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Teaching Case

A Systems Analysis Role Play Case: We Sell Stuff, Inc.

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ABSTRACT

Most systems development projects incorporate some sort of life cycle approach in their development. Whether the development methodology involves a traditional life cycle, prototyping, rapid application development, or some other approach, the first step usually involves a system investigation, which includes problem identification, feasibility study, cost-benefit analysis, and project planning. This topic is normally covered in introductory information systems courses taken by business students, as well as in systems analysis courses taken by information systems majors. This paper presents a role-play case of a fictional company, We Sell Stuff, Inc., giving students an opportunity to apply knowledge of systems investigation issues in a group setting. Three roles are described, along with an outline of project plan deliverables.

Keywords: Systems analysis, SDLC investigation phase, role-play, feasibility, cost-benefit analysis, IS management, user requirements.

1. CASE SUMMARY

In this paper we present a role play exercise that involves groups who participate in a classroom activity followed by a small group project regarding a fictional company called We Sell Stuff, Inc. Role-play is a useful teaching tool for many areas in information systems, as it facilitates student participation in active learning (Freeman 2003, Kerr et al 2003). We believe this exercise is most appropriately used in introductory IS courses or in systems analysis courses. The topic that the case applies to most directly is the Systems Investigation phase of the System Development Life Cycle (SDLC), particularly when discussing issues related to problem identification, feasibility studies, cost-benefit analyses and initial project planning (O'Brien 2005 pp. 346-348, Hoffer et al 2005 pp. 123-143). The paper is presented as a teaching case consistent with the guidelines for JISE (Cappell 2002).

The role play exercise involves three roles. Each role has a certain perspective of the information systems problems faced by the company, in the context of strategic pressures, technological capabilities and opportunities, and user needs. The three roles are (1) system user, (2) systems analyst, and (3) chief information officer (CIO). Each person in a role-play team receives a two-page description of their viewpoint. Together, these three roles' viewpoints should give a comprehensive picture of the circumstances and appropriate

solutions for the case. But, in order to come up with a good solution, the three role-players must interact and communicate with each other. Thus, this case provides a realistic exercise to facilitate practical, action-oriented learning with regards to the early stages of systems development projects. In addition, it gives students an appreciation of the differing perspectives that end users, managers, and system developers bring to software projects (Hasan 2002).

The system user is a supervisor of customer service representatives for We Sell Stuff, Inc., whose job functions include overseeing the marketing, customer service, and bill collection processes. The user role identifies problems in existing functionality and performance on the system, and also has a wish-list of new desired functionality. Existing problems include slow performance, lack of important data elements and reporting features, and outmoded technologies. The wish list includes desires for an e-commerce presence, knowledge management system, more flexible reporting features, decision support features, and more comprehensive tracking of transaction histories.

The systems analyst is an expert in the company's existing technical architecture, as well as knowing about current technology trends in the industry. This expertise includes knowledge of hardware and software platforms. In addition the systems analyst is aware of the reasons for systems performance problems and knows about various

options and costs of hardware upgrades that could solve these problems. Furthermore, the systems analyst is aware of technology trends in data warehousing, knowledge management, and web design, and has a good idea of the degree of expertise and effort required to perform various maintenance and enhancement tasks on the system. Finally, the systems analyst is also aware of the IT staff's current task commitments and availability for new tasks.

The Chief Information Officer (CIO) approaches the problem from the perspective of a high-level strategic planner. This person is responsible for staffing, budgeting, procurement, and overall IT planning in the organization. In this capacity, the CIO is aware of how much money is available for labor and capital expenditures, the current staff of IT personnel and their salaries, and the other major IT projects being conducted at We Sell Stuff, Inc. In addition, the CIO is aware of the strategic environment in which the company operates, including competitive pressures as well as some idea of the overall impact of various business functions on the company's profitability (O'Brien 2005 pp. 40-41).

