

Chapter 2

Business Processes, Information Systems, and Information

Study Questions

- What is a business process?
- What is an information system?
- How do business processes and information systems relate?
- What is information?
- What factors drive information quality?
- How do structured and dynamic processes vary?

List of Key Terms

- **Activity** – a task within a business process.
- **Actor** – people or computers that perform activities in a process.
- **Business Process Management Notation (BPMN)** standard – a standardized technique for documenting business processes.
- **Business process** – a sequence of activities for accomplishing a function.
- **Computer-based information system** – an information system that includes a computer as an actor.
- **Computer hardware** – machine actor in an information system.
- **Criteria** – a standard or benchmark upon which a decision is made.
- **Data** – the bridge between the machine-side and human-side of an information system.
- **Dynamic processes** – nonspecific, adaptive, even intuitive collections of activities that are developed to address unstructured problems and opportunities.

- **Five-component framework** – a model of the components of an information system: computer hardware, software, data, procedures and people.
- **Information** – knowledge derived from data.
- **Information system (IS)** – a group of components that interact to produce information.
- **People** – human actors in an information system.
- **Procedures** – instructions in an information system.
- **Repository** – a collection of records.
- **Role** – a subset of activities performed by an actor in a business process.
- **Software** – a collection of machine instructions in an information system.
- **Structured processes** – formally defined, standardized collections of activities.
- **Swimlane** – a column in a BPMN diagram that identifies all the activities for a particular role.
- **System** – a group of components that interact to achieve a purpose.

Suggested Answers to InClass Exercise Questions

The management and use of business processes is crucial to your success as a business professional. Although you may not realize it, business processes are all around us. To help you understand this fact, work with a group of students to complete the following tasks:

- 1. Identify three important business processes used at your university. Choose one process that involves finances, one process that involves operations, and one process that involves marketing.**

Examples students might identify:

Finances: Payroll, Purchase-to-pay, Financial Aid, Tuition-billing and collection

Operations: Course scheduling, registration, mail distribution

Marketing: Student recruiting, event promotion, student placement (depending on focus this could also be operations)

- 2. Complete the following for each process:**

- a. Name the process.**

Here again—these are examples. Student answers will vary a lot.

Finances: Payroll

Operations: Mail distribution

Marketing: Student recruiting

b. Identify and briefly describe three to five key activities for the process.

Payroll:

- 1) Collection and determination of work time for hourly employees.
- 2) Update list of current employees.
- 3) Calculation of federal taxes.
- 4) Deduction of employee-paid benefits.
- 5) Direct deposit of employee net pay into employee bank accounts.

Mail distribution:

- 1) Receipt of mail from USPS, UPS, Federal Express.
- 2) Collection of intra-campus mail.
- 3) Mail sorting for distribution.
- 4) Distribution of mail to employee and student mail boxes.
- 5) Distribution of mail to specific employees/departments that require a receipt signature.

Student recruiting:

- 1) General advertising of school academic and extra-curricular offerings.
- 2) Training of campus tour guides and admissions counselors.
- 3) Maintenance of print material sent/given to prospective students.
- 4) Campus tours for prospective students and families.
- 5) Maintenance of the “Prospective Students” section of the school Web site, Facebook page, Twitter account, etc.

c. Describe performance measures that management can use to assess the process.

Payroll:

- Process completion time relative to pay date – payroll must be on time
- Error rate – number of corrections required to paychecks each pay period/total number of checks issued

Mail distribution:

- Total pieces of mail/# of mail distribution employees
- Total pieces of mail/# of mail distribution employee hours
- Total pieces of mail/mail distribution budget

Student recruiting:

- Total number of students contacted/time period
- Total number of recruited students that actually matriculate
- Prospect conversion: Total number of recruited students that matriculate/total number of recruited students
- Per student recruiting costs: Total number of matriculated students/student recruiting budget

d. If the process is assisted with information systems, describe how. If you don’t know if the process is assisted by information systems, describe how you think information systems could be used.

Payroll – is entirely computerized. The only exceptions would be where human interaction is required between payroll personnel and other

university employees for initiation of pay, modification of pay variables, and termination of pay. In many organizations, even these functions are automated through intranet applications to the point where very little interaction is required at the personnel level.

Mail distribution – much of this process would still be manual, however, information systems can still be used to track mail distribution counts, to electronically scan package and receipt barcodes, to (in some cases) automatically sort mail, etc.

