Innovating Business Systems Labs for Engaging iGeneration Students

Full paper

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Abstract

We present the design, implementation and impact of an innovative new approach to delivering hands-on lab experiences to address the challenge of engaging iGeneration students. In the Business Systems and Policy course, a core requirement for most Business programs, we aimed to leverage the iGeneration’s affinity for “storification” and social media to enhance their engagement and, by extension, their learning. The labs are cast as a series of class blog entries written by a fictional student peer, a young woman named “Max,” who stumbles into an opportunity to work for a local Silicon Valley startup, building a mobile-integrated app to help them search for venture capital funding. As the story unfolds, she relates the business challenges and how she learns to meet them, step-by-step, with cloud-based Salesforce.com. Using free accounts, students follow along, “concretizing” IS concepts. We share lessons learned and preliminary evidence of engagement, satisfaction and learning impacts.

Keywords

Storification, Social Media, Innovation, Engagement, iGeneration, Salesforce, Business Systems Labs

Introduction

To teach effectively, most would agree it is critical to keep our pedagogy and materials engaging for our audience. Indeed, student engagement has been recognized as increasingly important in Business education research, due to evidence of its significant role in determining learning outcomes (Burch, et al. 2015). Though no consensus has been reached on formalizing the construct, there is mounting evidence that engagement, variously operationalized and measured, does impact learning. As a result, it also is gaining emphasis from the Association to Advance Collegiate Schools of Business (AACSB) in scrutinizing Business school accreditation for continuous improvement (Schwarz and Zhu 2015).

Engaging students may be particularly challenging for those teaching in the IS discipline, especially with the students we face today. Citing Clinebell and Clinebell (2008), Wu and Sankar (2015) posit “a major challenge faced by those teaching business education, including management information systems (MIS), is to get students excited about the concepts,” and we suggest that the iGeneration (also known as Generation Z) presents new and daunting challenges to doing so.

iGeneration (iGen) students come in with high expectations about the technology, due to their ever-greater exposure to flashy consumer products and services. iGen students “grew up with a smartphone in hand,” according to Joan Schneider, CEO of Schneider Associates, a Boston-based marketing consultancy. In “How to Market to the iGeneration” (Schneider 2015), a digital article at the Harvard Business Review online, she describes iGeneration characteristics that lead us to rethink our traditional approaches to teaching and to developing learning resources. For example, she explains that “Like Millennials, iGens share constant connectedness, but this generation of digital natives is also fiercely independent about their digital decision-making...[they] require information on-demand, and trust the advice of friends, even strangers, more than authority figures...” To truly engage our students, we can view ourselves as needing to “market” our ideas and materials to them and borrow from recommended strategies in designing the learning experiences we deliver.
Accordingly, in developing a new set of hands-on labs for our introductory Business Systems and Policy course, required for all Business majors at San José State University, we innovated a unique design that leverages iGens’ penchant for social media, storification, and high tech. The labs are cast as a series of class blog entries written by a fictional student peer, a young woman named “Max,” who stumbles into an opportunity to work for a local Silicon Valley startup, building a mobile-integrated app to help them search for venture capital funding. As the story unfolds, she relates the business challenges and how she learns to meet them, step-by-step, using the cloud-based Force.com platform from Salesforce.com. Students follow along (using free developer accounts offered by Salesforce), experiencing the scenario vicariously, across the six-episode story arc. The summative labs build upon one another, integrating many IS foundational concepts along the way, and “concretizing” them with hands-on demonstration and “virtual” discovery.

The remaining sections explain the rationale behind the design, the labs themselves, their implementation and lessons learned, and a preliminary assessment of outcomes and benefits that we believe shows great promise for enhanced levels of engagement, learning and satisfaction for this iGen-targeted approach.

### iGeneration Engagement Challenges & Strategies

In his book *Rewired: Understanding the iGeneration and the way they learn* (Rosen 2010), the author declares that the media inundation and technology immersion iGens have grown up with has literally rewired their minds and that they need more from education. The problem does not lie with the content but rather with the delivery; as educators, we must find ways to “spark their imagination.”

