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Teaching Case

A Systems Analysis Role-Play Exercise and Assignment

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ABSTRACT

This paper presents a role-play exercise and assignment that provides an active learning experience related to the system investigation phase of an SDLC. Whether using waterfall or agile approaches, the first SDLC step usually involves system investigation activities, including problem identification, feasibility study, cost-benefit analysis, and preliminary project planning. These topics are normally covered during business-oriented introductory information systems courses and in more depth during systems analysis courses. The role-play case has evolved over several iterations since the 1990s, and it grew from a simple in-class exercise with informal discussion to a full-fledged assignment involving project planning and budgeting, utilizing both face-to-face and online collaboration. Specific roles include a CIO, systems analyst, and representatives from three functional business areas. The paper presents these roles, describes and gives examples of student deliverables, and discusses experiences and lessons learned using the exercise in an IS course.

Keywords: Systems analysis and design, System development life cycle (SDLC), Collaboration, User requirements, Requirements analysis & specification, Active learning, Role-play, Cost benefit analysis

1. INTRODUCTION

In this paper, we present a role-play case for the investigation/planning phase of an IS development project. This case, which evolved from previous work by the authors (Mitri, 1993; Mitri and Cole, 2007), involves perspectives from a variety of stakeholders, including the CIO, technical analysts, and users from three different functional units (marketing, customer relations, and accounts receivable). Students who play these roles collaborate face-to-face, as well as via online collaboration tools, to build an IS plan and budget that takes into account the challenges and needs faced by the fictional organization We Sell Stuff, Inc. We believe this exercise can give a valuable, active learning experience to students in an introductory information systems course. In this paper, we describe the case and our experiences using it in the classroom.

The importance and efficacy of active learning is well documented in the information systems pedagogy literature (Freeman, 2003; Ramiller, 2003; Savery and Duffy, 1995; Steven and David, 2002). Bonwell and Eisen (1991) cite a variety of active learning approaches, including cooperative learning, debates, drama, simulation, peer teaching, and most relevant for this paper, role-play.

Like other active learning approaches, role-play exercises encourage student participation and engagement. They give students practice in teamwork, interpersonal communication, and problem solving among individuals with different perspectives of the problem at hand.

The IS pedagogy literature includes several examples of role-play projects used in information systems courses. Role-play exercises are presented for requirements elicitation (Costain and McKenna, 2011), project management (Sullivan, 1993), case study analysis (Kerr, Troth, and Pickering, 2003), business processes and ERP (Shen, Nicholson, and Nicholson, 2013), software engineering (Tyson and LaFrance, 2006), and object-oriented design (Steven and David, 2002). Although role-play exercises have traditionally been done in-class and face-to-face, modern technology has led to the development of online (Lombard and Biglan, 2009) and even multinational (Jaeger et al., 2011) role-plays.

Chen, Frolick, and Muthitacharoen (2003) provide empirical evidence that role-play is an effective method for improving communication for IS professionals. Kerr, Troth, and Pickering (2003) found that first-year IS students perceived more value in case studies that were augmented by role-play versus case studies that were not. Shen, Nicholson, and Nicholson (2015) found that students' self-assessed knowledge was significantly higher after participating in role-

play than before, and that role-play enhanced the enjoyment of learning IS material.

Because technologies change rapidly, role-play exercises geared to IS-related scenarios can quickly become obsolete. The technical issues of an exercise developed in the 1990s or 2000s are going to be very different from those of today. In addition, the tools and methods used for student collaboration are also considerably different today compared to the past. Nevertheless, many of the organizational concerns and decision/communication skills used in role-play exercises are relatively timeless. In a good IS role-play (even an old one) we try to tap into the students' communication, analytical, and decision-making skills. In this spirit, the authors of the We Sell Stuff, Inc. role-play exercise did what many role-play authors do, which is to upgrade and evolve our exercise in order to remain timely and relevant.

The rest of this paper presents the role-play exercise (which includes both face-to-face and online collaboration) and evaluates its use in the classroom. We start by giving an overview of the case, including the expected deliverables from the students. Then we present each user's role. Next we assess our experiences using it in an introductory IS course and discuss future work.