Student Recruiting – although information systems can't totally replace “the human touch” for a process like student recruiting, information support of student recruiting is vital. Initial communication with students will often come from inquiries via the Web site, Facebook, Twitter, or other electronic means. Follow-up communication will generally be using the same technology. All such communications will need to be logged and tracked. Information systems can be used to track and structure the recruiting process for each prospective student to ensure materials are sent in a timely fashion, communication is maintained without too much of a gap between contacts, etc. Scheduling of campus tours, even virtual campus tours can be conducted using information technology.

DISCUSSION QUESTIONS

1. In your own words, explain how egocentric and empathetic thinking differ.

Egocentric thinking centers on the self, the person doing the thinking. The primary criterion under consideration is “How will this affect me?” The egocentric thinker considers his/her viewpoint as correct, accurate and may not be open to alternative views.

Empathetic thinking still considers self, but does so from the perspective that his/her view is one of many possible views and that others' views hold valuable information that may alter or clarify the self-held perspective.

2. Suppose you miss a staff meeting. Using empathetic thinking, explain how you can get needed information about what took place in the meeting.

Contact a co-worker you know was at the meeting, apologize for not being at the meeting and ask your co-worker for his/her help. Explain that you realize their time is valuable and that you appreciate that they were at the meeting, you value their input, and that you would benefit from their perspective regarding what transpired.

3. How does empathetic thinking relate to problem definition?

Empathetic thinking improves problem definition, because often problems are identified through symptoms, the problem can't be identified directly. Through the empathetic consideration of others' perspective on the problem, you have a much richer frame-of-reference through which to view the symptoms and define the problem.

3. Suppose you and another person differ substantially on a problem definition. Suppose she says to you, “No, the real problem is that . . . ” followed by her definition of the problem. How do you respond?

Empathetically, you state that you want to better understand her problem definition and how she came to that definition, ask questions to better understand the criteria and perspective that yielded that definition. Then seriously consider the validity of her definition given what you learned from asking questions combined with your unique criteria and perspective.

- 4. Again, suppose you and another person differ substantially on a problem definition. Assume you understand his definition. How can you make that fact clear?**

State that you understand his definition of the problem and clarify that by discussing the criteria that define the problem and how they relate to his definition.

- 5. Explain the following statement: “In business, empathetic thinking is smart.” Do you agree?**

I do agree. Empathetic thinking allows intelligent inquiry in a business environment. By considering others’ perspectives, needs, desires, wants, opinions, etc. better decisions result. For example, it doesn’t matter how marketable you think a new product may be if you are the only person in the world who would buy the product. Empathetic thinking would consider the results of focus groups, market research, etc. in addition to personal opinion before making a marketability determination—and yield a better outcome.

Answers to Using Your Knowledge Questions

1. Consider Dirk's error in the opening vignette of this chapter.

a. List four possible solutions to this problem.

- 1) The equipment checkout system could list all students who have matching names on a single screen with prompts instructing users how to proceed.
- 2) The equipment checkout system shouldn't include students who are no longer at the school in responses to name-based queries.
- 3) The equipment checkout system could require the inclusion of a Student ID Number when looking up student records. The number could even be scanned from a bar code or magnetic strip on the card.
- 4) Employees like Dirk could be better trained in how to use the system to recognize the existence of multiple students returned from a query.

b. Of your four solutions, which is the most effective? Why?

The equipment checkout system could require the inclusion of a Student ID Number when looking up student records. By requiring a Student ID Number, which would come from the student's ID card, there would be no mistaken identity for students with similar names. Further, by using a scanner to read the number directly from the card, a source of human data-entry error is eliminated for cards in good enough condition to be scanned. When June Marble scanned the card, there was no issue identifying the correct Carter Jackson.

c. Of your four solutions, which is the cheapest? Which is the easiest to implement? Explain your answers.

Employees like Dirk could be better trained in how to use the system... Making changes to computer systems is expensive. Once the system has been developed and implemented, unless a change makes significant improvements in efficiency or effectiveness at a level that justifies the cost of the system modification, training to improve system usage may be the least expensive solution.

d. Describe the cost of Dirk's error to the intramural league and to each of the actors in the story.

- The cost to the league is a group of students that have formed a team called the Helicopters that did not get to practice, that probably didn't learn that they couldn't practice until they showed up for practice, and that are now angry and frustrated with the equipment office and the university.
- Dirk ended up looking like the idiot Carter exclaimed he is. He made a mistake using the system and didn't think about it deeply enough to recognize there might be another student with the same name.
- June Marble identified the problem, but it took her valuable time to do so.

