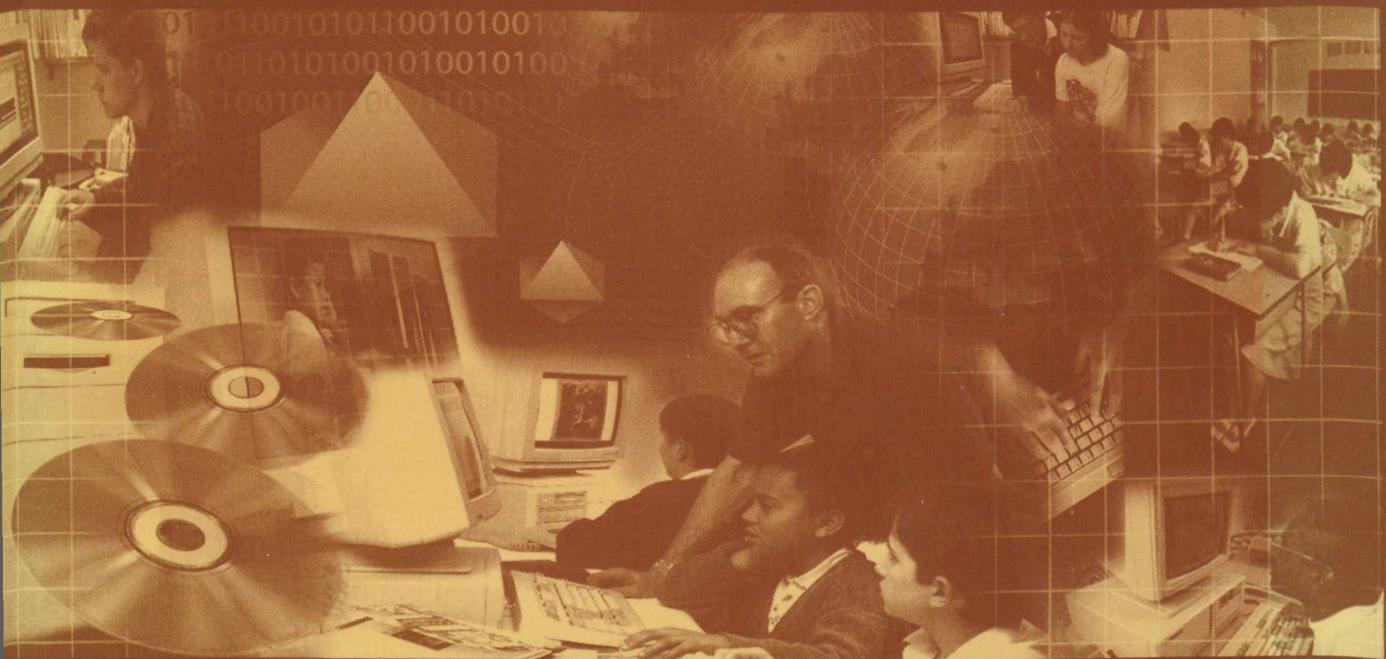


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be met before other educational needs are addressed? (e) Will resources (funds, staff) be adequate to meet those needs?

4.4 Reporting and Using the Results

A particular characteristic of needs assessment studies is the intended utility of the results. Whether for planning, problem-solving, setting criteria for evaluation results, or praising or censuring education efforts, the final stage in the process is intended to be one of active use of the findings.

Witkin (1984) suggests enhancing the use of needs assessment findings by communicating information about the study during all of its phases, from planning to use. Most writers encourage the use of effective communication strategies—that is, identifying the audiences for the information, tailoring the information to the audience and the media being used, and attending to the timing of the release of information relative to audience needs.

