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AIS Teaching Curation Project: The Introductory Course in Information Systems

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ABSTRACT

The Association for Information Systems (AIS) Teaching Curation Project aims to highlight and summarize research within the association that focuses on the major courses taught in Information Systems (IS) programs. The present literature review is a companion to a curation website specific to the introductory course in IS. In this review, we identify three major themes that pervade this literature: IS program enrollment, pedagogy, and curriculum. We use these themes to structure our summary of the research on the importance of the introductory course and various approaches to instruction. These themes also provide a framework for positioning future research. For instructors of the introductory course, this review and the companion website hosted by the AIS serve as a reference for recommendations and inspiration.

Keywords: Introductory course, Pedagogy, IS curriculum, Enrollment

1. INTRODUCTION

The introductory course in Information Systems (hereafter, the introductory course) is a cornerstone course within nearly every undergraduate information systems (IS) program. It often serves as the “gateway” to the IS program, introducing students to the IS discipline and related career paths. The course also familiarizes students with foundational IS concepts crucial for burgeoning business professionals, including practical technological experience and a guided understanding of the role of IS in industry. For this reason, many business schools offer—if not require—the course for all business students.

The constantly evolving nature and wide breadth of content are among the central challenges in teaching the introductory course, partially motivating and informing published research on the topic. However, such research is dispersed across numerous outlets, including journals and conference proceedings, making it difficult to find and benefit from the

collective knowledge and insights of this literature. Additionally, research is fragmented, due in part to the various names of the course and the lack of a cumulative tradition for researchers to follow. To address the challenges of the introductory course and present prior research in a manner that can motivate future investigations, an organization and review of prior literature is required.

This review is a companion to the broader Association for Information Systems (AIS) Teaching Curation Project, which seeks to identify, review, and examine pedagogical research for courses within the IS curriculum. The project is focused specifically on AIS and AIS-affiliated publications as these are generally available to all members of the AIS, which will be hosting the living curation website. Although research on education is regularly highlighted at conferences and widely seen as valuable in ensuring the effectiveness of IS programs, literature reviews are rare. In addition to the curation goals of making pedagogical studies easier to find and access for IS

educators, this review summarizes and organizes the introductory course literature both to understand the current state of research and to motivate future research on the course.

Introductory course instructors, IS program managers and facilitators, and IS education researchers may all benefit from this review. As a complement to the broader curation objectives, this review highlights resources and pedagogical approaches to teaching the introductory course. Additionally, we synthesize the main arguments around breadth and depth of content covered in the course and the value of such curricular choices in recruiting students to the IS major. For researchers, we reveal the disconnected nature of this research stream, recommending ways to improve the cohesion and strength of this literature as well as suggesting multiple directions for future research on the introductory course.

The paper proceeds as follows. First, we describe our methodology and the results of our systematic literature review. Next, we summarize key findings and conversations, highlighting the uniqueness of the introductory course among other IS courses. Finally, we look forward, synthesizing research into a parsimonious framework and offering directions for future researchers.

2. METHODOLOGY

The objectives of the teaching curation provided a set of necessary boundary conditions on our review of the literature. With the goal of identifying as many relevant resources as possible within AIS-affiliated publications, we endeavored to be comprehensive in our approach. We consulted the AIS website for a complete list of affiliated journals and conference proceedings; this resulted in 23 journals (six AIS journals, five AIS Chapter journals, and 12 affiliated journals) and 19 conferences (13 conferences and six chapter conferences). Initial article searches were conducted on the AIS eLibrary, with additional searches on Google Scholar and specific journal websites for materials as necessary. The remainder of this section describes our approach to searching for and determining the relevance of identified articles.

2.1 Identifying Keywords for Search

We conducted a pilot test to determine the appropriate naming schema by independently searching for articles and documenting the terms for referencing the course. From this pilot test and subsequent additions, we compiled the search keywords listed in Table 1. We recognize that the lack of a generally accepted name for the course likely precludes us from finding every article. Nonetheless, we aimed to be as comprehensive as possible in our search to review the literature most accurately.

As our goal was to be as comprehensive as possible, we did not add date criteria to our search. Thus, the date range of our results is from the earliest article that matched our criteria (1989) to the date of the search (2020).

2.2 Article Relevance

Our initial search returned over 1,000 articles across the various journals and conferences. Many of the articles, however, had little, if any, relevance to teaching the introductory course. Some were empirical studies using students in the introductory course, while others described unrelated concepts or other courses in the IS discipline. Thus, further filtering was required.

Search Terms		
“first course in MIS”	“first course in IS”	“initial course in MIS”
“initial course in IS”	“entry level course in MIS”	“entry level course in IS”
“introductory course”	“intro course”	“intro to IS”
“intro to MIS”	“introduction to MIS”	“core course”
“foundations of IS”	“foundations of MIS”	“foundations course”
“introductory MIS course”	“introductory IS course”	
<i>Note: “MIS” is a common abbreviation for the discipline, typically referring to “Management Information Systems.”</i>		

Table 1. Search Terms

From this initial set, we read through the abstracts and, if necessary, the text of the papers to determine which articles were focused on the introductory course. An article was deemed relevant if it contained information directly relevant to teaching or offering the introductory course. For example, if the only mention of the introductory course was within a list of various courses in the broader IS curriculum, the paper was removed. Additionally, because this curation is specific to teaching the undergraduate introductory course, any article centered on teaching the course at the graduate level was removed from further consideration. Articles not clearly within or outside the boundary conditions were marked for further deliberation among the author team for this review.

The filtering resulted in a final set of 137 articles. Each article was coded with the title, author(s), source, and year. Furthermore, we identified the broad theme(s) of each paper, identifying whether they addressed IS enrollment, pedagogy, and/or curriculum. These broad themes formed the basis of our structured literature review.

3. REVIEW OF INTRODUCTORY COURSE LITERATURE

This section provides a thematic review of literature relevant to teaching the introductory course. We divide this review into four sub-sections. The first provides an overview of research trends discovered in our review. The second describes the unique characteristics of the introductory course. We enumerate how, beyond content, the introductory course differs from other IS courses. The final two subsections discuss the pedagogical approaches and curricular challenges for those teaching the introductory course. The unique characteristics of the course impact its pedagogy and curriculum, thus there is some overlap between the sections.

3.1 Trends in the Literature

Of the 137 papers included in the final dataset, the majority were published at AIS-affiliated conferences. Of the papers published in journals, the *Journal of Information Systems Education* and the *Communications of the Association for Information Systems* were the two most popular outlets. The list of publication outlets for papers in the dataset is contained in Table 2.

Outlet	Count of Publications
Americas Conference on Information Systems (AMCIS)—including workshops	50
<i>Journal of Information Systems Education (JISE)</i>	37
<i>Communications of the Association for Information Systems (CAIS)</i>	15
AIS Special Interest Group for Education (SIGED) Conference	10
Southern Association for Information Systems (SAIS)	7
International Conference on Information Systems (ICIS)	4
Pacific Asia Conference on Information Systems (PACIS)	2
<i>MIS Quarterly</i>	1
Other AIS-affiliated outlets ¹	12
¹ Australasian Conferences on Information Systems (ACIS), <i>Business & Information Systems Engineering (BISE)</i> , International Conference on Information Systems Development (ISD Conference), <i>Journal of Information Technology Theory and Application (JITTA)</i> , Midwest Association for Information Systems Conference (MWAIS), <i>Pacific Asia Journal of the Association for Information Systems (PAJAIS)</i> , Special Interest Group on Decision Support and Analytics (SIGDSA)	

Table 2. Publications by Outlet

With respect to our thematic coding, 74 papers were tagged with the pedagogy motivation, 57 were tagged with the curriculum motivation, and 30 were tagged with the enrollment motivation. Other motivations, tagged in eight papers, included student wellbeing, field perceptions, and diversity.

Generally, the pace of publication was fairly slow until 2002 when the organization of the IS field was accelerated by the development and publication of the IS2002 model curriculum guidelines (Gorgone et al., 2003). A second spike of papers in 2007 corresponds with the enrollment crisis in the field (Annabi & McGann, 2015). This is illustrated in Figure 1.

3.2 Unique Characteristics Among IS Courses

While each course is unique due to its content, there are numerous factors that differentiate the introductory course from other IS courses. In this section, we highlight some of the most prominent factors scholars have discussed in relation to the introductory course.

