2016

Case Study: Content and Connections in the Information Systems Curriculum

John Gallaugher
Boston College, john.gallaugher@bc.edu

George Wyner
Boston College, george.wyner@bc.edu

CASE STUDY: CONTENT AND CONNECTIONS IN THE INFORMATION SYSTEMS CURRICULUM

John Gallaugher
Department of Information Systems
Carroll School of Management
Boston College
john.gallaugher@bc.edu

George Wyner
Department of Information Systems
Carroll School of Management
Boston College
george.wyner@bc.edu

Abstract:

Maintaining and growing interest in information systems (IS) courses and enrollment in the IS major continues to be a significant concern for university information systems departments. Research in this area understandably focuses on the content of the IS curriculum: the courses to be included, the topics to be taught in those courses, and specific teaching techniques and examples to be employed in the classroom. We argue that alongside these considerations of content, it is critical to examine the connections between these curricular elements and the interests and activities of key stakeholders in the university community including, for example, faculty and their research interests, alumni, employers, and students and their co-curricular interests. We briefly point to existing examples of this focus on connections in existing research and then describe how this focus on connections is put into practice in our university's information systems curriculum.

Keywords: curriculum design and development, information systems education, student engagement, IS core course, pedagogy

I. INTRODUCTION

While information technology continues to dominate business headlines and there is an increasing demand for introductory courses in programming and data science, these trends are not always reflected in information systems enrollment [Akbulut-Bailey, 2012; Becker et al., 2006; Granger et al., 2007; Granger et al., 2007].

The challenge of building enrollment in the information systems major has prompted a number of responses in the IS education literature. Research in this area understandably focuses on the content of the IS curriculum: the courses to be included, the topics to be taught in those courses, and specific teaching techniques and examples to be employed in the classroom [Firth et al., 2008; Looney and Akbulut, 2007; Topi et al., 2010].

In reflecting on our own experiences in creating greater student engagement with the information systems curriculum we have come to focus on what we consider to be an important complementary set of design concerns: the connections between these curricular elements and the interests and activities of key stakeholders in the university community including, for example, faculty and their research interests, alumni, employers, and students and their co-curricular interests.

Having made this distinction between content and connection we can see that there is existing research on IS pedagogy that does focus on the role that connections play in IS program design.

For example, in their 12-Step program for improving the introductory IS course, Firth and colleagues include five steps that are clearly about making such connections [Firth et al., 2008]:

Step 3. *Use writings from non-IS authors to tell the IS story*: connecting IS to non-IS authors.

Step 5. *Expose the students to innovative and interesting technology*: choosing technologies based on their external interest.

Step 6. *Recruit peers and alumni as guest speakers*: guest speakers connect the classroom to the outside world.

Step 7. *Expose students to career and internship counseling*: this counseling connects the course to student career aspirations.

Step 12. *Focus on local strengths*: connecting the classroom to relevant resources on campus.

In what follows we describe how our university's IS curriculum benefits from the forging of connections between the IS curriculum and: the broader management curriculum, faculty research and teaching interest, and student extracurricular activities.

While some of the approaches described here may play specifically to the strengths and circumstances of our institution, it is our hope that the issues raised will be sufficiently broad to be of general interest and to make a preliminary case that a focus on IS connections is a vital complement to the traditional focus on improving IS content in the curriculum.

In what follows we describe connections related to the introductory IS course, extracurricular programs in entrepreneurship, and field learning opportunities. We conclude with some thoughts about challenges and future work.

II. CONNECTIONS IN THE INTRODUCTORY IS COURSE

IS education researchers have identified the IS introductory course as an important potential lever in improving enrollment in the IS major [Akbulut and Looney, 2007; George et al., 2005] and this has been born out in our own experience in which there is ample anecdotal evidence that a positive experience in the introductory IS course leads students to disover the information systems major and career path as attractive options.

The design of our introductory course in information systems has been influenced by a focus on nurturing two kinds of connections: (1) connections between the IS introductory course and the overall management curriculum and (2) connections between the course and faculty interests and strengths.

