Novices' Quality Perceptions and the Acceptance of Process Modeling Grammars

A Trans-disciplinary Quality Approach

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Abstract. As Process Modeling Grammars provide a means to visualize and communicate complex business processes, it is crucial to convince novices to adopt them for every-day business. As their drivers of acceptance are widely unknown, my study develops a trans-disciplinary quality approach to investigate how quality perceptions affect novices' adoption intentions. The survey data were analyzed using PLS-SEM. The main result of my study is that the identified quality dimensions are interrelated and differ in their impact on adoption intentions. This provides a 'new', coherent view on quality perceptions of modelling grammars and deeper insights into how they affect behavioral intentions.

Keywords: Business Process Management, Modeling Grammar, Quality Perception, Adoption Behavior, Technology Acceptance

1 Introduction

The increasing complexity and digitalization of business processes requires depicting relevant process information in a clear and transparent manner. Process modeling provides a proper means to visualize, communicate, and evaluate complex business processes [1, 2]. As modeling grammars provide the conceptual base for process modeling by defining a set of graphical constructs and rules for their combination, a standardized modeling grammar is an indispensable prerequisite to integrate process modeling in ever-day business [3, 4]. It enables the use of modeling software to generate process models and to develop a shared understanding of their informational content.

To gain this shared understanding among all employees, the modelers of process models as well as their recipients must have sufficient knowledge about the applied modeling grammar and the willingness to use it in their daily routines [5]. Especially process modeling novices must be encouraged to learn and voluntarily adopt a commonly used modeling grammar. Therefore, it is essential to gain knowledge about the key-drivers of their adoption intentions to foster their acceptance behavior.

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Previous research, however, provides only minimal insights into the behavioral mechanisms underlying novices' initial adoption intentions in the context of modeling grammars. Therefore, these relevant key drivers are widely unknown. Prior publications, however, indicate, that quality perceptions are likely to influence the acceptance of a modeling grammar [e.g., 2, 3, 6]. Therefore, this study aims at empirically investigating if and how quality perceptions influence novices' adoption behavior.

The proposed research model develops a two-level quality approach. It builds on the observation, that process modeling novices usually experience a modeling grammar on two levels during a training period: They are taught (1) the language specification including the provided constructs and their rules of interaction and (2) its concrete usage in building process diagrams. Therefore, the quality approach in this study separates between quality perceptions on the *Language Level* and quality perceptions on the *Diagram Level* and poses two main research questions:

1. Do quality perceptions influence novice users' initial acceptance of a modeling grammar?
2. And do the different perceptional levels differ in their impact?

To answer these questions, this research applies a transdisciplinary approach. It aims at taking advantage of the fact that the influence of quality perceptions on adoption intentions is relatively well-investigated in the context of software systems – but poorly investigated in the context of modeling grammars. Therefore, this study identifies conceptual parallels between both research contexts and to transfer valuable insight from the one to the other to gain a well-founded research model as a base of the subsequent empirical investigation.

2 Theoretical Background

2.1 Previous Research on Technology Acceptance

The widespread Technology Acceptance Model (TAM) was originally developed by Davis [7] to explain a user's intention to initially accept a certain technology. Its core statement is, that users intend to accept a certain technology based on their perceptions of its Ease of Use (PEOU) and Usefulness (PU). In recent years, the TAM has been widely applied in the broader context of information systems [8 for an overview]. With regard to process modeling grammars, the publications of Recker [9, 10] showed a good applicability of the TAM in this specific context as well.

Numerous studies on information systems also indicated that quality perceptions may affect the TAM constructs PU and PEOU. Recker et al. [3] were the first who transferred this idea to the context of modeling grammars: They tested a research model combining a quality perspective (focusing on specific ontological deficiencies) with the TAM to investigate experienced users' continuance decisions. Based on their results, it can be presumed that a relationship between quality perceptions and the TAM also exists in the context of modeling grammars. Therefore, my study adopts this approach and builds on merging the TAM with a quality perspective specifically tailored to novice users' quality perceptions.

