. Our results have extended institutional theory to the IS field and shown its value in understanding the causes of the persistent gap between IS workforce preparation and industry needs. Future research should consider comparative studies of institutional fields that are more responsive to the needs of their industries to identify possible avenues to improve the integration among components in the IS field, their advantages and disadvantages. Tight coupling among system components can have negative effects (Perrow, 1984), and any attempts to improve the integration of the IS field should carefully consider the trade-offs involved.

These results also have important implications for practice. The current structure of the IS field limits responsiveness to industry needs. When these needs are ephemeral or illusory, this stability may actually be advantageous because it puts limits on the extent to which instantiated curricula can be hijacked by temporary fads and fashions and wind up creating workers who will be obsolete as soon as those fashions change. Employers need to give thoughtful consideration to targeting stable skills that will enable IS workers to adapt to the changing demands of the industry. Then they must work with academia to determine which of those skills are best developed in formal educational settings and which are best developed on the job.

Given the diversity of employment opportunities in IS, a diversity of programs developing graduates with a variety of skill mixes may be beneficial for industry as a whole, though some particular needs may not be met by academic training. However, if unresponsiveness is a serious issue threatening the legitimacy of IS programs, then the practitioner and academic communities need to consider various mechanisms for sensing and responding to relatively stable shifts in industry needs. Some possibilities might include providing an independent assessment of the degree to which pedagogical materials conform to various curriculum guidelines or providing assistance in setting up strategic boards for IS programs.

In addition to integrative mechanisms we need to develop a better understanding of each of the four components in our process model. For example, as summarized in Table 3, we have relatively little information about what is actually taught in undergraduate and graduate IS programs. Such an investigation would allow us to better understand how we enact the curricular guidelines and feedback from practitioners to educate IS workers and would reveal possible impediments to implementing existing curricula guidelines.

Striking the appropriate balance between flexibility and diversity on the one hand and consistency and control on the other is neither easy nor simple. Responding to the needs of industry for IS workers with the proper mix of skills presents the IS field as a whole just such a challenge. Locating the issue within the ecotone of academic and practitioner discourses and beginning to develop an understanding of the structure of the institutional field represent two early steps in meeting this challenge.