Strengthening the Connection Between the IS Course and the Management Curriculum

We have successfully argued for, and implemented, an IS undergraduate core course (3 credits, standard for the University's semester-long courses) as one of the first two courses that our business students experience, with most students taking the class their Freshman year. The core is capped at roughly 50 students each section, with ten to twelve sections offered each academic year. This course is often described as a first course in management taught through the lens of technology's impact across disciplines. It also has a decidedly strategic focus and an emphasis on technical innovation.

In taking this approach we have committed ourselves to developing an introductory course that connects strongly with the aims of the overall undergraduate management curriculum which has led to the need to focus the IS introduction on strategic issues.

A strategic focus in a freshman course may seem counter-intuitive. How can students consider firm competition if they are not fully aware of management's various disciplines and how they relate to one another? This argument leads many universities to hold strategic courses until later in the curriculum, often offering them as capstones. While rigorous strategic analysis benefits from students being able to read a balance sheet and understand financial projections, even new management students can assess their understanding of the products and services they use or are familiar with. Firms accessible through browser and app are easy for students to "visit," offering a degree of hands-on investigation unavailable to prior generations. Technology's role in the creation of strategic resources such as network effects or switching costs, as well as technology's relationship to scale, marketing, personalization, and other topics are all within the

grasp of new students when offered just a small amount of theory, foundation or background explanation through the right illustrative and connective examples.

We present the strategic element of the first course as a set of case studies of technology firms, which provides an opportunity to introduce business and strategic concepts in that context. The companies chosen vary from instructor to instructor but typically include companies like Google, Amazon and more recently Uber, as well as smaller firms such as Rent the Runway. These companies are familiar to and often admired by students.

Integrating across course concepts can also seem counter-intuitive. How can the role of IS as it relates to marketing, accounting, finance, etc. be explored if students haven't first gained exposure to these disciplines? However, we have found that a technology-focused first business course can illustrate many topics at an introductory level. Examples include: data's role in effective marketing, tech's role in restructuring operations and firm value chains, and online firm advantages that improve cash flow. While some IS faculty may be skeptical about introducing freshmen to, for example, the cash conversion cycle (a concept not typically seen as part of the IS teaching mission), we have found that students can grasp how Amazon's lower inventory demands and faster sales cycle allow the firm to sell and collect money from products well before it has to pay most suppliers. By grounding topics in examples they are familiar with or can easily relate to, students see IS everywhere, and in all aspects of business.

By connecting the topics presented in the introductory IS course more closely to the overall management curriculum we have been pushed to focus more on how information systems contribute to the competitive advantage of familiar and admired companies, which has made the IS course more engaging as well as positioning our introductory course as an essential element of the core.

An important benefit that arises both from the early and required nature of the course and its strategic focus is an opportunity to attract students to the IS concentration. Students often enter their university studies without an idea of what “IS is.” Students leave this course with an understanding of why IS is vital to business and typically develop an enthusiasm for topics and tech-focused business readings. It is not uncommon to hear a student say “Before I took this course I didn’t know what IS and now I think I want to major in it.” The holistic approach in which IS is introduced to students also sets up Information Systems as a useful complementary major for other disciplines.

Incorporating Flexibility to Enable Connections Between the IS Course and Faculty Interests

Although the introductory course is part of the undergraduate management core, we have designed it so as to offer faculty flexibility in adapting syllabi and course structure to their own strengths. It is important that students walk away with a set of core knowledge that is applicable in future studies and their career. However, a demand for complete consistency across sections inevitably places some constraints on an educator's ability to bring their particular expertise to class. Faculty have found that allowing for innovation, then sharing success, has allowed new topics and techniques to more rapidly migrate to other sections and faculty, enhancing overall experience in the introductory course.

This flexibility has allowed individual instructors to play not only to teaching strengths but also to research interests. A faculty member who does research on social media has incorporated twitter and crowd sourced exam questions into the course. An entrepreneurial faculty member has challenged student teams to develop technology-enabled business ideas. A technical-minded faculty member has incorporated more hands on demonstrations and programming content into the course.