2. AN OVERVIEW OF THE WE SELL STUFF, INC., ROLE-PLAY EXERCISE

This exercise facilitates several learning objectives relevant to an introductory IS course in a business college. These include, but are not limited to, the following:

1. Teamwork and interpersonal communications
2. Understanding IS-related terminology, including different types of IS (CRM, ERP, BI, analytics, etc.)
3. Relating information systems to organizational strategy, including competitive advantage and value chain
4. Understanding current technology, including hardware, software, database technology, client/server systems, cloud computing, etc.
5. Gaining practice in requirements elicitation
6. Gaining practice in IT planning and budgeting
7. Using collaboration and spreadsheet software for IT planning and budgeting

Our business college is AACSB-accredited, and our CIS program is ABET-accredited. Therefore, the exercise and assignment were designed to support learning objectives relevant to both of these accrediting bodies. Among the AACSB skill areas addressed by this role-play are: written/oral communication, analytical thinking, information technology, interpersonal relations and teamwork, reflective thinking, and application of knowledge (AACSB, 2013, pp. 31-32). Our introductory IS course is required for all business majors and, as such, is not subject to ABET requirements. However, ABET standards also guided the design of this exercise (ABET, 2015).

The principal activities involved in this exercise include Strengths, Weaknesses, Opportunities, and Threats (SWOT) and feasibility analysis, requirements determination, estimates of resource and budget requirements, and overall IS planning. The role-play exercise and assignment were administered to

students of an undergraduate introductory information systems course in the business college of a fairly large mid-Atlantic university.

The exercise gives an active learning experience relevant to many of the knowledge areas, topics, and skills taught in the course. The technologies of the role-play include several modern classifications of enterprise systems, including customer relationship management (CRM), enterprise resource planning (ERP), and e-commerce. One of the proposed projects in the role-play involves use of business intelligence technology. Data warehousing, cloud services, analytics, and social media are all included or implied in the narrative. The narrative also includes security and privacy issues, system performance problems, and concerns related to web presence.

We Sell Stuff, Inc.'s specific product line is not specified throughout the narrative, but in general it is a company that manufactures and sells products. Therefore, it faces similar challenges and goals of other companies in the manufacturing industry. The mission and environment of the organization is captured in the CIO role's narrative, focusing mostly on improving profitability. Particular attention is paid to product development, marketing, customer service, and supply chain. The narrative alludes to these issues, but the main emphasis is on IT's role and circumstances.

Like all companies, We Sell Stuff, Inc., has both strengths and weaknesses and faces typical business challenges. The total needs and desires of the users exceed the resources, so decision makers need to prioritize possible projects. The CIO role's narrative describes this from a strategic point of view, giving the CIO a bird's-eye perspective of the company's situation, as well as overall budgetary knowledge. Roles from the different functional units give more parochial views, many of which result from hands-on experience using the current system and from needs associated with their particular functions in the organization. The systems analyst role includes technical knowledge as well as project management expertise.

The exercise involves the following steps. Students are assigned into teams. Each student receives a role (there are five roles in total). During class time, student teams huddle together and discuss the case using their roles' perspectives. Following this, students collaborate via a Web-based collaboration tool (e.g. Office 365, Google Docs) to develop a detailed IS plan in a Word document and a budget in an Excel document. In constructing their plan, the team of students describes missions and goals as well as problems and opportunities. They perform feasibility and cost-benefit analyses and prioritize action items. The budget must be itemized, use Excel formulas and functions, and be driven by the costs of IT resources as well as budgetary constraints, both of which are described in various places of the narrative. Students also are required to submit their reflections on the team experience including their use of collaboration tools.

We believe this exercise is best done shortly after discussion of systems analysis, which is typically a chapter in most introductory IS textbooks. At this point in the semester, students would have been exposed to the concepts and methods required for producing the plan and budget. Also, students should by then have experienced some of the technological concepts found in the role-play narrative.

The next section presents each role's viewpoint. Later, we discuss and evaluate our experiences using the exercise in the classroom.

3. ROLE NARRATIVES FOR WE SELL STUFF, INC.

The five roles for We Sell Stuff, Inc. include (a) the CIO, (b) an accounts receivable manager, (c) a customer representative manager, (d) a marketing manager, and (e) a systems analyst. Here we present each role's narrative.