5. Trends and Issues

Changes in funding mechanisms, the worldwide recession, and emphases on testing and other forms of pupil assessment have reduced the emphasis on the development and use of needs assessments in education. Methodological development in this area was arrested just as philosophical debates regarding approaches used in behavioral science emerged. Much work remains to be done in developing models and procedures of determining needs in context, of incorporating values which often conflict into the process,

and of establishing ways of determining the priority of multiple needs, many of which interact with one another.

See also: Job Analysis; Project Evaluation and Monitoring

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Job Analysis

J. W. M. Kessels and C. A. Smit

Job analysis is an important aspect of human performance technology and its methods and techniques are widely used in recruiting, selecting, job design, appraisal, and organizational development. There is a growing view that it is an indispensable form of analysis in the design process of instructional systems. Numerous textbooks on instructional design stress its importance (Romiszowski 1981, Tracey 1984, Nadler 1982, Foshay et al. 1986, Davis 1971, Rothwell and Kazanas 1992); however, in daily practice job analysis is rarely carried out. Spurgeon et al. (1984), cited in Patrick (1991), report on a national survey in the United Kingdom which found that less than 20 percent of the employers of computer personnel had carried

out any formal analysis of the jobs of programmer, systems analyst, and analyst programmer before developing training provisions. Meanwhile, in the United States, 62 percent of the trainers interviewed did not conduct a structured and systematic needs assessment for design purposes (Pieters 1992 citing *Training*, Oct. 1985). A multiple case study on 17 training programs in the Netherlands, examining nine successful and eight unsuccessful cases, found no occurrence of systematic needs assessment, job, or task analysis (Kessels 1992). The question which naturally arises is whether job or task analysis is actually as indispensable as argued for in literature, or whether the training design practice itself is still in a developmental phase.

1. Terminology and Definitions

Though the practical application of job or task analysis is apparently scarce, the nomenclature is, in contrast, abundant. Some writers try to distinguish precisely the differences between the following types of analysis: occupational, job, work, performance, task and subtasks, duty, skills; and that of elements, subject matter, and content analysis (Tracey 1984, Rossett 1992). Subsequently, clear definitions of the terms occupation, job, performance, and so on are needed. On the other hand, job, task, and skills analysis are used interchangeably (Patrick 1991). In the description of the types of analysis needed in the design, development, and implementation of training interventions, this entry does not focus on the *object* of analysis as a determinant, but on the *purpose* served by the analysis, gathering information on the gap between what is and what should be (Kaufman 1990). Thus, it is not only important to analyze the performance, action, and behavior of employees but also their results and accomplishments: data on sales, services delivered, absenteeism, accidents, customer satisfaction, sick leave, time between machine break-down, scrap, and so on. This type of analysis, called "extent data analysis" by Rossett (1987), should also be included in the initial needs analysis and is part of job analysis.

Most authors consider job analysis as belonging to the front-end analysis phase preceding the design and development phases: however, it is not always clear whether or not job analysis is part of needs assessment. Needs assessment ascertains whether a perceived problem can or cannot be resolved by training interventions. If training is appropriate, which means that part of the solution to the problem can be achieved by means of the results of learning processes, then job analysis provides further information on what the requirements are for closing the gap between what is and what should be. These requirements are constituted not exclusively of skills and attitudes, but also of favorable conditions in the work environment. Separating needs assessment and job analysis is not recommended for the following reason: needs assessment and job analysis methods are very similar, in that both use interview, observation, document search, group activity, and survey techniques. It could be argued that it is not cost-effective to start extensive and time-consuming job analysis while the role of training as part of the solution remains undecided. From a systemic point of view, performance is seen as the result of a number of influencing variables in a larger system of which training and development form merely a part. Before appropriate interventions are selected and deployed, analysis should not only reveal whether employees lack skills or knowledge, but also whether the environment is a barrier, how incentives operate, and how management support and motivation affect performance (Stolovitsch and Keeps 1992, Rossett 1992, Mager and Pipe 1991, Gilbert

1978, Romiszowski 1981). This must lead to the conclusion that, from the wider perspective of human performance technology, the perceived problem ought to be analyzed regardless of whether or not training is involved. Therefore, instead of separating job analysis from training needs assessment, there may be a reason for conducting a multidisciplinary needs assessment, in which training technologists will participate, and will carry on with dedicated analysis as soon as explicit training interventions are agreed upon.

