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ANALYSING LEADERSHIP ACTIVITIES IN DESIGN: HOW DO LEADERS MANAGE DIFFERENT TYPES OF REQUIREMENTS?

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1. Introduction

Facing the pressures of globalisation and the challenges of technical innovation in the 21st century leadership issues are recognised as key role of organisational effectiveness. That statement is also true for leadership in the engineering environment. However, the general situation is far away from theory-based education and training of leaders. Theories differ considerably, and there is not even consensus about a definition of leadership. In addition, theoretical assumptions about leadership are often not proved in real-world evaluations, and published lessons on leadership practices frequently present myths, which simplify the complex process of leadership [Neuberger 2002].

In order to enhance the significance of scientific research on leadership issues empirical investigations related to terms and conditions of leadership are necessary. What are the requirements in the daily work of leaders? How do leaders react to different requirements and how successful are they in doing so? Are there patterns of correlations between leadership strategies and success? These questions are part of a research project of engineers and psychologists, which aims to analyse leadership processes in design. In this paper different types of requirements, relevant situations of leadership in design and the related performance are presented. Thus, the paper links to the main topics in leadership research as well as to the central focus of practitioners, how to support successful leadership behaviour.

2. Theoretical background

About 100 years ago theories about leadership started with the so-called great-man-theory and the idea that leaders are born with specific traits that make them great leaders. These early ideas ended with varying long lists of traits related to leadership. This person-centred approach was replaced by situational theories with the main assumption that leaders are made by the situation, and great men only realize what is needed. But soon it became obvious that leadership is a function of the person and the situation. As a consequence interaction and social learning theories took into account the interaction between leader and followers, such as the leader-role theory. Recent theories are influenced from cognitive approaches on the one hand, such as the multi-frames leadership theory and from the idea of a mutual continuous influence between the environment, the leader and followers [Sims & Lorenzi 1992].

Simultaneously, the ‘leadership style research’ has focused on leadership styles and invented a lot of types of classifications; the latest is the transformational and transactional leadership style [Bass, Avolio, Jung. & Berson 2003]. An important heritage of this leadership style research is the emphasis on the behaviour of leaders in their environment. However, the underlying assumption, that leadership

behaviour can be classified into two or even more styles, seems to be too constricted and does not reflect the complexity and time-sequences of behaviour.

In contrast to the above mentioned theories we define leadership as a steering function in social systems [Stempfle & Badke-Schaub in press]. A social system consists of partial systems (groups, individuals), which pursue own objectives but contribute to the common goal of the system. Thus, leadership combines all activities in a social system directed to the achievement of the common goal(s). This systemic approach does not primarily focus on the formal leader, in its place the required leading function might be performed by another group member. Hence, in order to fulfil the basic needs of a social system we distinguish three main fields of requirements of leadership activities:

1. Content-related requirements: encompass all activities to accomplish the task and to solve the given problem(s).
2. Process-related requirements: In order to successfully solve a problem the leading function does not only deal with the design task itself, but must also direct parts of the leading activities to structuring and coordinating people and processes.
3. Relation-oriented requirements: Leading activities also concern to aspects of goal attainment, that is to pursue goals against or with the support of others and ensuring the motivation of involved persons.

This basic typology was the starting point of the empirical investigation of leadership in design which is the focus of this paper.

3. Assessment of requirements

This section provides a brief overview over the aims of the empirical study, the assessment of the data [see Stempfle 2003; Stempfle & Badke-Schaub in press] and the differentiation of the requirements.

3.1 Aims of the study and data assessment

In an interdisciplinary cooperation between engineers of the Technical University, Darmstadt and psychologists of the Institute of Theoretical Psychology, Bamberg, a study was carried out aiming to analyse leadership processes in design in order to identify general behaviour patterns of successes and failures. This general aim encompasses the following sub-goals:

1. to derive detailed requirements of leadership in design,
2. to develop a typology of 'relevant' leadership situations, completing the critical situations which were developed in a previous empirical investigation in design [Badke-Schaub & Frankenberger 2003],
3. to grasp different behaviour strategies related to the result.