3.1 Chief Information Officer (CIO)

As the vice president in charge of the Information Systems (IS) department at We Sell Stuff, Inc. (WSS), you are concerned with assigning people to tasks and of budgeting moneys to projects. You know about the company goals and objectives of the organization. You also have an idea of how activities such as marketing, customer service, product development, and supply chain impact the profitability of the organization. You are aware of many of the company's concerns specifically related to competitiveness, security, web presence, and analytics. Finally, you know about current projects underway and current organizational performance.

The underlying company goal at We Sell Stuff, Inc., is to increase profitability. Top management believes that improvements in functional tasks will have the following impacts on profitability:

<u>Functional Task</u>	<u>Impact on Profitability</u>
Marketing efforts	high impact
Customer Service	very high impact
Supply Chain	moderate impact
Product Development	high impact

Thus, this will have a bearing on the priorities that you give to these tasks.

Recently, there was a breach of security on the system. A hacker was able to penetrate the defenses and obtain sensitive data, including account numbers and passwords, of a large number of customers and employees. This has had a negative impact on the company's reputation with many negative comments flooding Twitter and Facebook. A top "emergency" priority is to reassure customers that this will not happen again, and social media seems to be the best avenue for sending this message. Of course, another top priority is to address the security vulnerabilities that led to the breach in the first place.

In general, the company's web presence leaves something to be desired. Although there is a simple website where customers can log in and purchase products, there is no online capability for customers to interact with service representatives, to provide comments and reviews of WSS's products and services, or to return products if they don't want them. For returns, customers need to call in, and they often experience long wait times. Many customers have also commented that they would like to have more capability to link to the company's website via social media.

Another issue is that sometimes there is not enough product in stock to satisfy customer demand, especially for products that WSS purchases from third-party vendors. The purchasing process is still largely manual and paper-based, and employees in the purchasing department often do not have

enough knowledge about either the levels of inventory in stock or the promotions and sales initiatives created by the marketing department. Therefore, there is often demand that is unfulfilled due to insufficient stock. While this is not a severe problem, it is one that sometimes generates negative customer comments.

One area of pride for WSS is their product development. For the products that WSS manufactures in-house, the process is very smooth, cost-effective, and largely automated. WSS's home-grown products have a reputation for high quality at reasonable prices. Thanks to substantial IT and product-development investment over the past decade, WSS has a state-of-the-art manufacturing facility with robotics, automated workflow, and a highly trained workforce. This is an area in which WSS has a distinct advantage over competitors, and upper management does not want to compromise on this advantage.

Top-level and mid-level management has a strong desire to gain better and timelier intelligence regarding the entire value chain. Specifically, there is a growing need for quicker feedback on a variety of relevant data, including sales trends, customer feedback and comments, process workflow, and inbound logistics.

In summary, the company is going through turbulent times. There has been increased pressure to improve customer service and marketing, as these are seen to be the weak areas in the company. Manufacturing and product development has been traditionally strong, and there is real motivation to maintain and capitalize on that strength. But the weak marketing and customer service performance threatens the long-term health of the organization, and the recent security breach has exacerbated these concerns.

The IS department is composed of the following staff members and salaries: five junior developers fresh out of college at \$60,000 per year with limited technical skills; five senior developers with Microsoft experience and some Java experience at \$75,000 per year; four senior systems analysts at \$100,000 per year; and two senior database/system administrators/analysts at \$85,000 per year. Your allocated budget for this year is the following: System Personnel, \$1,400,000; Software/Hardware Acquisition, \$50,000; and Training, \$30,000.

Currently, there are two system development projects underway:

1. An upgraded manufacturing and product development system. This system is an attempt to enhance the automation of the manufacturing process by upgrading to the latest robotics technology. It is a very high visibility system, and it has a significant champion in top management, largely due to the desire to continue and enhance WSS's stellar reputation as a product developer. There are two systems analysts, two senior programmers, and four junior programmers working on it.