2. Explain, in your own words, the relationship of business processes and information systems. Assume you are going to give your explanation to a business professional who knows little about information systems.

Information systems, at least business information systems, generally enable and/or facilitate the human actions required in a process. The steps in, and the data flow through, a business process are often embodied in an information system in a manner that minimizes human error, minimizes transaction time, maximizes efficiency, and standardizes the behavior of all actors in the process.

3. **In Figure 2-8, the Team and Equipment Tracker information system is used exclusively by processes within the Intramural Sports organization. The Student Account Manager information system is used university-wide. Given these two different scopes,**

a. Which will be the easier system to change? Why?

The Team and Equipment Tracker will probably be easier to change because its scope is smaller—in order to understand the global effects of changes to the system requires examination of a much smaller set factors.

b. If problems occur with either of these systems, which system is more likely to provide a rapid fix?

This is possibly dependent upon viewpoint, but most generally problems with a system of a larger scope effects more system constituents so the cost of fixing the system will be more justifiable. Further, a larger number of constituents are likely to demand a fix for a larger scope system. From this viewpoint the Student Account Manager Information System is likely to provide a more rapid fix.

Another viewpoint, systems that affect a larger scope are often more complex than systems that affect a smaller scope, thus large-scope systems are more difficult to change, the larger scope requires more analysis to ensure that a system “fix” for one problem doesn’t create another problem elsewhere. From this viewpoint, the Team Equipment Tracker Information System may provide the most rapid fix.

c. If the intramural sports league wants a change to the form in Figure 2-6, how do you think they should proceed?

Document the problem from an empathetic perspective, identifying the problem’s effect on different system constituents including students and school personnel. Then propose a couple of alternative fixes for the problem and discuss the advantages and disadvantages of each. Find out who is responsible for receiving system change requests, get the proper forms (if there are specific forms), fill them out and deliver them to the responsible person. Be sure to leave contact information for one individual and encourage any interested person to make contact if there are questions or required clarifications. It also might be a good idea to volunteer to test any fixes for the problem prior to its release to the production environment—become part of the solution.

d. If the university IS department decides to change the Student Account Manager information system, how might that change affect the business process in Figure 2-1? Is it likely that the Intramural Sports organization can stop any change that will adversely impact its processes? Why or why not?

The only way a change to the System Account Manager would affect the University Intramural Sports Equipment Checkout Process is if the system change affected what was returned when student account status is obtained. Undoubtedly if that were to change it would affect the system in Figure 2.1, but many systems likely query student account status. If the change is deemed important enough that the benefit outweighs the cost of the effect on all systems in the larger scope of the Student Account Manager, it is unlikely the Intramural

Sports organization would be able to stop the change—it would have to adapt its own system to work with the change.

4. Consider some of the ramifications of the way in which information is defined in this chapter.

a. Why, according to this chapter, is it incorrect to say, “Consider the information in Figure 2-10?”

It is incorrect because Figure 2-10 is a table of data, not information.

Where is the information?

The information is in the mind of the reader who interprets the table from his/her own frame-of-reference.

b. When you read a news article on the Web, where is the news?

The news occurs at a specific location. Words that describe the news that occurred are in the Web. Those words become news information when you read and interpret them.

When you and a friend read the same news, is it the same news?

Yes, it is the same news. Whether you both interpret it as the same information is dependent upon any number of factors.

What is going on here?

An exemplification of the difference between data (written news) and information (interpreted news).

c. Suppose you are having a glass of orange juice for breakfast. As you look at the juice, where is it?

The orange juice is in the glass.

Is the thing that you know as orange juice on the table, or is it in your mind?

The “thing” itself (orange juice), is in the glass on the table. If you know what orange juice is, tastes like, feels like, etc., that information is in your mind.

After you drink the orange juice, where is it?

After the orange juice has been drunk, it is in your digestive system, however the memory of it, information about its color, taste, temperature, texture, etc. is in your mind.

d. Suppose I say that a glass of orange juice is a collection of molecules arranged into structures. When pressed, suppose I say a molecule is a collection of atoms, arranged according to certain principles. When further pressed, suppose I say that atoms are collections of electrons and neutrons, and, when pressed even more, I say, well, electrons are assemblies of quarks and leptons, etc., and that they, in turn, are collections of differential equations. In saying all this, have I said anything about the orange juice?