3.2.1 Three Student Audiences: Majors, Non-Majors, Undecideds. As opposed to nearly every other traditional IS course, the introductory course often includes a large percentage of students not majoring in IS (Davis et al., 2005; Pendegraft & Byers, 2000). It would be inaccurate, however, to presume all students are either majoring or not majoring in IS. Often, many students in the introductory course are undecided (Salisbury et al., 2004). Thus, an instructor is usually addressing

three audiences: IS majors, non-IS majors, and undecideds. Herniter (2008) addresses the challenge of the three audiences directly, noting that instructors are faced with the decision of how they want to focus the course. Inherent to this discussion is the assumption that instructors cannot adequately meet the needs of all three audiences simultaneously, as their needs are rarely complementary. Niederman et al. (2011) offer an exemplar solution. Regarding the teaching of IS ethics, they describe how instructors can use the same example with different foci. For students majoring in IS, instructors can focus on IT-related implications. For other majors, instructors can focus on broader implications. In this way, the same exercise can be uniquely tailored to different audiences.

3.2.2 IS Enrollment: “Gateway” into the IS Program.

Another unique characteristic of the introductory course is that it serves as the “gateway” to the IS field for many undergraduate students. The structure of many undergraduate programs gives business students the flexibility to select (or change) their major concentration after taking a set of core courses exposing them to foundations in marketing, accounting, finance, and so on. As one of these core courses, the introductory course provides the same role in the program structure and gives students an opportunity to select (or convert to) a major concentration after exposure to course material (Firth et al., 2008).

This is particularly important given the diversity of modern IS careers. Course content at the introductory levels gives students the capacity to make informed decisions about opportunities to specialize in technical skills (e.g., data analysis or software development) and curricular areas (e.g., information security or project management). Thus, the introductory course provides an opportunity for instructors to excite students about the possibilities within the field at a time when they have the most flexibility in their anticipated career paths (Dick et al., 2007).

In addition to the structural benefits of the introductory course within the broader undergraduate course sequence, research suggests that the three student audiences (majors, non-majors, and undecideds) enter the introductory course with misconceptions about the IS field and negative stereotypes about its professionals. As the “first formal introduction” (Akbulut-Bailey, 2013) to the field of IS, the introductory course has a significant role to play in exciting students about course material, educating them about career opportunities, and dispelling negative stereotypes about IS professionals.

The IS enrollment crisis in the early 2000s underscores the importance of understanding the “gateway” role of the introductory course and comprises one of the most prominent themes in this literature. Analyses on IS departmental enrollments suggest that, in IS programs in the United States, student enrollments peaked in the Fall 2000 semester and then declined precipitously such that Fall 2004 enrollment numbers were below those from 1995 (Dick et al., 2007; George et al., 2004). Annabi and McGann (2015) noted an initial, dramatic free fall period followed by a second period of slower decline and then a period of very slow recovery. Between 2001 and 2007, student enrollment in IS programs declined by as much as 80 percent worldwide (Granger et al., 2007).

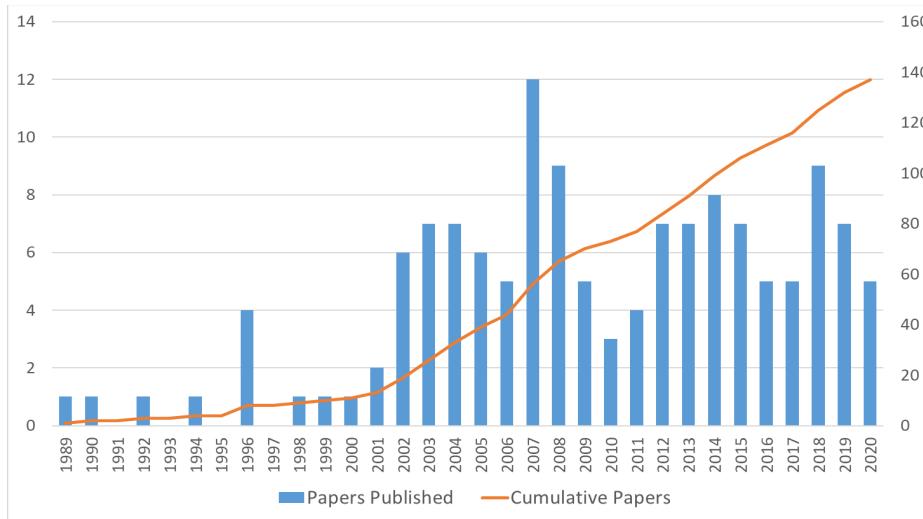


Figure 1. Publications by Year

The dramatic decline in student enrollment in the IS major during this time sparked significant introspection in the field with dozens of research papers, commentary pieces, and conference symposia dedicated to addressing the crisis. Research and commentary on the IS enrollment crisis primarily target the introductory course for intervention. The early position of the introductory course in the students’ broader course sequence presents opportunities for intervention when students have not yet declared a major.

Despite generating significant discourse on the matter, the published work on the enrollment crisis has not conclusively established a cause for the crisis. Some scholars speculate that fluctuating enrollments could be caused by macro-level trends in organizational enterprise resource planning (ERP) implementation. According to this explanation, the pre-2000s boom of IS enrollments is related to the rapid rise of ERP implementations during that time; the subsequent decline in enrollments mirrors the reduced demand for these types of organizational transformations after firms had finished their initial implementations (George et al., 2004). Other scholarship in this vein suggests that declining enrollment numbers are symptomatic of a disconnect between IS programs and the demands of industry employers (Dick et al., 2007). While these industry-level analyses can generate compelling explanations for issues in program enrollment, other scholars point to local issues arising from introductory courses failing to correct student misconceptions about IS careers.

As the academic discourse surrounding the IS enrollment crisis matured, a stream of research emerged that compared student preconceptions of IS practice before and after taking the introductory course. This scholarship suggests that students often perceive IS professionals as “geeks, mostly male, intelligent, technically oriented, and lacking managerial skills” (Akbulut-Bailey, 2013). Akbulut-Bailey’s work points to the importance of countering these stereotypes in the introductory course to give students a balanced view of the people who work in IS careers and the roles they perform in their work. Emerging evidence suggests that the scale of introductory courses presents unique opportunities to present countervailing narratives about racial and ethnic diversity in the field by using

course teaching assistants to help with relatability—particularly for women of color (Tari & Annabi, 2018). Empirical studies show that an effective introductory course can help to dispel these stereotypes and encourage broader student enrollment in IS programs.

Relatedly, some studies suggest many undergraduate students have internalized myths about the dangers of IT outsourcing—worrying there will be no jobs available to them upon graduation (Dick et al., 2007)—and that IS professionals experience a harmful “technostress” in their careers because of the ways they aggressively confront new technologies (Connolly & Rush, 2019). An effective introductory course uses both curricular and pedagogical strategies to give students an accurate perspective into the career paths available, the growth opportunities along those paths, and the potential risks of disruption.

3.3 Pedagogy

The majority of literature on the introductory course details various pedagogical approaches applied to the course. Some of these approaches are specific to one content area (cybersecurity, software development, strategy, etc.), though others encourage a broader approach to teaching the entire class. Most of the approaches are common for undergraduate education in general—including flexible and active learning and using case studies and projects—rather than offering specific or unique approaches for the introductory course. It is important to note that most of these studies report results from implementation at a single university and rarely reference IS studies conducted elsewhere. This limits the generalizability of the results to other campuses and prevents researchers from drawing strong conclusions about the best practices for teaching the course across campuses.

With this in mind, we present an overview of the reported strategies as they relate to the introductory course. Additionally, we discuss some of the tools used to help bridge the technological skill gap often present in the introductory course—which is crucial in fully engaging all student audiences in active learning. Lastly, because the introductory course can have massive enrollments per section, we discuss some of the

approaches that have been successfully applied in large sections.

3.3.1 Engaging Students. Active learning requires engaging students in the learning process, often by studying ideas and then solving problems or otherwise applying what they have learned (Chen & Brabston, 2009). This generally requires employing high impact practices—techniques and designs proven to be beneficial for student engagement and successful learning—such as collaborative assignments and projects, creating learning communities, and incorporating writing-intensive deliverables (Jones, 2015); it could also include collaborations with other disciplines to further engage students in both IS and finance topics (e.g., Aytes & Byers, 2005).