2. A series of proof-of-concept prototype experiments with business intelligence (BI) and data analytics applications. You have attended some conferences and vendor exhibitions of BI/analytics companies and came away with the thought that these technologies could be useful for addressing some of the problems facing WSS. Although this effort is still in its early stages, there has already been some measurable impact. For example, one prototype has been used by marketing and customer service management who commented that they now have a much better idea of national sales trends and have been able to get both summary and detailed information much quicker than was possible in their earlier reporting systems. To date, the proof-of-concept prototypes have been done in a piecemeal way, usually teaming a systems analyst or programmer to work with a customer rep or marketing manager when they have the time. It may be better to consider expending more resources on this effort.
4. There is no way for a customer to make an overdue payment online today. This feature would expedite the collection of some funds.
5. It is very hard to keep an experienced Account Receivable employee on the payroll. You would like to see some sort of online training in the system to allow new employees to learn the material more quickly.
6. You are very concerned about corporate security issues.

Although you would like to get all of these wish-list items taken care of, you recognize that this may not be possible. For example, being a very busy person, you have limited time to devote to systems development efforts. You recognize that working hard now may help improve the efficiency and effectiveness of your group in the future.

Based on your knowledge of the concerns facing WSS's top management, you have scheduled a meeting with a systems analyst from your department and with managers from marketing, customer service, and payment collection. The topic of this meeting is to investigate the ways to address WSS's problems and improve its competitiveness via systems development efforts. Thus, you, the systems analyst, and the customer rep manager form the IS PLANNING TEAM for this project.

You have been contacted by your Director who wants you to work with managers from other functional areas, the CIO, and the Information Systems staff to update your existing Information System. Several Managers (Supply Chain and Product Development) and your Director are out of the country for a while, but he wants to get this project moving quickly. He realizes that everyone is extremely busy, and it will be hard to meet again face-to-face. He recognizes that the current organization promotes Information Silos, and he wants to move to a more integrated approach. He insists that the team use Office 365 as a collaboration and document storage mechanism so that he can review the team's progress and monitor your contributions to the effort.

Your team will meet, discuss the problems and needs, assess feasibility, plan on a course of action, and produce an IS PLANNING REPORT based on the meeting. The meeting is about to begin...

This team will explore the ways to make the Account Receivable job easier via some systems development efforts. The Planning Team meeting is today. The meeting is about to begin...

3.2 Accounts Receivable Manager

You are the manager of a group of accounts receivable representatives for We Sell Stuff (WSS), Inc. You and your group are responsible for collecting payments from customers. People in your group have been complaining about their existing information system and have a long wish-list of possible improvements. Specifically, the following issues have come up:

3.3 Customer Representative Manager

You are the manager of a group of customer account representatives for We Sell Stuff (WSS), Inc. You and your group are responsible for providing support and service to existing customers. People in your group have been complaining a lot about their existing information system and have a long wish-list of possible improvements. Specifically, the following issues have come up:

1. It is difficult to keep track of customers who are lagging behind in their payments. In order to do this, the customer representatives must exhaustively search their list of customers periodically. It would be much more convenient if an exception report were generated automatically when a customer falls more than a month behind. This would impact the payment collections tasks that the reps perform.
2. The reports that are currently produced are difficult to read. All the pertinent information is there, but it is formatted in an inconvenient manner. It would be nice to improve the format of the reports.
3. Currently, the reports which list all customers for a representative do so in alphabetical order of the customers' names. It would be nice to provide a listing in order of how much the customers owe as this would help to quickly identify those who should be contacted for payment.
1. The system runs very slowly, especially at peak hours during mid-morning and mid-afternoon. This impacts all tasks performed by the customer reps. At times, they have to wait 30 seconds just to get a response. In order to do their jobs effectively, they need to consistently get a response within five seconds. They want some way to improve the response time.
2. When entering information about the customer, there is no place to put the email address. The screen has a position for phone number and one for fax, but many customers have email addresses, and this information would be very useful to store in the database. Keeping the email address would help improve the customer service operations.

