

# May the „characteristics of well-designed working tasks“ (DIN EN ISO 9241-2) be applied to interactive tasks as well? – A Pilot Study

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## ABSTRACT

International and European standards (DIN ISO EN 9241-2; DIN EN 614-2) demand the design of „complete“ (vs. partialized), „well-designed tasks“, since such tasks have proven to be advantageous for (intrinsic) work motivation, job satisfaction, and mental strain. However, the standards have been developed for work associated with machine operation and visual display units (VDU); most of the studies dealing with these characteristics investigated non-interactive jobs in manufacturing or administration. The question therefore is whether the standards apply to jobs including client or customer interaction as well. Exemplarily, 95 jobs in retail sales were examined using observation-based and subjective measures. As retail tasks consist of tasks both with and without customer interaction, the core concept „task completeness“ was extended and the characteristics of „well-designed tasks“ were adapted for their application to interaction-centered subtasks. Hence, the retail jobs could be grouped in reference to the completeness vs. partialization of their object-centered *and* their interaction-centered subtasks, and be compared with regard to perceived task characteristics.

The results approve the usefulness of the proposed modifications, and thus recommend the applicability of the standards to (interactive) retail tasks as well. Ongoing research is needed to examine the transferability of the standards to other kinds of interactive tasks as well.

## Keywords:

task characteristics – task completeness – interactive tasks – retail sales

## 1 Characteristics of well-designed working tasks

The characteristics of well-designed tasks are theoretically based and empirically founded. Therefore, they became a guideline for task evaluation and task design. Although these standards (DIN EN ISO 9241-2 and DIN EN 614-2) refer to operating machines and visual display unit (VDU) work, the characteristics are of a generic kind, and thus might be useful for the evaluation and design of *further* types of working tasks as well.

Integrating both standards cited the following list of required characteristics concerning well-designed working tasks results:

- The working tasks should not be partialized into fragments, but rather be complete and meaningful units.
- The tasks should contribute to the total output of an organization in an identifiable and considerable manner.

- The tasks should require a reasonable variety of skills and abilities, combining routine-, knowledge- and intellectually-based activities, and thus, avoid repetitive monotonous demands.
- The tasks should offer control as regards speed, sequence, and procedures of work.
- They should offer meaningful feedback on their accomplishment.
- The tasks should consider knowledge, experience, skills, and abilities of the employees, thus avoiding underload as well as overload.
- Carrying out the tasks should permit the extension of knowledge, skills, and abilities on the job as well as the application, and thereby, improvement in the level of training.
- Socially isolating work is to be avoided.

These standards are based on the psychological approach of complete vs. partialized working tasks (from a philosophical point of view cf. Schweitzer,

1971; from a psychological one, Hacker, 1978; 2005 or Volpert, 1979) and the related research.

At first, the psychological approach refers to the sequential or cyclical completeness of tasks. Accordingly, tasks should exceed the pure execution by additionally including the preparation, organization, and inspection of the results by the employees themselves.

As a consequence, a couple of further task characteristics coincide with the degree of task fragmentation. These are mainly job discretion or autonomy, variety – especially of mental requirements –, learning, and finally, the motivational potential of the tasks.

Secondly, the psychological approach incorporates the hierarchical aspect of partialization vs. completeness: Sequentially complete tasks correspond with a greater variety of mental demands (Rasmussen, 1985), including not only automated regulation, but also knowledge-based and moreover, intellectual or problem solving processes.

## 2 Retail sales tasks

The core of retail sales tasks is the exchange of already produced goods and money (see Figure 1).

This exchange neither comprises changing an object (i.e. monological activities) nor realizes the change of a subject's physical, psychophysical, or mental characteristics (i.e. dialogical activities). Thus, it is a distinct kind of activity. However, the exchange-centered activities may be *combined* to a varying extent with monological and / or dialogical activities.

