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RECONCEPTUALIZING IT USE IN THE POST-ADOPTIVE CONTEXT

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Abstract

The information systems (IS) community has developed many theories, approaches, and models that identify conditions and determinants of successful IT use. However, each model in the IS literature has evolved to address specific aspects and dimensions. This has led to conflicting results concerning the impact of IT use. Consequently, while a rich body of knowledge has emerged, with prominent models such as the Technology Acceptance Model or the IS Success Model, the complexity of defining a suitable multi-dimensional construct for IT use has largely been neglected. In this paper, we develop a new causal model of IT use. Based on Adaptive Structuration Theory, we argue for the multi-dimensionality of IT use and thoroughly derive its components. Moreover, we introduce two new concepts into studies of successful IT use: functional affordance and symbolic expression. Both establish a relation between the IT system under investigation and its users. In doing so, we provide a novel, synthesized approach for investigating IT use in the context of post-adoptive behaviours and the framework of Adaptive Structuration Theory.

Keywords: Adaptive Structuration Theory, IT use, Post-Adoptive-Behaviour.

1 Introduction

In the information systems (IS) literature, the interplay between information technology (IT) and human agents has been investigated for several years, especially within two major research streams – the technology acceptance and the user satisfaction literature. Both research streams have converged on a shared understanding of the salient predictors of individuals' acceptance and intentions to use new IT (2003). Across a number of cognition-based models – for example, the technology acceptance model (TAM, Davis 1989), the theory of planned behaviour (Ajzen 1991, Taylor and Todd 1995), the unified theory of user acceptance and use of technology (UTAUT, Venkatesh et al. 2003) or the IS success model (ISSM, DeLone and McLean 1992) – there is general agreement among IS researchers that, for *initial use*, intentions, object-based-beliefs and attitudes are strongly linked with behaviour in terms of duration and frequency of IT use (Burton-Jones and Straub 2006, Burton-Jones and Gallivan 2007).

Whereas research on technology acceptance and initial use has matured over the past years, research on IT use in the post-adoptive context has only recently come more into focus. Since organizations derive benefits from how IT is used over a longer period of time (Hsieh and Zmud 2006) it is not surprising that academics as well as practitioners are very interested in investigating how IT is used. Especially the myriad feature adoption decisions, feature use behaviours or feature extension behaviours made by an individual user after an IT system has been installed and made accessible to the users in order to accomplish their work activities has become the focal point of interest (Jasperson et al. 2005). Therefore, the goal of this research stream is to understand how individuals interact with IT in order to achieve individual as well as organizational benefits. In general, research on post-adoptive IT behaviours is theoretically consistent with the aforementioned models of initial use. Post-adoptive use is largely viewed as *intentional behaviour* that is driven by a series of conscious decisions to act (Ortiz de Guinea and Markus 2009). These decisions have two key inputs: beliefs about the technology (e. g., expectations arising from experience, perceptions of usefulness and ease of use) and an individual's affective response to the technology (e. g., satisfaction). However, concentrating on behavioural intentions rather than on usage may not be fully justifiable for two reasons.

First, surrogating usage with behavioural intention has not been based on conceptually rigorous and solid foundations. Specifically, there is little empirical evidence or even theoretical grounding that IS researchers can study behavioural intentions instead of IT use and that behavioural intentions tell the entire story of user behaviour (Wu 2009, Wu and Lederer 2009). Behavioural intention and IT use are different in nature in terms of how they influence the individual performance. The information about user behaviour as captured by the IT use construct is unique and may not be replaced by intention since behavioural intention is formed prior to IT use and the gap in time can be large (Bagozzi 2007). Not focusing on IT use but on behavioural intentions results in overlooking this crucial time gap, in which the (earlier formed) behavioural intention may change. Second, the effective use of IT, and the relationship between actual IT use and net benefits, have been neglected and controversially discussed in the literature (Seddon 1997, DeLone and McLean 2003, Silva 2007). Seddon (1997) even argues for the removal of the IT use construct since IT use does not cause any benefits but only precedes them. To counter this argument, one might object that IT use is fundamental and IT benefits cannot be realized without any IT use. The main problem concerning IT use is not its relevance but its poor conceptualization and operationalization (DeLone and McLean 2003, Burton-Jones and Straub 2006).

To sum up, the definition of IT use has been too simple and one-dimensional in past studies. We suggest that until now it is still unclear how IT use does de facto contribute to the overall success of IS and that focusing only on intentions to use does not contribute to our knowledge base in the post-adoptive context. Hence, as technology adoption and diffusion research continues the transition to examining post-adoptive IT behaviours, there is a need to further investigate the extent, quality and appropriateness of IT use in order to understand how and why individuals actually use IT after it has

been deployed within an organization (Lyytinen 2010). Based on this argument, the goal of this paper is to conceptually amend the construct of IT use. In this we aim to answer the following research question in the post-adoptive context: *How can we conceptualize IT use in ways that help us to better investigate user behaviour and individual performance?*

The remainder of the paper is structured as follows. In section 2 we discuss the theoretical background. Section 3 introduces our proposed new research model that explains the relationships between the functionalities offered by an IT, the variety of IT use behaviours of an individual and the individual performance outcomes. In section 4 we develop a measurement scale for our research model and apply some first pre-tests. Section 5 discusses our research and concludes the paper with an outlook on future research.