3. When serving the customer, it is helpful to have the total history of transactions that have been completed for the customer. This would greatly facilitate the customer service functions that representatives perform. Currently, only data about the most recent transactions are retained in the database; ideally, all previous transactions should be kept.
4. Although some customer representatives are experienced and have much expertise, the majority are less experienced. The less experienced representatives often make mistakes in serving their customers. It would be helpful to have a system that captures the expertise of the more experienced representatives which could advise and counsel the less experienced representatives. This would greatly improve the quality of customer service.
5. There is no Frequently Asked Questions (FAQ) section on the company website. Many of the customers' issues could be addressed in this manner.
6. You are very concerned about customer privacy issues.

Although you would like to get all of these wish-list items taken care of, you recognize that this may not be possible. For example, being a very busy person, you have limited time to devote to systems development efforts. You recognize that working hard now may help improve the efficiency and effectiveness of your group in the future.

You have been contacted by your Director who wants you to work with other End-User Managers, the CIO, and the Information Systems staff as a team to update your existing Information System. Several Managers (Supply Chain and Product Development) and your Director are out of the country for a while, but your Director wants to get this project moving quickly. He realizes that everyone is extremely busy, and it will be hard to meet again face-to-face. He recognizes that the current organization promotes Information Silos, and he wants to move to a more integrated approach. He has mentioned using Google Drive as a collaboration and document storage mechanism so he can review the team's progress and monitor your contributions to the effort.

This team will explore the ways to make the Customer Rep job easier via some systems development efforts. The Planning Team meeting is today. The meeting is about to begin...

3.4 Marketing Manager

You are the manager of a group of marketing representatives for We Sell Stuff (WSS), Inc. You and your group are responsible for the marketing efforts aimed at getting new customers and keeping existing customers. People in your group have been complaining about their existing information system and have a long wish-list of possible improvements. Specifically, the following issues have come up:

1. In order to better target potential customers for marketing and promotion efforts, it would be nice to have software that could quickly identify trends and analyze buying behavior. Currently, no such system exists in the company. Users have to look in individual databases and reports, then manually consolidate data into spreadsheets and/or word processors on their own, which is very time consuming and prone to error. Marketing employees don't have the time to do anything sophisticated, and therefore base their predictions on ad hoc assumptions. They would like to be able to see summary data and have the ability to navigate easily into the detail data.
2. Although your company has a website, it is very outdated. Your competitors use e-Commerce and are providing other features on the web such as on-line help desk capabilities. You are discovering that this is cutting into your market share. You would like to be able to start doing this as well, and you anticipate that this would have a considerable impact on your market share.
3. The Marketing group would like to have a system that allows it to track and know everything about a given customer. This should provide some new opportunities for cross-selling and up-selling.
4. Although some marketers are experienced and have much expertise, the majority are less experienced. It would be helpful to have a system in place that captures the expertise of the more experienced marketers which could advise and counsel the less experienced marketers. This would greatly improve the quality of marketing.
5. Currently you have no Social Media systems in place. You recognize that this technology is very important to getting and keeping customers.

Although you would like to get all of these wish-list items taken care of, you recognize that this may not be possible. For example, being a very busy person, you have limited time to devote to systems development efforts. You recognize that working hard now may help improve the efficiency and effectiveness of your group in the future.

You have been contacted by your Director who wants you to work with other End-User Managers, the CIO, and the Information Systems staff as a team to update your existing Information System. Several Managers (Supply Chain and Product Development) and your Director are out of the country for a while, but your director wants to get this project moving quickly. He realizes that everyone is extremely busy, and it will be hard to meet again face-to-face. He recognizes that the current organization promotes Information Silos, and he wants to move to a more integrated approach. He is insisting on the team using Office 365 as a collaboration and document storage mechanism so he can review the team's progress and monitor your contributions to the effort.

This team will explore the ways to make the Marketing job easier via some systems development efforts. The Planning Team meeting is today. The meeting is about to begin...

3.5 Systems Analyst

As a systems analyst at We Sell Stuff (WSS), Inc., you have considerable knowledge of the information systems currently used in your company, as well as a significant understanding of business processes. Specifically, your expertise is in database design and software development. In addition, you have a good idea of how long it takes to do various types of technical tasks and of the types of hardware, software, and networking resources that would be required for completing these tasks.

