Job Analysis and Work Roles, Psychology of

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Abstract

Job analysis is essential for understanding and changing working conditions and the workers themselves. Analyzing jobs is a crucial element in (psychological) work analysis because jobs and the tasks constituting them are the basic (design) units of an organization and the key interface between human beings and organization. This article briefly outlines job analysis methods and techniques, distinguishing them according to the criteria: unit of analysis, intended applications, theoretical foundation, method users and methods of data collection, methodological standards, and results. Emphasis is given – particularly in view of practical requirements – to the need for methods and techniques to be scientifically proven in terms of their reliability and validity. Finally, the future importance of job analysis and the necessary further developments are discussed.

Introduction

Job and work analysis is essential if we are to describe, understand, and change the way people work and their work environment. It is important because it is the basis for the solution of different human resource problems (Brannick et al., 2007). Job and work analysis also plays an important role in the European Union, as the European Framework Directive 89/391/EEC issued in 1989 legally commits every employer to conduct regular measures to encourage improvements with regard to the safety and health of workers at their workplaces. Generally speaking: If we wish to solve work-related problems, work analysis is not normally a matter of choice; we are either obliged to perform it explicitly or at least base our decisions on implicit work analysis information.

Job analysis is part of work analysis. It is necessary (see also Ghorpade, 1988) because

- jobs and their constituent tasks are the basic (design) elements of an organization, forming the basis for the constitution of workgroups, departments, and other larger divisions;
- jobs are consciously designed and changed by people (e.g., industrial engineers) who do not normally perform them;
- modern organizations are constantly changing (job analysis allows a continuous adjustment of job-related requirements to changing organizational goals).

There is a large number of jobs (e.g., in the production, office/administration, and service sectors) and elements of the work situation (e.g., organizational structures, agreements on working hours, work objects, and means of work), and a wide variety of ways in which job-related information can be used, that practically preclude the possibility of adopting a universal approach or analysis method here. Accordingly, there is no one job analysis method, but rather a number of systems, techniques, and methods that can be used to analyze jobs (Dunckel, 1999; Gael, 1988).

Nor are there any universally valid definitions, terms such as job, position, task, and element being used differently in different countries and approaches. This fact should be taken into account by the reader, for this article, too, uses terms in a way that would certainly not be endorsed by all job analysts.

Job analysis is the systematic, empirically oriented, problem-based collection of information on the interaction between humans and the work tasks and conditions that constitute a job or are connected with it "… by dividing it [the job] into smaller units, where the process results in one or more written products with the goal of describing what is done in the job or what capabilities are needed to effectively perform the job" (Brannick et al., 2007: p. 8).

Depending on the respective problem or goal (e.g., organizational planning and design, human resource management), different approaches and different techniques and methods are normally required (Dunckel, 1999; Gael, 1988; Ghorpade, 1988). A distinction should be drawn between job analysis and job evaluation: job evaluation in the narrower sense aims to determine compensation levels for a job (Landy, 1993); in a broader sense, job evaluation is also the evaluation of jobs according to given criteria, e.g., the extent to which jobs are conducive to health or personality development.

Jobs are composed of tasks, i.e., the same jobs are characterized by largely identical tasks. Task analysis is therefore a key element in job analysis (Dunckel and Resch, 2010; Landy, 1993). Task is generally taken to mean the purpose of a work system or the goal to be achieved under given conditions. Tasks specify goals to be attained by the worker, taking into account different overall conditions. Elements of jobs are therefore defined as work tasks if they relate in each case to different goals (more detailed treatment in Oesterreich and Volpert, 1987; Ghorpade, 1988). Tasks are the points in a job at which the organization meets concrete individuals and makes concrete demands on the activities of these individuals. The task is thus the 'interface' between the organization and the individual and an essential element in psychological job analysis.

Psychological job analysis systematically captures and evaluates information on a working individual's activity. Here, it is concerned not only with the externally visible activity and the conditions surrounding it, but also with the psychological processes (e.g., thinking, motivation) and structures (e.g., memory) determining and regulating this activity. Psychological job analysis thus focuses on the concrete work activity as a psychologically regulated activity – i.e., the activity of a working individual.