Some schools may feel comfortable with this flexibility, particularly if faculty in other disciplines have similar freedoms. However, for those more concerned about maintaining consistency, another approach that we have explored is to team across concepts. Faculty with an expertise in social media, security, data, or hands-on technology sessions, for example, may decide to teach

those topics across multiple sections. For faculty, this creates an intense but shorter period of classroom engagement, and can also lead to extended periods where faculty are free of classroom teaching commitment. Administrative buy-in around instructor and course evaluation is important, but our view is that IS faculty should strongly advocate that procedural rigidity shouldn't be a barrier for organizational innovation – especially when leveraging unique faculty expertise can potentially improve courses and create periods of less teaching demand that may lead to more productive research and service contributions. Team teaching also has the added advantage of introducing students to more faculty, effective when a positive in-class perspective may excite a student to take a future class with an instructor they might not otherwise hear from. It also exposes students early-on to a broader array of faculty, who may act as mentors, offer career advice, share expertise related to an area of entrepreneurial investigation, etc.

III. EXTRACURRICULAR CONNECTIONS

As noted above, our introductory IS course focuses on technology companies, most of which are entrepreneurial in origin. This gives us an opportunity to connect the course to entrepreneurship and digital innovation [Fichman et al., 2014].

An innovation focus not only yields benefits for future practitioners [Fichman et al., 2014] it also allows faculty to underscore the role of young people as innovators. The notion that 'people like me have accomplished greatness' is a profoundly motivating tool and leads to an opportunity to connect the IS curriculum to a co-curriculuar program on entrepreneurship.

We have developed this connection between the IS curriculum and entrepreneurship opportunities by developing a set of extracurricular programs based on nearly a decade of experience, experimentation, and revision led by one of the authors. What follows is a recent snapshot of these programs. We say “snapshot” because the success of these programs has resulted in broader participation across the university with a broader set of constituents which will no doubt lead to an evolution in these programs.

We will discuss this set of programs in some detail to give a sense of the scope and the kind of details that must be addressed to provide this important complement to our IS curriculum.

Overview

The program is meant to provide structure for those seeking to get feedback on ideas, develop entrepreneurial skills, refine businesses and build prototypes. The program is bookended by two sets of competitions: an elevator pitch competition early in the Fall semester, and the final of an extended venture competition (including a social impact component) concluding near the end of the Spring semester. While students can follow the program throughout the year (and return with new or sufficiently refined ideas in subsequent years), students can participate at any level, even participating in one-off seminars and workshops without entering competitions.

“Get Inspired”

The year-long program begins with a "Get Inspired" focus. Classroom speakers and university-wide programs invite young entrepreneurs to campus. In our experience this naturally involves connecting to recent alumni, including winners of prior contests that have moved forward with their ideas. These events have often been coordinated across classes and complementary campus clubs into a single "Entrepreneurship Week." The goal is to showcase that students are capable of developing ideas into workable products during their college career, and to excite students to try their hand at business and product development. Activities early in the semester are also used to briefly outline the year's program of events, so students get a sense of opportunities and timelines.

“Get in the Game”

The academic year's first competition opportunity is for students to "Get in the Game," presenting preliminary ideas via an elevator pitch competition. Workload for participation is light – just 60

seconds to present an idea, no slides, no prototypes needed. A focus on audience participation makes the event a campus highlight – participants bang inflatable "thunder sticks" and yell the countdown call to “3-2-1, Pitch.” This high-energy, festive event attracts students from across campus and broadens awareness of additional extracurricular entrepreneurship opportunities. Judges are often members of the local investment community, as well as entrepreneurs, or executives involved in accelerator programs.

In our competition, elevator pitch prize money is modest, but at least five prizes are offered – first, second, and third judges prizes; a judged "social impact" prize; and an audience choice (with text voting in rounds of four to five presenters, and one final text polling during final judge deliberation). Having 20 to 25 teams in the finals keeps the event manageable while drawing friends and additional spectators in a very full presentation venue (with more than 25 ideas entering, a pre-screening event is offered, with the added benefit of providing feedback to advancing teams and improving pitch quality).

This event also provides the opportunity to offer an idea development workshop, focused on improving the quality of entrant ideas, and building student confidence. A successful entrepreneur who has raised funds, or a seasoned venture capitalist is also invited to speak as "The Pitch Doctor," offering advice on what makes a compelling idea and pitch.