2.2 The Influence of 'Quality'

Quality-Related Research on Information Systems. In the context of information systems quality perceptions were identified as a key driver of usage intentions and success [11–13]. A clear definition of 'quality', however, is difficult. As quality perceptions are context dependent 'quality' can be interpreted from various perspectives [14–16]. Previous research on quality-driven adoption behavior mainly focused on 'quality' as meeting customer expectations. Particularly the conceptualization originally developed by DeLone & McLean [12] evolved into a de-facto standard.

The original DeLone & McLean model distinguishes between the two dimensions *System Quality* and *Information Quality* which were integrated, adapted, supplemented, and refined in a variety of subsequent investigations [e.g., 12, 14]. *System Quality* reflects the technical component of an information system (e.g., its features and functions) whereas *Information Quality* captures quality perceptions of its informational output like understandability and applicability. Both dimensions were found to have a significant influence on users' intentions to use an information system [12, 13].

Quality-Related Research on Modeling Grammars. In the context of process modeling grammars various researchers consider 'quality' a critical driver of acceptance, too, and continually called for more empirical research in this context [e.g., 2, 3, 6, 17]. However, a clear, commonly used and empirically proven conceptualization of quality in this context is still lacking. Existing quality approaches differ in their conceptualization of quality emphasizing different evaluation criteria, different contexts of usage, and different objectives. Well-regarded publications in this context are for example the SEQUAL-framework focusing on semiotic aspects [e.g., 18, 19], the subsequent publication of Krogstie [5] focusing on model based software development, the CD-framework [20] emphasizing cognitive aspects, Moody's 'Physics of Notations' [2] as a guideline for the design and improvement of modeling grammars, the Bunge-Wand-Weber (BWW) Model [4, 21, 22] focusing on ontological aspects, and the subsequent investigation of Recker et al. [3], focusing on user perceptions of ontological deficiencies.

All of these quality-approaches provide valuable insights into the meaning of 'quality' in the context of modeling grammars. However, due to their specific contexts or missing empirical foundations, none of these approaches provides a proper base for my research. Instead, it seems necessary to merge their core-findings to develop a perception-oriented quality conceptualization focusing on 'quality' as meeting novice users' expectations.

Conceptual Parallels between both Research Contexts. To gain such a conceptualization, it seems appropriate to consider the transferability of findings from the well-investigated field of information systems to the specific context of modeling grammars based on two major parallels:

First, both research fields basically agree that perception-oriented quality approaches are more appropriate to investigate users' acceptance behavior than detailed checklists of objective evaluation criteria [e.g., 3, 11, 23]. Whereas such perception-oriented approaches are already established in the field of information systems, existing quality approaches in the context of modeling grammars predominantly base on detailed and objective evaluation criteria. Moody's "Physics of Notations", for example, provides nine design principles including 25 single criteria [2]. Such detailed evaluation-checklists, however, are not appropriate to investigate novices' adoption behavior as particularly novices were found to develop rather general perceptions including less attributes than knowledgeable individuals [24].

Second, in both research fields, a quality approach including perceptions on different levels seems most appropriate. Quality-related publications in the context of modeling grammars can be divided into two major research streams: Some publications are concerned with quality aspects on the *Diagram Level* whereas others try to make improvements on the *Language Level* [6 for an overview]. Nevertheless, existing quality conceptualizations in the context of modeling grammars do not clearly distinguish between those two perception levels. In contrast, previous research on information systems applies such a two-level approach and clearly separates between S*ystem Quality* and *Information Quality* [12].

This two-dimensional conceptualization for information systems seems well transferable to the context of modeling grammars: As *System Quality* captures the ability of a software system to provide a sound technological base including relevant features and functions [12–14], quality-related publications on the *Language Level* focus on providing a sound constructional base, including ontological, syntactical and semantical aspects of the provided constructs [e.g., 2, 5]. As *Information Quality* is described "in terms of outputs that are useful for business users, relevant for decision making and easy to understand" [14], quality-related publications on the *Diagram Level* emphasize essentially identical issues like applicability, cognitive effectiveness and a clear understandability of the derived process models [e.g., 2, 6, 23, 25, 26]. In both contexts, the quality of the informational output is, to some extent, restricted by the quality of technical or conceptual base.