## References

- AACSB Accreditation Coordinating Committee and AACSB International Accreditation Committee “Deploying Academically Qualified Faculty: An Interpretation of AACSB Standards”, An AACSB White Paper, November, 2006.
- DaRosa, D. A. and Bell, R. H. “Graduate surgical education redesign: Reflections on curriculum theory and practice”, *Surgery* (136:5), November 2004, pp. 966-974
- Davis, G.F. and Marquis, C. “Prospects for Organization Theory in the Early Twenty-First Century: Institutional Fields and Mechanisms”, *Organization Science* (16:4), July/August 2005, pp. 332-343.
- DiMaggio P. J. and Powell W. W. “The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields”, *American Sociological Review* 48, April 1983, pp. 147-160
- Gottschalk, P. and Sollie-Saether, H. “Critical Success Factors from IT Outsourcing Theories”, *Industrial Management and Data Systems* (105:6), 2005, pp. 685-702
- Greenwood R. and Suddaby R. “Institutional Entrepreneurship in Mature Fields: The Big Five Accounting Firms”, *Academy of Management Journal*, (49:1), 2006, pp. 27-48
- Hirschheim, R., Loebbecke, C., Newman, M. and Valor, J. “Offshoring and its implications for the information systems discipline”, in *The Proceedings of the Twenty Sixth International Conference on Information Systems*, Avison D. E. and Galletta D. F. (Eds.), Las Vegas, 2005, pp. 1003-1018
- Lorig K and Gonzalez V. “The integration of theory with practice: a 12-year case study”, *Health Education Quarterly*, (19:3), Fall 1992, pp 355-368
- McAdam, D., and Scott, W. R. (2005) “Organizations and movements.” in *Social Movements and Organization Theory*. G. F. Davis, D. McAdam, W.R. Scott, M.N. Zald, (Eds.), Cambridge University Press, NY, 2005, pp. 4-40.
- Maguire S., Hardy C. and Lawrence T. B. “Institutional Entrepreneurship in Emerging Fields: HIV/AIDS Treatment Advocacy in Canada”, *Academy of Management Journal*, (47:5), October 2004, pp. 657-679
- Markus, L. M. and Robey, D. “Information Technology and Organizational Change: Causal Structure in Theory and Research”, *Management Science*, (34:5), May 1988, pp. 583-598
- Mohr, L. B. *Explaining Organizational Behavior*, San-Francisco:Jossey-Bass, USA, 1982
- Montano, J. L. A., Cardoso, S. M. J. and Joyce, J. “Skills development, motivation and learning in financial statement analysis: an evaluation of alternative types of case studies”, *Accounting Education*, (13:2), June 2004, pp. 191-212
- Nagy, S. “Using Theory in Curriculum Development: The Future Selves Curriculum”, *American Journal of Health Studies*, (18:1), Winter 2002, pp. 31-37
- Neale W. C. “Institutions”, *Journal of Economic Issues* (21:3), September 1987, pp. 1177-1206.
- Nellen A. “The Introductory Tax Course Revisited”, *The Tax Advisor, Tax Education*, November 2003, pp. 695-697.
- Newman, M. and Robey, D. “A Social Process Model for User-Analyst Relationships”, *MIS Quarterly*, (16:2), June 1992, pp. 249-266
- North D. C. “Institutions”, *Journal of Economic Perspectives* (5:1), Winter 1991, pp. 97-112.
- O’Neil, C. J., R. Weber, and D. Harris. “Assessing the impact of the AICPA model tax curriculum on the first tax course taught at AACSB-accredited institutions”, *The Tax Advisor*, August, 1999, pp. 596-600.
- Parto S. “Economic Activity and Institutions: Taking Stock”, *Journal of Economic Issues* (39:1), March 2005, pp. 21-52.
- Perrow, C. *Normal Accidents: Living With High-Risk Technologies*, NY: Basic Books, USA, 1984.
- Ramiller N., Swanson E. B. and Wang P. “Research Directions in Information Systems: Toward an Institutional Ecology”, *Journal of the AIS* (9:1), January 2008, pp. 1-22
- Scott W. R. “Conceptualizing Organizational Fields: Linking Organizations and Societal Systems”, in *Systemrationalitat und Partialinteresse [Systems Rationality and Partial Interests]*, Derlien H. U. Gerhardt U. and Scharpf F. W. (eds.), Baden-Baden, Germany: Nomos Verlagsgesellschaft, 1994, pp. 203-221.
- Scott W. R. *Institutions and Organizations*, Second Edition, Foundations for Organizational Science, A Sage Publication Series, California, USA, 2001
- Spillane J. and Burch P. “The Institutional Environment and Instructional Practice” in *The New Institutionalism in Education*, Meyer H. D. and Rowan B. (eds.), State University of New York Press, Albany, NY, USA, 2006, pp. 87-102
- Tan L. M. and Veal J. “Tax Knowledge for Undergraduate Accounting Majors: Conceptual vs. Technical”, *eJournal of Tax Research* (3:1), June 2005, pp. 28-44.