“Get Skilled”

Students with ideas they are passionate about are ready to "Get Skilled / Get Serious". The year-long seminar series invites local experts to give talks and lead discusions on topics meant to provide skills to get students moving forward from idea to prototype. Topics have included "The Lean Startup Methodology," an introduction to prototyping and software development resources for first-time coders (tapping an alumnus who is self-taught is a great choice), and legal issues for startups (relying on local law firms with entrepreneurship practices). These workshops are supplemented with several informal events such as: Lunch with an Entrepreneur and round-robin feedback (where teams hop from table-to-table, getting advice and feedback on the current state of their idea development from a series of disparately skilled experts: e.g. founder, investment, technical, legal, social impact.

“Get a Job”

The principal "Get a Job" offering is a spring-semester startup-focused job fair. The program is offered in Spring since many startups hire with a shorter offer-to-work time period than larger firms (often in conjunction with recent funding rounds). Startups present a particularly attractive option for first and second year students who don't have advanced coursework. Many startups can use labor from smart but otherwise unskilled students. Even freshmen can contribute in areas such as product testing, evaluating competitor or related products, gathering preliminary market intelligence, and helping to launch a firm's social media strategy. In advance of the Startup Fair, a website is prepared linking to startup web pages and social media accounts, encouraging students attending the fair to research firms in advance, and to arrive prepared for more productive engagement. Past fairs have limited participating firms to "Pre-IPO" companies, attracting a mix of very early-stage firms and firms entering a high-growth stage. This distinction helps participating firms to not be lost in a crowd of the otherwise well-known big-name campus recruiters, such as Fortune 1000 companies and the very active consulting and accounting firms.

Final Event

The final Venture Competition is for larger prize purses. This advanced and more rigorous competition requires preliminary screening and semi-final rounds (again relying on seasoned experts for evaluative feedback). The final pitches are open for public viewing, and the award ceremony has become a campus event, often covered by local media and University press. Teams which make later rounds leading to the final are invited in for additional feedback on their pitch and the strength of their financial models. Teams also have an opportunity to be paired with a mentor/coach (working either in-person with members of the local business community or with

remote mentors via video conference). Coaches provide further feedback on idea and product, offer their expertise, and can facilitate additional networking. Early stage venture capitalists, angel investors, staff from local startup-accelerator programs, and successful entrepreneurs are selected as finals judges. This has helped many of our most successful student teams move forward to eventually gain admission to accelerators such as Y-Combinator, TechStars, MassChallenge, and to receive seed-stage investment.

Connection to the Curriculum

This year long set of extra-curricular programs creates strong engagement of students outside the classroom. While the programs support all kinds of entrepreneurship, as argued above, technical entrepreneurship is especially appealing and accessible to students and thus a connection to the information systems curriculum is implicit. This connection is brought into full view in the classroom where faculty publicize and discuss the upcoming events and have the opportunity to link them to the topics being studied and in some cases to actual in class assignments.

IV. FIELD LEARNING CONNECTIONS

Given the strategic focus of our introductory course, another important connection is between the classroom experience and the actual real world companies which serve as the key case studies in the course. One of the authors has developed a set of offerings, both curricular and extracurricular, to make these connections both during and after the introductory IS course.

These programs are all branded under the “TechTrek” brand, which has helped create awareness of desirable and high-impact offerings. Non-credit programs include a weekly city TechTrek open to all students, undergraduate and graduate, across all majors. Since the university is accessible by public transportation, students travel into the city to visit with regional tech offices, local tech firms, startups, accelerators, and venture capital firms. Visits run most Friday afternoons (a time when few courses are offered on campus), with students typically on-site from 90 mins to 2 hrs. on average. Time on-site often involves an executive presentation, Q&A session, and an office tour and product demo, if applicable. Students handle event publicity, signups (open to all students at the university, undergraduate and graduate), and distribute background information in advance so that all can arrive prepared and ready for discussion and dialogue. Firms are allowed to set visit size, with most conference rooms capable of holding 25 students, max, while corporate auditoriums and larger facilities have held as many as 100 at a time.

Since the University is within driving distance of New York City, a one-day extra-curricular TechTrek NYC program is also offered where students board a bus very early in the morning, arrive in Manhattan for a day full of five visits, and return to the University late that evening. This can be a great way to engage alumni and recruiting firms that can't regularly travel to campus. These extra-curricular experiences not only reinforce learning and provide additional opportunities to IS students, they also act as a gateway introducing non-majors to the role of technology in business. As such, many non-major participants have gone on to take IS electives and even take up the IS concentration.