It is also recommended that job analysis should not be restricted only to the initial stage of the design process for the following reasons: (a) it may lead to incomplete information, because very often at the beginning it is not clear at all what the developer should be looking for during the analysis, in spite of careful planning; (b) it may lead to vast analysis activities, stemming from a fear of overlooking critical elements, resulting in an overload of detailed data, that is unlikely to be used. Therefore, it is important to integrate job analysis not only into the needs assessment phase but in all the activities concerning design, development, and implementation. Since each phase requires new and specific information, additional analysis is needed and job analysis continues throughout the training process. The information needed for stating relevant instructional objectives and setting criterion measures is of a different nature from the information on the basis of which training strategies are chosen, training materials developed and trainers selected. Subsequently evaluation of performance and of impact on the organization could be considered as the last form of job analysis in the total process. Thus, job analysis should be an iterative activity throughout the design and development process and be given a wider application, not simply limited to the initial stage of the project.

Unfortunately, job analysis is often associated with the time and motion studies that were introduced along with scientific management. This negative connotation gives rise to ideas such as: (a) job and task analysis is restricted to visible tasks and the main analysis technique is observation (Rossett 1987); (b) job analysis is only applicable to the technical tasks of blue collar workers and only as far as psychomotor skills are involved, so conducting job analysis does not apply to designers of management development programs and problem-solving workshops; (c) job analysis focuses on a single incumbent interacting with his or her surrounding equipment and materials, and not on members of a group interacting with each other, with clients and customers, with ideas and problems; (d) job analysis offers simply a description of the actual performance and not of what should be. Thus, job analysis would have no value for training and development programs geared toward improvement, organizational change, or in a learning organization.

In spite of the above misinterpretations, in corporate education, job analysis is increasingly considered

as one of the few guarantees that a training program is performance-oriented, even for programs on management development, problem-solving, customer satisfaction, and quality improvement.

Annett et al. (1971 cited in Patrick 1991 p.132) focus on the decision-making process in training and define job analysis as the process of collecting information necessary to reach decisions about what, how, even how thoroughly, to train and perhaps how much to invest in training.

As previously advocated, a wider application of job analysis beyond the initial phase of training design is necessary and, considering the amalgam of labels used, job analysis in this context can be described as a group of information collection methods and techniques that claim to provide a valid basis for the design, development, and implementation of performance-oriented, cost-effective, and efficient training activities.

2. Purposes of Job Analysis

The need for job analysis grows when training programs drift away from performance and become too content-oriented. As a result, they lose their focus on the skills needed and on the problems to be resolved in the work environment. The basis of mismatched programs lies mainly in existing textbooks, management theories, concepts originated in the group dynamics laboratory, technical specifications, and so on. The content becomes an end in itself. There may exist a superficial relationship with the subject matter essential for the job, but very often this concerns only the names and labels used. The content is merely information to be transmitted without subject matter expertise. Programs based on this type of information tend to focus strongly on dissemination of knowledge, whether it is relevant for a given performance problem or not. Job analysis is an intervention to direct and redirect programs toward performance improvement.

In the design and development process, job analysis should provide the basic information for:

- (a) Reaching a conclusion on whether training is needed or not, and on what interventions should be implemented in order to support the training provisions.
- (b) Stating the training objectives. In addition to task-oriented information on the content of the target skills, psychological information is needed to enable skills to be classified as cognitive, interactive, reactive, or psychomotor (Romiszowski 1981, Patrick 1991).
- (c) Stating realistic criteria for learning results, performance improvement, and impact to be achieved, and for constructing matching assessment instruments.