## Extended Reference List: Publications Included in the Analyses

- Abraham T., Beath C. M., Bullen C., Gallagher K. P., Goles T., Kaiser K. M., Simon J. C. "IT workforce trends: Implications for IS programs", *Communications of AIS*, 17, June 2006, pp. 2-43
- Adams, C. R. and Song, J. H. "Integration Decision Technologies: Implications for Management Curriculum" *MIS Quarterly*, (13:2), June 1989, pp. 199-209
- Albin M. and Otto R. W. "The CIS Curriculum: What employers want from CIS and general business majors", *The Journal of Computer Information Systems*, Summer 1987, pp. 15-19
- Applegate, L. M. and Elam, J. J. "New Information Systems Leaders: A Changing Role in a Changing World" *MIS Quarterly*, (16:4), December 1992, pp. 469-490
- Ashenhurst, R. R. "Curriculum Recommendations for Graduate Professional Programs in Information Systems", *Communications of the ACM*, (15:5), May 1972, pp. 363-398
- Athey S., Plotnicki J. and Ballester Y. "Changing Information Systems Job Requirements From 1989 to 1993", *Journal of Computer Information Systems*, Spring 1995, pp. 12-22
- Benbasat, I., Dexter, A. S. and Mantha, R. W. "Impact of Organizational Maturity on Information System Skill Needs" *MIS Quarterly*, (4:1), March 1980, pp. 21-34
- Benjamin R. I., Dickinson C. Jr. and Rockart J. F. "Changing Role of the Corporate Information Systems Officer", *MIS Quarterly*, September 1985, pp. 177-188
- Cappel J. J. "Entry-Level IS Job Skills: A Survey of Employers", *Journal of Computer Information Systems*, Winter 2001-2002, pp. 76-82
- Cheney, P. H. and Lyons, N. R. "Information Systems Skills Requirements: A Survey" *MIS Quarterly*, (4:1), March 1980, pp. 35-43
- Cheney, P. H., Hale, D. P. and Kasper, G. M. "Knowledge, Skills and Abilities of Information Systems Professionals: Past, Present, and Future" *Information and Management*, (19:4), November 1990, pp. 237-247
- Chrysler E. and Auken S. V. "Entry level value versus career value of MIS courses: Faculty expectations versus alumni perceptions", *Journal of Computer Information Systems*, Spring 2002, pp. 38-43
- Couger, D. J. "A Report of the ACM Curriculum Committee on Computer Education for Management: Curriculum Recommendations for Undergraduate Programs in Information Systems" *Communications of the ACM*, (16:12), December 1973, pp. 727-749
- Couger, D. J. "Preparing IS Students to deal with Ethical Issues", *MIS Quarterly*, (13:2), June 1989, pp. 211-218
- Couger, D. J., Davis, G. B., Dologite, D. G., Feinstein, D. L., Gorgone, T. J., Jenkins, A. M., Kasper, G. M., Little, J. C., Longenecker, H. E. J. and Valacich, J. S. "IS' 95: Guidelines for Undergraduate Curriculum", *MIS Quarterly*, (19:3), September 1995, pp. 341-359
- Davis, D. B. "The Hard Demand for Soft Skills", *Datamation*, (39:2), January 1993, pp.28-32
- Davis, G. B., Gorgone J. T., Couger J. D., Feinstein D. L. and Longenecker H. E. "IS' 97 Model Curriculum and Guidelines for Undergraduate Degree Programs in Information Systems", *ACM*, New York, NY and AITP (formerly DPMA), Park Ridge, IL., USA 1997
- Farwell, D. W. and Kuramoto, L. "A New Paradigm for IS" *Information Systems Management*, (9:2), Spring 1992, pp. 7-14
- Feeny, D. and Willcocks, L. "Core IS Capabilities for Exploiting Information Technology" *Sloan Management Review*, (39:3), Spring 1998, pp. 9-21
- Ferguson, E., "Impact of Offshore Outsourcing on CS/IS Curricula" *The Journal of Computing Sciences in Colleges*, (19:4), April 2004, pp. 68-77
- Ferguson, E. "Changing Qualifications for entry-level Application Developers" *Journal of Computing Sciences*, (20:4), April 2005, pp. 106-111
- Fulbright, R. and Routh R. L. "How Information Technology Professionals keep from being outsourced or offshored", in the *Proceedings of the Fifth Conference on Information Technology Education*, Helps R. and Lawson E. (Eds.), Salt Lake City, UT, USA, 2004, pp. 188-193
- Goles T., Hawk S. and Kaiser K. M. "Information technology workforce skills: The software and IT service provider perspective", *Information Systems Frontier*, (10:2), April 2008, pp. 179-194
- Gorgone, T. J., Couger J. D., Davis G. B., Feinstein D., Kasper G. and Longenecker H. E. Jr. "Information Systems '95 Curriculum Model - A Collaborative Effort", *DATA BASE*, (25:4), November 1994, pp. 5-8
- Gorgone, T. J., Davis, G. B., Valacich, J. S., Topi, H., Feinstein, D. L. and Longenecker, H. E. J. "IS 2002 Model Curriculum and Guidelines for Undergraduate Degree Programs in Information Systems" *Communications of AIS*, (11:1), January 2003, pp. 1-63

