
NEED FOR SYSTEMS ANALYSIS AND DESIGN

Systems analysis and design, as performed by systems analysts, seeks to understand what humans need to analyze data input or data flow systematically, process or transform data, store data, and output information in the context of a particular business. Furthermore, systems analysis and design is used to analyze, design, and implement improvements in the support of users and the functioning of businesses that can be accomplished through the use of computerized information systems.

Installing a system without proper planning leads to great user dissatisfaction and frequently causes the system to fall into disuse. Systems analysis and design lends structure to the analysis and design of information systems, a costly endeavor that might otherwise have been done in a haphazard way. It can be thought of as a series of processes systematically undertaken to improve a business through the use of computerized information systems. Systems analysis and design involves working with current and eventual users of information systems to support them in working with technologies in an organizational setting.

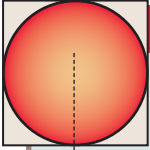
User involvement throughout the systems project is critical to the successful development of computerized information systems. Systems analysts, whose roles in the organization are discussed next, are the other essential component in developing useful information systems.

Users are moving to the forefront as software development teams become more international in their composition. This means that there is more emphasis on working with software users; on performing analysis of their business, problems, and objectives; and on communicating the analysis and design of the planned system to all involved.

New technologies also are driving the need for systems analysis. Ajax (Asynchronous JavaScript and XML) is not a new programming language, but a technique that uses existing languages to make Web pages function more like a traditional desktop application program. Building and redesigning Web pages that utilize Ajax technologies will be a task facing analysts. New programming languages, such as Ruby on Rails, which is a combination programming language and code generator for creating Web applications, will require more analysis.

ROLES OF THE SYSTEMS ANALYST

The systems analyst systematically assesses how users interact with technology and businesses function by examining the inputting and processing of data and the outputting of information with the intent of improving organizational processes. Many improvements involve better support of users' work tasks and business functions through the use of computerized information systems. This definition emphasizes a systematic, methodical approach to analyzing—and potentially improving—what is occurring in the specific context experienced by users and created by a business.



HEALTHY HIRING: ECOMMERCE HELP WANTED

"You'll be happy to know that we made a strong case to management that we should hire a new systems analyst to specialize in ecommerce development," says Al Falfa, a systems analyst for the multioutlet international chain of Marathon Vitamin Shops. He is meeting with his large team of systems analysts to decide on the qualifications that their new team member should possess. Al continues, saying, "In fact, they were so excited by the possibility of our team helping to move Marathon into an ecommerce strategy that they've said we should start our search now and not wait until the fall."

Ginger Rute, another analyst, agrees, saying, "As long as the economy is healthy, the demand for Web site developers is far outstripping the supply. We should move quickly. I think our new person should be knowledgeable in CASE tools, Visual Basic, and JavaScript, just to name a few."

Al looks surprised at Ginger's long list of languages, but then replies, "Well, that's certainly one way we could go. But I would also like to see a person with some business savvy. Most of the people coming out of school will have solid programming skills, but they should know about accounting, inventory, and distribution of goods and services, too."

The newest member of the systems analysis group, Vita Minn, finally breaks into the discussion. She says, "One of the reasons I chose to come to work with all of you was that I thought we all got along quite well together. Because I had some other opportunities, I looked very carefully at what the atmosphere was here. From what I've seen, we're a friendly group. Let's be sure to hire someone who has a good personality and who fits in well with us."

Al concurs, continuing, "Vita's right. The new person should be able to communicate well with us, and with business clients, too. We

are always communicating in some way, through formal presentations, drawing diagrams, or interviewing users. If they understand decision making, it will make their job easier, too. Also, Marathon is interested in integrating ecommerce into the entire business. We need someone who at least grasps the strategic importance of the Web. Page design is such a small part of it."

Ginger interjects again with a healthy dose of practicality, saying, "Leave that to management. I still say the new person should be a good programmer." Then she ponders aloud, "I wonder how important UML will be?"

After listening patiently to everyone's wish list, one of the senior analysts, Cal Siem, speaks up, joking, "We'd better see if Superman is available!"

As the group shares a laugh, Al sees an opportunity to try for some consensus, saying, "We've had a chance to hear a number of different qualifications. Let's each take a moment and make a list of the qualifications we personally think are essential for the new ecommerce development person to possess. We'll share them and continue discussing until we can describe the person in enough detail to turn a description over to the human resources group for processing."

What qualifications should the systems analysis team be looking for when hiring their new ecommerce development team member? Is it more important to know specific languages or to have an aptitude for picking up languages and software packages quickly? How important is it that the person being hired have some basic business understanding? Should all team members possess identical competencies and skills? What personality or character traits are desirable in a systems analyst who will be working in ecommerce development?

Our definition of a systems analyst is necessarily broad. The analyst must be able to work with people of all descriptions and be experienced in working with computers. The analyst plays many roles, sometimes balancing several at the same time. The three primary roles of the systems analyst are consultant, supporting expert, and agent of change.