Unlike 'classical' work studies or technical (job) analyses, psychological job analysis is inconceivable without the involvement of the concrete working individual concerned. Supplying the affected workers with comprehensive information on the aims and objectives of an analysis, taking into account the fears and anxieties caused by it, and providing feedback to the workers on the results are (or should be) essential elements of any psychological job analysis.

Classification Criteria

Job analysis methods and techniques can be distinguished on the basis of various criteria (also McCormick, 1976): unit of analysis, intended applications, theoretical foundation, method users and methods of data collection, methodological standards, and results.

Unit of Analysis

The job analysis unit is the job itself and the tasks that comprise it. For this reason, many job analysis systems relate directly to the tasks and the immediate work conditions. More comprehensive job analysis systems (Dunckel, 1999; Gael, 1988) take into account the fact that essential features (e.g., potential for defining goals self-reliantly) and results of the tasks only become comprehensible if the overall organizational conditions and the knowledge, skills, and attitudes of the workers are taken into consideration. They therefore extend the analysis to include both the organizational conditions (e.g., degree of responsibility, codetermination potential, values and norms, leadership climate) and the working individuals with their respective knowledge, skills, and attitudes.

Methods can be classified, based on widely accepted criteria, according to whether they are more job/task-oriented or worker/person-oriented (Brannick et al., 2007). Job-oriented analysis is concerned with analyzing tasks, job conditions, or job features, without regard for the concrete individuals involved and their different knowledge, skills, abilities, and attitudes. Person-oriented analysis, on the other hand, is centered on the person and specifically concerned with differences among individual workers in the perception, interpretation, and performance of the job. Typical job-oriented approaches are: functional job analysis, task inventories, health services mobility approach (Gael, 1988; Ghorpade, 1988); typical person-oriented approaches are: position analysis questionnaire, critical incident technique, ability requirement scales, cognitive task analysis (Gael, 1988; Ghorpade, 1988).

The distinction between job-oriented and person-oriented analysis is of conceptual and practical significance. In stress research, for example, it is conceptually important to begin by determining stress factors independently of the person involved (and their individual perceptions and coping behavior) in a job-oriented manner, then going on to examine how objectively identical stress factors are differently perceived and dealt with by different individuals and how they affect different people. However, the (person-oriented) analysis of these interindividual differences means first determining objective stress factors because we are concerned here with interindividual differences in relation to objectively identical stress factors. This distinction is of practical significance when planning future workplaces for which there are not yet any workers. Here, the job-oriented approach is the only way of obtaining job analysis information.

Intended Applications

Techniques and methods have been and are being developed for different goals and potential applications. Job analysis literature contains numerous different lists of goals and proposed applications for job analysis information (Ash, 1988; Lees and Cordery, 2000). Basically speaking, two complexes of goals can be distinguished: work/job and organization design, and personnel development. More concrete aims of job analyses are, for instance, comparing work activities, changing and planning the work situation and organization, determining skill requirements and factors defining aptitude requirements, technology assessment, maintenance of industrial health and safety standards, and job evaluation.

Job analysis methods and techniques play an important part in human resources management and personnel selection (Algera and Greuter, 1998; Brannick et al., 2007). They are used to determine more precisely the requirements a person must meet to perform his or her work tasks. These requirements may be specified as tasks to be accomplished, behavioral requirements (e.g., required behavior or behavioral repertoire), eligibility requirements (e.g., knowledge and skills), or trait requirements (e.g., abilities and interests). For each of these requirement types, there are a number of techniques available (Gael, 1988).

If the results of such analyses are combined, job analysis can also be used to describe (work) roles as defined by Katz and Kahn (1978) (see also Dierdorff and Morgeson, 2007). According to these authors, roles are standardized behavior patterns demanded of all persons involved in a given functional relationship. Here, job analysis can also help to identify when and on what conditions role expectations (of the different organization members with respect to individual workplace occupants) can lead to conflicts and job stress.

The intended applications of job analysis are not necessarily independent of one another. If, for example, the goal is to change the work organization, it will often be necessary to analyze both the technological implications and the consequences for the workers involved.