Given that most listeners do not have a deep enough understanding of physics to understand how “certain principles” organize quarks and leptons into electrons and neutrons which are organized into molecules that collectively make the unique thing called orange juice, no, you have not said anything of consequence about the orange juice. Discuss the organizational principles in a manner such that everyone can understand the cause and effect of how all this becomes orange juice...then you’ve said something of consequence about orange juice.

Or, have I just made statements about constructs in my mind? What do you think?

Yes, they are just statements about constructs, not directly relatable enough to most peoples' knowledge of orange juice to be of consequence to their interpretation of "orange juice information".

- e. **Consider the statement, "Words are just tokens that we exchange to organize our behavior; we don't know anything, really, about what it is they refer to, but they help us organize our social behavior. Reality is a mutual hallucination. It only looks the way it does because all of us have the same, more or less, mental apparatus and we act as if it's there." Do you agree with this statement? Why or why not?**

There are a limitless number of possible answers to this question. Whether or not the student agrees, one of the better approaches would be to address this from the systems perspective. There is more to interpreting reality than words. Our environment is the result of many stimuli perceived through a system of senses: sight, smell, hearing, touch, and taste. Words help us collectively share our perceptions, but don't necessarily affect them (although at a higher-order level of complexity they may help us refine our perceptions—for example an excellent description of the characteristics of a fine wine may help us better perceive the complexity of its "personality"). Reality is perceived and often perceived incorrectly, but it is not a collective hallucination. At least for the vast majority, the reality perceived through our system of senses is in fact real. If one backs up and strikes the back of his/her head on an unseen, odor-free, unheard, un-tasted tree, the tree is not a hallucination, nor is the bruise and pain that results from the collision—although for different individuals, the pain perceived may differ, as might the description of the perception.

- f. **Describe how you might use insights from this sequence of questions to become a better business professional.**

The preceding questions try to get the student thinking about our individual perceptions of reality and how our unique collection of knowledge, experiences and backgrounds may result in wide variations in individual perceptions of the same reality. If carefully considered and internalized, the recognition that one's own perceptions may differ from others' (and that one's own perceptions may in fact be further removed from actual reality than others') will cause a business professional to actively seek and consider others' perceptions when evaluating alternative solutions to a business problem, when trying to understand their business/industry environment, etc.

5. **Using Figure 2-14 as a guide, identify two structured processes and two dynamic processes at your university.**

Here again, the number of answers is almost beyond limit. Here are a few examples:
Structured processes:

- Registration
- Fee Payment
- Parking – where everyone has an assigned parking space

Dynamic processes:

- Determination of electives for a student's major
- The offensive strategy for the school's homecoming football game

Parking – where everyone has an assigned type of lot

Explain how the degree of structure varies in these processes.

Structured processes:

- Registration – highly structured, highly computerized. There are variations what classes each student chooses, and when s/he takes them, of course, but the process is highly repeatable and standardized.
- Fee Payment – same as Registration.
- Parking (assigned parking space) – pretty structured – people park in the same spot each day, although time of arrival and departure will obviously vary.

Dynamic processes:

- Determination of electives for a student’s major – possibly some structure as determine by the student’s major, faculty, and industry expectations. However, the actors in the process, except for the student himself, will vary wildly from decision to decision, student to student.
- The offensive strategy of the school’s homecoming football game – individual plays, even sequences of plays would be very structured. Overall strategy would be affected by the relative strengths and weaknesses of the opponent. Although the actual process is probably semi-structured, the dynamic nature of the event would yield potentially dynamic process alterations during the game.
- Parking (assigned lot) – semi-structured, there may be many lots of a given type, or only one of a given type. Access to spaces is first-come, first-serve, the process of filling a parking-lot, dynamic—almost organic.

How do you think change to these processes is managed?

Structured processes:

- Registration – changes would be carefully investigated, planned, developed and implemented followed by post-implementation review.
- Fee Payment – same as Registration.
- Parking (assigned parking space) – same as Registration.

Dynamic processes:

- Determination of electives for a student’s major – possibly some structure as determined by the student’s major, faculty, and industry expectations. However, the actors in the process, except for the student himself, will vary wildly from decision to decision, student to student.
- Football team offensive strategy – Changes to the process would be quick, reactive, temporary and within the hierarchical structure of an athletic team. The amount of analysis, pre-planning, etc. would vary greatly within a game depending on outcomes.
- Parking (assigned lot) – less structured than “assigned space” parking. Changes would require less analysis due to the less granular level of detail required. Changes would be centrally managed at the lot level, individually managed at the space level.