In three engineering design departments, leadership processes in the product development process were observed, including meetings and talks with customers and suppliers. Two design departments were part of medium-sized enterprises (in total <1000 employees), which supplied automotive devices and system solutions for the automobile industry and their suppliers, the third company produced various industrial equipment and facilities, commercial vehicles and engines, with more than 75000 employees worldwide.

The primary method of the study was continuous non-participation observation. A laptop-based protocol system based on our protocol systems from earlier investigations was used to document the observations in real time. The final protocol consisted of a word-by-word transcription of important dialogues and a description of the observed processes. The continuous protocol of the observed process was the basis for further categorisation of the leadership situations and the analysis of the related activities. In addition, semi-structured interviews and questionnaires assessed individual evaluations in regard to the work context.

3.2 Differentiation of the requirements in relevant leadership situations in design

According to the above definition of leadership we distinguish three main types of requirements, leading persons have to cope with in their daily work. These requirements relate to the problems to be solved, to the necessity to coordinate persons and processes and to control interpersonal processes. Analysing the data protocols we were able to differentiate these main requirements into the following sub-categories of relevant leadership situations (see Table 1), which complete the types of critical situations of the previous studies in regard to the leading function [Badke-Schaub & Frankenberger 2003]:

Table 1. Relevant leadership situations as sub-categories of the main requirements

Content-related requirements	
Goal elaboration	formulation of goals and decisions related to goal and task clarification
Solution development	discussion and selection of solutions in a supervising function
Analysis of failures	diagnosis of sources of failures and development of alternatives
Process-related requirements	
Planning processes	scheduling activities related to the coordination of who, what and when
Monitoring processes	procedures of monitoring and controlling processes and people
Resource management	allocation of different kinds of resources such as money, people, material
Relation-oriented requirements	
Interpersonal influence	strategies influencing others pursuing own goals and/ or company's goals
Conflict management	processes of detection, analysis and solving opposing positions
Coaching	motivating and supporting, rewarding performance, and building identification for the company's goal

4. Results

In this section, results are presented related to the overall analysis of the three departments because it turned out that on this general level of analysis of frequencies no differences between the companies could be found. Altogether, 334 single situations were analysed, 13 situations could not be evaluated due to unclear consequences. The results show that nearly half of the activities (47%) refer to process-related requirements, whereas the other 53% are almost equally distributed between content- and relation-oriented requirements.

Table 2. Distribution of the main requirements over all 3 departments (n=321 situations)

Content-related requirements	25%
Process-related requirements	47%
Relation-oriented requirements	28%

4.1 Frequency of different situations

A more detailed analysis provides an overview of the relevant leading activities related to the main categories (see Figure 1). If leading persons are dealing with content-related requirements they are mostly occupied with solution development (14%) and second frequently with the analysis of failures (9%). Although the observation was focused on leaders of design departments only 2% of all relevant

activities were concerned with goal elaboration. By far the most important leading activity in terms of frequency are planning processes, which makes up 25% of all observed situations. Almost equally frequent are situations with interpersonal influence and conflict-related activities. Coaching activities refer to the support of colleagues and were observed only in 3% of all situations.