One can argue that the gaming industry has been far ahead on this front. Telling cohesive stories has been a major growing trend in digital gaming since the mid-1990’s (Picucci 2014), one that has paralleled the evolution of graphics sophistication. As Picucci notes, Dan Pinchbeck, writer and producer of acclaimed narrative-based game *Dear Esther*, said, “One of the really wonderful things about games in the last few years has been the huge advances in depth and detail in terms of storytelling, particularly using games to spin these extraordinary worlds, and in a way, that’s starting to flesh out what was done back in the early 90s when graphic tech really started kicking off” (Pinchbeck 2012). Given the large and growing list of famous actors voicing digital games, including Bruce Willis, Liam Neeson, Kiefer Sutherland, and others (Siuty 2013), the digital gaming industry clearly is honing in on iGens’ appetite for storytelling.

As in gaming, incorporating challenge, curiosity and fantasy into learning environments through a compelling narrative element of “storification” is suggested as a way to generate intrinsic motivation (Mott, et al. 1999) and plays directly to the need to spark iGens’ imaginations. This intuitive tenet was the inspiration for the design of the Salesforce labs we describe below.

### Designing for Engagement

#### Context

Like many universities, the BS in Business Administration undergraduate curriculum at San José State University (SJSU) includes a required, introductory Management Information Systems (MIS) course for all Business majors. At SJSU, students majoring in all concentrations other than MIS take Business 188, Business Systems and Policy, which is the primary focus of this paper. Students in this course either have declared concentrations within the Business major, or are taking the course within a Business minor from other majors, such as engineering and economics, elsewhere in the university. Students majoring within the MIS concentration take Business 110A, Fundamentals of MIS, which is an alternate version with deeper technical focus. Both versions of the introductory core course are upper-division level for juniors and seniors, and as such cannot be taken for transfer credit from a community college.

The focus of these courses covers both foundational concepts and current developments in the information systems field. The course is designed to provide an introduction to information systems, including terms, concepts, capabilities, and impacts on business organizations, exposing students to technologies such as Mobile Computing and BYOD, Data and Databases, Cloud Computing, Analytics, Business Processes & Process Automation, Collaboration Tools, Enterprise Applications and CRM.
The overall philosophy of these courses is to gain an understanding of functional areas in business organizations, as well as key business information technologies, to effectively "bridge" potential communication gaps when working with others, from strategic levels down to operational. In the non-IS student version of the course discussed in this paper, we want to provide business students “a peek under the hood” of information technology and systems development. The goal is to help them collaborate with IS colleagues to facilitate bridging by 1) seeking IS support they may need, 2) helping identify technology-enabled opportunities, and 3) contributing to developing basic applications on their own or as part of a development team. Thus, we sought a way to allow non-technical students to “get inside the head” of someone conceptualizing support features and apps, and to learn how to build them out using a platform that is powerful yet relatively quick and easy, without substantial coding.

To accomplish this goal for the class, we emphasize several areas: student engagement, hands-on experiential learning, preference for enterprise-level, industry-leading tools, and drawing on the local innovation industry by leveraging our Silicon Valley location. Since students in our course have concentrations in everything but MIS (e.g., Accounting, Marketing, Finance, etc.), many have little or no affinity for or particular interest in technology. As a result, strong student engagement with the material is often a challenge — instructional materials need to be clear and free of technical minutiae, yet packed with value in ways that maintain relevance across a range of business disciplines. This required us to rethink our traditional hands-on learning experience and develop the alternative innovative approach discussed in this paper.

As a relatively large public institution and business school (over 5,000 business majors), a large number of sections and students are involved in this class: approximately 14 sections per semester, with enrollments of 45 students per section/section, totaling over 1200 students per year. This scale of enrollments obviously requires many instructors, with instructor buy-in crucial to effectively deliver these learning opportunities to all of our undergraduate students. Instructional materials have to be clear and understandable, and the hardware and software platforms and infrastructure have to be easy to implement and manage.

**Traditional Labs**

Hands-on technical activities in this course historically have been taught using typical lab approaches and desktop tools such as Microsoft Access that are readily available in most universities’ student computing lab facilities. Like many schools, some of these lab assignments were home-grown versions developed by local faculty, and other times they were delivered as bundled packages accompanying textbook adoptions from large publishers. The latter had been the case in our program for the most part, with some differences across faculty depending on their course approach and selected textbook.