3 Research Model and Hypotheses Development

3.1 Effects of Quality Perceptions on the Language Level

Quality perceptions on the *Language Level* reflect the evaluation of a modeling grammars specification. As the *Language Level* aims at providing a proper constructional base to generate process models, it corresponds to *System Quality* which aims at providing a proper technical base to generate an informational output.

Gorla et al. [14] suggests to further group the relevant attributes for *System Quality* into the relevant subcategories *System Flexibility* and *System Sophistication*. Previous quality-related research on modeling grammars indicates a similar dichotomy: On the one hand, a wide range and proper definition of the provided constructs – often referred to as *Expressive Power* – is considered fundamentally important [e.g., 2, 3, 28]. On the other hand, previous research claims for a certain level of *Grammar Flexibility* to reduce complexity and use it on different levels of experience [28–30]. Consequently, my study distinguishes between the two constructs *Expressive Power* and *Grammar Flexibility* at the *Language Level*.

Expressive Power refers to the question if a modeling grammar is able to provide constructs to express relevant information completely and concisely [2, 3, 31]. For that aim, especially construct overload and construct deficit must be prevented. Construct overload occurs in situations in which the provided language elements "appear to have multiple real-world meanings and, thus, can be used to describe various real-world phenomena" [31]. This may cause confusion and involves the threat of ambiguity and misinterpretation. Construct deficit occurs when there is no notational element corresponding to a particular real world issue [21]. This causes the problem that relevant facts cannot be expressed by the provided constructional elements. As the Expressive Power of a modeling grammar, therefore, determines its fundamental applicability, I hypothesize

H1a) Expressive Power is positively associated with Perceived Usefulness.

On the other hand a high level of Expressive Power accompanied with a wide range of modeling vocabulary reduces the intuitiveness of a modeling grammar, increases complexity and makes it difficult to learn and handle [28]. Therefore, Expressive Power is supposed to negatively affect its ease of use [28]. I hypothesize

H1b) Expressive Power is negatively associated with Perceived Ease of Use.

Grammar Flexibility addresses the question, if a modeling grammar's specification includes possibilities to reduce it to subsets of core-constructs. This question is of high practical relevance: A study by Sedick & Seymour [28], for example, showed that all surveyed organizations tried to simplify process modeling grammars depending on their individually required level of detail. Zur Muehlen & Recker [29] found out that in every-day business usually a core set of constructs is used and additional constructs are included where necessary. Consequently, a modeling grammar's specification should include a clear distinction between core-sets and expansion sets of constructs (as e.g., BPMN2.0). This may reduce the aforementioned negative effects of increasing complexity to foster an easy usage. Thus, I hypothesize

H2) Grammar Flexibility is positively associated with Perceived Ease of Use.

3.2 Effects of Quality Perceptions on the Diagram Level

Each novice user has a certain set of process models in mind, after finishing a process modeling training. The *Diagram Level* reflects his quality perceptions of these diagrams – as the informational output of a modeling grammar – and, therefore, corresponds to *Information Quality*.

Previous research on information systems suggests breaking *Information Quality* down into content-related and formal evaluation criteria [14]. Content-related quality criteria capture the usefulness and applicability of the provided information whereas the formal criteria correspond to its appearance and understandability [14, 32, 33]. Previous research on process modeling analogously emphasizes a distinction between ‘content’ and ‘format’ with regard to diagrammatic representations [2, 26, 34]. Therefore, my research adopts this dichotomy and distinguishes between *Formal Capability* and *Content Capability* on the *Diagram Level*.

Formal Capability emphasizes the striven goal of the ‘cognitive effectiveness’ of the formal representation of process information in process diagrams [2, 26, 35]. “Cognitive effectiveness is defined as the speed, ease and accuracy with which a representation can be processed by the human mind” [2]. The formal capability of the resulting process diagrams, therefore, reflects a modeling grammar’s ability to visualize processes in a clearly structured and understandable way. BPMN, for example, provides structuring elements like pools and lanes to display interaction, whereas EPC diagrams lack a similar structuring. Following Johansson et al. [36], this leads to a good evaluation of BPMN-models with regard to structure and a rather bad evaluation of EPCs in this context. Consequently, a novice user will probably perceive the underlying modeling grammar as useful and easy to use, if the resulting diagrams appear to foster his efficient information processing. I hypothesize

H3a) Formal Capability is positively associated with Perceived Usefulness.

