PERFORMANCE-BASED TRAINING SYSTEM APPROACH: A SYSTEMS MODEL FOR EFFECTIVE HUMAN PERFORMANCE IN VOCATIONAL TECHNICAL INSTITUTIONS AND INDUSTRIES

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Abstract

Effective human job performance in Vocational Technical Institutions and the industry demands a system model necessary to achieve the desired performance and efficient productivity. The paper therefore, examined the concept of system, systems approach and performance – based training system approach illustrating their models. It described the phases of performance-based training system, an extension of systems approach to instruction and explained their roles in training. The applications of performance-based training system were also explained. The paper concluded with some recommendations.

The main concern of any vocational technical educational institution or training programme in the industry in the world over is to develop effective training necessary for efficient performance of the trainees. When work is not performed in the way it should be done or below the desired performance standard, the problem can be identified as human performance problem. The identified problem may be due to lack of knowledge, skill, poor training, introduction of new technology, an innovation in the system or as a result of environmental and psychological factors which could influence human performance. In other to solve human performance problem in training programmes, Performance-Based Training System (PBTS) that is based on systems approach to instruction could be employed. In systems approach, the first thing to do in solving a problem is to identity the root causes of the problem by conducting needs analysis. Need analysis also called performance analysis, performance assessment or front – end analysis involves examination of the total performance system in order to

identify the root causes of human performance problems. Any root cause of a problem that is related to knowledge, skill and ability of the performer requires job and task analysis. Job/task analysis is part of systems approach used to solve human performance problem. This help to provide detailed analysis of jobs and tasks. To this end, systems approach and its application in the field of human performance technology is hereby explained. This application is called performance-based training system, one of the ways of solving human performance problems when the solution to perform the problem requires training.

Concept of System

A system can be defined as any unit with component parts (Dike, 2008). It is also seen as anything that is made up of different parts in which each part function interdependently in order for the system to achieve a common goal. Similarly, Ughamadu (1992) referred to a system as an object, event or a procedure which is made up of different parts that are working independently and cooperatively to achieve a predetermined or common purpose. The parts of a system are known as sub-system. The subsystem functions interdependently and interrelated to achieve a common purpose. A system is therefore a group of subsystems working together to achieve a definite goal. For clear understanding, a system has the following features:

- It is made up of different parts or components
- The parts are interdependent and functionally related.
- The parts perform specific functions without obstruction of the others as they interact.
- What is seen as a system in one instance could be a subsystem in another instance
- A system is organized to achieve a goal, so it is goal oriented and value-laden etc.

Systems are classified into natural and artificial (man-made) system or open and closed systems. The example of natural systems is solar system, digestive system etc, while man-made systems are the educational system, 6:3:3:4 educational system, instructional system etc. All the systems function in a larger environment called the supra-system. A supra system is the outside environment of any system from where the system obtain energy, information or any form of input or produce output.

To make the point clearer, the instructional system shown in figure 1 is typical example of a system since it has different subsystems such as trainee, instructor, facility, equipment and training material which will interact to achieve a defined instructional goal.