Describe how the nature of the work performed in these processes varies.

Structured processes:

- Registration – most of the work (defined as activities performed by actors in the process) is computerized. The student is the primary human actor, supported by advisors, faculty, the Registrar, etc.
- Fee Payment – pretty much the same as registration, however there would be some different actors (VP of Finance rather than Registrar, for example).
- Parking (assigned parking space) – same as Fee Payment.

Dynamic processes:

- Determination of electives for a student’s major – probably highly human interactive between an advisor and the student. Supported by print material, electronically published material, and the registration system.
- Football team offensive strategy – Highly reactive and centrally determined (depending on the system and the experience of actors such as the quarterback). Primary decision-making actor is the offensive coach (or the head coach) supported by other coaches and certain players. Strategy will change quickly in reaction to game conditions, player abilities and availability, but process control will remain centralized.
- Parking (assigned lot) – although the process is dynamic, even organic, the process followed by individual patrons would vary little. The nature of the work that supports the process is highly programmable and relatively static in nature.

Explain how information systems are used to facilitate these processes.

Structured processes:

- Registration – as mentioned above, most of the work in this process is computerized. Human actors make decisions regarding course offerings and student selections, the information system tracks and controls.
- Fee Payment – Human actors determine fees based on a categorized structure and course selections. The information system calculates fee totals and tracks and controls fee payment upon human actor payment activity.
- Parking (assigned parking space) – Information system receives a request for a space from a human actor and the system assigns a space, or allows the human actor to select a space based on certain criteria (kind of like selecting your own airplane seat).

Dynamic processes:

- Determination of electives for a student’s major – Information systems would play a more limited role in this process. The dynamic nature of this process requires more unstructured human interaction. Information systems would play a role in presenting a course listing, supplying information regarding courses already taken, prerequisites, course descriptions and major requirements.
- Football team offensive strategy – This information system is probably not computerized at all. Any computer-based information system support would likely occur prior to the event in the form of player and team-trend analysis.
- Parking (assigned lot) – Computer-based information systems play a lesser role in this case than in the Parking (assigned parking space) process. The information system would simply track which type of lot each person is assigned to. There is likely very little interaction between the “parker” and the information system.

How do you think the character of the information systems supporting these processes varies?

Structured processes:

- Registration – highly structured, inflexible, standardized.
- Fee Payment – highly structured, inflexible, standardized.
- Parking (assigned parking space) – highly structured, inflexible, standardized.

Dynamic processes:

- Determination of electives for a student’s major – The information systems to support this process would be in the form of information repositories that are used on-demand and probably differently by each student.
- Football team offensive strategy – This information system would be human-based, highly interactive, unstructured, non-standardized.
- Parking (assigned lot) – Information systems supporting this, like more structured processes, would be standardized, structured, and inflexible. The human actors would play a less structured role.

Answers to Collaboration Exercises

Collaborate with a group of fellow students to answer the following questions. For this exercise do not meet face to face. Coordinate all of your work using email and email attachments, or Blackboard, or Google apps, or SharePoint, or some other collaboration system. (You can read more about using such tools in Chapter 9.) Your answers should reflect the thinking of the entire group, and not just one or two individuals.

The purpose of this exercise is to compute the cost of class registration. To do so, we will consider both class registration processes as well as information systems that support them.

1. Class registration processes:

- a. List as many processes involved in class registration as you can. Consider class registration from the standpoint of students, faculty, departments, and the university. Consider resources such as classrooms, classroom sizes, requirements for special facilities such as audio visual equipment, labs, and similar needs. Also consider the need for departments to ensure that classes are offered in such a manner that students can complete a major within a four or five year time period. For this exercise ignore graduate schools.**

Undoubtedly there are a couple of dozen processes involved in registration, but most students will probably identify one or two for each “standpoint”. A typical list will look something like the following:

STUDENTS:

Advising process

Course registration process

FACULTY:

Notification of department regarding course technology needs

DEPARTMENTS:

Course Scheduling, including faculty and room assignments, and enrollment limits

UNIVERSITY:

Course list creation process

Publication of course enrollments to departments and faculty

Maintenance of course enrollments and waitlists

- b. For each process, identify human actors. Estimate the number of hours each actor spends in the roles that he or she plays per enrollment period.**

| PROCESS | Human Actor(s) | Computer System(s) |
|--|-----------------------------|---|
| Advising | Student, Advisor | Advising system |
| Course registration | Student | Registration System |
| Faculty technology request | Faculty member, Dept. Chair | |
| Course scheduling | Dept. Chair | Registration System Room Scheduling System Personnel System |
| Course list creation | Registrar | Registration System |
| Publication of enrollments | Registrar | Registration System |
| Course enrollment and waitlist maintenance | Registrar | Registration System |

In regards to hours spent by each actor, there is no correct answer, the idea is to get students thinking about the resources required to complete an institutional process like registration.