H3b) Formal Capability is positively associated with Perceived Ease of Use

Content Capability captures the functional perspective of the informational output of a modeling grammar. A process modeling grammar can only be perceived as useful if it provides the ability to build process models for various purposes [2, 3, 18, 23, 27]. If the resulting diagrams seem to be useful in every-day business, to facilitate decision making, and to provide a proper base for communication, the underlying modeling grammar will probably be perceived as useful. Thus, I hypothesize

H4) Content Capability is positively associated with Perceived Usefulness

3.3 Dependencies between the Language Level and the Diagram Level

As a process modeling grammar is not an end in itself but serves the sole purpose of building process models, there may be interdependencies between the quality-constructs on the two levels:

Expressive Power. Though a well-designed modeling grammar does not automatically lead to well-designed process models, a poorly designed modeling grammar makes it impossible to design high-quality diagrams [5]. Therefore, a wide range and proper definition of modeling constructs is a necessary prerequisite for deriving organizational benefits from process modeling [3]. This is especially important to meet the various purposes of process modelling [28]. A lack of well-defined constructional elements, consequently, restricts the applicability of the resulting process diagrams. Therefore, I hypothesize

H5a) Expressive Power is positively associated with Content Capability.

A proper supply of constructional elements affects the *Formal Capability* of the resulting process models as well. Construct overload on the *Language Level* may result in ambiguous process models which include constructs with multiple real-world meanings. This requires users to bring in external knowledge to understand the proper meaning of a construct in a certain context [3, 31] and, therefore, diminishes the understandability of a diagram. Additionally, a modeling grammar may provide – on the *Language Level* – constructs that help to structure the derived diagrams to foster a clear structure and to prevent cognitive overload [2]. Thus, I hypothesize

H5b) Expressive Power is positively associated with Formal Capability.

Grammar Flexibility. A flexible specification with defined subset of constructs may also foster the applicability of the resulting process diagrams. As process models are intended to provide a base for effective communication it “is desirable that a Business Process Model can be understood by the various stakeholders involved in an as straightforward manner as possible” [37]. These process stakeholders may differ with regard to their educational level and modeling experience. Therefore, a subset of core-constructs is helpful for an effective communication between stakeholders on different levels of experience.

H6a) Grammar Flexibility is positively associated with Content Capability.

The reduction to a core-set of constructs may foster the cognitive effectiveness of the resulting diagrams as well. Following Moody [35] the most common mistake in modeling practice is the request to show too much information on a single diagram. The resulting complexity rather impedes than enables effective communication [35]. Therefore, company-wide agreements to only apply a defined subset of constructs may foster the appearance and understandability of the resulting diagrams. Thus, I hypothesize

H6b) Grammar Flexibility is positively associated with Formal Capability.

3.4 The Basic TAM-Hypotheses

The well-established TAM hypotheses have already been tested and verified in numerous TAM-studies [8 for an overview]. Following Recker [9, 10], they turned out to hold in the context of process modeling grammars as well. Thus, I hypothesize:

H7a) Perceived Ease of use is positively associated with Perceived Usefulness

H7b) Perceived Usefulness is positively associated with Intention to Use

4 Research Methodology

4.1 Study Design and Data Collection

This study applies an experimental survey approach, which is a common method to investigate behavioral intentions. Data were collected using a survey of students from a German University of Applied Sciences in January 2017.

In preparation of the survey, all participants were trained in the use of two process modeling grammars (BPMN2.0 and EPCs) during winter term 2016/2017. The students were taught the specification of both modeling grammars (including their notational elements) as well as the concrete use of each grammar for the creation of process models. All of the students were provided the same training documents and the same exercises. Both modeling grammars were taught to a similar extent.