Besides the application purpose, the application area also plays an important role. Job analysis techniques and methods consider different levels and units of an organization. A distinction must be made between

- sectors (e.g., industrial, administrative, service);
- levels of an organization (e.g., enterprise as a whole, business division, department, workplace group, workplace, work task);
- professional groups (e.g., executives, specialized professional groups); and
- activity classes (e.g., assembly, control and monitoring activities, administrative activities, service activities).

Depending on the specific concern, the emphasis will be on different information. Job analysis, too, faces the problem of breadth versus depth. The more detailed the information, the

more limited the application purpose. It may therefore be a good idea to proceed in several steps, starting with rough analyses to determine the key analysis areas, which are then analyzed in greater detail.

Theoretical Foundation

The theoretical foundation largely determines which information is captured at which level or with which analysis unit.

Work studies as defined by Taylor or Gilbreth (see Ghorpade, 1988) are based on an additive *movement* (or motion) model. Techniques working on this basis thus attempt to define elementary movement units (e.g., grasping with the hand), combining these additively in order to then determine, say, the standard time required to perform the work.

Approaches rooted in behaviorism also attempt to identify elementary units (of behavior) (e.g., processing materials, recognizing optical differences). Their units are bigger and hence they are therefore not movement-oriented but *behavior*-oriented.

These approaches, however, fail to take into account the fact that movements merge to form 'wholes,' are integrated in complex webs of activity and the regulating mental processes and representations, and are codetermined by these. This is why many developments, especially in Germany, are based on the '*action regulation* theory' (Frese and Sabini, 1985; Oesterreich and Volpert, 1987), thus giving priority to questions relating to the psychological regulation of action, the level of psychological regulation, the completeness of actions, the degrees of freedom (Hacker, 1998), or the scope for action or decision. The guiding idea here is that of humane work, i.e., work geared to human strengths and enabling individual workers to perform their job under permanently tolerable conditions, without impairment of their well-being and in a manner conducive to their personal development.

In the emphasis they place on characteristics such as scope for action, variability, identity, and importance of the task, action theory approaches are in keeping with the traditions of industrial sociology, e.g., the work of Turner and Lawrence (1965) and the work of Hackman and Oldham (1975) that build on this. Since the latter approaches are specifically concerned with questions relating to the 'motivation potential of work,' they can also be classified as oriented to *motivation theory* (*see* Work Motivation).

Besides drawing on approaches based on behavior, action, and motivation theory, job analysis systems also have recourse to concepts of stress theory (*see* Workplace Stress), ergonomics, and human engineering (*see* Human Factors and Ergonomics); in addition, worker-oriented approaches draw on concepts of personality theory.

Method Users

The main users of job analysis methods are the workers themselves, first-level supervisors, higher-level supervisors, job analysts, technical experts and other company experts, but also works and staff councils.

Whether and to what extent a method can be used depend, among other things, on the application requirements that must be met by the users. Important factors here, besides formal qualifications, are the amount of experience the users need in analysis techniques, whether they can teach themselves how to use such techniques or whether special training is required.

Methods of Data Collection

There are also fundamental differences between techniques in terms of the data collection methods used, for example:

- interview methods (e.g., individual and group interviews, technical conferences with experts, more or less structured questionnaires and checklists);
- observational methods (e.g., direct and indirect observation, continuous observation, work sampling);
- analyses of company data (e.g., working hours lost, accident statistics, workplace descriptions);
- analyses of documents (e.g., file analyses, form analyses); and
- work activities performed by job analysts.

Each of the methods has its advantages and disadvantages. It is therefore a good idea to combine several methods (Brannick et al., 2007; Gael, 1988). These advantages and disadvantages can be highlighted by comparing interview and observation methods.

Interview Methods

It is a good idea to interview workers, for they are the ones who know their own work activities best. Furthermore, such interviews are indispensable when the workers' subjective assessment of the work is needed or psychological processes are to be evaluated because these can only be accessed directly by introspection. In addition, interviews, especially questionnaires, are frequently the method of choice because they are relatively easy to develop and use. Interview methods are the most frequently used job analysis technique.

This should not, however, obstruct our view to the fact that interview methods have a number of weaknesses. Some typical problems are:

- comprehension problems of workers who are not so accustomed to dealing with the written language (e.g., in the case of questionnaires);
- the ambiguity of everyday language;
- difficulties in translating scientific terms into everyday language; and
- the problem of putting into words many aspects of psychological regulation processes (Hacker, 1998).