In either case, these traditional labs often suffer from several common limitations and drawbacks. Perhaps most significantly, at least in our employment market, Microsoft Access is often perceived as a personal productivity tool best suited to desktop applications, rather than an enterprise-level industry-standard application that students are likely to encounter as they enter the local labor force. A second limitation specific to the MS Access publisher bundle we had been using was a system compatibility issue where it was built to run on Windows-based platforms only. With a large proportion of our students relying on Mac-based laptops, this presented a significant problem as they were forced off their preferred platform and required to find a Windows-based machine or facility.

Beyond technical issues, the traditional approaches we had been using had several other learning-outcome limitations. Variances across faculty textbook choices resulted in variances in the lab experiences offered to their respective students. Many of the exercises were standalone, non-cumulative assignments with learning objectives limited to that particular assignment. Scenarios behind the assignments were often lackluster and not relevant to the vibrant, high-tech region in which our students live and work. Instruction formats were often dry (“Today, you will create a table, build a form, and enter multiple records.”), and rote plug-and-chug steps with limited contextual learning content. Finally, especially with publisher-provided bundles, auto-grading solutions were sometimes erratic and had questionable accuracy.

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1 The Lucas Graduate School and College of Business (LCoB) at SJSU relies on this course to meet the undergraduate Business major’s program learning objective on innovation.
The Salesforce Labs

After many years of using these traditional approaches to instructional lab materials, with varying approaches, textbook offerings, contextual revisions, etc., faculty in our MIS program decided to rethink the entire underpinnings of our hands-on lab offerings and explore alternatives that:

- are relevant to our students and region;
- introduce leading-edge, industry-standard tools that better prepare our students for their entry into the regional workforce;
- acknowledge and capitalize on the skills and expectations of our iGen student population.

Towards that end, we sought to better understand iGeneration students and develop instructional materials that serve their learning objectives and styles. In her on-line HBR article “How to Market to the iGeneration” (Schneider, 2015), Schneider describes several characteristics of iGens that summarize the generation well. Figuratively growing up with a smartphone in their hand, iGens share constant connectedness, require information on-demand, and trust the advice of friends (and even strangers) more than authority figures, organizations and brand marketing. They are typically multi-screen users and consume large amounts of media simultaneously from multiple touch points. To “reach” iGens, she suggests several tips, including:

- Personalize everything – make messages resonate with them as individuals.
- Connect through social media – frame information content in the form and outlets they use.
- Excite them with content – use engaging content format with interaction and visual stimulation.
- Use mobile – make everything available to them wherever they are on whatever device they carry.

To try and reach these iGen students effectively, we developed a series of lab activities where students use a free Salesforce Developer account to develop an end-to-end business application that creates an embedded database, a mobile app, security controls, and social media messaging modules in a live production environment. The case instructions are written using a “storified” blog-style presentation that walks students through a fictitious first-person narrative describing the experiences of a student much like them who is enrolled in their same class.

We used the Force.com app development platform (http://www.salesforce.com/platform/products/force) from enterprise cloud software juggernaut Salesforce (http://www.salesforce.com). Salesforce was the 6th fastest-growing company in the world in 2015 (Wieczner 2015), and was named by Forbes Online as the world’s most innovative company four years in a row through 2014. Their CEO, Mark Benioff, claims that they will be the fourth-largest software company in the world by the end of 2016 and they are currently building what will be the tallest building on the west coast of North America. Headquartered in San Francisco, California, less than an hour from our campus, Salesforce is well known to our students, brings cache that excites and engages them to learn, and generates enthusiastic employers’ responses.

Through its cloud-based Customer Relationship Management (CRM) web platform known as Force.com, Salesforce provides a free lifetime account in Salesforce (SF) Developer, an industry-leading enterprise software development package, to anyone who registers. Force.com is a full-blown developer edition, not a limited-time free trial edition or scaled down educational version, that runs as a browser-based Platform-as-a-Service (PaaS) in the cloud. The software runs multi-platform seamlessly, with desktop and mobile-device friendly capabilities, and students (or other developers) simply sign up on-line using an email account. Salesforce has embedded functionality for conceptual topics such as Entity-Relationship (ER) data modeling, database implementation, data validation, user authentication, cloud storage, social media communication, business process automation, and many others.