Interview, if possible, two or three actors in each role to determine the time they spend in that role, per term.

If this is not possible, consider forming in-class groups of three or four students to collectively estimate role-based time per term.

- c. Estimate the labor cost of the processes involved in class registration. Assume the fully burdened (wages plus benefits plus applicable taxes) hourly rate of clerical staff is \$50 per hour, that of professorial staff is \$80.**

Once again, there is no correct answer, however students should put their response in a well-organized, readable format. This would be a good place to require students to use a spreadsheet.

Determine the number of departments involved in registration, and estimate the number of clerical and professional actors involved in each. Use averages, but realize that some departments are much larger than others.

Answers to this will be so varied that an example will not be instructive. However at a minimum, students should identify the Registrar's office and academic departments. Potentially the Business Office (or appropriate equivalent), advising office (if there is one), etc. The number of actors will vary greatly depending upon the size of your institution, and will vary greatly within that.

2. Information Systems

- a. For each process identified in 1, list supporting information systems. Consider information systems that are used university-wide, those used by departments, and those used by individuals.

| PROCESS | Computer System(s) |
|--|---|
| Advising | Advising system |
| Course registration | Registration System |
| Faculty technology request | |
| Course scheduling | Registration System Room Scheduling System Personnel System |
| Course list creation | Registration System |
| Publication of enrollments | Registration System |
| Course enrollment and waitlist maintenance | Registration System |

- b. For each information system identified in 1, describe the five components of that information system.

| PROCESS | HARDWARE | SOFTWARE | DATA | PROCEDURES | PEOPLE |
|----------------------------------|--|--------------------------------|---|------------------------------------|---------------------------|
| Advising | Thin client , Web server | Advising System Software | General Education requirements, Major requirements, Student records | Meeting scheduling, Advising | Advisor, Student |
| Course registration | Thin client, Web server | Registration system | Student records, Course file | Registration | Student |
| Faculty technology request | Thin client, Web server (or maybe a yellow pad of paper) | Room Scheduling system | Classroom file | Room reservation | Faculty, Dept Chair |
| Course scheduling | Thin client, Web server | Course mgmt software | Course file Classroom file | | Dept Chair |
| Course list | Thin client, | Registration | Course file | Print course | Registrar |

| | | | | | |
|---|----------------------------|-------------------------------|---|--|-----------|
| creation | Web server, Printer(?) | system, Email system(?) | | list | |
| Publication of enrollments | Thin client, Web server | Registration System | Course file Student files | Match courses to enrolled students | Registrar |
| Course enrollment and waitlist maintenance | Thin client, Web server | Registration System | Course file Student files Waitlist file | Match courses to students on the wait list. | Registrar |

- c. List sources of cost for each of the five components identified in your answer to question 2, above. Consider both development and operational costs.

| COMPONENT | COSTS | |
|------------|--|---|
| | DEVELOPMENT | OPERATIONAL |
| Hardware | Servers, clients, data storage and backup, networking infrastructure purchase and installation | Electrical costs, domain registrations, IP number costs, etc. |
| Software | Software purchase/licensing and/or analysis, design and development, training | Support fees and/or maintenance costs, backup costs |
| Data | Initial data conversion and data entry | Backup costs, ongoing data entry |
| Procedures | Design, documentation, training | |
| People | Hiring and training | Ongoing training, wages and benefits |

Explain how some of the personnel costs in your answer here may overlap with the costs of actors in processes.

A wide variety of answers are possible. Look for logical ties between the answer to c. and the students' knowledge of how registration operates at your university.

For example:

- Disconnects between procedures design and the interface between people and software/hardware may increase personnel costs.
- Actors in the registration process probably participate in other processes such as fee payment, etc. so personnel costs will be shared among multiple processes.

Why will only some of those costs overlap?

Some of the components are truly dedicated to the registration process. For example, registration software likely has no direct role to play in other processes, so costs associated with registration software do not overlap with other processes.