To train each student in two different modeling grammars seemed especially important, as perception development processes are comparative by nature [24].

BPMN2.0 and EPCs were chosen – analogously to the studies by Recker [9, 10] – for two main reasons: on the one hand, both are well-known modeling grammars of high practical relevance focusing on the visualization of information. On the other hand, the two grammars show enough differences with regard to their expressive power and diagram appearance to capture different effects on adoption intentions.

Each participant was asked to answer the questions in the questionnaire for each of the two modeling grammars. As all of the participants were students of a German-speaking class, the questions were provided in German language as well. To ensure content-equivalence between the German and English version of the measurement items, the translation procedure recommended in Brislin [38] was applied.

I received 44 completed and usable questionnaires, each including assessments of the two different process modeling grammars. This resulted in 44*2=88 total observations for further analysis. Among the 44 participants, 20.5% were female, 79,5% were male. The average age was 22.7 years. The participants were all students of an Information Systems Bachelor Degree Program (100%).

4.2 Construct Measurement

Due to a lack of appropriate measures in Process Modelling Research, the measurement items for *Expressive Power, Grammar Flexibility, Formal Capability* and *Content Capability* were derived from the *System Quality* and *Information Quality* measures in the study of Gorla [14]. These measures represent a well-founded synthesis of quality-related measures from various Information Systems studies (see [14] for an overview). As these measures were designed for the evaluation of Information Systems, they had to be reformulated and adapted to the specific context of process modelling. These adaptions were discussed with several experienced researchers to ensure content validity and understandability of the resulting measures.

The measures for the TAM constructs are based on the publications of Recker [3, 9, 10, 39], Moore and Benbasat [40], and Venkatesh and Davis [41]. All constructs were measured reflectively on a 7-point Likert Scale (1=”fully disagree” to 7=”fully agree”).

Table 1. Measurement Items of the Applied Constructs

Expressive Power (EXP)
The process modeling grammar provides notational elements to…
…capture information accurately
…capture information completely
…capture information concisely
Grammar Flexibility (FLEX)
The process modeling grammar…
…can be reduced to a set of individually useful features and functions
…can be handled by all levels of users
Formal Capability (FORM)
The resulting process depiction…

…has a good appearance
…has a clear structure
…is clearly understandable
Content Capability (CC)
The created process models …
…are useful for the professional work
…facilitate decision-making
…provide a proper foundation for communication
Perceived Ease of Use (PEOU)
Overall, I believe, that using this process modeling grammar is easy.
Modeling processes in the intended way is easy with this modeling grammar
I find creating process models using this modeling grammar is easy.
Perceived Usefulness (PU)
Overall, I find this modeling grammar useful for process modeling.
I consider this modeling grammar appropriate for process modeling.
I find this modeling grammar useful for meeting my process modeling objectives
Intention to Use (INTU)
If I have access to this modeling grammar, I intend to use it for process modeling.
My intention is to use this modeling grammar for process modeling.
I prefer to use this modeling grammar instead of using another process modeling grammar.