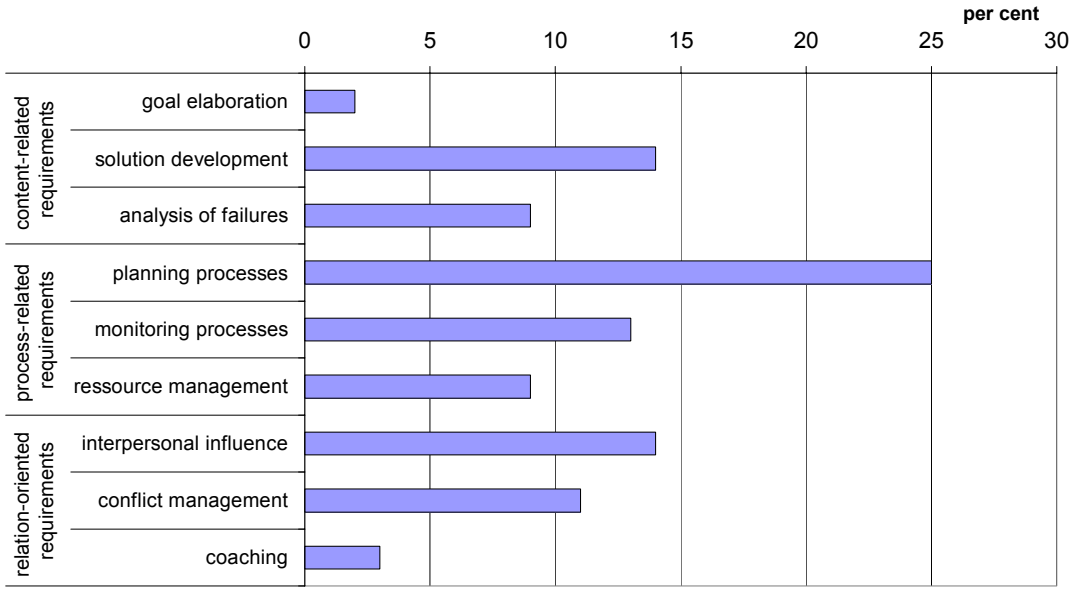

Figure 1. Frequency of relevant leading situations related to the main requirements (in percent)

4.2 Successful coping with relevant leadership situations

The outcome of each situation was evaluated in terms of success by two raters independently. The criterion for the evaluation of a situation as successful referred to the question whether progress was made by the observed activities or not. In an overall evaluation we can state a success rate of about 60 per cent as an average over all situations (see Figure 2) what however also indicates 40 per cent unsuccessful outcomes.

4.2.1 Planning processes

Moreover, in a secondary evaluation each of these situations was differentiated into further activities. For example, planning processes include time planning, coordinative planning and strategic planning, in which strategic planning activities seem to be the most difficult area of planning and end in 50 % with an unsuccessful result (see Table 3). The planning sub-category 'coordination of persons' encompasses the most frequent activities and the most successful planning processes. The reason may be that this type of planning provides clear instructions and is easier to realise than strategic planning.

Table 3. Planning Activities (n=83 situations)

	successful	unsuccessful
time scheduling	23%	17%
coordination of persons	33%	11%
strategic planning	8%	8%

Figure 2 depicts the different sub-categories of relevant leadership situations related to successful and unsuccessful results. It can be stated that there are especially two categories of situations with very poor results: goal elaboration and conflict management. As there are altogether only 7 situations of goal elaboration but 34 situations of conflict management, different kinds of conflict management will be discussed in the reminder of this paper.