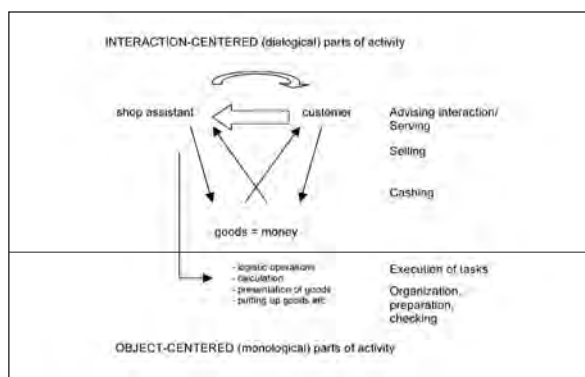


Figure 1: Components of retail sales tasks

Monological, object-centered activities in the sales context are e.g. logistic tasks, calculating tasks, or putting up goods. Dialogical, subject-centered activities are e.g. exploring the customers' needs and desires, and giving advice to them in order to support their purchase decision.

Especially in serving – opposed to mere selling – the shop assistants are to explore and influence the customers' desires.

There are only few studies on mental demands of retail sales tasks. As analyzed by Langmann (2003) as well as by Zülch and Stock (2003), retail tasks are predominantly sequentially and hierarchically incomplete and low in demands on the working individual. However, demands resulting from customer interaction – the central component of sales tasks – have not been examined in these studies. Berekoven (1990) found that the proportion of customer interaction in different branches of retail sales varies between 20 and 40 percent of total working time. Different qualities of customer interaction have not been investigated by the author. Given these incomplete analyses of demands of retail tasks, there are also no studies on relationships between demands and mental strain in sales jobs.

Statements concerning the validity of the „characteristics of well-designed tasks“ for this type of human service activities may thus not be based on results of empirical research so far. Our main question therefore is: May the „characteristics of well-designed tasks“ be applied to retail tasks as well?

Even though the generic wording of these characteristics *suggests* their applicability to further jobs besides operating machines and VDU tasks as well, restrictions of their transferability may be imagined. These restrictions might be due to the conceptualization of the core characteristic „completeness“ (vs. partialization): Since the standards have been developed for object-centered tasks, „completeness“ vs. „partialization“ is defined for jobs *not* including client or customer interaction. Thus, a conceptualization of this core characteristic for interactive or customer-centered activities is to be developed in the first instance (Table 1).

Hypothetically, a *complete* customer interaction should integrate *all* customer-related subtasks occurring in the sales process, i.e. identifying and fulfilling customer request as well as providing routine information (shortly: *selling*), assisting the customer's purchase decision by offering advice or giving user instruction (shortly: *servicing*), and *cashing*. By division of labour, these three components of customer interaction may be combined differently (see Table 1, alternatives B to E).

For object-centered retail tasks the graduation of completeness vs. partialization proposed by Hacker (2005) may be used. According to this, predominantly executing subtasks may be distinguished from preparing, organizing, and checking ones. In consideration of the kinds of subtasks combined in retail tasks lined out above, we suppose a completeness-based classifi-

Table 1: Proposal for grading the interaction-centered partialization vs. completeness of customer interaction in retail sales

Interaction-centered task components in retail sales	Alternatives					
	A	B	C	D	E	F
<b>Selling</b> (Identifying and fulfilling customer requests; providing routine information)	-	-	-	+	+	+
<b>Serving</b> (Offering advice, assisting exploration, user instruction)	-	-	+	-	+	+
<b>Cashing</b>	-	+	+	+	-	+

- does not belong to the task                      + belongs to the task

cation of retail sales tasks that allows both for subtasks with and without customer interaction (see Table 2).

Because the two dimensions of completeness vs. partialization refer to different kinds of subtasks, they are independent from one another. Thus, compensatory mechanisms may be hypothesized. To give an example: If the interaction with varying customers is stimulating, even in partialized object-centered retail tasks lacking autonomy and variety of mental requirements (e.g. in cashing), there might not be any negative consequences for the working individuals' perception of the task. In general, the relationship between partialized interactive retail tasks and perceived task characteristics (i.e. autonomy, variety, learning, and motivational potential) as well as mental strain (i.e. fatigue, monotony) are unknown so far. Investigating them will supply important information about the transferability of the „characteristics of well-designed tasks“ for retail jobs.

Since relations between perceived task characteristics and perceived mental strain have proven to be strong, the present study restricts to the examination of the former: The relationship between task design and perceived mental strain, which will be analyzed in ongoing research.