5 Measurement Validation and Hypotheses Testing

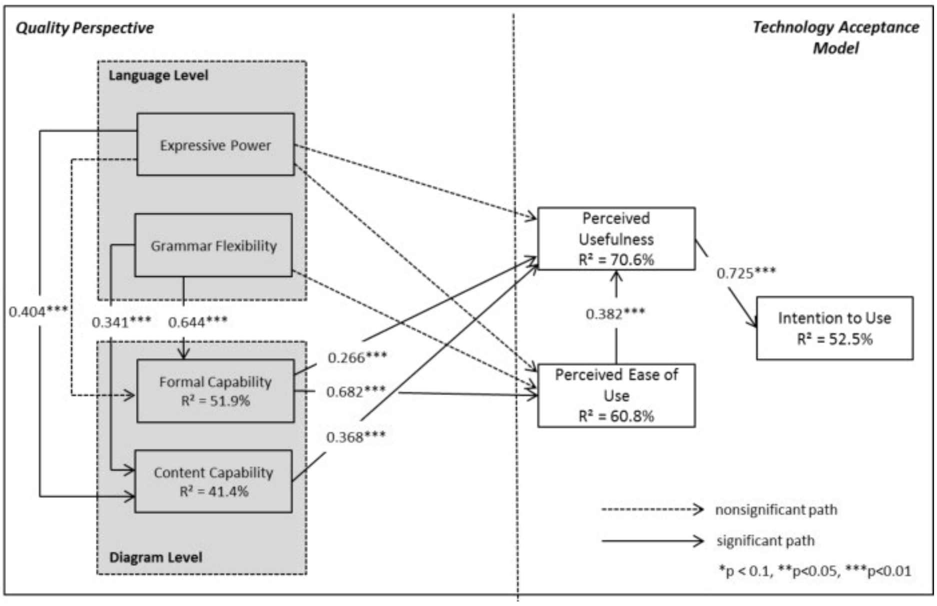

Figure 1. Results of the PLS-estimation of the research model

As the quality-driven adoption of modeling grammars is poorly investigated so far, applying the PLS-SEM method seems appropriate to meet the exploratory character of this study. This method is particularly suitable to test theories in early stages, as it makes fewer demands on data distributions and sample sizes compared to covariance-based approaches [42, 43]. Based on the research of Cohen [44], Hair et al. [43] recommend a minimum of 58 observations for a respective research model with maximally four arrows pointing at a construct. As 88 observations easily exceed this recommendation, the sample size should be sufficient for a sound data analysis.

Table 2. Cronbach's Alpha, CR, AVE and HTMT

Constr.	*Cr. α*	*CR*	*AVE*	*EXP*	*INTU*	*PEOU*	*PU*	*FORM*	*CC*
EXP	0.880	0.925	0.805						
INTU	0.928	0.954	0.874	**0.355**					
PEOU	0.923	0.951	0.866	**0.468**	**0.701**				
PU	0.927	0.954	0.873	**0.473**	**0.776**	**0.802**			
FORM	0.884	0.929	0.813	**0.507**	**0.677**	**0.854**	**0.823**		
CC	0.829	0.897	0.745	**0.652**	**0.640**	**0.551**	**0.762**	**0.669**	
FLEX	0.744	0.886	0.796	**0.602**	**0.504**	**0.726**	**0.646**	**0.874**	**0.669**

The **evaluation of the measurement model** followed the established evaluation criteria recommended in Hair et al. [43]. With regard to **Internal Consistency Reliability** all constructs meet the established quality criteria recommended in Bagozzi & Yi [45] and Hair et al. [43] (Cronbach's α >0.7 and CR>0.7). With all outer loadings exceeding the recommended threshold of 0.7 [43], **Indicator Reliability** is also given. As all AVE values are higher than the recommended threshold of 0.5 [43], **Convergent Validity** is also fulfilled. The **Constructs' Discriminant Validity** was evaluated by applying the recommended HTMT approach [43, 46]. Henseler et al. [46] propose two types of limits for HTMT-values: a strict limit of 0.85 and a more permissive limit of 0.9. 19 of 21 HTMT-values in this study meet the strict threshold of 0.85; only two exceed this limit minimally (0.874 and 0.854) but are below the limit of 0.9 (see Tabel 2, bolded values).

Hair et al. [47] propose to **validate the structural model** as follows: To avoid critical levels of **collinearity** among the predictor constructs, computing the VIF values for all predictor variables is recommended. All VIF values turned out to be far below the established limit of 5 [47]. The amount of **variance explained** (R^2) was considerable high exceeding the level of 50% for all of the endogenous TAM constructs and exceeding 40% for all of the endogenous constructs on the Diagram Level (see figure 1). The **cross-validated redundancy value** Q^2 [48, 49] was >0 for each of the endogenous constructs (0.428 for INTU, 0.481 for PEOU and 0.543 for PU, 0.383 for FORM, and 0.278 for CC), which indicates predictive relevance [50].

