

Management Services: A Magazine of Planning, Systems, and Controls

Volume 1 | Number 5

Article 5

11-1964

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Recommended Citation

Schlosser, Robert E. (1964) "Psychology for the Systems Analyst," *Management Services: A Magazine of Planning, Systems, and Controls*: Vol. 1: No. 5, Article 5.

Available at: <https://egrove.olemiss.edu/mgmtservices/vol1/iss5/5>

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The systems analyst should be as skilled in handling people as he is in designing procedures. To induce employees to accept changes in their work routines, he needs to understand motivation and learning, the basic principles of—

PSYCHOLOGY FOR THE SYSTEMS ANALYST

*by Robert E. Schlosser
Price Waterhouse & Co.*

ONE of the greatest challenges to the systems analyst is the potential conflict between the business's need for change and its employees' resistance to change. As a business tries to adapt to changing conditions, its employees are required to accept new patterns of thought, new work routines, and new social relationships. Frequently, the psychological discomforts created by the new conditions cause good employees, regardless of position, to resist necessary changes.

One of the major tasks of a systems analyst is to reduce this resistance by bringing order and understanding to the process of change. To do this successfully, an analyst must have not only a grasp of the

technical needs and resources of the business but also a sound understanding of the basic principles of psychology. He must understand how people behave and use that understanding to develop good human relations.

While there is no general agreement as to what constitutes an adequate listing of basic principles of psychology, there are two concepts that can bring the area into focus for us. These concepts are:

1. Motivation
2. Learning

Motivation

The primary "principle" of motivation is that every human experience involves a causation factor and an effect from that cause. The principle of cause-and-effect relationships in human behavior means that every motive produces some effect and that every response or effect is preceded by a motive. Motivation,

as an activating force, affects every area of human behavior. Its field of influence ranges from the directing of a simple act where the motive is obvious to a complex, formal activity pattern, such as career behavior, which represents numerous detailed aspects of motivation.¹

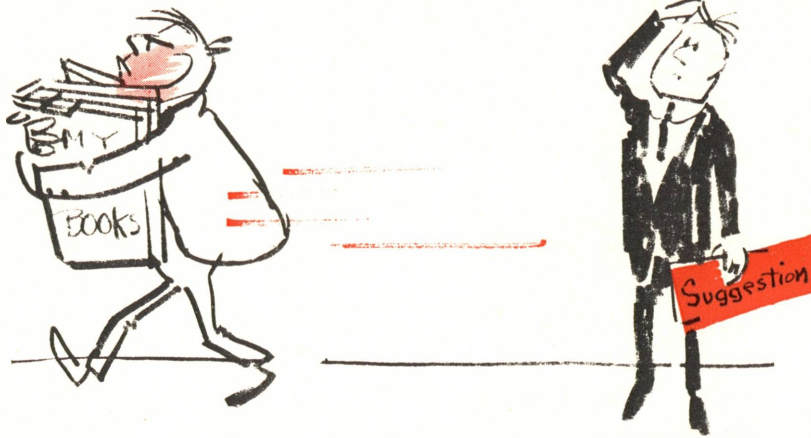
One list of essential motivating causes includes the following: (1) the urges arising from bodily needs, (2) the urge to succeed and to achieve, (3) the urge to avoid failure and disappointment, (4) the urge for recognition and approval, (5) the urge for sympathy and affection, (6) the urge for security, (7) the urge to experience the new and the different, and (8) the sex urge.²

The systems analyst should be aware of these motivating forces

This article is adapted from a chapter in a forthcoming book, *Accounting Systems Theory and Practice*, by James B. Bower, Charles T. Zlatkovich, and Dr. Schlosser, to be published by Allyn & Bacon, Inc.

¹Lester D. and Alice Crow, *Understanding Our Behavior*, Alfred Knopf Publishing Co., 1956, pp. 53, 54.

²*Ibid.*, pp. 60-67.



The success of proposed systems changes may be seriously jeopardized if they seem to cast aspersions on the competence of employees, particularly the employees who are to be expected to carry them out.

and use this knowledge in carrying out his assignments. Each one of the motivating forces cited can play a part in carrying a systems engagement through to a successful—or unsuccessful—conclusion. To emphasize this point, consider the following situations in which a systems analyst had to give thought to some of these forces.