Do all of the costs of class registration information systems apply to the cost of class registration business processes? Why or why not?

No. Registration information systems are part of a larger “university information system”. The university information system will share data among many systems. That data will likely be stored in a relational database in which many of the files are used by many different systems.

- d. **As a student, you have no reasonable way to estimate particular information systems costs in your answer to question c, above. However, using your best judgment, estimate the range of total costs. Would it be closer to \$10,000? \$100,000? \$1,000,000? More? Justify your answer.**

There is no way to supply an answer that will satisfy at every institution. What is important is that the student justifies his/her answer using data. How many human and computer actors? What does each cost on average? Has the student included infrastructure costs? Maintenance costs? etc.

3. Effectiveness and Efficiency

- a. **What does the term *effectiveness* mean when applied to business processes?**

The process contributes to the achievement of organizational objectives.

List as many pertinent effectiveness objectives for class registration as possible. List possible measures for each objective.

| Objectives | Measures |
|---|---|
| The system correctly assigns students to selected classes | Exception reports of advising errors, student registration mistakes, etc. |
| The system results in students' feeling the process was un-intrusive, even rewarding | Student attitudes toward registration as measured indirectly through complaints/comments and directly through post registration surveys, etc. |
| The system recognizes time and prerequisite conflicts and assists students when these occur | System tracks through log files the number of time and prerequisite conflicts identified and corrected during registration |

- b. **What does the term *efficiency* mean when applies to business processes?**

Process completion requires a minimum amount of resources.

List as many pertinent efficiency objectives for class registration as possible. List possible measures for each objective.

| Objectives | Measures |
|--|--|
| Registration can be completed in a prescribed total time | Binary measurement, completed on time or not. Activity time – total time during the registration period that nobody was actively using the registration system subtracted from the total time registration is open. |
| Average registration time/student is at or below a set benchmark | Calculate from log files the average time it took students to complete the registration process. |

| | |
|--|---|
| | Also could determine minimum and maximum times, as well as calculate median time. |
|--|---|

4. The Quarter System? Many universities operate on a four-term quarter system that requires class registration four times per year as opposed to semester systems that require class registration just three times per year. As of 2011, the state of Washington has experienced large tax revenue reductions and has severely cut the budget of state universities, resulting in substantial increases in student tuition and fees. Yet the University of Washington continues to operate on a quarter system.

a. Assume you work for a university using a quarter system. Justify that system.

The quarter system, in which there are three academic periods during the course of the academic year, has a number of possible advantages over the semester system:

- Some would suggest the larger number of classes that can be offered with the same number of faculty under the quarter system allows for creative curriculum design.
- It is believed by many that the current generation of college students has a shorter attention span than generations in the past. The quarter system, given its shorter timeframe, allows students to better maintain focus and learning intensity over the duration of the quarter.
- In the quarter system, courses meet more often, generally 4 hours/week rather than 3 hours/week (semester system). This keeps students focused on the subject and may immerse them in learning more effectively.
- Courses can be offered more often in the quarter system, which allows students to better manage their academic performance. The cost of dropping a course, for example, is less when it can be retaken without waiting an entire year.

Can your argument be based upon registration process efficiency? Why or why not?

Probably not—although registration efficiency cannot be used to justify the semester system either. One could possibly argue that efficiency, defined as total resources dedicated to registration over an academic year will be less under the semester system, but it is a questionable argument given the degree of automation in the registration process, particularly for school personnel.

Can it be based on registration process effectiveness? Why or why not?

The automation of registration via computer-based information systems should not allow an argument against the quarter system based on any measure of effectiveness affected by the registration process.

b. Assume you attend a university on a quarter system. Using your answers in a above, write a two page memo explaining the advantages of converting to a semester system.

Given the answers above, converting to a semester system cannot be justified, therefore a two-page memo is not appropriate if a student answered as above.

If the student did feel efficiency and/or effectiveness can justify a move to the semester system, his/her response must be well written, logical and defensible from an efficiency and/or effectiveness perspective.

c. Considering your answers to questions a and b, do you think it would be wise for universities to convert to semester systems? Why or why not?

There isn't a correct answer to this. What is important is that the students' answers are consistent with their responses to a and b, and that their position is well presented.

Would you recommend a national policy for universities to use the semester system?

Here again, no correct answer, but a solidly defended position that considers the system-wide effects of such a policy is the desired outcome.

d. If converting from a quarter system to a semester system is advantageous, why not convert to a one-term system? What would be the advantages and disadvantages of such a system? Would you recommend one if it reduced your tuition by 25%? 50%? 75%?