To facilitate incorporating active learning into the classroom, instructors often adopt a flipped classroom approach—either fully or partially. Flipped classrooms replace traditional lecture with interactive work and exercises during in-person classes, often requiring students to arrive to class having viewed a pre-recorded lecture and having read the required materials on their own time (Wright et al., 2012); in a partially or semi-flipped classroom, there is still some traditional lecture provided in class, though it is broken up with small group discussions and attention re-setting activities (Connolly & Rush, 2018; Makkonen, 2006) or supplements a pre-recorded content lecture with a discussion of concepts as they apply in practice (Strecker et al., 2019). Alternatively, instructors may employ a team-based learning (TBL) approach. The TBL promotes higher-level thinking skills in students by stimulating curiosity, student interdependence, and individual accountability within small teams via cooperative learning structures (Goh et al., 2020). Additionally, active learning approaches may combine with flexible learning approaches—offering choices (e.g., when and where to study, which technology to use, how to communicate with the instructor or other students, when assignments are due, and which scenario or activity to complete) to better meet individual student needs (Abraham, 2002; Bakke et al., 2007; Bryant et al., 2001, 2003; Guthrie, 2010).

All of these approaches are supported through the use of learning management systems (LMSs) or course websites for distributing course materials, creating a clear course structure and progression for students, and facilitating communication among students outside of class (Bakke et al., 2007; Bryant et al., 2001, 2003; Guthrie, 2010; Mukherjee & Bleakney, 2017). Most LMSs include functionality to allow students to make multiple attempts on assignments and other assessments (Bakke et al., 2007), as well as adaptive release—which prevents students from progressing in the course until specific activities have been completed (Moore & Rutledge, 2018). The latter may be especially useful in TBL approaches where individual activities should be completed prior to related team activities (Goh et al., 2020).

While the literature provides a range of activities that can be deployed in classes to engage students, the majority feature case studies and projects. The expected outputs of these activities vary from participation in class discussions to providing documentation and/or functioning applications. For example, Max Labs is an interactive case study that teaches students how to use Salesforce (Hill et al., 2017; Hill & Nance, 2016); relatedly, Wright et al. (2012) use a final project that requires students to design, build, and manage an enterprise

system in Salesforce for a fictional business. Brady and Denison (2006) assign a project requiring written documentation and technical deliverables for a small business requiring a new database and website. Sankar and Wu (2015) partnered with external clients to assign students to an experiential learning activity using GPS technology. Some projects and cases described in the literature require budgets, diagramming, feasibility analyses, and other documentation related to planning and adopting new IS for strategic purposes (Chen & Brabston, 2009; Eierman & Schuldt, 1998; Mitri et al., 2017; Pollalis, 1996). Other activities involve researching current trends, events, or technology and creating detailed reports to present to the class (Gudigantala, 2013; Oakley & Church, 2018; White & Lester, 2002). These are in addition to case studies about CIO decision-making (Rodon, 2013), IT-alignment with corporate strategy (Clark, 2016), information ethics (Niederman et al., 2011), and the role of IS in protecting intellectual property (Willey et al., 2011).

Although the literature generally lauds the positive learning outcomes and student experiences with these teaching approaches, it tends to highlight two concerns with integrating more hands-on learning into the classroom: 1) the amount of content covered, and 2) synthesizing the content with the activities. As with most foundational courses, there is a vast amount of information that can be covered in the introductory course; when integrating more activities, instructors need to carefully consider which topics are most important to cover and reduce overall content (i.e., covering fewer topics or cover topics in less depth) to avoid overwhelming students' cognitive load. Regarding the second concern, extant literature notes that students may struggle to understand how the activities supplement and reinforce course content, so instructors must help students make those connections. One study provides a solution to both of these concerns: ensure the IS story is the anchor and guiding force for both content and activity selection (McGuire & Benamati, 2018).

3.3.2 Software and Online Tools. The literature discusses and introduces a variety of tools for use in the introductory course. Software and online tools provide an opportunity for students to engage more directly with course concepts. This is unique to the introductory course over most other foundational courses in the business school because the course content deals directly with technology and technological solutions. Requiring students to interact with software and online tools adds depth to the content of the course without necessarily adding to student costs as most are free for students, open source, or offered through the university.

Software and online tools may be adopted for part or all of the course, depending on features and applicability to various topics. Some tools—like Hour of Code (Du & Wimmer, 2019) and web API tools (Olsen & Moser, 2013)—support deeper but brief (one to two class periods) student engagement with a specific course topic (e.g., programming, IS development). Other tools, such as ACT-Online (Luo & Schatzberg, 2009), provide students an opportunity to earn a certification while engaging with a topic over a longer time horizon (i.e., several weeks). Some classes are more ambitious, teaching students diagramming (Grenci, 2005; Jones, 2015; Lavin et al., 2018), Visual Studio (Ghosh, 2012; Ghosh et al., 2014), structured query language (Ghosh et al., 2014; McGuire & Benamati, 2018), SAS Enterprise Miner (Hassan Zadeh et al., 2016), or

SAP (Johnson et al., 2004; Pridmore et al., 2014). A handful of studies used software such as Salesforce.com (Wright et al., 2012) and Microsoft SharePoint (Firth et al., 2008) to organize the entire course and immerse students in enterprise software, making the tools an integral component of the course experience.

Tools such as Excel and other Microsoft Office products (Grenci, 2005; Jones, 2015; McGuire & Benamati, 2018; Nguyen & Ulbrich, 2013; etc.) focus on improving student computer literacy and practical skills. However, some IS programs have de-emphasized this aspect of the course in redesigns because students developed a limited view of the role of IS in industry and the opportunities in IS careers.

3.3.3 Special Considerations for Large Class Sections. One of the challenges of teaching the introductory course is that section sizes vary widely across programs and universities, complicating the transfer and use of knowledge among educators. Some of the pedagogy-focused literature for this course is applied specifically to large (i.e., 50 to upwards of 300 students) in-person or online sections. In this section, we highlight three key lessons from the introductory course literature for large class sections: engaging students, implementing teams, and leveraging online tools.

First, it is possible to incorporate active learning, flexible learning, and flipped classroom approaches to larger class sections (Aitken & Hatt, 2012; Bakke et al., 2007; Guthrie, 2010; Mukherjee & Bleakney, 2017; Sclarow & Raven, 2020; Sylvester & Hooper, 2007, etc.). One approach is to use student response systems (i.e., clickers) within lectures to check understanding, gauge student opinions, start class discussions, and reset attention (Hauck & Nelson, 2006; Nelson & Hauck, 2008; Riordan et al., 2017; Whitney et al., 2019). This has been shown to increase student motivation and improve class attendance (Hauck & Nelson, 2006). In a different approach, Bakke et al. (2007) describe implementing competitive pop quizzes during class, where students are randomly selected to compete in one of three formats (individual, team, or individual with audience support) for prizes.

Building on the first lesson, students in large enrollment classes can be further engaged through TBL and small group activities. Using informal, small group activities within lectures requires no grading or completion grading while encouraging students to engage with each other and the material, allowing students to learn from each other and reducing their reliance on the instructor or limited teaching assistant (TA) support (Connolly & Rush, 2018; Gudigantala, 2013; Sclarow & Raven, 2020). Alternatively, formal group assignments may comprise most of the graded activities in order to engage students in case studies and projects while reducing the time required to grade (Bromberg et al., 2013; Goh et al., 2020; Riordan et al., 2017; Sylvester & Hooper, 2007).

Lastly, to successfully engage students and implement teams in large sections, it is crucial that instructors leverage online tools. One strategy is to rely more heavily on a course website or LMS to provide additional resources—such as links to external websites, YouTube videos, and custom graphic novels to summarize content and case studies—and flexibility for students—via self-guided skills practice, self-paced quizzes, multimedia resources, and opportunities to repeat activities (Aitken & Hatt, 2012; Bakke et al., 2007; Bryant et al., 2001; Guthrie, 2010; Mukherjee & Bleakney, 2017). For TBL, the

LMS also facilitates team communication and, potentially, file sharing (Makkonen, 2005). The instructor has more front-end work identifying and preparing appropriate resources and setting up the course online, but this enables students to learn content in their preferred format without significantly increasing the amount of grading required in most cases. Additionally, online tools exist to facilitate skills development without unreasonable increases to the amount of graded work. Software like MyLabIT offers autograded and guided skills assignments in Excel (Nguyen & Ulbrich, 2013). Extended case studies like Max Labs provide easy to adopt activities, though it is recommended to have TA support when using the program in large sections (Hill et al., 2017; Hill & Nance, 2016). Certification or other online programs may also have autograded components—such as ACT-Online or Hour of Code—though these may not include integrations to easily transfer grades into an LMS (Du & Wimmer, 2019; Luo & Schatzberg, 2009).