Observation Methods

Observation methods are generally used in cases where it is important to avoid the sort of errors that can occur in interview methods or 'bias' as a result of evaluation and interpretation processes on the part of the workers, or when, in future workplace design, no workers are yet available for the planned jobs.

Observation methods are often seen as a way of getting around the problems inherent in interview methods and obtaining 'more objective' data. In reality, they are subject to the same sort of problems as interview methods, in some cases giving rise to additional problems:

- The quality of job observations deteriorates for complex work activities.

- Certain temporally dynamic aspects of the work activity (e.g., pressure of time) are harder to observe.
- Infrequent events, which are nevertheless of significance for the job, (e.g., starting and stopping machines, annual accounts) are often not included.
- Observers, too, are subject to evaluation, interpretation, and 'biasing' processes. For instance, observers tend to rate workplaces as uniformly good or bad.

These typical advantages and disadvantages mean that proper job analysis involves considering precisely the methods which are suitable. This also means that users must be aware of the problems inherent in these methods, carrying out, where necessary, appropriate training measures to reduce them.

It is also a good idea – whenever this is feasible – to combine different methods, e.g., questionnaires, interview, and observation methods. For this reason, many techniques also include the *observational interview* as a proven data collection method, based on structured observation of the work processes and related interviews with the workers involved at their workplace.

This is also reasonable and required from a methodological point of view as a number of surveys show that data provided by incumbents have a significantly lesser reliability than data collected by analysts and experts (Dierdorff and Wilson, 2003; Voskuijl and Sliedregt, 2002; see also Dunckel and Resch, 2010).

Methodological Standards

Job analysis methods differ, among other things, in their degree of standardization – ranging from nonstandardized 'free' descriptions to semistandardized interviews to observations and interviews following exactly prescribed rules. They differ in the amount of time they take (from 30 min to several hours), their psychometric quality, the number of dimensions captured, etc. Which method to choose cannot be decided in a general manner; this depends largely on the intended application and on available knowledge and theory building with respect to the problems under investigation.

Scientifically based methods should be reliable and valid:

- The *reliability* of a method shows whether and to what extent a method can be used to obtain 'stable,' 'reliable,' or 'replicable' results. Ideally, repeated measurements of the same object should show as little deviation as possible (Oesterreich and Bortz, 1994).
- The *validity* of a method indicates the extent to which it actually measures what it is supposed to measure.

Examining these quality criteria is not only of scientific interest, but also of utmost practical importance. If the results of the analysis are to have practical consequences, e.g., for job design, decision makers must be able to depend on the fact that the results are reliable and valid.

Results

Job analysis methods provide quantitative and qualitative results. Qualitative results are mostly verbal, narrative descriptions of the job or the tasks; quantitative results are presented in numerical – and in some cases graphical – form. Complex methods generally present results in both qualitative and quantitative forms.

Outlook

Job analysis will continue to constitute a major basis for organization and personnel development also in the future. Given the numerous potential applications, there will be no one universal method covering all application purposes, even though the latest techniques allow more effective forms of information analysis and evaluation.

Job analysis methods were developed principally for the industrial and administrative sectors. They exhibit shortcomings, for example, when analyzing activities in the service sector, domestic and family work, and the self-employed sector. Furthermore, job analysis, too, will be obliged to respond to changes in the working world. New forms of work, e.g., jobs in virtual and networked organizations, teamwork within virtual structures, telecommuting and electronic business, dynamic and complex jobs with vague boundaries, also present new challenges for job analysis techniques and methods (Brannick et al., 2007; *see* Teamwork and Team Performance Measurement).

In addition, in the area of human resources management, job analysis is still needed (Ash, 1988) to help reduce gender discrimination with respect to pay by showing that the still existing differences in income between men and women on the same jobs cannot normally be justified by differing job requirements and conditions.

See also: Job Satisfaction; Organizational Citizenship Behavior; Organizational Climate in the Work Setting; Performance Appraisal and Evaluation; Teamwork and Team Performance Measurement; Work Motivation.

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