Also under the TechTrek banner are two full (3 credit) TechTrek West courses, one for graduate students, another for undergraduates. In these classes students spend half a semester examining competition and entrepreneurship in technology industries. The rest of the contact hours are held in a full week of 20-plus visits with entrepreneurs, technology executives, and venture capitalists in Silicon Valley and San Francisco (with an additional day in Seattle for grad students). Foundation principles are offered by the instructor, lecture-style in the first week (with additional concepts presented via podcast), then students are assigned either individually or in teams to prepare classmates on a specific firm that will be visiting. These domain experts select and distribute readings (screened by the instructor), prepare an in-class presentation, and lead a follow-up discussion, plus brief students in the field en route to the visit. A course wiki is used for spill-over Q&A and knowledge sharing, and which preserves presentations from prior classes (undergraduate and graduate material is accessible to both classes), to help students quickly get

up to speed on their assigned topic. Students also follow hosting executives via social media, and continue monitoring developments prior to the visit. An extensive in-class, closed-book exam is required to ensure deep preparation on industry-related theory as well as state-of-practice at each firm so that students are best prepared to engage executive speakers at a deep level. Students select a synthesis paper on a topic of choice (approved by instructor) as their final deliverable.

The travel portion of the program is financed through a course lab fee, which covers airfare, lodging, breakfast, and motor coach transportation in the field (students also pay a share of travel costs for the accompanying faculty). A lab fee structure allows students to seek financial aid for an increased cost of attendance, and has allowed even students of very modest means to experience the field programs.

The University offers an additional tech-focused three-credit field learning course, TechTrek Ghana, with a half-semester in-class learning experience at the home university, followed by a week-long field visit to that West African nation. The Ghana class has a focus on studying the role of fast/cheap technology (mobile phones, app stores, the cloud, etc.) on economic development. Like TechTrek West, the Ghana course offers a mix of lecture and seminar-style teaching. This class also relies on weekly in-class speakers in areas related to course topics (e.g. impact investing, tech entrepreneurs in frontier markets, consultants and authors working in the area). Most are able to visit the University, however some engage via Skype or Google Hangout. A locally offered, full-day international conference on African Business is also a requirement for all students. Since travel is in May and students disperse when returning to the US, final synthesis projects analyzing specific tech in emerging markets or student-proposed ideas for new initiatives, are submitted as YouTube videos, with all students required to view and evaluate their peers. During their time in Ghana, students spend a full day at a local NGO developing young, post-graduate technology entrepreneurs. They return to this organization each evening for dinner with these entrepreneurs-in-training and join them in topical panel discussions with visiting experts (example topics: fintech, agriculture tech, the local app economy, tech investing in Ghana). Days spent outside the NGO campus usually involve three visits a day (less than TechTrek West, given the demands of local traffic and other logistics). Sites include regional offices of technology multinationals, as well as thriving local entrepreneurs, investors, and non-profits.

While the field courses are open to all, enrollment in the undergraduate courses requires a year of study on-campus to demonstrate academic strength and a committed interest in the areas of technology and/or entrepreneurship (and global development for those applying to TechTrek Ghana). Like the TechTrek West courses, TechTrek Ghana is capped at 24 undergraduate students to make travel logistics manageable. Students in the undergraduate offerings are selected via competitive application (graduate students are selected via lottery). While the program is open to all students, academic excellence, maturity, and a track record of commitment to technology and/or entrepreneurship are primary screening criterial. These courses have become among the most competitive at the University, acting as a magnet attracting many of the best students across disciplines to engage with the IS department.

Benefits are broad and impactful. The three field courses (Graduate and Undergraduate TechTrek West and TechTrek Ghana) are consistently the top-rated courses in the IS department, and students regularly cite the experiences at their most impactful learning opportunities at the university. TechTrek West courses have been offered annually since 2005, and TechTrek Ghana began in 2012. The unique opportunity to anchor and extend in-class learning with “master class” in field visits covering strategic issues at a range of firms helps students see concepts in-action across firms of several sizes and industries. Students that travel for these programs also gain insight into a new geography, compare firms of different sizes, and view corporate culture up-close in ways that cannot be covered in a classroom, alone.