This role-play exercise involves two main phases:

1. An in-class group exercise in which teams of three (CIO, systems analyst, and customer rep) meet to discuss the problems and opportunities based on each role's knowledge and perspective. This meeting exemplifies the systems investigation phase of the SDLC, and its purpose is to identify problems, assess feasibility, and produce a preliminary project plan. This meeting could take place during a one-hour classroom session.
2. A take-home group project, where the team members must get together to produce a project plan, which identifies overall mission and objectives, problems and opportunities, feasibility assessment, an overall set of action items, and a preliminary budget. This report can then be handed in for a grade.

2. CASE TEXT

2.1 USER – Customer Representative Supervisor
You are the supervisor of a group of customer account representatives for We Sell Stuff, Inc. You were a customer rep yourself for many years, so you have a good idea of the sorts of activities these people are involved in. These people are responsible for the following tasks:
1) marketing efforts aimed at getting new customers,
2) providing support and service to existing customers, and
3) collecting payment from 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. The system runs very slow, 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 5 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 on the database. Keeping the email address would help improve the customer service operations.
3. When servicing the customer, it is helpful to have the total history of transactions that have been done for the customer. This would greatly facilitate the customer service functions that the representatives perform. Currently, only data about the most recent transaction is kept in the database. Ideally, all previous transactions should be kept.
4. 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.
5. In order to better target potential customers for marketing and promotion efforts, it would be nice for some software to quickly identify trends and buying behavior analysis. 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 people 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.
6. 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.
7. Currently, the reports which list out all customers for a customer 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...this would help to quickly identify those who should be contacted for payment.
8. Although your company has a website, it is very outdated. Your competitors are using Electronic 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.
9. Although some customer representatives are experienced and have much expertise, the majority are less experienced. The less experienced representatives often make mistakes in servicing their customers. It would be helpful to have a system in place that captures the expertise of the more experienced representatives and can thus advise and counsel the less experienced representatives. This would greatly improve the quality of customer service.

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, you have limited time to devote to systems development efforts, being a very busy person. In fact, the whole group of customer reps are backlogged, especially those with the most experience. On the other hand, you recognize that working hard now may help improve the efficiency and effectiveness of all the representatives in the future.

You have been contacted by the manager of We Sell Stuff, Inc.'s Information Systems department, who wants you to participate in an IS Planning Team. This team will explore the ways to make the customer reps job easier via some systems development efforts. The first IS Planning Team meeting is today.

The meeting is about to begin....................

2.2 Systems Analyst

You are a technical person who has much knowledge of the information systems currently used in your company, We Sell Stuff, Inc. Specifically, you know a lot about programming and software design. 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 and software that would be required for performing these tasks.

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

Developing a Data Warehouse including OLAP, Data Mining, and drill down capabilities
(with Data Warehousing Software)	12 months
(with 3rd Generation language)	24 months

Knowledge Management System including artificial intelligence (AI) and Expert systems capabilities
(with expert system shell)	12 months
(with 3rd generation language)	24 months

Minor database improvements	2 weeks per improvement

(e.g. add a field, add an improvement to the index file)

Major database improvements	2 months

(e.g. maintaining records of all customer transactions)

Changes to report formats	1 week

Generating new reports	1 month

Developing Web Site for Ecommerce and Customer Relationship Management (CRM)
(requires Java)	12 months

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

Your information system runs on an IBM AS/400. This hardware is outmoded and will not be supported by IBM much longer. Although is it sufficient for the TPS/MIS, it does not have capabilities to support a modern web presence or knowledge management or data warehousing. There are two processors (CPU) and 2 gigabytes of RAM.

You are aware that IBM has a more modern midrange called an eServer ("e" stands for electronic-business). The eServer series allows up to 12 processors, and up to 32 gigabytes of RAM. The base model has 4 processors and 8 gigabytes of RAM.

The eServer also includes a Java-platform for web development and much greater disk storage capability than your current system. To upgrade from the current model to a base eServer (with 4 CPUs and 8 gigabytes of RAM) would cost your company $50,000. Each additional CPU would cost $2000 and each additional gigabyte increase in RAM would cost $1000.