### 5 Questions and Hypotheses

Our main question is: Is a two-dimensional categorization of retail tasks, combining both the completeness-based classification of *object-centered* subtasks proposed by Hacker (2005) and the completeness-based classification of *interaction-centered* subtasks

introduced here, useful for the prediction of outcome variables?

We hypothesize the following commonalities and differences of the three selected configurations of object- as well as interaction-centered completeness vs. partialization (Tables 2 and 3) with regard to the examined perceived task characteristics:

*Hypothesis 1:* There is no significant difference in perceived total task variety, since either customers or tasks vary in the configurations.

*Hypothesis 2:* Contrastingly, due to the greater variation of contents in serving customers (compared to merely selling or cashing), perceived customer-specific variety is significantly higher in group 3 than in groups 1 and 2.

*Hypothesis 3:* Due to the generally limited degrees of freedom in carrying out retail tasks, there is no significant difference between the three groups with regard to the perceived autonomy.

*Hypothesis 4:* Contrastingly, perceived autonomy in the interaction with customers is higher in group 3 than in groups 1 and 2, as the interaction periods are longer and less formalized in group 3 than in the other two groups.

*Hypothesis 5:* There is no significant difference in the perceived learning potential of the task configurations compared, as the variation of goods, prices, operations, and strategies is limited in all kinds of sales jobs.

*Hypothesis 6:* Contrastingly, again the specific learning potential of customer interaction is higher in group 3 than in groups 1 and 2 because of the reasons mentioned in hypothesis 2.

#### 4 Method

*Sample.* The pilot study analyzes 95 shop assistants (65 females) of small and medium-sized retail sales organizations with a mean age of  $40 \pm 11$  years and on average 16 years of professional experience in retail sales. About 54 percent of them are working in part time sales jobs.

*Independent variables.* The pilot study restricts to the three task configurations shown in table 2 (groups 1 to 3). Thus, the independent variable is the complete-

ness vs. partialization of object-centered and interaction-centered activities. The examined workplaces were assigned to the two-dimensional classification system – and thus, to the three task configurations – by the results of work studies, which analyzed the task characteristics as they are. These work studies comprised a combination of scientific observation and interview. Group 1 consists of shop assistants carrying out a combination of mainly executive object-centered subtasks as well as cashing interaction with customers. The sales people summarized in group 2 carry out

Table 2: Three selected configurations of retail sales tasks

Interaction-centered partialization/completeness	none	Mainly cashing	Mainly selling (+ cashing)	Mainly serving (+ selling + cashing)
Object-centered partialization/completeness				
none				
one mainly executing action				
several mainly executing actions		Group 1	Group 2	
executing and action-preparing actions				Group 3

Table 3: Selected task characteristics of the analyzed groups (cf. table 2)

Task Characteristics	Group 1	Group 2	Group 3
	<ul style="list-style-type: none"> <li>several mainly executing object-centered subtasks</li> <li>mainly cashing</li> </ul>	<ul style="list-style-type: none"> <li>several mainly executing object-centered subtasks</li> <li>mainly selling (+ cashing)</li> </ul>	<ul style="list-style-type: none"> <li>executing and action preparing subtasks</li> <li>mainly serving (+ selling) (+ cashing)</li> </ul>
Variety (vs. Repetition)	<ul style="list-style-type: none"> <li>Repetitive, one executive subtask</li> <li>varying customers</li> </ul>	<ul style="list-style-type: none"> <li>several executing subtasks</li> <li>varying customers</li> </ul>	<ul style="list-style-type: none"> <li>several executing (+ preparing) subtasks</li> <li>varying customers</li> </ul>
Autonomy	<ul style="list-style-type: none"> <li>speed of operations (highly standardized demands)</li> </ul>	<ul style="list-style-type: none"> <li>speed and sequence (standardized demands)</li> </ul>	<ul style="list-style-type: none"> <li>speed and sequence</li> <li>kind of implementation (non-standardized demands)</li> </ul>
Learning Potential	<ul style="list-style-type: none"> <li>no variation in demands</li> <li>low interactive demands</li> </ul>	<ul style="list-style-type: none"> <li>varying demands</li> <li>interactive demands</li> </ul>	<ul style="list-style-type: none"> <li>varying demands (requiring occasional knowledge acquisition)</li> <li>varying, manifold interactive demands</li> </ul>