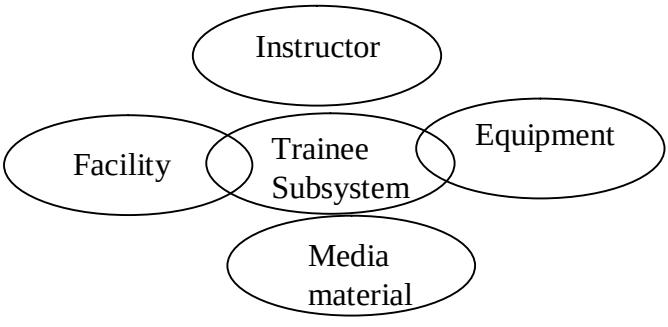


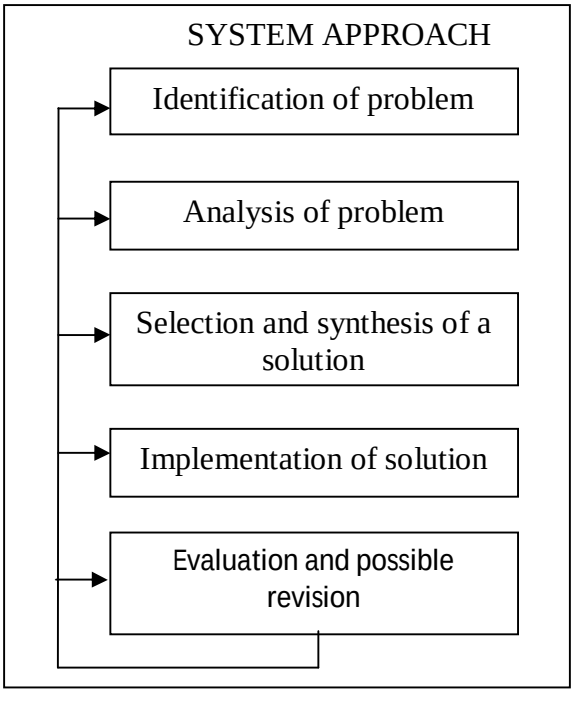
Fig.1: Instructional system and the subsystems

From human performance perspective, a system is a set of interrelated parts, all working towards a defined goal. In other words, a system is made up of different subsystems which interact and function as a whole in order to produce results toward a common goal. The interactions are the input and output materials produced by each subsystem. The subsystems depend on each other for materials input and output or results.

Systems Approach to Instruction

Having known the meaning of a system, systems approach can be defined as the adoption of step-by-step method to identify the problems of instruction and the component parts required to prepare, present and evaluate alternative instructional solution (Dike, 2008). To Kaufman (1969), it is the use of logical problem-solving method to identify and solve instructional problems. It is also an attempt to see teaching and learning process as an event that is made up of several subsystems such as the learner, teacher, media, methods, learning experiences, evaluation etc which cooperatively, interact to promote effectiveness and efficiency. It emphasizes the learner and the performance expected from him. The step-by-step approach towards the solution of performance problem is shown in five faces of the model in figure 2. System approach considers a problem as parts or phases that function together and work towards findings solution.

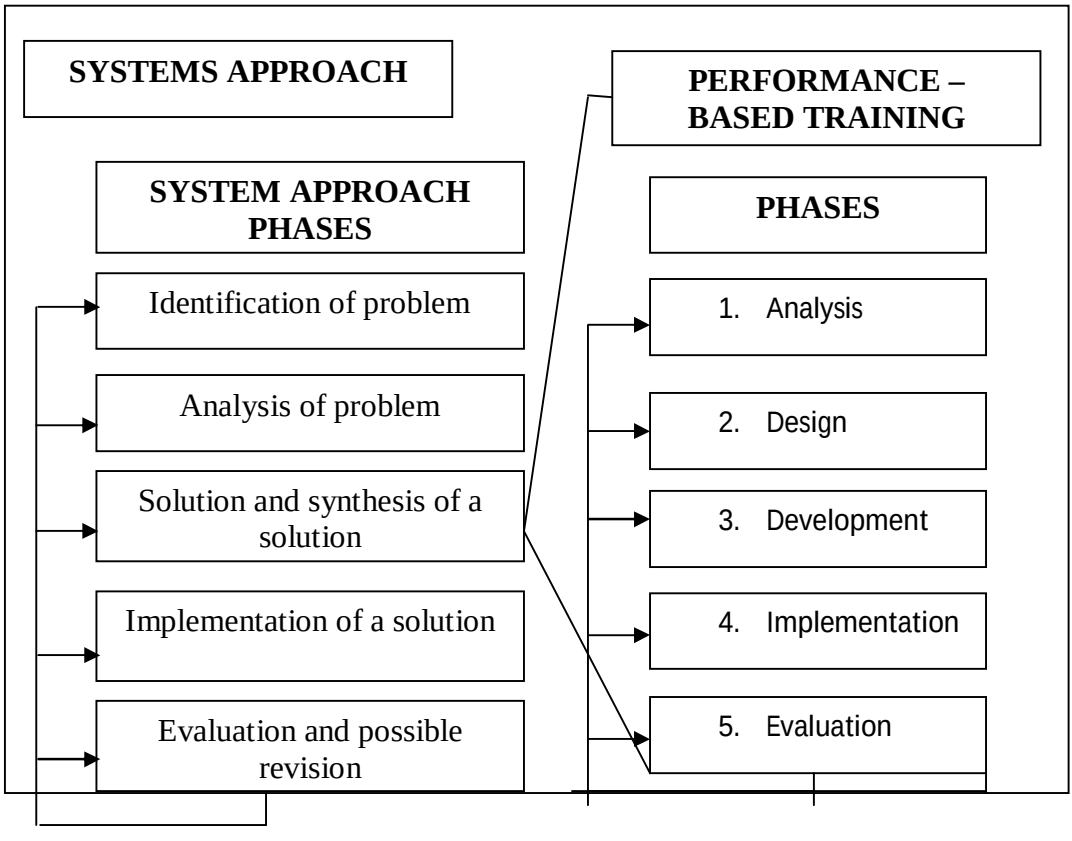
As indicated in the model, systems approach helps to identify and define the problem clearly. The problem is analyzed in or to identify the alternative solutions. This follows the selection of the best solution which is then implemented and evaluated to determine the effectiveness of the training. The whole process is subject to revision if the evaluation result is not effective.