You have the following ideas of how long it would take to do the following software development projects in-house:

- Develop a website for e-commerce and implement CRM functionality
 - using e-commerce from a cloud services provider takes two months; not as customizable
 - using a CRM software package, hosted in-house takes six months; more customizable
- Develop a data warehouse including OLAP, data mining, market basket analysis, and other business intelligence functions
 - using data warehousing cloud services takes six months; harder to integrate with company database
 - using a data warehousing software package takes 12 months; easier to integrate with company database
- Implement Business Intelligence, including market basket analysis and data visualization
 - as an add-on if using e-commerce cloud services takes one month
 - using a 3rd-party service takes two months
 - developing in-house, using data feeds from e-commerce website, takes eight months
- Minor database improvements
 - adding fields to existing tables or minor data formatting changes take two days per improvement
- Major database improvements
 - developing sales performance reports takes two months
 - developing inter-enterprise reporting functionality takes six months
 - changes to report formats takes two days per report
 - generating new departmental reports takes two weeks per report

These estimates assume that a systems analyst or a senior programmer would be doing the tasks. For inexperienced programmers, each task would take twice as long.

Your information systems run on rack servers supported by technical support staff. Each department runs on its own server which has enough capability to run transaction and reporting processes for the department. None of the servers has the capability to support a modern web presence, knowledge management, or data warehousing.

Currently, your company has five Dell PowerEdge R220 Rack Servers, each dedicated to a specific department. Each server has 4GB of memory; a larger shared server that

supports virtualization would help with some of the performance issues.

The technical support staff at WSS has discussed meeting the demands of the various departments but current staff has no experience with load management or server virtualization; the approach in the past has been to buy additional servers to increase processing capability for any department that needs it.

You are aware that there are many providers of cloud services that support some of the business processes in which your company is interested. These include e-commerce platforms, data warehousing, and customer relationship management. Most of these cloud services are provided on an as-needed basis; processing resources are dynamic and can quickly be increased or decreased as demand changes. The cost of these services is based on actual usage, not on a fixed fee.

You have the following knowledge about the speed of the information system:

- a. During peak hours (10-12 a.m. and 2-4 p.m.), there are many users on most of the servers. This creates too much demand for the scarce resources available. Particularly, the CPUs (Central Processing Unit) and RAM (random access memory) are being hit very hard during this time which causes a significant slowdown in system performance. Conversely, at other times of the day, and especially at night, very few people are using the system, and it is almost idle.
- b. The number and power of CPUs has measurable impact on computer speed. Existing servers have only 4GB of memory; the current price of these servers is \$1,929.00; and the price of a PowerEdge R730 16GB server is \$3,349.00.

You have the following knowledge about software:

- a. Most programming done by your company to date has been to develop MIS/reporting systems, and most applications are written in Visual Basic. Recently, some small applications have been developed with Java, and a few programmers know Java.
- b. Some end users are very experienced with Excel and have created pivot tables that allow them to analyze sales data. Programmers support this end-user computing by maintaining data downloads from the in-house sales system.
- c. You and one other systems analyst have experience with database development, programming of MIS systems, and system implementation. One programmer has some experience with web and mobile app development, and six other programmer/analysts have previous experience with Java programming and systems development.
- d. Tableau Software has data analytics products that can be run on the web or on local computers with the ability to publish to the web. Tableau Online is free; Tableau Personal is priced at \$999.00 per user; and Tableau Professional is \$1,999.00 per user.

- e. Rackspace provides cloud hosting for e-commerce, big data, and has their own servers. A 15GB server with 620 GB of storage can be leased for \$657.00/month. They also offer managed server virtualization services.
- f. Magento has a start-up e-commerce package that offers marketing tools such as targeted promotions, coupons, wish lists, customer rewards, and other features that work to engage and retain customers. The package is scalable and can be upgraded as demand increases. The start-up package (Magento Enterprise) is priced at \$15,550.00
- g. Training for data mining and OLAP software costs about \$5,000 per person. Training for Java and internet classes cost around \$6,000 per person.
- h. The Marketing manager has asked if IT could develop a blog that Marketing could use to highlight products and generate sales. You are aware that Marketing has created a Facebook page, but without online ordering capability, it hasn't resulted in any sales increases.