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

a) During peak hours (10-12 AM and 2-4 PM), there are many users on the system. 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. This causes a significant slowdown in system performance. Ironically, at other times of the day, and especially at night, the system is very idle and very few people are using it.

b) The number of CPUs has measurable impact on computer speed. Currently, your company has two CPUs. You estimate that switching to the eServer base model will improve computer speed by 15%. Adding a fifth CPU could make an additional 10% improvement, and a sixth can improve performance by 5%.

c) The amount of memory available can affect computer speed as well. Currently, your computer has 2 gigabytes of RAM. The eServer base model has 8 gigabytes of RAM. If you add 2 additional gigabytes, you anticipate the speed will improve by 20%, as it would reduce the paging rate to your virtual memory on disk.

d) CPU upgrades and memory upgrades are not independent of each other. Adding CPU shifts the performance bottleneck to the RAM, and adding RAM shifts the performance bottleneck to the CPU. Thus, the CPU performance gains listed above could be doubled if each new CPU were accompanied by an additional 2 gigabytes block of RAM.

You have the following knowledge about SOFTWARE:

a) Currently, your company's TPS and MIS are written in COBOL. Most of the programmers and systems analysts have been trained in COBOL.

b) Most programming done by your company to date has been MIS and TPS related. But recently some small applications have been developed with Java and a few programmers know Java.

c) You and one other systems analyst have previous experience with expert system shells. Six other programmers and systems analysts have had previous experience Java.

d) IBM's data warehousing package site license would cost around $20,000. Data warehousing provides the capability to do custom data queries, provide data mining, on-line analytical processing (OLAP), drill-down capabilities, and other sophisticated analytical capabilities.

e) IBM also provides a knowledge management development tool that includes artificial Intelligence (AI) capabilities. The site license for this is $25,000.

f) The Java based e-commerce/CRM development platform cost $20,000.

g) Training for knowledge management software costs about $5000 per person. Training for Java and internet classes cost around $6000 per person.

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

Although many senior people are busy on these existing tasks, there are some relatively inexperienced programmers who have relatively little to do.

You have recently been contacted by the manager of We Sell Stuff, Inc.'s Information Systems department (the CIO), who wants you to participate in an IS Planning Team. This team will explore the ways to make the customer representatives' job easier via some systems development efforts. The customer reps 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 customer reps about the system's performance. A meeting has been scheduled for today.

The meeting is about to begin....................

2.3 Chief Information Officer (CIO)

As the vice president in charge of the Information Systems (IS) department at We Sell Stuff, Inc., 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, collection, inventory control, and product development impact the profitability of the organization. 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:

Functional Task	Impact on Profitability
Marketing efforts	large impact
Customer Service	huge impact
Payment collection	minor impact
Inventory Control	moderate impact
Product Development	large impact

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

The IS department is composed of the following staff members:

	Yearly Salary
5 rookie programmers with COBOL experience	$45,000
5 rookie programmers with Java experience	$45,000
4 senior programmers with COBOL experience	$60,000

1 senior programmer with Java experience	$60,000
3 systems analysts	$75,000

Your allocated budget for this year is the following:

	Budgeted Amount
System Personnel	$1,000,000
Software/Hardware acquisition	$100,000
Training	$30,000

Currently, there are two system development projects underway:

1) An inventory control TPS/MIS enhancement project. This project is about 80% complete. There is one systems analyst, 3 senior programmers, and 3 rookie programmers working on this project. A significant part of the system has already been implemented, and tangible benefits are being gained.

2) A new manufacturing and product development system. This system is an attempt to automate much of the manufacturing process. It is a very high visibility system, and has a significant champion in top management. There are two systems analysts, two senior programmers, and four rookie programmers working on it. Recently, one of the systems analysts suggested that this project could be aided with by using artificial intelligence (AI) and expert systems technology.

Recently, you hired three new rookie programmers who have not been assigned to any task yet.

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.

Because of these facts, you have decided to explore the possibility of finding ways to improve upon the marketing and customer service capabilities of your company's information systems. You have scheduled a meeting with a systems analyst from your department and with a manager of customer representatives, who are responsible for marketing, customer service and payment collection. The topic of this meeting is to investigate the ways to make the customer reps jobs easier through some systems development efforts. Thus, you, the systems analyst, and the customer rep manager form the IS PLANNING TEAM for this project.