- Gorgone, T. J., Gray P., Feinstein D., Kasper G. M., Luftman J. N., Stohr E. A., Valacich J. S. and Wigand R. T. "MSIS 2000 Model Curriculum and Guidelines for Graduate Degree Programs in Information Systems", *Communications of the Association for Information Systems*, (7:1), January 2000.
- Gorgone, T. J., Gray, P., Stohr, E. A., Valacich, J. S. and Wigand, R. T. "MSIS 2006: Model Curriculum and Guidelines for Graduate Degree Programs in Information Systems" *Communications of AIS*, (17:1), January 2006, pp. 1-56
- Green, G. I. "Perceived Importance of Systems Analysts' Job Skills, Roles and Non-Salary Incentives" *MIS Quarterly*, June 1989, pp. 115-133
- Gupta, J. N. D. and Seeborg, I. S. "The Graduate MIS Course in the Schools and Colleges of Business" *Journal of Management Information Systems*, (5:4), Spring 1989, pp. 125-136
- Henry, R. M., Dickson, G. W. and James, L. S. "Human Resources for MIS: A Report of Research", Minneapolis, Minnesota, Management Information Systems Research Center, Graduate School of Business Administration, University of Minnesota, 1973
- Hingorani K. K. and Sankar C. S. "Entry Level MIS Jobs: Industry expectations versus academic preparation", *Journal of Computer Information Systems*, Summer 1995, pp. 18-27
- Igersheim, R. H. and Swanson, L. A. "Management Information Systems Curricula: State-of-the-art" *Decision Sciences*, (5:2), 1974
- Israel, B. "Hiring Systems Analysts for the 1990s" *Information Executives*, (3:1), 1990, pp. 35-36
- Ives, B. and Olson M. H. (1981) "Manager or Technician? The Nature of the Information Systems Manager's Job", *MIS Quarterly*, December 1981, pp. 49-63
- Ives, B. and Rubin, R. "Editor's Comments: Educating Tomorrow's Business Leaders About Information and Information Technology", *MIS Quarterly*, (17:3), December 1993, pp. li-liv
- Jenkins, M. D. and Johnson, R. D. "What the Information Analyst should know about Body Language", *MIS Quarterly*, (1:3), September 1977, pp. 33-47
- Jiang J. J., Udeh I. E. and Hayajneh A. "Employers' expectation of incoming business graduates: From recruiters' views", *Journal of Computer Information Systems*, Summer 1994, pp. 57-59
- Kwak M. "Technical Skills, People Skills: It's Not Either/Or", *MIT Sloan Management Review*, Spring 2001, pp. 16
- Lee C. K. and Han H. J. "Analysis of Skills Requirements for Entry-Level Programmer/Analysts in Fortune 500 Corporations", *Journal of Information Systems Education*, (19:1), Spring 2008, pp. 17-27
- Lee S. M. and Lee C. K. "IT Managers' Requisite Skills", *Communications of the ACM*, (49:4), April 2006, pp. 111-114
- Lee, D., Trauth, E. M. and Farwell, D. W. "Critical Skills and Knowledge Requirements of IS Professionals: A Joint Academia/Industry Investigation", *MIS Quarterly*, (19:3), 1995, pp. 313-340
- Leitheiser, R. L. "MIS SKills for the 1990s: A Survey of MIS Managers' Perceptions", *Journal of Management Information Systems*, (9:1), Summer 1992, pp. 69-91
- Litecky C. R., Arnett K. P. and Prabhakar B. "The paradox of soft skills versus technical skills in IS hiring", *Journal of Computer Information Systems*, Fall 2004, pp. 69-76
- Loebbecke C., Massey A. P. and Sambamurthy V. "Recruiters' perspectives on the demand for IS Skills: Implications for Doctoral Programs", in the *Twenty Eighth International Conference on Information Systems*, Montreal, Canada, 2007
- Longenecker H. E. and Feinstein D. L. "A Comprehensive Survey of USA and Canadian Undergraduate Programs in Information Systems", *Journal of Information Systems Education*, (3:1), 1991, pp. 8-13
- Longenecker H. E., Feinstein D. L., Couger J. D., Davis G. G. and Gorgone J. T. "Information Systems '95: A Summary of the Collaborative IS Curriculum Specification of the Joint DPMA, ACM, AIS Task Force", *Journal of Information Systems Education*, (6:4), 1995, pp. 174-187
- McFarlan F. W. and Nolan R. L. "Curriculum Recommendations for Graduate Professional Programs in Information Systems: Recommended Addendum on Information Systems Administration", *Communications of the ACM*, (16:7), 1973, pp. 439-441
- McGee M. K. "Skills that will matter", *InformationWeek*, 02.01.2006
- McGee M. K. "Want to keep your job safe? Beef up your soft skills", *InformationWeek*, 21.07.2007
- McLeod, R. J. "The Undergraduate MIS Course in the AACSB Schools" *Journal of Management Information Systems*, (11:2), Fall 1985, pp. 73-85
- Miller, R. A. and Luse, D. W. "Advancing the IS Curricula: The Identification of Important Communication Skills Needed by IS Staff during Systems development", *Journal of Information Technology Education*, 3, 2004, pp. 117-131
- Navarro P. "Why Johnny can't lead", *Harvard Business Review*, December 2004, pp. 17