3.4 Curriculum

IS scholars have, for decades, discussed best practices for deciding what to teach in the introductory course. The challenge posed to instructors is as much about which topics to add to the course as it is about which topics to remove. The variety of potential subject matters in the introductory course forces instructors to identify what is most relevant to students.

While numerous articles over the years have discussed the standard curriculum for the introductory course, much of that conversation is either outdated or unnecessary in light of the IS2020 standard, which defines many of the curricular standards for the “Foundations” competency (see Leidig & Salmela, 2020). For example, in the early 1990s, one discussion surrounded whether to teach IS documentation in the core course (O’Brien & VanLengen, 1992), a concept now widely considered to be unnecessary. Therefore, this section highlights the enduring challenges noted by researchers related to developing a curriculum that properly provides students with relevant and necessary competencies. In determining the curriculum for the introductory course, instructors must achieve two primary objectives. One objective is to introduce the discipline of IS, both as a means of informing potential majors and underscoring the importance of IS to students who may soon enter the workforce. The second objective is to teach students the set of core competencies needed for future courses and/or their careers after academia (Salisbury et al., 2004). These dual challenges, introducing and teaching, pose unique challenges in determining the most effective curriculum for the introductory course.

3.4.1 Introducing Information Systems. The first major objective in determining introductory course curriculum is introducing the field of IS. While there is variability across programs, most universities offer the introductory course to students relatively early in their college careers, before they have taken courses in their major (if already selected). As such, the introductory course provides a unique opportunity to advertise the merits of IS. For students already committed to a different major, the need persists to introduce IS, but for a different purpose: students majoring in other disciplines must understand the importance of IS to achieving organizational aims (Davis et al., 2005).

One of the fundamental challenges in teaching the introductory course is communicating the central definition of IS as a field of study (Salisbury et al., 2004). More practically, the challenge is how to distinguish IS from other, related disciplines—most notably computer science (CS) (Firth et al., 2008). This challenge pertains to course concepts as well as the difference between IS professionals and those from other disciplines. The introductory course provides the opportunity to differentiate IS professionals and discuss what makes them unique (Akbulut-Bailey, 2013). The recommendation from many scholars in solving this problem is to emphasize that IS involves the use of technology within businesses (Salisbury et al., 2004; Wright et al., 2012). While reference disciplines may provide some of the content within the course, the focus should be on the unique facets of IS beyond those reference disciplines (Hassan, 2008). For example, whereas CS may provide content related to the tactics of computer security (e.g., encryption), the unique component of IS lies in discussing the need for security and how organizations can develop strategies to maximize their security. The unique contribution of IS within organizations is a vital, yet difficult, concept to convey.

Related to this challenge is the decision regarding which concepts best introduce the IS discipline (Hassan, 2008). Nearly all scholars recognize the need to discuss the application of IS within organizational contexts, but the crux of the difficulty lies with how technical the course content should be. Some scholars lament the reduction in discussions regarding systems and technology (e.g., Salisbury et al., 2004); others argue for focusing on the organizational benefits of IS (e.g., Wright et al., 2012). Instructors must determine the proper balance between technology and application in determining the curriculum of the course. Too much technology risks misidentifying the discipline as CS. Too little technology risks losing the discipline's primary artifact. In making this determination, instructors must recognize that the goal is not merely to teach certain concepts, but also to properly introduce the discipline.

3.4.2 Teaching IS Concepts/Skills. Both the recommended concepts and skills taught in the introductory course have changed over the years. Many of the subjects promoted in the past would not be recommended today. However, while the specific material for the course is always in flux, there are some consistent challenges noted by scholars inherent to selecting course content. In this section, we focus on those broader themes and offer recommendations for instructors teaching the course.

3.4.2.1 Breadth Versus Depth. One of the most common challenges regarding concepts and skills is the decision regarding the breadth and depth of the curriculum. Opinions among scholars differ, with some promoting a generalist approach (in favor of broad and shallow curriculum focused on the multi-faceted nature of IS) and others promoting a specialist approach (in favor of depth, covering fewer topics with greater intensity). Generalist scholars point to the wide-ranging impact of IS in the business world. As such, the opportunity exists to demonstrate the myriad of ways in which IS impacts businesses (McCoy et al., 2015). Much of the literature discussing breadth in curriculum focuses on the dual technology/business nature of the discipline and, thus, the course (Case et al., 2019; Ghosh et al., 2014; Wright et al., 2012). Beyond the business focus, some scholars advocate for a generalist approach by discussing the

broad range of IS concepts. Even staying within the core IS concepts provides a broad curriculum necessary for students to learn (Chen & Brabston, 2009).

Specialist scholars focus on the difficulty in teaching a broad array of concepts. They argue that, if left unchecked, the introductory course may produce “weak generalists” who lack sufficient knowledge in any area (Hassan, 2008) due to a superficial understanding of the material (van Over & Stover, 1994). Beyond the difficulty of a broad curriculum, the opportunity exists to help students understand the material through a more focused curriculum. One example of this is using a core “story” that permeates through the material (McGuire & Benamati, 2018). The benefit of a core story is that it emphasizes both breadth and depth. For example, if the core story for the introductory course is “information systems help managers make better decisions,” then the breadth comes from connecting course content to that story, while the depth comes from maintaining a focus on the story throughout the course. Beyond core stories, some scholars recommend central topics to focus the curriculum. Recommendations include business process integration (Hershey, 2003) and digital disruption (Case et al., 2019), though this will naturally change with the times.

The aim for instructors should be to find the appropriate balance between breadth and depth without sacrificing content or rigor. Instructors must consider the length of their course, the capacity of their students, and their goals of instruction in making this decision.

3.4.2.2 New Technologies Versus Classic Theory. Another common debate is the balance between discussing new, innovative technologies and focusing on more fundamental concepts that are immune to technological fluctuations. The argument in favor of new technologies is two-fold. First, discussing new technologies is a “low-hanging fruit” (Olsen & Moser, 2013) that is interesting for students, thereby serving as a marketing tool for the discipline (Firth et al., 2008). Second, new technologies help prepare students for the working world they are about to enter. Maintaining currency with regard to technology is central to AACSB accreditation (Milovich et al., 2020) and helps students find jobs, which is a key motivation for learning (McCoy et al., 2015). In terms of recent suggestions for newer technologies to promote in the introductory course, scholars have proposed blockchain (Milovich et al., 2020) and machine learning (Lukyanenko, 2018).

Conversely, there are many who discourage the use of new technologies in the introductory course. Maintaining currency requires a regular revision of curriculum, which hinders forming a consistent identity and raises questions about the legitimacy of the discipline (Case et al., 2019). A high level of technology intensity in the course may lead to technostress among students (Connolly & Rush, 2019), which may reduce the excitement for covering new technologies. Therefore, many faculty focus on more long-term knowledge than the short-term benefits of fashionable technologies (McCoy et al., 2015).

One clear theme across these two challenges is the need to discuss IS concepts within the broader contexts in which they are enacted (McCoy et al., 2015). Without the contextual discussion, we risk misinforming students that IS is a technical discipline lacking relevance in the “real” world. Difficult decisions abound regarding how to determine what to teach in

the introductory course, but the organizational context remains a vital component whichever approach is selected.

4. DISCUSSION

The importance and prevalence of the introductory course have motivated a vast literature over the past few decades. One of the goals of this paper is to draw attention to that literature in order to aid instructors and pedagogical researchers in using its insights. Another goal is to recommend future research directions on the introductory course. In this section, we do so through two means. First, we provide a summarizing research framework for situating prior and future research on the topic. Second, we offer directions for future research, both at the micro and macro levels.

4.1 Research Framework

Condensing the multitude of literature into a parsimonious framework is difficult to do perfectly. Researchers have discussed the introductory course from so many angles and levels of abstraction that a synthesis incorporating all literature would be too complex to easily understand. Nonetheless, from a broad vantage point, a general understanding can be obtained.

The three pillars of the literature are curriculum (what to teach), pedagogy (how to teach), and IS program enrollment (“gateway” of the IS program). Nearly every paper in our review of AIS articles and conference proceedings focused on one or more of these topics. While each of these pillars is interesting on its own, we note that opportunities abound for studying the intersections of these pillars. For example, although we found many papers that discuss a compelling new concept for the course (curriculum), some papers go further and discuss how to teach that new concept (curriculum + pedagogy). Similarly, many papers discuss novel approaches to teaching the core curriculum (pedagogy), while some go further and consider how a certain approach might entice more students to major in IS (pedagogy + enrollment). Figure 2 shows the number of papers that fall within each pillar and their intersections.