Career benefits are also significant. Many students gain an inside track on internship and job opportunities, and all expand their contact networks. As a result of the program, many firms that had not formally recruited on campus have now begin to do so. Career Services is often involved

as a guest of the program, sending representatives on local visits and on TechTrek West, creating strong links between the department's impact across the University.

This program has also partnered with University PR for video, print, and online profiles showcasing unique opportunities for our students. For similar reasons, Admissions has also extensively featured these experiences in materials and recruitment events. The TechTrek programs also offer significant opportunities for alumni engagement, and are often a part of Advancement/Development discussions with would-be donors.

Field Learning and Alumni Engagement

Many alumni of the TechTrek experiences have gone full circle to host after being hired in regions that we visit. All of the TechTrek West visits, most of the local visits, and many of the Ghana visits are also hosted by alumni. LinkedIn can be an effective tool for surfacing alumni working at firms and within industries in a given region. The University Advancement office also likely has a list of alumni and parents with noteworthy experience, and the TechTreks can be a unique and impactful mechanism to engage busy executives with some of a schools brightest and most passionate students.

V. CONCLUSION

In this paper we have used the distinction between curriculum content and curriculum connections to frame an examination of some distinctive elements of our university's information systems curriculum.

As with any case study the generalizability of our findings is uncertain, but it is our hope that this account will encourage further consideration both of the specific practices we describe and the general notion of connections as a design consideration. Additional research opportunities exist in gathering longitudinal data regarding the impact of these programs on the career path and success of participants.

ACKNOWLEDGEMENTS

The authors wish to thank the track chair and anonymous reviewers for their thoughtful comments and suggestions. An effort so extensive does not exist without extensive participation and collaboration from a broad set of constituencies. We are grateful for our colleagues at Boston College, our students, alumni, and the business community for their tremendous support of these initiatives. We are also grateful to the staff, students, and alumni of The Meltwater Entrepreneurial School of Technology (MEST) in Accra, Ghana, for their vision, leadership, and partnership on the TechTrek Ghana program.

LIST OF REFERENCES

Akbulut, A. Y., and Looney, C. A. 20072007. "Attracting students to the IS major: The role of IT sophistication in introductory IS courses," *AMCIS 2007 Proceedings*, pp. Paper 456.

Akbulut-Bailey, A. 2012. "Improving IS Enrollment Choices: The Role of Social Support," *Journal of Information Systems Education* (23:3), pp. 259-270.

Becker, J., Hassan, N., and Naumann, J. D. 20062006. "Combating the enrollment downturn in IS/IT programs," *AMCIS 2006 Proceedings*, pp. Paper 282.

Fichman, R. G., Dos Santos, B. L., and Zheng, Z. 2014. "Digital Innovation as a Fundamental and Powerful Concept in the Information Systems Curriculum," *Mis Quarterly* (38:2), pp. 329-343.

Firth, D., Lawrence, C., and Looney, C. A. 2008. "Addressing the IS enrollment crisis: A 12-step program to bring about change through the introductory IS course," *Communications of the Association for Information Systems* (23:1), pp. 2.

George, J. F., Valacich, J. S., and Valor, J. 2005. "Does information systems still matter? Lessons for a maturing discipline," *Communications of the association for information systems* (16:1), pp. 219-232.

Granger, M. J., Dick, G., Jacobson, C. M., and Van Slyke, C. 2007. "Information systems enrollments: Challenges and strategies," *Journal of Information Systems Education* (18:3)EDSIG, pp. 303.

Granger, M. J., Dick, G., Luftman, J., Van Slyke, C., and Watson, R. T. 2007. "Information systems enrollments: Can they be increased?" *Communications of the Association for Information Systems* (20:1), pp. 41.

Looney, C. A., and Akbulut, A. Y. 2007. "Combating the IS enrollment crisis: The role of effective teachers in introductory IS courses," *Communications of the Association for Information systems* (19:1), pp. 38.

Topi, H., Valacich, J. S., Wright, R. T., Kaiser, K., Nunamaker Jr, J. F., Sipior, J. C., and de Vreede, G. J. 2010. "IS 2010: curriculum guidelines for undergraduate degree programs in information systems," *Communications of the Association for Information Systems* (26:1), pp. 18.