Conflict of motivations

In order to increase the efficiency with which receiving reports were processed, a systems analyst recommended, among other things, that the receiving department be relocated nearer the receiving dock and the inspection department. The recommendation was accepted, and the receiving department was relocated in the receiving dock area. Within a short time after the move the supervisor of the receiving department complained that he could not see much improvement in efficiency. He also expressed his concern over the morale of his employees. It seemed to be much lower at the new location.

After looking into the problem the systems analyst discovered that the women's rest room was located a good distance from the new receiving department quarters and that to get there the women in the department had to "run a gauntlet" of men in the inspection department and in one factory department. Dis-

comfiture caused by this arrangement was the root of the morale problem. Once rest room facilities were provided adjacent to the receiving department, the morale problem disappeared, and efficiency reached the level expected when the move was approved.

This problem arose from a conflict of motivating forces, the urge arising from bodily needs on the one hand and the urge for sympathy and affection on the other. The women could not avoid the use of rest room facilities, but they did not like the attitude of the men they had to pass to reach the facilities. In this instance, a systems improvement nearly failed because the analyst had either overlooked or failed to give sufficient weight to basic motivating forces.

Frustration

Everyone possesses the motivating urges to succeed and to avoid failure. These are forces of which



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the systems analyst must be aware in redesigning any system, in whole or in part. His efforts may be seriously jeopardized if suggested changes seem to reflect unduly on the competence of the very employees who are to be expected to carry out the revised operations.

For example, a systems analyst discovered, while on an assignment involving the investigation of the entire accounting system for a moving van company, that the manual journalizing and posting of transactions and manual preparation of payroll data were extremely inefficient. In recommending that a multiple-purpose bookkeeping machine be installed, with all of the attendant changes in forms and procedures, he neglected to discuss this proposal with the bookkeeper, a person who had been with the company for several years and had been considered very competent. The bookkeeper reacted vigorously in opposing the recommendation, chiefly because of an assumption that the recommendation made by the analyst was a direct disparagement of his ability. The urges to succeed and to avoid failure were being frustrated. Often it is possible to avoid such frustrations of basic motivations if the analyst is sensitive to their existence and adjusts his approach accordingly.

Using motivations

One of the principal motivating forces with which a systems analyst must deal is the urge for recognition and approval. Almost invariably, when personnel are consulted and their opinions are given thoughtful consideration, changes to be effected by the systems analyst become joint projects. An effective approach that utilizes in a positive way both this urge and the urge to experience the new and the different could be called the team approach.

In most systems modifications more than one person and more than one department are involved. In lieu of attempting to make the complete systems review, design, implementation, and follow-up him-



The participative or team approach is a way to utilize positively the urge for recognition and approval and the urge to experience the new and different.

self, a systems analyst will often enlist the help of a representative from each department to be affected. This is the team approach. Results from the group will be workable compromises, and the fact that departmental representatives helped draft the solution will in and of itself help in the acceptance of changes by all departments involved.

Indeed, this approach can assist in offsetting deleterious effects from any of the motivating forces. By using this approach, the analyst is permitting various human urges to be expressed and solutions found, rather than ignoring the psychological reactions of the people in a system and thus in many instances dooming his efforts to failure.

Learning

Two sources define learning as follows:

1. "... a process of adaptation. Through the process of learning, men acquire new ways of behaving or performing in order that they can make better adjustment to the demands of life."³

³G. Lester Anderson and Arthur I. Gates, "The General Nature of Learning," *National Society For The Study of Education - Forty-Ninth Yearbook, Part I Learning and Instruction*, University of Chicago Press, 1950, p. 16.

2. "... learning is shown by a change in behavior as a result of experience."⁴

In most assignments undertaken by a systems analyst, the degree of success he attains depends directly on how well the personnel understand the new procedures and methods that have been installed. The teaching of new methods and procedures can be effective only if the teacher understands the concept of learning.

Lee J. Cronbach discusses "seven elements in behavior." If we are to accept Professor Cronbach's definition (2 above) that learning is a change in behavior, careful consideration should be given to these "seven elements in behavior":

"The elements in behavior are as follows:

"a. *Situation*. The situation presents alternatives requiring choice.