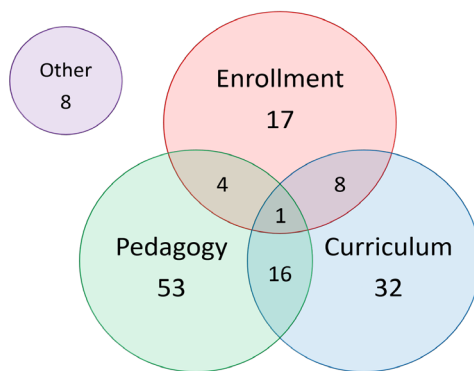


Figure 2. Three Pillars of the Literature

4.2 Limitations and Directions for Future Research

There are several opportunities for future studies on how best to teach and facilitate the introductory course in IS. In

examining the literature, we have identified some shortcomings in the extant research that future studies should work to rectify. Most notably, the literature in this stream is fragmented and lacks a cumulative tradition. This may be partially due to the variety of names used to reference the introductory course, which makes it challenging to locate extant studies. Contextualized to this review, while we endeavored to be as comprehensive as possible in locating papers relevant to the introductory course, it is almost certain that more remain due to the discrepancies in naming and description. To address this issue going forward, we recommend that scholars refer to the course as “introduction to information systems” or, more colloquially, “intro to IS” in keywords and article titles.

Fragmentation in the literature may also be due to the variations in course offerings across different universities, departments, instructors, etc. Differing motivations and limitations (self-imposed or otherwise) necessitate significant variation in the manner by which the course is taught. As such, there are very few recommendations, if any, that can be deemed applicable to all instructors of the introductory course. Centering the curriculum on the application of technology within organizations (Wright et al., 2012) will look far different, if present at all, when taught outside of a business school. Pedagogically, the use of social media to enhance student learning (Racham et al., 2010), while laudable, may not be appropriate for a setting where students have limited access to technology outside of the classroom. It is one of the responsibilities of an instructor teaching the introductory course to make the pedagogical and curricular decisions that align with the unique needs of their context.

Although this literature review should help alleviate the fragmentation of this literature by identifying keywords with which to find relevant studies and summarizing extant work, the onus of unifying this research stream rests with researchers; they must intentionally engage with completed research to increase the generalizability of their studies.

In addition to the fragmentation of the literature, we also observe a lack of theoretical lenses. While pedagogical and curricular recommendations are made with logical grounding, there is rarely theory to drive that logic. Of the 137 articles in our corpus, only 21 (15%) contained propositions or hypotheses in some form. Relatedly, when empirical evaluations are made, the predominant method of investigation is a single case study. The primary shortcoming of a single case study is the limited generalizability to other settings; one way to increase generalizability of the findings is to expand the case study to multiple universities. Integrating more theory into studies (which helps promote replicability) and increasing the generalizability of results to other campuses are essential to developing a body of knowledge and demonstrating practical implications.

Another area for future research to consider is what other dependent variables matter in evaluating an intervention in the introductory course. Enrollment, student knowledge, and student evaluations of the course tend to be the primary outcomes of interest. However, some scholars have begun to advocate for considering psychological outcomes like technostress (Connolly & Rush, 2019) and enjoyment (Olsen & Moser, 2013). We encourage future researchers to continue taking student well-being into consideration, in addition to longer-term impacts—such as preparation to work in teams,

improvement to social/soft skills, and the effects of course satisfaction on enduring enrollment in the IS major.

More generally in terms of research topics, we encourage researchers to consider how to make the introductory course more accessible. As the recent pandemic has shown, the digital divide is still a serious concern, with implications for IS classrooms. As a community, we should focus on interventions that make the IS classroom inherently more accessible and inclusive to all students.

Lastly, enrollment is a main theme in the introductory course literature. However, interest ebbs and flows depending on the current state of enrollment; this indicates a reactive approach to enrollment crises which can be helpful in correcting downward trends but is less so in identifying potential new threats to enrollment. Future research should investigate how to effectively communicate the value of an IS degree, particularly considering the proliferation of online courses and certifications, the increasing prevalence of analytics curriculum in other business disciplines, the antitrust investigations of large technology companies, and other trends in the broader environment. By recognizing threats before they significantly impact enrollment, we can begin discussing the pedagogical and curricular remedies to implement in the introductory course that will help prevent future enrollment crises.

4.3 Implications for Course Development and Teaching

Our literature review offers several practical implications for IS program managers and introductory course instructors. First, we synthesize many of the arguments and positions surrounding the breadth versus depth argument as it pertains to curriculum in the introductory course. This ongoing debate presents a challenge for IS programs, particularly for those desiring to use the introductory course as a “gateway” to the major. It is further complicated by the ever-changing nature of the IS discipline—both in academia and in industry. Every program is different and will take sides on this question depending on their program and objectives; however, our discussion of this debate may illuminate why programs choose various approaches and explain why this tension persists.

Second, we reveal the lack of empirical support for using the introductory course as a recruitment tool. Studies about program enrollment and the introductory course fall short of establishing causality or clear relationships that can be replicated in future studies or in practice. There is clearly interest in the introductory course’s ability to educate students about IS careers and to entice some students to continue in IS coursework. However, the current literature provides little guidance on how best to leverage the introductory course as a recruitment tool. Program managers should be discerning in altering the introductory course to this end given that guidance in the literature tends to be anecdotal instead of empirical.

Third, we highlight various pedagogical approaches taken in teaching the introductory course. While the generalizability of the results may be limited due to the design and nature of the studies, it is clear that instructors are primarily concerned with engaging students in learning—even in large enrollment sections of the introductory course. The vast majority of the pedagogy-centric literature emphasizes active learning approaches, sometimes in combination with flexible learning, flipped classrooms, and TBL. Some studies encourage pushing students to engage with more technical elements through guided activities (e.g., Max Labs, Hour of Code) or semester-

long projects that require documentation and technical deliverables (most times emphasizing low-code or no-code solutions). The shift is clearly towards providing students opportunities to interact with IS concepts in applied activities to build computer and information literacy skills—regardless of initial technical ability; luckily, there are an increasing number of online resources available to support instructors and students in this endeavor. This trend, however, also means instructors must be more discerning about which topics to cover in the course in order to 1) ensure clear connections between activities and content covered and 2) prevent overwhelming (and, thus, disengaging) students.

In summary, this review and the accompanying curation saves instructors valuable time in searching for research on the introductory course, enabling them to more quickly find guidance, resources, and inspiration with which to experiment in their classes.

4.4 Implications for Research

This literature review highlights a couple of implications for academia and the future of this research stream. First and foremost, this is the first literature review—of which we are aware—analyzing the research about the introductory course. This work is valuable because interest in this course as a focus of research has persisted; as such, there is value in reflecting on what knowledge has been accumulated and in providing guidance and direction for new studies. To that end, our review primarily highlights the fragmented nature of this literature. This may be due in large part because studies in this area arise out of convenience and circumstance—e.g., in many cases, the course or the entire IS program is being overhauled, thus presenting an opportunity to discuss the results and implications of those changes—instead of grounding studies in theory and extant research. This tendency is especially evident in that only approximately 15% of the articles include formal hypotheses and over 30% of the articles we examined are context-specific cases reliant primarily on student evaluations and qualitative data. Because this stream is fragmented and ungrounded, it is unclear what knowledge has been gained about the introductory course and which findings are more broadly generalizable to other campuses and classrooms.

Second, we have organized the literature around three primary themes: enrollment, pedagogy, and curriculum. Given the fragmented nature of the literature, this framework enables us to better conceptualize the various conversations within this stream of research; it also provides a starting point for positioning future studies at interesting intersections between these themes. For example, enrollment continues to be an area of concern for IS programs, and the literature often points to the introductory course as central to effective recruitment strategies. However, research in understanding how pedagogy and curriculum in the introductory course can be used to attract students to the IS major often lacks empirical evidence that changes to the course increased program enrollment. As such, future research has an opportunity to explore the intersections of enrollment with pedagogy and/or curriculum to better understand the possible impact of the introductory course on increasing the number of IS majors.