Given the selection of the underlying platform, we next turned to the development of the lab activities’ learning content – the core of the learning innovation effort. Rather than produce a traditional set of step-by-step lab instructions for Salesforce, we wanted to engage our iGen students in a manner that reflects their interests, knowledge base, and Generation Z experiences and philosophies. For that, we opted to use the “storification” approach of telling a tale instead of providing instructions. Figure 1 shows the conceptual underpinning of Storified Learning.
The storified approach we used for these assignments yielded a series of labs that built upon one another, told through a fictional first-person blog narrative of a student enrolled in exactly the same BUS 188 class in which we run the labs. Our student “Max” is a typical undergraduate business student, not a technical specialist in any way, who has a course assignment to learn about Salesforce and blog her trials, tribulations, and experiences through the semester. Early in the semester, she attends the presentation of a guest speaker hosted by the student Entrepreneurship Club, where she happens to meet and chat with an alumnus (“Riley”) who is CEO of a local start-up. The CEO describes one of her current business processes (tracking “Pitches” she makes to potential venture capitalist funders) where she’s having challenges managing the VC communications and pitch data. Max makes an off-hand comment that it sounds like something where Salesforce might be useful, and the next thing she knows, Riley has hired her part-time to see how she might be able to develop and implement a simple Pitch Tracking System for the start-up. See Figure 2 for a sample of the beginning blog narrative.

Figure 1. Storified Learning Model

Figure 2. Sample of Storified Blog Post
It is important to highlight that the intent of these labs is not to teach Salesforce, per se, but to teach the underlying business concepts of the course, including innovation, strategic information systems, technology development, mobile computing, and cloud-based architectures, to name a few. Towards that end, Max makes a point to describe her research as she’s working on the project (providing web links for other students to read), introduces tangential topics and links that students might find interesting, and perhaps most importantly, explains why she’s doing certain things, not just what she did. The narrative introduces Silicon Valley history, key lingo, and basics of start-ups and venture capital, all through the eyes of a student in the class who is learning in the moment and documenting what she’s learning as it occurs. The goal is to engage our students in conceptual learning through context, using language and media that students find comfortable and familiar, to provide a far greater learning experience beyond just following a series of steps.

Max’s story proceeds through a pre-lab narrative and six lab assignments that build on one another, with the content of each successive lab tracking with the course content progression through the semester. Writing with humor, including setbacks and required rework, Max produces exceptionally detailed notes of exactly what steps she completed (literally, click-by-click at the beginning), to produce the outputs of the particular task. From her first-person perspective, the activities are her part-time job; in reality they are the “Instructions” that direct students through the respective lab steps. See Figure 3.

Finally, to guide students to produce the desired deliverables for the labs, Max notated each deliverable with a marker that instructed students to stop and take a screen capture (or, preferably, region capture) of exactly what would be on the screen at that point in the process. See Figure 4.

At the end of the first lab assignment, designed to be completed within a 75-minute class period, students will have learned how to sign up for a Salesforce Developer account, build out a small database, enter a set of records within specified range values, produce a report, and build a mobile app that they actually used on their phone or tablet to input a complete data record. Subsequent labs take students through the development of input validation criteria, executive dashboards, ER diagrams and data normalization, social media information systems, and business process design and stakeholder communication systems.

Figure 3. Example of Blogged Documentation Steps
By using the storified approach, the intent is to help students in the class engage more closely with the lab materials in a number of ways.

- The storyteller is a student just like them, sitting in the same class in a prior semester, working on the same assignment they are working on. This reflects the nature of iGens who tend to listen to and follow advice from peers more than from authority figures.
- The story is told in first person to provide authenticity, using humor and slang to enhance likeability, and is written via blog entries composed in Blogger to demonstrate realism and currency in today’s business and social environment.
- The story is written in episodic fashion, with a beginning, middle and end to each episode, and with a continuing overall story arc across the entire project to help keep attention and interest from one segment to the next.