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.........................

2.4 We Sell Stuff, Inc. Information System Plan Report Outline

I. Mission and Goals -

    A. State the organizational goals and objectives, and prioritize them

    B. Identify the Critical Success Factors. Express these in terms of Porter's model of competitive forces and strategies.

II. Problems and Opportunities
  A. Identify the problems stated by users and managers (and give the causes if you can).
  B. Identify the market and/or technological opportunities and threats.

III Feasibility Analysis –
  A. Evaluate in terms of Organizational, Technical, Operational, and Economic Feasibility
  B. Identify (1) tangible costs, (2) intangible costs, (3) tangible benefits, and (3) intangible benefits.

IV. Strategy and Action Items
  A. Identify and describe the steps and tasks that will be undertaken during this project.

V. Preliminary Budget
  A. Itemize the amount of money that will be spent for different aspects of this systems development project. Stay within budget!

3. DISCUSSION AND CONCLUSIONS

Although we consider this to be a useful and fun exercise for the students, there are a few pitfalls to avoid. These pitfalls revolve primarily around time management issues, student attitudes, and grading. In general, this would be an optimal exercise for a class that meets for over an hour (for example one hour and fifteen minutes). But for classes that meet for only 50 minutes, it is difficult to squeeze in a complete meeting. This should be taken into consideration when planning the use of the exercise.

When we use this exercise again there will be several things that we will consider to do differently to improve upon it. Originally, we thought that once the exercise was initially started the students would understand it and complete it without too much difficulty. However, that was not always the case. After the students had a few minutes to read their roles and meet as a group there were several basic concepts of the exercise that needed to be discussed again (now that they understood what was expected of them and had a chance to see their individual roles). This clarification phase was not anticipated the last time. Then came a phase of very specific questions related to the project for each group. This required us to move from group to group answering their questions. Although we did not perform any formal studies, we observed that, for the most part, groups that did not ask questions tended to perform poorly on the assignment.

Class size also makes a difference. We taught sections of very different sizes. One of the sections was about 70 students and the other was only about 30 students. The section with 70 students ended before all of the group's clarification questions could be answered. Next time, especially for a bigger class section, it is planned to use part if not all of two class periods to complete this exercise.

Student comments about the exercise have been mixed. A few commented that it was an enjoyable break from the usual lecture-oriented classroom activity, and that it gave them an idea of real-world issues in IS development. But other students seemed to think of it as "busy-work", especially the requirement to meet outside of class and produce an actual report as a deliverable for grading. One student complained that this extra project added too much work to an already overloaded schedule; consequently in subsequent semesters we are taking care to avoid too much overlap between this project and others. Some students thought the exercise was fairly easy, but a few said that this is really a lot of work and requires a lot of thinking.

The other item which took more time or effort than expected was the actual grading of the exercise. It takes quite a bit of time to evaluate each group's responses to the questions and validate that they met the objectives (again especially for the bigger sections or number of students). This would of course be true for any project that includes a written component.

Finally, based on the effort that is required for a group to do a good job on this assignment, we are going to make the exercise count more toward the final course grade. The first couple of semesters, the exercise counted only 2% of the overall course grade, so many students did not seem to take it seriously. This semester, we plan to count it as 10% of the overall course grade.

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AUTHOR BIOGRAPHIES

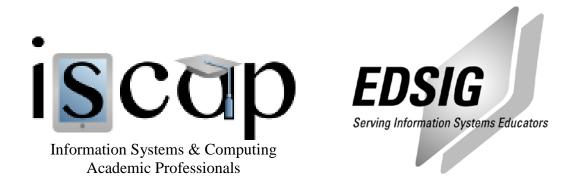**Mike Mitri** is an associate professor of Computer Information Systems at James Madison University. His primary teaching focus is in object-oriented programming, database, web development, and introduction to information systems. His research interests include DSS, AI, and educational applications. Mitri has extensive industry and consulting experience in a variety of software development projects.

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