- (d) Selecting training strategies and planning sequence. For training design purposes, the following aspects are very important: what is difficult in the job, what is easy, what the job incumbent is afraid of (something that might happen), what is critical, what is particularly difficult for newcomers, what in the job is tiring or annoying, rewarding or motivating.
- (e) Selecting subject-matter information, real-life examples, case studies, and exercises to support the learning process.
- (f) Generating relevant assignments and projects.
- (g) Organizing local support.
- (h) Selecting experienced trainers and coaches.
- (i) Selecting trainees.
- (j) Assessing results.

Each product in the design and development process requires a different kind of information and different questions to be answered by means of additional analysis. Therefore, it is doubtful that a single database, with global statements on behavior, standards, and conditions for all the human resource areas, will serve the many and different job analysis purposes as mentioned above. The simple job analysis as suggested by Dennis and Austin (1992) in their "Behavioural Analysis and Standards for Employees (BASE)" is not likely to provide the variety of information needed in the diverse domains of recruiting and selection, training, performance, and competency assessment.

Besides these information-gathering purposes, job analysis serves to establish local and top management support for a training program. During the analysis process many representatives of the hierarchical structure are involved in the various cycles of information gathering, feedback, and agreement sessions. Their investment in time and effort often turns into commitment as soon as they perceive these efforts as beneficial to their own interests. Involvement in job analysis is not limited to members of the organization. Clients and customers can contribute with valuable information on the expected level of quality in services and products. Besides the valuable information on actual and desired performance, such an invitation to participate will result in reinforced relationships.

The process of needs and job analysis is in itself an important learning process for the organization. Job analysis can be considered as a feedback mechanism that offers information on what is, and that tries to find out what should be. To benefit from this learning process, job analysis should be carried out by a project group or task force including responsible managers and influential stakeholders.

3. Methods and Techniques

Literature and practice offer a wide array of methods and techniques used for job analysis purposes. Most methods used are based on commonly known information-collection techniques like interview, observation, group techniques, survey, and document search. Tracey (1984), Zemke and Kramlinger (1982), Rossett (1992), and Carlisle (1986) stress a systematic organization and application of the analysis: it should have a purpose, clear goals, carried out according to a plan, using methods and data collection techniques that are appropriate for the type of information sought for, and the results should be reported on accurately.

In addition to the general information-collection techniques mentioned above, job analysts have developed dedicated methods for specific application. Flanagan (1954) focused on the critical incidents technique. This technique collects typical behaviors and practices, ranging from highly desirable and effective to highly undesirable and ineffective.

Other tailored job analysis methods include:

- (a) Focus groups: for comparing and contrasting intangible aspects of jobs and attitudes of high and low achievers (Zemke and Kramlinger 1982).
- (b) Adoption by training staff: trainers adopt a new plant, department, or system to experience and investigate the qualifications that are required for running it (Kessels and Smit 1989).
- (c) Simulation: new tasks, approaches, and procedures are tried in a mock-up or in a virtual reality situation in order to examine the job requirements (Kessels and Smit 1989).
- (d) Job comparison: the requirements of future jobs and tasks can be identified by comparing the requirements of familiar jobs and cognitive operations used in one context to those needed in a new context. For example, the requirements of the new traffic control function in the naval context can be identified to some extent by comparing the requirements of air traffic and railroad traffic control functions and examining the specific context differences (Kessels and Smit 1989).
- (e) The jury of experts: contradicting opinions and conflicting performance and quality standards found during the job analysis can be submitted to a jury of experts who judge the desired objectives for the training program (Kessels and Smit 1989). Besides the jury of experts contributing to the necessary involvement of line managers and subject-matter experts, this often reveals inconsistencies in organization behavior that cannot be solved through training.