**Implementation**

Implementation of the instructional labs has scaled up over two years of development, from an initial pilot in just two sections to full coverage in all current sections. The scope of the assignments, the evolution and stability of the Salesforce platform, and the need for faculty to get up to speed all necessitated a thoughtful and methodical expansion of the project. Two faculty members (including one of this paper’s co-authors) spent several months developing and testing the initial set of materials prior to the first semester implementation. A different faculty member then piloted the materials in two sections of his course, working in collaboration with the project author to revise and refine the materials based on classroom experiences and student feedback. Several additional faculty members adopted the revised materials the following semester, trying various formats that include dedicating in-class time to the labs, requiring them to be done independently outside of class, and other variations. As of Spring 2016, all faculty in all sections of BUS 188 have adopted the Salesforce labs as the core hands-on activities for their respective courses, regardless of the textbook they have adopted.

Three implementation details warrant further discussion. First, student deliverables for all lab activities are screen/region captures of various interfaces students develop over time. Most are Salesforce screens, with a small number of email system screens in later assignments. These deliverables have an advantage for academic integrity and student engagement by showing the student’s name on the screen, thus demonstrating that the actual student did the work – there is no way to duplicate or transfer the output from one student to another. From a grading standpoint, clear screenshots and grading rubrics can be developed for use by the faculty or student graders that allow each student’s electronic submissions to be graded and recorded quickly on-line through the university’s Learning Management System.
Second, with funding from the dean, a team of advanced MIS students was hired and trained each semester to provide technical support in the classrooms. A Google Hangouts forum was created for students to post questions or problems, and the student assistants monitor the forum to provide assistance as needed. This has a great advantage of scaling the support across sections, reducing the one-on-one messaging and troubleshooting between individual students and their respective faculty member.

Finally, drawing on experiences from the early offerings of these labs, the project author has continued to evolve the supporting materials for each lab. Documents such as “pre-flight checklists” include tips and learning objectives for students, and feedback forms allow students to submit critiques or observations of points that may warrant clarification. The feedback forms also provide an opportunity to solicit insights on the learning value of the various labs.

As we’ve transitioned to full implementation, we’ve noted a number of missteps and also keys to success:

- Phasing in was important because piloting helped identify unforeseen misunderstandings that arose in students’ interpretation of instructions. Being in the classroom with the students as they worked allowed the labs to be honed through successive detailed editing rounds to eliminate any source of confusion that can diminish the quality of the experience we were striving for.
- Language and writing style were critical. Much tweaking was required to get Max’s “voice” to sound authentic and engaging. Students often laud the inclusion of humor in the labs as an engagement key.
- Even with the format and language design, it remains hard to get the iGen students to read unless they are convinced that the text between the instructions is useful. This seems to be addressable by explaining up front, when first introducing the labs, that the text around the instructions is where they learn the “what” and “why’s” and they need to read it if they want to actually learn anything from the experience.
- Particularly for a large course with numerous sections and a pool of multiple instructors that changes from term to term, it proved critical to provide a team of lab assistants to be in the classroom for each lab session so that instructors felt “safe” when they themselves were not totally comfortable with the Salesforce platform.

In general the phased transition has been smooth but required careful planning and attention throughout.

**Discussion of Impacts/Benefits**

The department continues to solicit feedback and evaluate the impacts of this project on student learning. Feedback from students is consistently positive and enthusiastic, with particular appreciation for the value they gain from exposure to Salesforce before they enter the workforce. Following each semester, multiple students have connected back to the department to describe how the exposure and hands-on work with Salesforce had a direct benefit in their external interviews for internships or career opportunities. Feedback from employers has been similarly complimentary and appreciative.

Beyond just exposure and experience with Salesforce, anecdotal insights provided by students into why these activities have been beneficial reinforce the benefits anticipated originally:

- “I like the backstories for each lab. Makes it more human and less of just instructions.”
- “I really enjoyed reading the blog postings. I’m really into blog posts so it only makes sense.”
- “Great job keeping me engaged. Fun!”
- “I thought creating an app was very difficult, but thanks to Salesforce, I learned how in a few easy steps.”
- “I felt engaged because I felt like I was learning something useful for my future career.”
- “It was very challenging for me. It made my brain hurt…but so worth it.”
- “I feel smart. 😊”
Distilling the recurring themes that emerge, we find:

- Hands-on experience makes abstract concepts tangible and provides exposure to leading enterprise technology.
- Blog format and style is familiar, accessible, and leads students to read more thoroughly.
- The student first-person perspective puts students “in” the innovation-based scenario, which captivates and taps their enthusiasm/energy. It also generates opportunities for tangential classroom discussions on aspects such as Silicon Valley itself and the venture capital industry.
- The scenario approach lets students “discover” gradually, exercise their curiosity, and gives them the feeling of innovating, vicariously, through Max’s eyes.
- The summative case description interweaves course content such as data management and business processes with broader contextual topics such as Silicon Valley innovation culture/history, start-ups and business development, and personal branding.