SYSTEMS ANALYST AS CONSULTANT

The systems analyst frequently acts as a systems consultant to humans and their businesses and, thus, may be hired specifically to address information systems issues within a business. Such hiring can be an advantage because outside consultants can bring with them a fresh perspective that other people in an organization do not possess. It also means that outside analysts are at a disadvantage because the true organizational culture can never be known to an outsider. As an outside consultant, you will rely heavily on the systematic methods discussed throughout this text to analyze and design appropriate information systems for users working in a particular business. In addition, you will rely on information systems users to help you understand the organizational culture from others' viewpoints.

SYSTEMS ANALYST AS SUPPORTING EXPERT

Another role that you may be required to play is that of supporting expert within a business for which you are regularly employed in some systems capacity. In this role the analyst draws on professional expertise concerning computer hardware and software and their uses in the business. This work is often not a full-blown systems project, but rather it entails a small modification or decision affecting a single department.

As the support expert, you are not managing the project; you are merely serving as a resource for those who are. If you are a systems analyst employed by a manufacturing or service organization, many of your daily activities may be encompassed by this role.

SYSTEMS ANALYST AS AGENT OF CHANGE

The most comprehensive and responsible role that the systems analyst takes on is that of an agent of change, whether internal or external to the business. As an analyst, you are an agent of change whenever you perform any of the activities in the systems development life cycle (discussed in the next section) and are present and interacting with users and the business for an extended period (from two weeks to more than a year). An agent of change can be defined as a person who serves as a catalyst for change, develops a plan for change, and works with others in facilitating that change.

Your presence in the business changes it. As a systems analyst, you must recognize this fact and use it as a starting point for your analysis. Hence, you must interact with users and management (if they are not one and the same) from the very beginning of your project. Without their help you cannot understand what they need to support their work in the organization, and real change cannot take place.

If change (that is, improvements to the business that can be realized through information systems) seems warranted after analysis, the next step is to develop a plan for change along with the people who must enact the change. Once a consensus is reached on the change that is to be made, you must constantly interact with those who are changing.

As a systems analyst acting as an agent of change, you advocate a particular avenue of change involving the use of information systems. You also teach users the process of change, because changes in the information system do not occur independently but cause changes in the rest of the organization as well.

QUALITIES OF THE SYSTEMS ANALYST

From the foregoing descriptions of the roles the systems analyst plays, it is easy to see that the successful systems analyst must possess a wide range of qualities. Many different kinds of people are systems analysts, so any description is destined to fall short in some way. There are some qualities, however, that most systems analysts seem to display.

Above all, the analyst is a problem solver. He or she is a person who views the analysis of problems as a challenge and who enjoys devising workable solutions. When necessary, the analyst must be able to systematically tackle the situation at hand through skillful application of tools, techniques, and experience. The analyst must also be a communicator capable of relating meaningfully to other people over extended periods of time. Systems analysts need to be able to understand humans' needs in interacting with technology, and they need enough computer experience to program, to understand the capabilities of computers, to glean information requirements from users, and to communicate what is needed to programmers.

They also need to possess strong personal and professional ethics to help them shape their client relationships.

The systems analyst must be a self-disciplined, self-motivated individual who is able to manage and coordinate other people, as well as innumerable project resources. Systems analysis is a demanding career, but, in compensation, an ever-changing and always challenging one.

THE SYSTEMS DEVELOPMENT LIFE CYCLE

Throughout this chapter we have referred to the systematic approach analysts take to the analysis and design of information systems. Much of this is embodied in what is called the systems development life cycle (SDLC). The SDLC is a phased approach to analysis and design that holds that systems are best developed through the use of a specific cycle of analyst and user activities.

Analysts disagree on exactly how many phases there are in the systems development life cycle, but they generally laud its organized approach. Here we have divided the cycle into seven phases, as shown in Figure 1.3. Although each phase is presented discretely, it is never accomplished as a separate step. Instead, several activities can occur simultaneously, and activities may be repeated. It is more useful to think of the SDLC as accomplished in phases (with activities in full swing overlapping with others and then tapering off) and not in separate steps.

INCORPORATING HUMAN–COMPUTER INTERACTION CONSIDERATIONS

In recent years, the study of human–computer interaction (HCI) has become increasingly important for systems analysts. Although the definition is still evolving, researchers characterize HCI as the “aspect of a computer that enables communications and interactions between humans and the computer. It is the layer of the computer that is between humans and the computer” (Zhang, Carey, Te’eni, & Tremaine, 2005, p. 518). Analysts using an HCI approach are emphasizing people rather than the work to be done or the IT that is involved. Their approach to a problem is multifaceted, looking at the “human ergonomic, cognitive, affective, and behavioral factors involved in user tasks, problem solving processes and interaction context” (Zhang, Carey, Te’eni, & Tremaine, 2005, p. 518). Human computer interaction moves away from focusing first on organizational and system needs and instead concentrates on human needs. Analysts adopting HCI principles examine a variety of user needs in the context of humans interacting with information

FIGURE 1.3

The seven phases of the systems development life cycle.