System approach has proved successful in engineering, electronics, science etc. It is also applied in the field of human performance in technology. Therefore it is known as performance-based training system approach.

Performance-Based Training System Approach

Performance-based training system approach as an extension of system approach is an application of systems approach to improving human and organizational performance (Wolfe, 1991). It can also be described as an extension suitably employed when the solution to human performance problem involves training. Like systems approach, the performance-based training system is made up of five phases. The phases are analysis, design, development, implementation and evaluation as shown in figure 3.



As indicated in the diagram, the phases of the system are separate parts that work together to achieve the desired performance standard. The lines with arrow heads that go into phases represent the input materials and outputs of each phase, while those that move from evaluation to the other phases goes back to the appropriate phase of the system for revision if the result of the training evaluation is not effective or up to the desired performance standard.

Description of the Phases of Performance-Based Training System Approach

The five faces of performance-based training system are explained as follows:

Analysis Phase: Analysis is the first phase of performance-based training system which identifies the training related performance problems such as concepts, behaviours, values and skills considered worthwhile. Needs analysis, job analysis and tasks analysis are carried out at this stage to identify the problems.

Needs analysis is the study of performance and total environment that influence it in order to make effective recommendation and decisions about closing the gap

between actual performance and desired performance (Wolfe, 19991). Needs analysis helps to identify the root causes of performance problems and the problem areas to be corrected by training. Training is solution to performer's lack of knowledge, skill, ability in performing critical activities and inability to remember critical information. During analysis, the total performance system is evaluated to determine the root causes of performance problems. If the problems are identified as lack of knowledge, skills and ability to perform, the performer must meet the set standard. Then the performer's lack of knowledge, skill and ability in performing critical activities requires detailed job/task analysis. Job analysis is the process used to determine what a job includes while task analysis is a process used to determine how to perform a job.

Job/task analysis therefore, tells us exactly what is included in a particular job and exactly how it should be done. In application to training, job/task analysis is usually conducted when a performance problem can be corrected or partially corrected by training.

Design Phase: Design is the second phase of performance-based training system. Design can be defined as a plan, blueprint, drawing or an outline from which something may be made, or the art of making such drawings. Design phase involves constructing a blue print of training materials for the purpose of making plan for organizing, communicating and supplementing the information generated in the analysis phase.

At this stage, the objectives to be achieved, test items for each objective, instructional strategies to be employed, course content that are divided into modules and lessons, sequencing of course segment, mode of delivering content and selection of media/materials for each course segments are the information generated for learning effectiveness.

Development Phase: This is the third phase of performance-based training system where learning experiences are converted into course materials. Learning experience cannot be used if they are not converted into course materials. Development phase involve creating, constructing, producing and providing these materials. Course materials such as all test items and support materials, instructional materials (audio/visuals), job aids, learning packages, administrator's guides among others are produced in this phase. The materials produced should reflect the instructional strategies, sequence of operation, media materials and the course objectives generated at the design phase. These materials are utilized at implementation stage of the system where the training is executed.

Implementation Phase: This is the practicalization phase of the developed course materials. It is the phase where the actual developed course materials are executed or put into practice under teaching and learning situation in order to correct the

performance problems identified in the analysis phase. This phase falls in the hands of implementers who are the teachers, instructors or trainers and the recipients who are the learners, trainees, students or performers.

The implementation phase involves the followings activities:

- Testing all the instructional and administrative materials with the members of the target population or trainees.
- Identifying and correcting the errors and deficiencies in the course materials
- Evaluating the test result to confirm that the target trainees can meet the specified performance standards etc.

To this end, this phase helps to ensure and certify that the training is technically correct and can provide the directions for correcting errors and deficiencies in the training.