No correct answer. Student responses will, of course, cover the entire spectrum, but hopefully will address the question from a systems perspective.

e. At present, there is no public outcry to convert the University of Washington to a semester system. There has been, however, considerable public anguish about the increasing costs of tuition. Why do you suppose this situation exists?

This question assumes a correlation between the quarter system and rising tuition. Such a correlation is defensible. Student responses should address this, and could suggest that the invalidity of this assumed correlation may come from the sense that an additional registration period every year adds to tuition cost.

f. Given all of your answers to this question, which type of term system (e.g. quarter, semester, year) does your team believe is best? Justify your answer.

Once again, no correct answer, but any position taken must be well defended and consistent with prior responses.

Case Study 2

An Amazon of Innovation

Questions

1. In what ways does Amazon.com, as a company, evidence the willingness and ability to collaborate?

Amazon's affiliate program is one of the premier examples of collaboration in the business environment. Literally thousands of businesses sell products through Amazon's ecommerce system and their products are shown to consumers in the same search results as Amazon's own products regardless of price competitiveness.

2. In what ways does Amazon.com, as a company, evidence the willingness and ability to experiment?

Amazon's history is one of experimentation, followed by analysis of results and informed adaptation. Amazon's patent for the "one-click buy" process is an example of a willingness to experiment and try something different. They also pioneered the process of allowing customers to post product reviews, both good and bad, on their Web site, as well as site personalization base on customer purchase history and the promotion of products similar and/or "also purchased" associated with the current product being viewed.

3. In what ways do you think the employees at Amazon.com must be able to perform systems and abstract thinking?

Amazon's entire "storefront" is an abstraction. Customers don't see actual products, they see descriptions (abstractions), pictures (abstractions), customer reviews (abstractions), comparable products (actually abstractions), etc. Amazon employees must understand how to abstract products through descriptions, pictures, etc. such that the abstractions work within the systems Amazon uses to support its business processes.

4. Describe, at a high level, the principal roles played by each of the five components of an information system that supports Amazon.com's order fulfillment information systems.

| COMPONENT | PRINCIPLE ROLE(S) |
|------------|--|
| Hardware | Serve Amazon's Web site, order fulfillment and tracking system. |
| Software | Present Amazon inventory, pricing, and product information to customers through a Web site. Allow product orders and payment through a Web site. Facilitate order fulfillment and shipping through the order fulfillment system. |
| Data | Is the abstraction of products that customers see when they use the Amazon Web site. Abstracts the products ordered by customers for order fulfillment. |
| Procedures | Supported by hardware and software across the board, procedures standardize the process of communicating with customers before and after the sale, the process of maintaining product offerings, listing affiliates' products, payment collection, order fulfillment, customer feedback and product reviews, and post-sale customer service. |
| People | People at Amazon maintain product inventories using information systems. They fulfill orders. Handle customer service for returns and order fulfillment problems. |

5. Summarize the importance of business processes to Amazon.com's success.

Amazon is a high-volume ecommerce retailer. By definition, there is no interaction with Amazon personnel pre-sale. The processes by which customers browse Amazon's inventory, select products to purchase, checkout and track the shipment of their order must be user-friendly, highly reliable, fast, repeatable and scalable.

Without well-designed, standardized business processes, Amazon would not survive.

6. Choose any five of the innovations in Figure 2-15 and explain how you think Moore's Law facilitated that innovation.

Amazon.com Kindle in 2007, is basically a small focused-functionality computer that has network connectivity and the ability to download print material for electronic viewing. The incredible power of the microprocessor and its precipitous price drop since its initial invention (in keeping with Moore's law) allowed for the Kindle's creation and affordability.

7. Suppose you work for Amazon.com or a company that takes innovation as seriously as Amazon does. What do you suppose is the likely reaction to an employee who says to his or her boss, "But, I don't know how to do that!"?

The "boss" could be credited with any number of responses, all of them negative. Responses could range from "You are fired" to "I don't care if you don't know how to do that, figure it out!". There is the possibility the "boss" could assign a mentor, send the employee to training, etc. It truly depends on the individual.

8. Using your own words and based on your own experience, what skills and abilities do you think you need to have to thrive at an organization like Amazon.com?

Student responses will include many different skills. A list of examples:

- Process design and documentation
- Brainstorming and constructive communication
- Abstract thinking
- Systems thinking
- Organization skills