5. CONCLUSION

The introductory course in IS sits uniquely among the catalog of IS courses because of its numerous challenges. Instructors must introduce the discipline to students that may have little technical background. This often requires teaching a wide variety of challenging topics while advertising the discipline because a successful and popular course could increase IS program enrollments.

In this paper, we discussed the most pertinent challenges presented in the literature surrounding the introductory course. Our overall impression is that many often-diverging solutions have been suggested for the plethora of challenges, yet few solutions have been studied in ways that generalize to other IS programs. We hope this paper serves to frame those discussions in a manner that encourages more definitive and empirically supported recommendations for those tasked with teaching the course.

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APPENDIX

List of Identified Papers with Framework Coding

#	Short Cite	Outlet	Title	Curriculum	Enrollment	Pedagogy	Other
1	C. Adams and J. Song, 1989	MISQ	Integrating Decision Technologies: Implications for Management Curriculum	X			
2	J. R. Troxell, 1990	JISE	Combining Statistics and Information Systems: The La Salle Experience	X			
3	J. A. O'Brien and C. A. VanLengen, 1992	JISE	Evaluating Information Systems Documentation Techniques	X			
4	D. van Over and D. L. Stover, 1994	JISE	Object-Oriented Design: A New Approach to Curriculum Development	X			
5	Y. A. Pollalis, 1996	AMCIS	Teaching & Learning Strategies for Introductory Information Management: Lessons from Group-Based Classroom Experiences			X	
6	G. L. Boyer and L. J. McKell, 1996	JISE	Information Systems Knowledge and Skills for the Business Management Undergraduate	X			
7	J. A. Lawrence and S. Reisman, 1996	JISE	Information/Systems and Quantitative Core Courses in AACSB Accredited Business Schools	X	X		
8	M. C. Jones and R. A. Pearson, 1996	JISE	The Relationship Between Computer Literacy and Education: An Empirical Assessment	X			
9	M. Eierman and B. Schuldt, 1998	AMCIS	Interactive Cases in MIS			X	
10	G. Schell, 1999	AMCIS	The "Introduction to Management Information Systems" Course Goes Online				X
11	N. Pendegraft, R. W. Stone and C. R. Byers, 2000	JISE	Using Information Systems as a Unifying Influence in An Integrated Business Curriculum	X			
12	K. Bryant, J. A. Campbell and D. Kerr, 2001	ACIS	Flexible Learning and Academic Performance in Information Systems			X	
13	D. Lending and S. Kruck, 2001	AMCIS	Some Determinants of Student Performance in the First College-Level IS Course		X		
14	R. Quinonez and R. Guthrie, 2002	AMCIS	Computer Based Training, Computer Self-Efficacy, and Beginning Computing			X	
15	S. White and W. Lester, 2002	AMCIS	The IT Workforce Challenge: Adoption of IT Careers by Minority Groups—Issues and Recommendations		X	X	
16	R. Abraham, 2002	JISE	Evaluating the Virtual Management Information Systems (MIS) Classroom			X	
17	L. E. MacDonald and K. T. Fougere, 2002	JISE	Software Piracy: A Study of the Extent of Coverage in Introductory MIS Textbooks	X			

#	Short Cite	Outlet	Title	Curriculum	Enrollment	Pedagogy	Other
18	D. Sirias, 2002	JISE	Writing MIS Mini-Cases to Enhance Cooperative Learning: A Theory of Constraints Approach			X	
19	W. Wehrs, 2002	JISE	An Assessment of the Effectiveness of Cooperative Learning in Introductory Information Systems			X	
20	D. Salisbury, M. Huber, and C. Piercy, 2003	AMCIS	Panel Session on Is 2002.1 -- Fundamentals of Information Systems	X			
21	C. Sankar and P. Raju, 2003	AMCIS	Teaching A Real-World Decision-Making Process Using Information Technology Tools			X	
22	G. L. Hershey, 2003	CAIS	A Different Focus and Content For the Core Information Systems Course For Business School Majors	X			
23	J. W. Beard and T. O. Peterson, 2003	JISE	Coming to Grips with the Management of Information: A Classroom Exercise			X	
24	D. Kerr, A. Troth and A. Pickering, 2003	JISE	The Use of Role-Playing to Help Students Understand Information Systems Case Studies			X	
25	J. D. Holmes, 2003	JISE	The Introductory MIS Course: Using TQM to Tame the Widow-Maker				X
26	K. Bryant, J. Campbell and D. Kerr, 2003	JISE	Impact of Web Based Flexible Learning on Academic Performance in Information Systems			X	
27	J. Dyer, R. MacKinnon and T. Case, 2004	AMCIS	What Intro Students Know About Computer Concepts	X			
28	K. Aytes, 2004	AMCIS	Adding Value to the Core Business Curriculum: Innovative Use of IS Courses	X			
29	W. B. McKenzie, M. Brickley, S. Reid and M. Yuan, 2004	AMCIS	IS2002 Curriculum Redesign: A Small College Response (Research in Progress)	X			
30	W. D. Salisbury, M. W. Huber, C. Piercy and K. L. Elder, 2004	CAIS	The AMCIS 2003 Panels on IS Education-I: Let Us Not Throw Out the Baby with the Bath Water: Information, Technology, and Systems All Matter in the Core IS Course	X			
31	J. George, J. Valacich and J. Valor, 2004	ICIS	Does Information Systems Still Matter? Lessons For A Maturing Discipline		X		
32	T. Johnson, A. C. Lorents, J. Morgan and J. Ozmun, 2004	JISE	A Customized ERP/SAP Model For Business Curriculum Integration			X	
33	T. Case, R. MacKinnon and J. Dyer, 2004	SAIS	Computer Literacy and the Introductory Student: An Analysis of Perceived and Actual Knowledge of Computers and Computer Applications	X			
34	A. Durfee, S. Schneberger and D. L. Amoroso, 2005	AMCIS	Computer Based Assessments of Student Performance in Hybrid Classes: Does Class Size Really Matter?			X	

#	Short Cite	Outlet	Title	Curriculum	Enrollment	Pedagogy	Other
35	P. Makkonen, 2005	AMCIS	Is Web Based Seminar An Effective Way of Learning as A Part of Information Management and Information Systems Development Course?			X	
36	K. Aytes and S. Byers, 2005	CAIS	Innovation in Information Systems Education-IV Mutual Fund Management Information System: An Integrated Project For the Introduction to MIS Course	X		X	
37	M. Frydenberg, A. A. Kamis and H. Topi, 2005	CAIS	Upgrading IT101 with Handheld Computers			X	
38	G. Davis, A. Massey and N. Bjoern-Andersen, 2005	ICIS	Securing the Future of Information Systems as An Academic Discipline	X	X		
39	R. T. Greci, 2005	JISE	Framing Electronic Commerce Within An Introductory Information Systems Course	X		X	
40	J. Brady and B. Denison, 2006	AMCIS	The Business Analyst—In Training	X		X	
41	N. Hassan, 2006	AMCIS	IT Literacy: The Idea of Emergent Literacy in IS Education	X			
42	P. Makkonen, 2006	AMCIS	Benefit of An Optional Problem-Based Seminar on the Web: Comparing Ways of Learning on the Web			X	
43	R. Hauck and M. Nelson, 2006	MWAIS	Embedding Student Clickers in An Introductory Management Information Systems Course			X	
44	A. B. Woszczynski and D. B. Geist, 2006	SAIS	A Comparison of College and High School Students in An Online IT Foundations Course				X
45	A. Y. Akbulut and C. A. Looney, 2007	AMCIS	Attracting Students to the IS Major: The Role of IT Sophistication in Introductory IS Courses		X		
46	G. Dick, M. Granger, C. Jacobson and C. van Slyke, 2007	AMCIS	Where Have All the Students Gone? Strategies For Tackling Falling Enrollments		X		
47	H. Koch and T. Kayworth, 2007	AMCIS	Using Information Systems Theory to Increase IS Enrollment		X		
48	R. V. Bradley, V. W. A. Mbarika, C. S. Sankar, P. K. Raju, and B. Kaba, 2007	CAIS	Using Multimedia Instructional Materials in MIS Classrooms: A Tutorial			X	
49	C. A. Looney and A. Y. Akbulut, 2007	CAIS	Combating the IS Enrollment Crisis: The Role of Effective Teachers in Introductory IS Courses		X		
50	J. S. Benamati, M. A. Serva, D. F. Galletta, A. Harris and F. Niederman, 2007	CAIS	The Slippery Slope of MIS Academia: A Discussion of The Quest For Relevance in Our Discipline	X			
51	N. P. Napler and R. D. Johnson, 2007	JISE	Technical Projects: Understanding Teamwork Satisfaction in An Introductory IS Course			X	
52	S. Bakke, R. H. Faley and G. Steinberg, 2007	JISE	A Student-Centric Approach to Large Introductory IS Survey Courses			X	