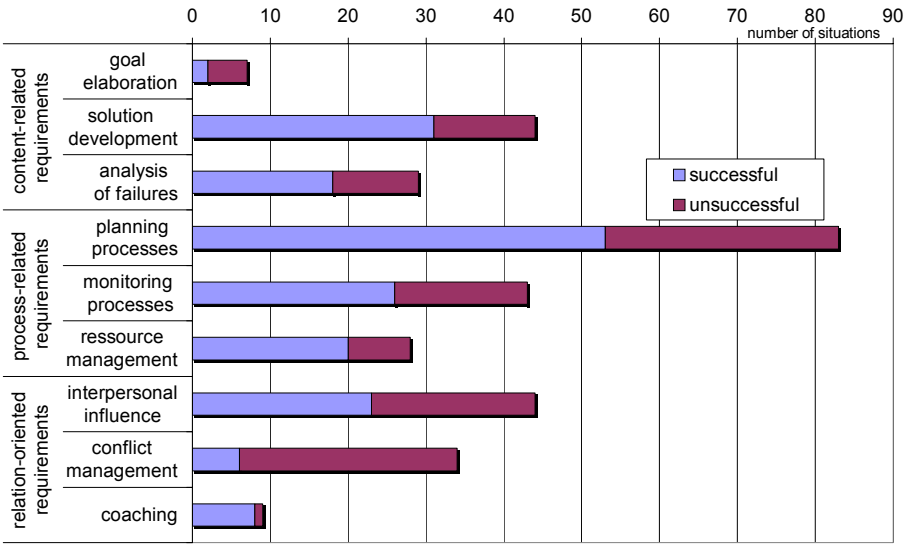

Figure 2. Successful and unsuccessful results of relevant leadership situations

4.2.2 Conflict management

Conflicts occur in various forms and may have positive as well as negative consequences. Moreover, conflicts are a crucial component of changes. Thus, conflict management covers a broad area of strategies referring to coping with opposite values, contradictory goals and interests, aiming at the same time to gain benefits and to avoid costs from conflicts. We divided the observed activities of the leading person related to conflict handling behaviours into three main categories: personal feedback, striving for consensus and striving for a rational solution.

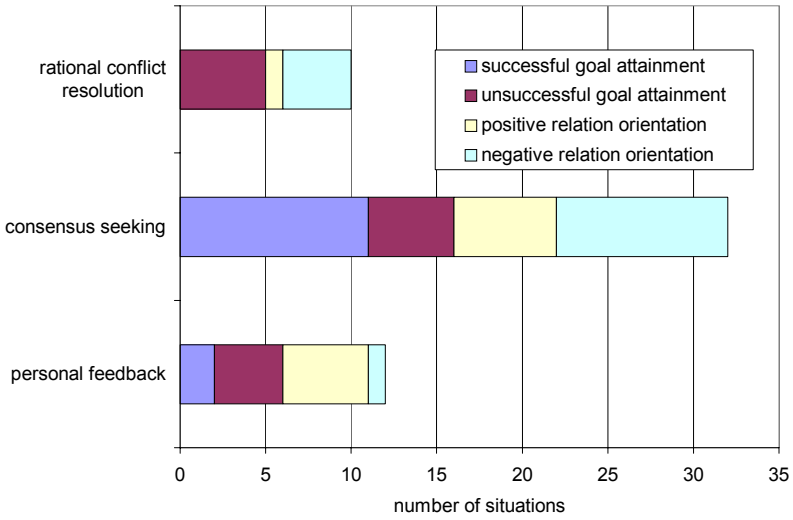

Figure 3. Strategies of conflict management and their consequences in terms of goal attainment and relation orientation

As the quality of conflict management strategies is related to the improvement in goal attainment on the one hand and to relation-oriented consequences on the other, each situation was evaluated in relation to both criteria (see Figure 3). Although the numbers are low, the results are very surprising, because:

a) striving for rational conflict resolution in terms of rational arguments led in no case to an improvement in goal attainment and in 5 out of 6 cases to negative relation orientation;

b) seeking for consensus reveals as the most effective conflict resolution style: 11 out of 16 situations signify progress related to the goal attainment, although in most of these situations the negative impact on the relationship prevailed;
c) personal feedback uncovers as a successful conflict management strategy in terms of positive relation-orientation whereas goal attainment is often rated as unsuccessful.

Even though rational conflict solving is often recommended as preferred conflict solving strategy, this approach led in most of the observed cases neither to progress in goal attainment nor to a positive relation orientation. One reason may be that rational conflict solving imparts a response orientation with own ideas in the foreground whereas consensus seeking arranges in a cognitive context a more generative orientation and in a motivational context the building of a shared understanding as a basis for further coordination and communication.

5. Concluding remarks

The empirical data reveal that relevant leadership requirements in design departments are primarily related to coordinating and planning activities. However, in contrast to other studies about leadership processes the presented data prove that leadership in design is still concerned with technical issues such as solution development, solution analysis and detection of failures. The data also disclose that the types of requirements are managed differently in terms of success. A surprising result is the extreme low number of activities related to goal elaboration and the mostly unsuccessful outcome. The other important result concerns the deficient leadership qualities in situations of conflict management. As a consequence further education and training of leaders should develop methods which support strategies related to goal development and conflict management.

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