Patrick (1991) distinguishes between three major types of analysis:

- (a) The task-oriented approaches include the hierarchical task analysis and the critical incidents technique. These approaches serve the identification of training needs, the specification of training objectives, and the identification of training content.
- (b) The psychological taxonomies include information-processing requirements, ability/aptitude requirements, and the types of learning. These taxonomies help to improve the selection of trainees, to design the training, and to elaborate the content of cognitive complex tasks.
- (c) The third set of analysis concerns knowledge representation. This set should enable the analysis of complex cognitive tasks and provide a framework of the different kinds of knowledge used during expert performance. However, no strong generalizations emerge concerning how to analyze complex tasks and much improvisation and ingenuity is required by the analyst (Patrick 1991).

4. Expertise of the Job Analyst

A concise description of the expertise of the job analyst can be found in Tracey (1984):

Analysts should have a general knowledge of the job categories to be studied and should be capable of avoiding bias. They should have the mental ability and insight required to probe for and elicit information in a systematic manner, and to recognize commonalities and variations in specific jobs. In addition, job analysts should be articulate and methodical; be able to write reasonably well, to observe astutely, and to attend to detail for relatively long periods of time; and, of course, be interested in people and jobs. (p.98)

In addition to Tracey's characterization of the job analyst, it is important to acknowledge a practical dilemma; often the training designer is an experienced employee or subject-matter expert whose involvement in the design and development process of new training programs follows on from an initial interest in moving into training. Conducting task analysis presumes that the analyst can be completely uninhibited in asking questions such as: "Why do you do this, in that way?"; "How do you know that you should alert X in this situation?"; "What do you find difficult when a problem like this arises?" and so on. This attitude, combining innocence or naivety with integrity and security, is essential for obtaining information that is high in both quality and quantity. However, it is impossible for an experienced colleague or subject matter expert who is designing a training program for his or her own field of expertise to ask this kind of question and to pretend to have a naive attitude. The experienced employee is both inhibited by his or her own competence and by the fear of losing face in front of colleagues. This is often the reason why training staff do not conduct front end analysis. In fact, the nature of job analysis is

one of "professional illiteracy": a skilled information-gathering process, pretending ignorance, thus evoking critical, though often unconscious, know-how. This attitude cannot occur between colleagues. It is therefore recommended that job analysis be conducted partially in couples in which both subject-matter and training design expertise are represented. Where the analyst whose contribution stems from training expertise can play the role of "professional illiterate," that role will be accepted by the job holders. Job holders even appreciate the interest an "outsider" shows in their work. This positive and nonthreatening climate during the data-collection process is of great value regarding the quality of information sought.

5. Discussion of Underlying Assumptions

In general, instructional designers like to do job and task analysis, once they have experienced it; it brings them out of their potentially limited world and initiates them into the real action of an organization. However, many get caught up in piles of collected data, ending up stating hundreds of instructional objectives that will never be used. Managers feel uneasy with this kind of time- and cost-consuming activity that, in their opinion, does not contribute a great deal. Swanson and Gradous (1986 p.239) warned against this paralysis through analysis. For Hiebert and Smallwood (1990) it is one of the reasons to suggest a completely different look at needs analysis. As opposed to the objectivist tradition, they introduce an interpretative approach. Unlike the objectivist approach, the interpretative does not assume that an objective set of training needs exists. The one chosen depends on experience, knowledge, skills, and preferences. The environment consists of a dynamic flow of information and since the analyst is part of that environment there is no such thing as an objective observer. Meanings, interpretations, and training needs, are socially and culturally determined. They can be negotiated and renegotiated. Thus, needs and job analysis is a negotiating and agreement process in which the analyst is a major stakeholder.

Finally, Hiebert and Smallwood (1990) introduced the integrative approach as a compromise between the positions of the objectivist and interpretative mode. It employs parts of both. The goal of the integrative approach is to use objectivist language and processes while thinking in the interpretative mode and concurrently moving participants to recognize the value of new approaches.

See also: Constructivism and Learning; Needs Assessment; Task Analysis

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