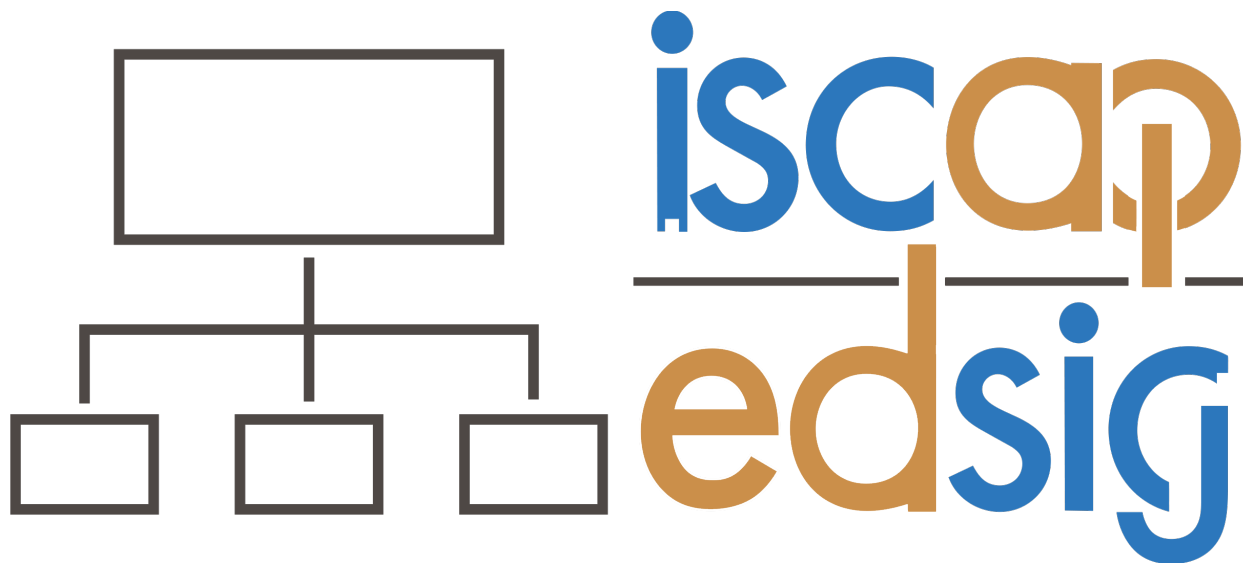
#	Short Cite	Outlet	Title	Curriculum	Enrollment	Pedagogy	Other
53	K. Phongkusalchit and J. Lin, 2007	MWAIS	The Effects of Foundation Course and Age in Decision Technology	X			
54	R. Karsten and D. Schmidt, 2007	MWAIS	Ten Years Later: Changes in Business Student Computing Efficacy	X			
55	A. Sylvester and V. Hooper, 2007	PACIS	Overcoming Teaching Challenges in A Foundation IS Course—An Intervention Study			X	
56	G. W. Couturier, K. Nelson, H. W. Webb and L. Webb, 2007	SAIS	Redesigning An Introductory Is Course as A Recruiting Tool For IS Majors	X	X		
57	B. C. Herniter, 2008	AIS SIGED	Early History of Survey and Core Courses with Implications For Information Systems Education	X			
58	A. Molla, H. Deng and B. Corbitt, 2008	AMCIS	Internationalizing the Information Systems Curriculum: A Case Study	X			
59	C. J. Navarrette and R. A. Guthrie, 2008	AMCIS	Challenges in Teaching Large Online Sections			X	
60	N. R. Hassan, 2008	AMCIS	Courting Multidisciplinary Illiteracy	X			
61	D. Schwieger, 2008	AMCIS	Examining Approaches to Effective Concept Delivery; One Professor's Approach in the MIS Survey Course			X	
62	D. Firth, C. Lawrence and C. A. Looney, 2008	CAIS	Addressing the Is Enrollment Crisis: A 12-Step Program to Bring About Change Through the Introductory IS Course	X	X	X	
63	R. M. Kesner, 2008	CAIS	Business School Undergraduate Information Management Competencies: A Study of Employer Expectations and Associated Curricular Recommendations	X			
64	D. J. Ballou and B. R. Huguenard, 2008	JISE	The Impact of Students' Perceived Computer Experience on Behavior and Performance in An Introductory Information Systems Course				X
65	M. L. Nelson and R. V. Hauck, 2008	JISE	Clicking to Learn: A Case Study of Embedding Radio-Frequency Based Clickers in An Introductory Management Information Systems Course			X	
66	F. Chen and M. Brabston, 2009	AIS SIGED	Total Cost of Ownership: A Project Integrating Multiple Topics For the Introductory IS Course	X		X	
67	X. Luo and L. Schatzberg, 2009	AIS SIGED	Results of An Online Information Security Module in A Required Introductory MIS Course	X		X	
68	K. Kozar and T. Miaszkiewicz, 2009	AMCIS	Designing the Introductory IS Course Using Student Personas: Lessons Learned From Product Design		X		
69	X. Zhang, V. Raghavan and B. Martz, 2009	AMCIS	Investigating IS Student Retention Factors		X		
70	C. Scott, M. A. Fuller, K. M. MacIndoe, and K. D. Joshi, 2009	CAIS	More Than A Bumper Sticker: the Factors Influencing Information Systems Career Choices		X		

#	Short Cite	Outlet	Title	Curriculum	Enrollment	Pedagogy	Other
71	P. Ractham, L. Kaewkitipong and D. Firpo, 2010	AMCIS	MIS2.0: Designing the Next Generation MIS Course Using Social Networking Technology			X	
72	T. W. Ferratt, S. R. Hall, J. Prasad, and D. Wynn, Jr., 2010	CAIS	Choosing Management Information Systems as A Major: Understanding the SMI Factors For MIS		X		
73	C. Guthrie, 2010	JISE	Towards Greater Learner Control: Web Supported Project-Based Learning			X	
74	H. Koch and J. Trower, 2011	AMCIS	How I Became IS: Understanding the Major Decision		X		
75	A. N. Attaway, S. Chandra, B. L. Dos Santos, M. E. Thatcher and A. L. Wright, 2011	JISE	An Approach to Meeting AACSB Assurance of Learning Standards in An IS Core Course	X			
76	F. Niederman, S. Taylor, G. Dick, and L. Land, 2011	JISE	Teaching IS Ethics: Applying A Research Technique For Classroom Use	X		X	
77	L. Willey, J. C. Ford, B. J. White and D. L. Clapper, 2011	JISE	Trade Secret Law and Information Systems: Can Your Students Keep A Secret?	X		X	
78	A. Aitken and G. Hatt, 2012	ACIS	A Preliminary Evaluation of the Use of Graphic Novels in Teaching Information Systems		X	X	
79	R. Wright, M. Kuykendall and J. S. Matsukawa, 2012	AIS SIGED	Re-Conceptualizing the Foundation IS Course	X		X	
80	S. Balkan and M. Sopha, 2012	AMCIS	I'm Going Mobile: Teaching Freshmen Business Students Mobile Application Development	X			
81	S. Ghosh, 2012	AMCIS	Innovating in the MIS Core Course— Bridging Business and Technology			X	
82	D. Gefen, A. Ragowsky, E. R. McLean, M. L. Markus, S. Rivard, and M. Rossi, 2012	CAIS	ICIS 2011 Panel Report: Are We on the Wrong Track and Do MIS Curricula Need to Be Reengineered?	X	X		
83	E. Whelan and D. Firth, 2012	JISE	Changing the Introductory Is Course to Improve Future Enrollments: An Irish Perspective		X		
84	N. R. Bromberg, A. A. Techatassanasoontorn and A. D. Andrade, 2012	PACIS	Using Digital Storytelling in Information Systems Learning			X	
85	A. Y. Akbulut and J. Motwani, 2013	AIS SIGED	Gender Differences in Students' Perceptions of IS Professionals and the Role of the Introductory IS Course		X		
86	T. Olsen and K. Moser, 2013	AIS SIGED	Teaching Web APIs in Introductory and Programming Classes: Why and How	X		X	
87	A. Y. Akbulut-Bailey, 2013	AMCIS	Students' Stereotypes of IS Professionals and the Influence of the Introductory Is Course	X	X		X
88	N. Gudigantala, 2013	AMCIS	An Active Learning Approach to Teaching Undergraduate Introduction to MIS Course	X		X	
89	T. H. Nguyen and F. Ulbrich, 2013	AMCIS	The Effectiveness of Different Assessment Strategies: An Empirical Study			X	