The **path coefficients** of the proposed hypotheses were computed using the PLS-SEM algorithm implemented in SmartPLS [51] (see Figure 1). To test the significance of each path, the corresponding **t-values** were computed applying the PLS SEM Bootstrapping Routine in Smart PLS with 5000 subsamples and a two-tailed test. All hypothesized relationships between the quality constructs on the *Diagram Level* and the TAM constructs were supported and turned out to be significant at a 1% level. Significant paths between the *Language and the Diagram Level* could be identified as well: The hypothesized relationships between *FLEX* and FORM, between *FLEX* and *CC*, and between *EXP* and *CC* were found to be significant at a 1% level. The assumed relationship between *EXP* and *CC* was not supported. Interestingly, none of the hypothesized direct relationships between the constructs on the *Language Level* and the TAM constructs was significant. This surprising result will be discussed in detail in the subsequent section.

6 Results, Conclusions and Future Research

This study posed two research questions in the introduction. With regard to the first question, a clear link between quality-perceptions and novices' usage intentions could be found and the identified quality dimensions could explain a considerable portion of the variance of the TAM-constructs. With regard to the second question, the identified quality dimensions turned out to influence the TAM-Constructs in different ways. Whereas the perceptions on the *Diagram Level* directly affected the students' intention to use a modeling grammar, the perceptions on the *Language Level* affected their usage intentions only indirectly via the *Diagram Level*. Consequently, the *Diagram Level* can be interpreted as a kind of perceptional mediator between the *Language Level* and the resulting acceptance intentions. This somewhat surprising result can be explained by the fact that information in diagram form can be processes and remembered better than ordinary language [2 for an overview]. Information about a modeling grammar in diagram form, consequently, is likely to have a stronger and instant influence on the subsequent acceptance behavior than the rather abstract grammar specification. Quality perceptions about the specification, however, are not irrelevant, as they do influence the users' perceptions on the Diagram Level.

In summary, the main results of my investigation are that (1) considerable parallels between the 'quality' of information systems and modeling grammars can be found, (2) that a coherent, perception-oriented approach is appropriate to capture novice users' quality perceptions, (3) that these quality perceptions do influence the initial acceptance of a modeling grammar, and (4) that the identified perceptional levels differ in their cause-effect relationships. They contribute to theory and practice:

From a **theoretical perspective**, my study introduces a 'new' view on quality perceptions in the context of modeling grammars. It clearly indicates that perceptions on the Language Level cannot be investigated separately from perceptions on the Diagram Level, as one depends on the other. By combining the Language and the Diagram Perspective, it merges the core-subjects of two wide research streams into a single quality model. This may provide a base to better understand and further investigate open questions from prior research. Recker et al. [3], for example, received mixed and inconsistent results whether certain perceptions of ontological deficiencies directly affect PEOU and PU. Building on my results, it seems possible that perceptions of some ontological weaknesses influence subsequent perceptions of PEOU and PU only indirectly via perceptions on a Diagram Level.

From a **managerial perspective** my results may help (1) to choose a modeling grammar that will probably be voluntarily accepted among all employees and (2) to design proper training strategies:

With regard to selection decisions, my study showed that *Expressive Power* and *Grammar Flexibility* both positively affect users' quality perceptions of the resulting diagrams and subsequently their adoption intentions. This indicates that it is crucial to select a modeling grammar that provides – on the one hand – a wide and well-defined supply of constructs and – on the other hand – is kept flexible enough to work on individually required subsets.

Knowing about the drivers of novices' acceptance intentions (including their cause-effect relationships) may help to develop appropriate training strategies as well: It seems reasonable to first introduce a modeling grammar on the Language Level and to teach the concrete usage for building process diagrams in a second step. If modeling novices were first shown the provided constructs as well as recommended subsets, this knowledge is likely to influence their subsequent perception of the resulting diagrams – which was found to directly influence their adoption intentions.

As this study has a few **limitations** as well it encourages further research in the following areas: First, the study is an exploratory approach to provide a first insight into the relevance of quality perceptions for novice users' adoption behavior. It was based on novices' perceptions of only two modeling grammars. Future research should extend this study on bigger sample sizes and additional modeling grammars.

Secondly, the focus of this study was on novice users. The level of individual experience may, however, influence individual quality perception development processes. Therefore, the study needs to be repeated with a respective sample of more experienced users.

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