"b. *Personal characteristics*. A person's abilities and attitudes limit the ways in which he can respond.

"c. *Goal*. The person sees some possibility of acting on the situation so as to gain satisfaction.

"d. *Interpretation*. The person interprets the situation.

"e. *Action*. The person takes

⁴Lee J. Cronbach, *Educational Psychology*, 2d ed., in consultation with Ernest R. Hilgard and Willard R. Spalding, Harcourt, Brace & World, Inc., 1963, p. 71.

whatever action he expects will lead to the greatest net satisfaction.

"f. *Consequence*: confirmation or contradiction. The response is followed by consequences which confirm or contradict the person's interpretation.

"g. *Reaction to thwarting*. If a response does not satisfy the person's wants, we say that he is blocked or thwarted. He may reinterpret and try a new response. He may decide that his goal cannot be reached. If he doubts that he can reach his goal, he is likely to become emotionally upset."⁵

At this point the intimate relationship between the concept of motivation and the concept of learning should be obvious. A goal is an objective that an individual wishes to reach. The urges that spur individuals toward goals are contained in the concept of motivation.

Goals

Goals can either be proximate or remote. A proximate goal to an employee may be the finishing of a particular work assignment. A remote goal may be self-advancement. The employee has been led to believe that good work will be rewarded by professional advancement. Another proximate goal may

⁵*Ibid.*, p. 69.



Goals can be proximate or remote. One employee may be aiming for professional advancement; another may be hurrying to finish his work and leave.

be the employee's desire to finish so that he can leave to attend a twinight double - header baseball game.

If the systems analyst is to initiate and maintain effective employee learning processes, he must be able to create attainable goals for the employees involved in the system. For example, in a job shop manufacturing plant it is imperative that the time spent on each job be accurately reported if the direct labor cost per job is to be computed. When direct laborers are being asked to report their time in this way for the first time, something more than just instructions must be issued to them. A goal must be created. They must see in their own way that a worthwhile goal is being reached.

In one manufacturing plant the systems analyst talked first with the foremen of the various direct labor departments involved, convincing them that his request would lead to more meaningful information that would not only help general management but would have beneficial results for each foreman as well. Those foremen who were convinced

that their ultimate goal of self-advancement would be helped by this change in procedure became staunch allies of the systems analyst. Those who could not translate this change immediately into a worthwhile personal goal had to be approached differently. The analyst had to probe to find the argument which would convince these foremen that the proposed change was necessary and worthwhile.

After the immediate on-line supervisors of the direct laborers had accepted the new procedure, some time was given to them so that they could convince the men under them that the change was necessary. Many of the foremen relied quite heavily on the urges to succeed and to avoid failure. Once the men realized that the completion of accurate time tickets was a means to success, most resistance to the new procedure ceased. The new procedure had become a worthwhile goal.

Personal characteristics

Personal characteristics include "all the abilities and all the typical

responses that the person brings to the situation."⁶ This element of behavior specifically involves the frame of mind of the individual and what he has already learned from previous experience.

The approach that the systems analyst used in the previous example, in which he convinced the laborers through their supervisors that the new labor reporting procedure was necessary, would have been doomed to failure had not the men in each department already learned through prior experience that cooperation with their boss was far more beneficial than opposition or disobedience. These men were ready to be convinced by their foremen that the new procedure was necessary.

Quite frequently the systems analyst must study the personnel in a department that is to be affected by a new or revised procedure to determine whether their personal characteristics place them in a state of readiness to accept the suggested change. In some cases he will find it necessary to create certain ex-

⁶*Ibid.*, p. 73.

periences for the employees in order to get them into the desired state of readiness.

The element of personal characteristics in human behavior may need special attention by the systems analyst in situations where increased mechanization of a data processing system is being recommended. Employees who have not been properly introduced to the idea of working in a data processing system centered around an electronic computer, for example, often resist the proposed innovation because they are not personally ready to embrace the new concepts and the new approach to data processing made possible by the computer. A major part of the systems analyst's work is to get employees ready to accept the highly mechanized system so that they can learn to operate it properly. Many systems revisions or new installations have been set back or could not be effected because the systems analyst did not recognize personal characteristics as an element of human behavior and failed to give sufficient weight to the human factor in a systems engagement.