#	Short Cite	Outlet	Title	Curriculum	Enrollment	Pedagogy	Other
90	J. Rodon, 2013	JISE	Fitness & Wellness Place Appoints A Chief Information Officer			X	
91	N. R. Bromberg, A. A. Techatassanasoontorn, and A. D. Andrade, 2013	PAJAIS	Engaging Students: Digital Storytelling in Information Systems Learning			X	
92	C. Aoun, K. Ang, and S. Vatanasakdakul, 2014	AMCIS	Where Is the Feedback! A Decomposition of Feedback Mechanisms in An Introductory Information Systems Course				X
93	L. Chen and C. Holsapple, 2014	AMCIS	Teaching the Introductory MIS Course: An MIS Approach			X	
94	M. Sopha and S. Balkan, 2014	CAIS	Going Mobile: Teaching First-Year Business Students Mobile Application Design		X	X	
95	J. A. Pratt, A. Keys and T. Wirkus, 2014	JISE	Preparing Information Systems Graduates For A Complex Society: Aligning IS Curricula with Liberal Education Learning Outcomes	X			
96	S. Ghosh, B. Naik and X. Li, 2014	JISE	Is Course Success in Liberal Arts Institutions—What’s the Formula?	X		X	
97	J. Pridmore, J. Deng, D. Turner, and B. Prince, Brad, 2014	SAIS	Enhancing Student Learning of ERP and Business Process Knowledge Through Hands-On ERP Exercises in An Introductory Management of Information Systems Course			X	
98	R. Miller and B. Jensen, 2014	SAIS	Recruiting Majors: Decision Factors and the Impact of An Introductory Information Systems Course		X		
99	S. Vowels, 2014	SAIS	Research in Progress: Ethics-Infused Management Information Systems Education	X		X	
100	B. M. Jones, 2015	AIS SIGED	Re-Engineering Introductory Information Systems Course For the 21st Century			X	
101	H. Annabi and S. T. McGann, 2015	AIS SIGED	MIS-Understood: A Longitudinal Analysis of MIS Major Misconceptions		X		
102	C. Sankar and Y. Wu, 2015	AMCIS	Design Experiential Learning Activities For MIS Introductory Courses			X	
103	J. Haan, F. Rodammer and C. Speier-Pero, 2015	AMCIS	The Integration of Business Analytics Into A Business College Undergraduate Curriculum	X			
104	S. McCoy, A. Everard and B. M. Jones, 2015	CAIS	Foundations of Information Systems Course Content: A Comparison of Assigned Value By Faculty, Recruiters, and Students	X			
105	A. Y. Akbulut, 2015	JISE	The Impact of the Introductory IS Course on Students’ Perceptions of IS Professionals		X		
106	S. D. Pawlowski and Y. Jung, 2015	JISE	Social Representations of Cybersecurity By University Students and Implications For Instructional Design			X	

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107	J. Gallagher and G. Wyner, 2016	AIS SIGED	Case Study: Content and Connections in the Information Systems Curriculum	X	X		
108	A. Hassan Zadeh, S. Schiller, and K. Duffy, 2016	AMCIS	Teaching Analytics: A Demonstration of Association Discovery with SAS Enterprise Miner	X		X	
109	T. Hill and W. Nance, 2016	AMCIS	Innovating Business Systems Labs For Engaging iGeneration Students			X	
110	O. Marjanovic, 2016	JITTA	Designing Innovative Education Through Action Design Research: Method and Application For Teaching Design Activities in Large Lecture Environments			X	
111	J. W. Clark, 2016	SIGDSA	Bespoke Analytics At Lie-Nielsen Toolworks			X	
112	G. Shankaranarayanan, D. Stoddard and R. Gilleran, 2017	AMCIS	Digital Brand Strategy- Project For An ITM Course	X			
113	A. Mukherjee and S. Bleakney, 2017	AMCIS	Redesigning An Introduction to Information Systems Course For Scalable Active Learning in Online and Blended Environments			X	
114	T. R. Hill, M. Doyle, D. Kocsis, R. Sessions and R. Jackson, 2017	AMCIS	Inroads to Engaging Igeneration Students in Innovative IS Education: Lessons Learned in the Trenches			X	
115	M. Mitri, C. Cole, and L. Atkins, 2017	JISE	A Systems Analysis Role-Play Exercise and Assignment	X		X	
116	R. J. Riordan, M. J. Hine and T. C. Smith, 2017	JISE	An Integrated Learning Approach to Teaching An Undergraduate Information Systems Course		X	X	
117	A. Lavin, M.-C. Martin and S. Sclarow, 2018	AIS SIGED	Radically Redesigning Introductory MIS Large-Scale Lectures: Creating Enhanced Learning Environments			X	
118	A. Connolly and D. Rush, 2018	AMCIS	Classroom Strategies For Overworked Faculty of Intro to MIS: Harnessing the Power of Cooperative Learning			X	
119	C. McGuire and J. Benamati, 2018	AMCIS	Driving Relevance Into the Introductory Information Systems Course	X		X	
120	M. Tari and H. Annabi, 2018	AMCIS	Someone on My Level: How Women of Color Describe the Role of Teaching Assistants in Creating Inclusive Technology Courses		X		X
121	T.-Y. Chi, 2018	AMCIS	Hands-On Exercises and Assignments on Google Cloud Platform			X	
122	R. Lukyanenko, 2018	ICIS	Time For Machine Learning in Introductory IS Courses?	X			
123	M. Thongmak, 2018	ISD Conference	The Use of Gamification in An Introductory MIS Course: the Views of Game Participants and Game Conductors			X	

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124	S. Moore and A. Rutledge, 2018	MWAIS	The Impact of Guided Learning on Student Achievement and Retention in An Online Course Environment: A Reflection on Introductory MIS Courses			X	
125	R. L. Oakley and M. Church, 2018	SAIS	Engaging Students with Mobile Application IS Concepts Through Creating Video Vignettes			X	
126	A. J. Connolly and D. Rush, 2019	AMCIS	How Emotional Self-Control Relates to IT Mindfulness and Technostress in Students				X
127	J. Du and H. Wimmer, 2019	AMCIS	Impact of Hour of Code: A Five-Year Study			X	
128	M. Whitney, P. Guilbaud and D. A. Romanova, 2019	AMCIS	Introductory Information Systems Course: Driving 21st Century Skill Development with Student Response Systems			X	
129	S. Strecker, U. Baumöl, D. Karagiannis, A. Koschmider, M. Snoeck, and R. Zarnekow, 2019	BISE	Five Inspiring Course (Re-)Designs—Examples of Innovations in Teaching and Learning BISE			X	
130	H. Annabi and S. McGann, 2019	CAIS	MISunderstood: A Longitudinal Analysis of Major Misperceptions	X	X		
131	J. D. Ezell, D. Lending, T. W. Dillon, J. May, C. A. Hurney and K. H. Fulcher, 2019	JISE	Developing Measurable Cross-Departmental Learning Objectives For Requirements Elicitation in An Information Systems Curriculum	X			
132	T. Case, G. Dick, M. J. Granger and A. Y. Akbulut, 2019	JISE	Invited Paper: Teaching Information Systems in the Age of Digital Disruption	X	X		
133	Y. Chen, Yu and T. R. Hill, 2020	AMCIS	Teaching Business Students Chatbots: First Forays and Lessons Learned	X		X	
134	S. Sclarow and A. J. Raven, 2020	AMCIS	Teaching Javascript While Flipping the IS Classroom			X	
135	H. K. Lee and T. Deng, 2020	ICIS	Using Cloud-Based Tools to Facilitate the Teaching of Machine Learning in Introductory IS Courses			X	
136	M. Milovich, J. A. Nicholson and D. B. Nicholson, 2020	JISE	Applied Learning of Emerging Technology: Using Business-Relevant Examples of Blockchain	X			
137	S. H. Goh, P. M. Di Gangi and K. Gunnells, 2020	JISE	Applying Team-Based Learning in Online Introductory Information Systems Courses			X	



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