Quantitative data from the most recent semester has been collected and though analysis is just beginning, preliminary observations are consistent with the qualitative evidence. In the Fall 2015 semester, the labs were still being phased in across the many sections (12–15) of the class we run in any given semester. One instructor was teaching two sections: a normally sized section (45 students) in which he integrated the Salesforce labs for the first time, as well as a “double” section (110 students) that was not yet converted to these labs. This provided an opportunity to look for effects by comparing two sections that had the same instructor and materials in the same semester, differing only in the inclusion of the labs. This particular instructor chose to assign the labs only as out-of-class homework, so we would expect the effect might be weakened with comparison to performing the labs as in-class experiences, and our preliminary examination of the data suggests the effect is indeed muted. Effects may have been further weakened due to the instructor being new to the labs and thus less skilled in leveraging their value for classroom discussion.

Still, the results are highly consistent with the positive effects we would anticipate from such an intervention. Students were asked to score the degree to which they had mastered each of the each of the eleven course objectives on a Likert scale; while these objectives are general and lack any direct mention of the labs themselves, the mean scores for the lab-inclusive section were higher than those of the “control” section for ten of the eleven objectives, running roughly 5–30% better across the board. If any significance is born out by the forthcoming statistical analysis, it will support our assertion that the labs were engaging enough, even among iGens (and even as out-of-class assignments), to make more sense of the course itself for the students, thereby enhancing learning.

While we also plan to analyze student performance based on objective grading measures (rather than students’ self-evaluations), a preliminary examination of the instructor’s student evaluations shows means – across the thirteen individual survey items, including a composite score – that again are consistent with positive effects, suggesting enhanced students’ satisfaction with the course. The means for students in the lab-inclusive sections were higher by roughly 2–10%, for each of the thirteen items. In looking at the prior semester scores for this same instructor, teaching the same two sections of the course, the evaluations were nearly identical between the two groups, despite the class size differential. So if any of these results are found to be statistically significant, it would further establish the value of the labs in engaging students and thereby enhancing their perceived satisfaction and, by extension, their learning.

Finally, students who did have exposure to the labs reported consistently high scores for questions aimed at their engagement and satisfaction with the lab experience itself. Across fourteen Likert-scaled items, the response means were mostly well above 4.0 (where 5 = “Strongly Agree”) for questions such as “The labs were interesting” (4.43) and “The labs were fun and engaging” (4.36). The two lowest means were both 3.79 for “I achieved the course objectives better because of the Salesforce labs” and “The Salesforce labs helped make the rest of the course (the non-lab part) more meaningful.” These data are surprising given the course objective ratings data reported above, but may suggest that the labs’ carryover effect to course objectives is subtle and not fully recognized by the students, even when it is there, if the instructor is not making the linkage explicit. In any event, we find the numerical data to be consistent with the qualitative feedback – the labs are well received and valued by the students themselves.
Conclusion

It seems clear that teaching the iGeneration presents a formidable challenge, and it is incumbent on us, as educators, to explore new alternative pedagogies that address their “rewired” minds. Rather than try to beat them, we must join them. Given the overwhelmingly positive anecdotal reaction from both faculty and students and the preliminary data’s consistency with that feedback, we believe storification and social media hold promise in engaging our iGen students and suggest it is worth exploring further. Going forward we hope to learn more about how to maximize the effect by analyzing the existing data more extensively and by collecting new data to assess practical, lasting effects from the lab experience.

We intend to share the labs for use in other programs and we invite further research and development to help enhance the engagement potential of this approach and to apply it in other areas. Salesforce.com (www.salesforce.com) provides a free Developer Edition at: https://developer.salesforce.com/signup. In addition, fortunately, many other apps also exist to facilitate the creative process. Just as important, though, a well-told story with engaging characters is the “secret sauce” of storified labs. We hope we have provided some inspiration.

REFERENCES