Situation

"The situation consists of all the objects, persons, and symbols in the



Employees who have not been properly introduced to the idea of working with a computer may resist because they are not ready for new concepts.

learner's environment. Experience in one situation prepares a person to respond to similar situations in the future."⁷

A systems analyst who realizes that the situation in which certain employees have found themselves during their normal working hours will affect both their current behavior patterns and those toward which he would like to see them move is in a better position to judge what effect new or revised data processing procedures will have on these employees. Employees who have been taught that systems changes are good and that there is

a thrill in experiencing new and more efficient data processing procedures will welcome the new and the different situations when they are confronted with them. Employees who have been encouraged by their employer—either actually or implicitly—to resist change normally resist systems changes without listening to the merits of the proposal. Thus, the systems analyst must recognize or discover the experience level that he must work with during his engagement.

During a systems investigation at a fairly large medical clinic in the Midwest a systems analyst found that employees were not reluctant to try new and different procedures.

⁷Ibid.



Workers who have not been taught to welcome changes normally resist them without listening to the merits of the proposal.



Giving credit for an idea to the person whose acceptance of it is sought can have a strong influence on employee interpretation of a situation.

The reason was that the clinic management did an excellent job of employee training. Employee goals were effectively tied to organization goals. Because the employees had been exposed many times to new and different situations and had been expected to choose alternatives that advanced their own goals as well as the clinic's, these employees were in a personal state of readiness for the new procedures recommended. Unfortunately, this situation exists in too few companies.

Interpretation

*"Interpretation is a process of directing attention to parts of the situation, relating them to past experience, and predicting what can be expected to happen if various actions are taken."*⁸ It is important to know that once a learner is confronted with a situation he will make certain interpretations, based on previous experience, from which he will predict what will happen if various alternatives are chosen.

In any systems engagement changes in routine will be proposed to certain employees. Depending on how the employees interpret these changes, they will either be convinced that the changes are worthwhile or will be opposed to them. If

the systems analyst has sufficient depth of understanding of human behavior, his presentation of proposed changes will be such as to permit favorable interpretation of the proposals.

On one systems engagement the analyst discovered that a certain department supervisor interpreted most problems or situations by asking himself this question, "Which alternative will make me look the best—to my boss and to my people?" To capitalize on this discovery the systems analyst utilized an interesting approach.

One problem to be solved in this part of the engagement was the redesign of a customer charge ticket so that it could be used more effectively by the accounts receivable clerks and accounting machine operators. The analyst spent most of his time helping the supervisor redesign this document. When the task was completed, however, all of the credit for the new form design was given to the supervisor. There was no question about the acceptance of this form when the new procedures were installed. The supervisor convinced his people that far more benefits would accrue to the department through the new procedures than through the continuation of the old. In this instance the analyst was skillful enough in presenting the situation properly to in-

sure that the desired interpretation was drawn from it.

Responses

*"The person's actions include movements and statements; they are observable responses. A person chooses whatever action he expects to give him the greatest satisfaction."*⁹ The example just cited illustrated both interpretation and action. The supervisor not only interpreted the use of the new form properly but also responded to or acted on an alternative in the situation by convincing his subordinates that the change was desirable.

To some extent the element of action in human behavior is dependent on the other elements. If enough facts are known about the status of the other elements, the kind of action that an individual will take can quite often be predicted. In recommending a proposed systems innovation, the analyst can be reasonably sure that it will be received favorably if he has done a good job in preparing the individuals affected by this innovation. If acceptable goals have been outlined for them, if they are in a proper state of personal readiness to accept this change, and if the situation has been presented properly so that the

⁸Ibid.

⁹Ibid., p. 74.

Systems analysts are as imperfect as anyone else. . . .

desired interpretations will be made, the systems analyst should be able to expect a favorable response from them.

Consequences

*"Consequences: confirmation or contradiction. Some events that follow the action are regarded by the learner as the consequences of it."*¹⁰ This element, too, contributes to the analyst's ability to predict or expect certain actions. The learner inevitably predicts the consequences of actions that he is about to take. If the consequences are favorable, this assists the learner in choosing among alternative courses of action when a similar situation is presented to him.