Most of the systems analysts and senior programmers are quite busy working on other projects. Specifically, the inventory control MIS system is being totally revamped (project is 80% complete; some enhancements have already been implemented and are being used). In addition, a new project was recently started for automating the manufacturing and production scheduling processes.

Although many senior people are busy on these existing tasks, there are some relatively inexperienced programmers who have time to take on additional projects.

You have recently been contacted by the manager of We Sell Stuff, Inc.'s Information Systems department (the CIO) who wants you to participate on an IS Planning Team. This team will explore ways to make the end-user jobs easier via some systems development efforts. The end-users are responsible for marketing, customer service, and payment collection. These areas have been suffering in the company, and there have been many complaints from the end-users about the system's performance. Your CIO wants you to support the group's collaboration efforts and document storage using Office 365. A meeting has been scheduled for today. The meeting is about to begin...

4. PROCESS AND DELIVERABLES

The **We Sell Stuff, Inc.**, role-play exercise was created during 2014 and implemented in the classroom during the spring 2015 semester for two sections of an undergraduate introductory information systems class. Most students taking this class were freshman or sophomore business majors at a traditional residential university. Students were given this role-play exercise relatively late in the semester while covering the systems analysis chapter of the textbook (e.g., Kroenke, 2014). By this point in the semester (chapter 10 in the textbook), students have learned about the strategic role of IS, data communication and the cloud, databases, hardware and software, business processes and IS, enterprise systems, collaboration, business intelligence, e-commerce, and other typical introductory IS topics. In addition, students have gained practical experience designing and implementing simple 4-5 table databases along with queries and forms using

Microsoft Access. Students have also used collaboration tools like Office 365.

The project started with one full class period (one hour and fifteen minutes) during which the team members received their role narratives (see Section 3) and conducted their face-to-face meeting. Each team consisted of 3-5 members, where one member played the CIO, another played the systems analyst, and the others played the various user roles. Teams of 3 or 4 students used the CIO and Systems Analyst roles and 1 or 2 user roles. The assignment of user roles was prioritized in this order to provide some consistency across teams of varying sizes: Customer Service, then Marketing, then Accounts Payable. After this meeting, the teams continued their planning process over the next two weeks using a collaboration platform (Office 365 was used in that semester, but the particular collaboration platform doesn't matter). In order to facilitate online collaboration skills, students were encouraged to do most of their work online with minimal face-to-face meetings. As described earlier, the project deliverables include an IS Project Report in Microsoft Word, an Excel-based budget, and reflections on the student's experience with the project.

The report was required to include: goals and objectives, problems and opportunities, a feasibility analysis, and a strategy consisting of a set of action items. For feasibility analysis, students discussed organizational, technical, scheduling, and cost feasibility. The cost-benefit analysis required both tangible and intangible factors. The Excel budget itemizes the amount of money that will be spent for different aspects of this systems development project and includes formulas for multiplications and additions so that totals change automatically if any of the unit costs change.

The self-reflection questions assessed the students' experience with the exercise. These included questions about the group dynamics as well as the team's use of technology for collaboration. These questions asked students to analyze and articulate their thoughts. Students' answers to the reflection questions and team responses for each of the plan elements are included in the Teaching Notes. It is interesting to note that many of the students preferred face-to-face collaboration over online collaboration. In fact, they often combined the two, working in the same Office 365 space while sitting together with their laptops.

A major first step in constructing the project report was to articulate the goals and objectives of the company at a broad level (as opposed to action items which are more focused). Based on the information from the role narratives (especially the CIO), goals included several of the following concerns: profitability, customer service, marketing, security, product development, and inventory. Students were also required to state these goals in terms of Porter's (1980) competitive forces model.

5. EXPERIENCES AND LESSONS LEARNED

Although teams' reported goals, problems/opportunities, and action items varied, several common themes emerged. The problems and opportunities are basically an aggregate of items from all the role narratives. The most common themes in the goals relate to broad-level issues such as social media, web presence, security concerns, and analytics. Problems and opportunities exist in all the role narratives; some are high-

level strategic concerns and others are specific and focused issues of concern to a subgroup of stakeholders. Action items stem from the goals and the problems/opportunities, as do the feasibility analyses. These include purchasing decisions (hardware, software, services) as well as in-house software development and database tasks. Employee training is also emphasized, as well as hiring recommendations. The Teaching Notes associated with this paper lists several teams' report items, including their stated goals, problems/opportunities, action items, and feasibility analyses.