Evaluation Phase: This is the fifth and last phase of performance based system approach. Evaluation can be described as the process of obtaining information about a training programme to decide whether to continue, change, modify, improve or terminate the programme (Amadi & Obiefuna, 2005), Training programmes are evaluated to monitor and determine whether they are meeting the set goals and objectives. Evaluation therefore, provides the opportunity to monitor and ascertain the effectiveness of new or an on-going training programme. The evaluation phase of this training system runs through all the phases of the system as shown in the model in figure 3. This arrangement enables each phase to be monitored to determine its effectiveness and likely revision when necessary. If the training did not meet the stated objectives, it is necessary to go to any phase in the model in order to correct the problem. The particular phase to go to depends on the type of problem, its seriousness and the phase concerned.

Application of Performance-Based Training Systems Approach to Training

Performance- based training system has wide application in the training programmes of vocational technical educational institutions and the industry. Such applications are aimed at improving human organizational performance. The system has made impressive impact in many training areas which are not limited to:

- Development of new training
- Review and validation of existing training
- Identification of retraining needs
- Development of jobs aids
- Development of government mandated training
- Development of man-machine interface system
- Selection of personnel (Wolfe, 1991)

Development of New Training

Performance-based training system can be applied when initiating new training or processes of performing a job or when the result of needs analysis indicate that lack of knowledge, skills or abilities of the trainees can be corrected with training. The system can also be employed in an organization when there is no formal training for an ongoing programme or processes and it is decided to initiate one. To achieve this purpose, a job analysis is conducted to support the new training development.

Review and Validation of on-going Training Performance-based Training System

Performance-based training system approach is not only useful in initiating a new training or process but also can be applied in reviewing and validating an on-going training. The system is also used when there is performance problem in an existing training which could be as a result of lack of knowledge, skills or abilities to perform critical job activities. Review and validation is therefore necessary when there is discrepancy in job performance. That is, when performers are not performing up to the standards or not doing what they are expected to do.

Identification of Retraining Needs

Outside the use of performance-based training system for developing initial training, it is also suitable for identifying retraining needs of those already in employment but require retraining to improve their performance skills or job efficiency. Training is teaching or practice given to people, learners or trainees in order to bring desired standards of behavious, efficiency or physical condition.

Similarly, retraining implies teaching or practice given to those already trained and employed but requires another training in order to improve their knowledge, performance skills, or job efficiency. In this case, needs analysis helps to identify the tasks that require periodic retraining which will improve trainee effectiveness. To achieve this aim, job analysis as applied in training development and training review and validation of initial training are used for determining retraining needs.

Performance-based training system may be applied to retraining when:

* Task is very difficult to perform. The retraining will make the trainees to master the tasks effectively,
* Task is very important to a job or production. That is when the task involved must be performed and accurately,
* Task is not performed regularly. This can make performers not to be conversant or skilled with the performance of the task, and
* A job has no delay tolerance etc.

Selection of Personal

Performance-based training system can also be applied in selection of personnel for industrial establishment. In modern work environment, the selection of personnel for initial employment and for advancement is done in such a way that there will be no discrimination against anybody in terms of sex, age, race, status or religious belief, but based on who will perform the job most effectively. Based on this condition, job/task analysis can be use to aid human resource management in the area of personnel selection. It helps to determine the knowledge, skills and abilities for determining the criteria or the standard where the selection of personnel is based. This is because any criteria that are derived from job/task analysis is related to job performance.

Development of Job Aids

Job aids are guidelines to be remembered and followed by operators while performing a job. It displays short, narrative and graphic instruction on the skills to be remembered while performing a task. In the same manner, procedural job aids provide step-by-step guideline for performing a task. Performance-based training system is not left out in developing suitable job aids that are mostly applied to special problems. Such special problems include tasks that are not performed regularly, so, can be easily forgotten by operators and tasks that are difficult to perform.

Conclusion and Recommendations

It has been seen that performance-based training system, made up of analysis, design, development, implementation and evaluation phases is an extension of systems approach employed when solution to performance involves training. It is applied in development of new training, revision and validation of on-going training, identification of retraining need, selection of personnel, development of job aids etc.

At times in Nigeria, solution to performance problem is proffered without thorough analysis to identify the root causes and factors that can help find its solution. For this reason, the efforts to solve such problem fail to yield the desired result.

On this basis, the paper recommends that:

Need analysis and job/tasks analysis should be conducted before solving performance problem. This will help to identify the root causes of the problem before attempting to solve it in order to achieve the desired performance standard in trainees.

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