Employees who have had favorable experiences when working with a systems analyst are far more willing to work with him again. Em-

¹⁰Ibid.

ployees who have had no such experience tend to be a bit hesitant and "stand-offish" until they are motivated and willing to accept this new experience as part of their learning process.

An absolute must for a successful systems analyst is to see to it that the consequences of his proposals are salutary. To be assured of this result the analyst must have the support of top management. Employees must see that he has this support. They also should be able to see from past experience that cooperation is far more beneficial to them, in terms of their own long- and short-run goals, than opposition to or rejection of new proposals.

Thwarting

*"Reaction to thwarting . . . thwarting occurs when the person fails to attain his goals."*¹¹ Up to this point

¹¹Ibid.

in the discussion of the elements of human behavior little doubt has been expressed that the systems analyst can, in every instance, create proper goals, induce a proper state of personal characteristics, and present the situation so that the proper interpretation will be made and desired action will be taken. Unfortunately this is not always the case. Systems analysts are as imperfect as anyone else in properly utilizing the various elements of human behavior. Furthermore, not all actions result in favorable consequences for the employees who must accept new procedures and must be taught how to use them, nor are the consequences always favorable for the analyst himself.

Usually, when an individual's first response is thwarted, one of two reactions occurs. He may re-assess the situation and try another action, or he may give up and refuse to respond at all (nonadaptive be-



Unfortunately, not all actions result in favorable consequences for the employees who must accept new procedures and must learn how to use them.



The urge for recognition and approval is a basic human motivating force.

an effect from that cause. The essential motivating causes are sometimes classified as the urge arising from bodily needs, the urge to succeed and to achieve, the urge to avoid failure and disappointment, the urge for recognition and approval, the urge for sympathy and affection, the urge for security, the urge to experience the new and different, and the sex urge. The systems analyst must always be aware of these motivating forces and must use his knowledge of them in carrying out his assignments if he is to be successful.

The concept of learning centers around the idea that "... learning is shown by a change in behavior as a result of experience." Since a good deal of the effort put forth by a systems analyst is in the area of teaching, it is imperative for the systems analyst to understand the various elements of human behavior which are the basic aspects of learning: goals, personal characteristics, the situation, interpretation, action, consequences: confirmation or contradiction, and reaction to thwarting. These seven aspects function in this way: Every individual strives for goals. His previous experience has prepared him in certain ways to be personally ready for new experiences. When a new situation is presented to him, he will interpret this new situation and respond in a way he thinks will meet his goals, based on the consequences that he has experienced in similar situations before. If consequences in previous similar situations have brought him closer to his goals, this will have increased his personal readiness to accept the new situation. However, favorable consequences do not always result, and then the individual is said to be thwarted.

The systems analyst must concentrate on teaching employees to accept and to operate new procedures in such a way that none of them feel that they have been thwarted. He must also be realistic enough to know that this ideal cannot always be attained and should work out ways to deal with nonadaptive behavior.

havior). A successful systems analyst should never be guilty of the latter reaction to thwarting. He should believe "that the mountain can be moved" and should act accordingly.

Another problem presents itself, however, when the analyst encounters a nonadaptive reaction from the individuals who will be responsible for effecting the new or revised procedures that are being recommended. How should this be handled? The ultimate solution, if the new procedures have been approved by management, is to reassign the nonadaptive employees or separate them from the company. Such a solution should be resorted to only if the individual's reaction to thwarting is definitely and firmly nonadaptive.

One systems analyst reported the following example: He had been asked by the owners of a small trucking company to review the accounting system to see whether a more mechanized system was feasible. Even after doing everything he could from a human relations point of view, he was not able to convince the bookkeeper that she could learn to operate a general pur-

pose accounting machine. When this person realized that her employer was convinced of the desirability of the more mechanized procedures and that her resistance would not forestall the change, she asked to be relieved of her duties. The management was sorry to see her react this way but was instrumental in placing her in another company in the same city in a similar position.

Summary

People are an essential part of any business system. No matter how heavily mechanized data processing systems become, people will be part of these systems and will present a series of problems to systems analysts that are very different from those posed by the communications media and machines that are also essential physical elements of a data processing system.

The systems analyst must understand two important concepts of psychology—the concept of motivation and the concept of learning. The concept of motivation embraces the idea that every human experience involves a causation factor and