We now present some lessons learned from using this role-play exercise. First, as mentioned earlier, students generally felt uncomfortable doing the assignment exclusively via online collaboration tools. This is despite the fact that the teams existed and did collaboration exercises for some time before the role-play exercise. We are not sure whether and how students can become more comfortable with remote collaboration but will explore this issue in future semesters.

Second, it was clear that students need a deeper understanding of feasibility analysis as this was the most problematic aspect of the project plan for many teams. In addition, teams seemed to have difficulty creating high quality budgets. There was little consistency in either the format or the level of detail, and the concept of "itemizing" a budget seemed confusing to many. It should be noted that most students taking the class have not yet taken any accounting courses, so perhaps a bit more detailed explanation of these topics would be useful in future semesters.

Third, as with any group project, there is the danger that some students will participate more than others. There are various approaches for dealing with the possibility of "slackers." One option is to include peer-assessment as a component of the project grade. We did something like this in our assignment, and students consistently judged that all team members did their fair share of work. Additionally, with our exercise, student participation can be tracked. The role-play meeting itself takes place in the classroom, so the instructor can observe the participation. Even the take-home part can be tracked because students are required to participate using collaboration software. Finally, use judgment in how much of the overall course grade depends on the group project. In our case, this assignment only counted for five percent of the overall grade, and much more was based on individual test performance. So, even if a student manages to get away with freeloading, the effect on his or her overall grade is minimal.

6. CONCLUSIONS AND FUTURE DIRECTIONS

The role-play exercise described in this paper evolved over three major iterations to its current state. Over the course of these three iterations, the technologies and IS topics changed dramatically. In the first version, published in 1993 (Mitri, 1993), the technology focuses on a mainframe platform, using COBOL and FORTRAN programming languages, with the exploration of expert system shells. In terms of information systems concepts, the focus is on transaction processing systems (TPS), management information systems (MIS), and decision support systems (DSS), which were the major IS classifications at the time. This was in the early days of the Windows operating system, and the Web as we know it did not exist at the time; although there was a fair amount of

Internet activity in the academic community, this was not a major platform for business systems.

The second version, published in 2007 (Mitri and Cole, 2007), emphasizes migration from mainframe systems to programming languages supporting e-commerce, data warehousing, and knowledge management applications. Again, this is reflective of the predominant technologies of the time, as well as the major topics found in introductory IS textbooks at the time (e.g., O'Brien, 2005).

In this third iteration, emphasis is placed on customer relations management (CRM), business intelligence (BI) and data mining, migration from in-house IT platforms to cloud service platforms, and the use of data visualization tools. In addition, security concerns are emphasized much more heavily in the current version of the role-play than in previous iterations.

Although the technological discussion changes considerably in the narratives of the three different iterations of the role-play, many of the business and strategic concerns remain fairly stable. The largest functional concerns relate to customer service, marketing, and product development, with additional concerns related to inventory control and payment collection. Salaries have, of course, increased from the \$25,000-\$50,000 range in 1993 to the \$60,000-\$100,000 range in the current iteration. As in previous versions, there is a tradeoff between acquisition and in-house development. And, in all three versions, system performance issues arise leading to decisions on platforms and hardware acquisition. So, despite the rapid changes in technology, many of the basic concerns faced by IS professional remain stable over time, although security concerns have increased over time.

The deliverables of the role-play also evolved over time. In the first iteration, this was simply an in-class exercise with informal discussion afterward. Although the case can still be used in this way, we have incorporated it into a broader assignment which includes both group and individual components as described in this paper. The accompanying Teaching Notes gives various options for how to use the exercise.

As we continue to enhance the role-play exercise, we hope to add new elements and perspectives. One major area of expansion is to include ethical components into the narrative and decision-making process. This is especially promising now that BI, analytics, and security have been included in the narrative, and it fits well with the mission of our university. We would also like to include more reference to social media, embedded systems, text analytics, sentiment analysis, cyber security, globalization, NOSQL, internet of things (IoT), big data, and other cutting edge technologies.

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