predominantly executive object-centered subtasks as well. However, in contrast to group 1, their interaction-centered subtasks do not only consist of cashing, but also include selling activities such as identifying and fulfilling customer requests. This kind of sales job is typically found in shops with a low need for explaining the goods to be sold. Group 3 includes sales people accomplishing at least two different object-centered subtasks. Besides the mere execution, at least the preparation of one's own work, its organization, or the examination of own results is required. The interaction with the customers predominantly consists in the assistance of the customers' purchase decisions, thus necessitating advising and possibly instructing them.

*Dependent variables.* Perceived total and interaction-specific task variety, autonomy, and learning potential were recorded by a questionnaire (cf. Melzer, 2008) including rating scales of perceived frequencies (five stages between „never applies“ and „always applies“) and perceived intensities (five stages between „does not apply“ and „completely applies“).

The differences between the three groups were tested using the Exact Test by Fischer.

## 5 Results

Table 4 compares the results with the hypotheses. As hypothesized, the three groups with differing values of the main „characteristics of well-designed working tasks“ do not differ significantly with respect to task variety. Thus, Hypothesis 1 may be accepted. In contrast, Hypothesis 2 regarding to perceived customer-specific variety may not be verified: Even though the shop assistants summarized in group 3 perceive a greater variety of customer interaction than the assistants of group 2, the assistants of group 1 perceive a greater customer-specific variety than the assistants of

group 2 as well. Whether this perception merely depends on the frequency of customer interaction rather than on the actual contents may not be answered so far. As expected in hypothesis 3, there are no significant differences as to perceived autonomy. However, there are also no significant differences in perceived customer-specific autonomy. Hypothesis 4 thus has to be refused. Again, the impact regarding the frequency of the interaction with different customers versus the contents of these interactions may not be evaluated. The expectation of no significant difference in the total learning potential is met (Hypothesis 5). The same holds true for Hypothesis 6: As assumed, the customer-specific learning potential is significantly higher in group 3 than in the other 2 groups.

## 6 Discussion

The main goal of this pilot study is to test whether a transfer of the international standards on „characteristics of well-designed tasks“ from object-centered machine operating and visual display unit work to the increasing share of service tasks is worthwhile sophisticated research. The generic wording of the standards seems to contradict task-specific differences between object-centered vs. interaction-centered tasks. In that case, an empirical investigation would become inevitable. A first prerequisite to answer the question is the conceptualization of the specific kind of partialization vs. completeness of interactive tasks. A proposal was made and tested. The offered solution works.

Consequently, an extension regarding the already known scale of object-centered task partialization tasks by a new scale of interaction-centered task partialization offers the opportunity of a valid categorization of retail sales jobs. Besides, the idea of a further transfer to other kinds of interactive tasks, e.g. in the

Table 4: Summary of hypotheses and results

Perceived task characteristics	Hypotheses	Results
1.1. perceived variety	$G1 = G2 = G3$	$G1 = G2 = G3$
1.2. perceived customer-specific variety	$G1, G2 < G3$	$G2 < G1, G3$
2.1. perceived autonomy	$G1 = G2 = G3$	$G1 = G2 = G3$
2.2. perceived customer-specific autonomy	$G1, G2 < G3$	$G1 = G2 = G3$
3.1. perceived learning potential	$G1 = G2 = G3$	$G1 = G2 = G3$
3.2. perceived customer-specific learning potential	$G1, G2 < G3$	$G1, G2 < G3$

sector of nursing, seems to be of high theoretical and practical impact.

A further prerequisite for an effective transfer of the standards is the redefinition of at least some of the task characteristics intimately connected with partialization vs. completeness, since interaction does not play any role within the standards so far. An important question to be answered in these continuative studies is whether the two dimensions of task completeness are indeed independent from one another, and whether there is a significant interaction between them.

All in all, the continuation of research in the transferability of the international standards on well-designed working tasks turned out to be worthwhile and necessary.

In ongoing research with greater samples, the full scale of task characteristics and the integration of perceived workload, essential consequences for the analysis, evaluation, and design of an increasing kind of human service tasks become apparent.

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