- Nelson, R. R. "Education Needs as Perceived by IS and End-User Personnel: A Survey of Knowledge and Skill requirements", *MIS Quarterly*, (15:4), December 1991, pp. 503-525
- Nunamaker, J. F. J., Couger, D. J. and Davis, G. B. "Information Systems Curriculum Recommendations for the 80s: Undergraduate and Graduate Programs", *Communications of the ACM*, (25:11), November 1982, pp. 781-805
- Prabhakar B., Litecky C. R. and Arnett K. "IT skills in a tough job market", *Communications of the ACM*, (48:10), October 2005, pp. 91-94
- Richards T., Yellen R., Kappelman L. and Guynes S. "Information Systems Managers' Perceptions of IS Job Skills", *The Journal of Computer Information Systems*, (38:3), Spring 1998, pp. 53-57
- Roepke, R., Agarwal, R. and Ferratt, T. W. "Aligning the Human Resource with Business Vision: The Leadership Initiative at 3M", *MIS Quarterly*, (24:2), June 2000, pp. 327-353
- Ross, J. and Ruhleder, K. "Preparing IS Professionals for a Rapidly Changing World: The Challenge for IS Educators", in the *Proceedings of the 1993 Conference on Computer Personnel Research*, St Louis, Missouri, USA, 1993, pp. 379-384
- Sumner, M. "A report on Industry-University Roundtable Discussions on Recruitment and Retention of High-tech Professionals", in the *Proceedings of the 2001 ACM SIGCPR Conference on Computer Personnel Research*, San Diego, California, USA, 2001, pp. 139-143
- Tang H. L., Lee S. and Koh S. "Educational gaps as perceived by IS educators: A survey of knowledge and skills requirements", *Journal of Computer Information Systems*, Winter 2000-2001, pp. 76-84
- Todd, P. A., McKeen, J. D. and Gallupe, R. B. "The Evolution of IS Job Skills: A content analysis of IS job Advertisements from 1970-1990", *MIS Quarterly*, (19:1), March 1995, pp. 1-27
- Trauth, E. M., Farwell, D. W. and Lee, D. "The IS Expectation Gap: Industry versus Academia Preparation", *MIS Quarterly*, (17:3), September 1993, pp. 293-307
- Trent, R. H., O' Neill, N. W., Rand, R. R. and Sanderson, E. J. J. "Perspectives on the Academic Preparation of MIS Professionals" in the *Proceedings of the ACM SIGCPR Conference on Management of Information Systems Personnel*, College Park, Maryland, USA, 1988, pp. 119
- Turner R. "Towards a Structural Model Connecting Hard Skills, Soft Skills and Job Conditions and the IS Professional: The Student Perspective", *Issues in Informing Science and Information Technology*, 2004, pp. 977-991
- Turner R. and Lowry G. "Towards a Profession of Information Systems and Technology: The Relative Importance of "Hard" and "Soft" Skills for IT Practitioners", *Issues and Trends of IT Management in Contemporary Organizations*, May 19-22, 2002, pp. 676-678
- Turner, R. and G. Lowry "Education for a Technology-based profession: Softening the Information Systems Curriculum", Chapter XIII. Current Issues in IT Education, IGI Publishing, Hershey, PA, USA, 2003, pp. 153-172.
- Vitalari, N. P. "Knowledge as a Basis for Expertise in Systems Analysis: An Empirical Study", *MIS Quarterly*, (9:3), September 1985, pp. 221-241
- Watson, H. J., Young, D., Miranda, S., Robichaux, B. and Seerley, R. "Requisite Skills for New MIS Hires", *ACM SIGMIS Database*, (21:1), Spring 1990, pp. 20-29
- Weber J. E., McIntyre V. J. and Schmidt M. "Explaining IS student and IS industry differences in perceptions of skills importance", *Journal of Computer Information Systems*, 41(4), Summer 2001, pp. 79-83
- Werner, R. "The Business Systems Professional", *MIS Quarterly*, (3:1), March 1979, 65-66
- Willcocks, L. and Feeny, D. "IT Outsourcing and Core IS Capabilities: Challenges and Lessons at Dupont", *Information Systems Management Journal*, (23:1), 2006, pp. 49-55
- Woratschek, C. R. and T. L. Lenox "Information Systems Entry-Level Job Skills: A Survey of Employers" in the *Proceedings of the Information Systems Education Conference, ISECON*, San Antonio, Texas, USA, (19:1), 2002
- Zwieg P., Kaiser K. M., Beath C. M., Bullen C., Gallagher K. P., Goles T., Howland J., Simon J. C., Abbott P., Abraham T., Carmel E., Evaristo R., Hawk S., Lacity M., Gallivan M., Kelly S., Mooney J. G., Ranganathan C., Rottman J. W., Ryan T and Wion R. "The Information Technology Workforce: Trends and Implications 2005-2008", *MIS Quarterly Executive*, (5:2), June 2006, pp. 101-108