2 Theoretical Background

2.1 IT Use in IS Research

Benbasat and Zmud (2003) argue for a theoretical link between IT use and IT impact. They suggest that, among other phenomena and factors, the *consequences of IT use* (direct and indirect, intended and unintended) on humans who directly (and indirectly) interact with IT systems should be investigated in more detail. Recent research argues that *IT use* still needs further investigation in order to better understand the effect of use on user satisfaction and net benefits (Petter et al. 2008). One major issue concerning the concept of IT use in quantitative studies is that the construct suffers from poor validation and theoretical foundation (Burton-Jones 2005), even though the IS literature already knows a vast amount of different conceptualizations of IT use such as “actual use” (Devaraj and Kohli 2003), “depth of use” (Venkatesh et al. 2008), “nature of use” (Igbaria et al. 1997) or “self-reported use” (Igbaria et al. 1997, Venkatesh et al. 2008). Most of these measures of IT use are survey-based and therefore prone to subjective response biases. That is why research on IT use tries to refer to more non-perceptional measures such as computer logs, which capture the amount of activity time that a user spent using the IT system (Venkatesh et al. 2000, Sykes et al. 2009). Among other conceptualizations of IT use, the three most common conceptualizations of actual use are duration, frequency and intensity (or extent) of use (Davis 1989, Taylor and Todd 1995). The cornucopia of different measures of IT use is one reason for the mixed conclusions about the relationship between IT use and individual performance (Petter et al. 2008, Petter and McLean 2009). Whereas some researchers found a strong positive relation between IT use and net benefit (Burton-Jones and Straub 2006, Rai et al. 2006), other studies found no or only a weak relationship (Iivari 2005). The core of the problem seems to be that every operationalization of IT use is addressing different aspects of the construct (Petter and McLean 2009). In addition, measures of IT use are often chosen for their appearance in past empirical studies rather than for theoretical reasons (Burton-Jones and Straub 2006, Petter and McLean 2009).

The lack of theoretical grounding for the IT use construct could be one explanation why IT use has been operationalized in many varying ways and why its conceptualization has been fairly superficial. IT use is a multifaceted construct that implies more than just the amount of time or the depth of use. The varied, (un-) conscious, and creative ways humans actually make use of IT cannot be simply operationalized by such measures. IT use depends on the IT system itself, the humans that interact with that special system and a multitude of other social and organizational factors that influence the human-technology interaction. An IS is a socio-technical phenomenon that emerges from the actions and interactions of its social and technical parts (Bostrom and Heinen 1977). Recent studies suggest that more attention should be given to the social act and the dynamics of adaptation of IT by human agents (Vaast and Walsham 2005, Faulkner et al. 2010). The resulting understanding recognizes that it becomes increasingly important to study the meanings that human agents ascribe to IT, given the local context in which they are to use IT and in which their meanings about the IT systems are constructed

(Kjaergaard and Jensen 2008). This implies a focus on social processes and change, including issues such as meaning construction, cognition, learning and sense-making (Orlikowski 1992). Therefore, every operationalization of IT use needs to take into account that humans may use IT systems and the functions offered by IT in various ways for various reasons. For example, whereas one human may make use of only a part of the functionality of IT systems, others may make use of every function or even reject to use any functions at all. The lack of a theoretical basis for IT use and the fact that IT use is more than the actual time spent with the operation of IT systems requires a theoretical and conceptual deliberation of IT use.

Until we have robust, consistent and reliable measures of IT use, it will be difficult to fully understand the relationships between IT use and other factors of IS success or IT adoption (Wu 2009). Consequently, our research is based on the idea that different types of IT uses can lead to different net benefits on the individual or the organization level, which in turn can be desirable or undesirable. We argue that we are in need of (a) a richer conceptualization of the IT use construct and (b) more comprehensive and consistent measure of IT use in order to better understand the effect of IT use on net benefits on various levels.

2.2 A Structurational Perspective on IT Use and IT Systems

In order to account for a more detailed conceptualization of the IT use construct, we suggest to utilize the structurational framework of Adaptive Structuration Theory (AST) developed by DeSanctis and Poole (1994). AST is a social theory that describes the interplay between technology, social structures and human action, and is a holistic attempt to examine the use and the impacts of advanced technologies in organizations (DeSanctis and Poole 1994, Poole and DeSanctis 2003). AST provides a lens to understand, investigate and predict outcomes of IT-induced change in a socio-technical work system (Bostrom et al. 2009). It provides an overarching perspective, where IT artefacts are included in the structures of an organization. This incorporates concepts of outcomes and goals, which we need for conceptualizing IT use as well. Moreover, AST allows for other, context-specific theories to be embedded within its framework (Gregor 2006).

Initially, DeSanctis and Poole (1994) considered social structures (rules and resources as basis for human behaviour) embedded in technology in form of the concepts of “structural features” and “spirit”. Structural features are said to bring meaning and control to group interaction. For a group support system, for example, these might include voting algorithms and anonymous recording of ideas. The spirit of a structural feature set is described as its underlying general intent with regard to values and goals. Both concepts serve as a source for social structure and influence the way people actually use IT. However, these definitions are highly controversial as the concepts of structural feature and spirit are conceptualized as properties of an IT system, although such values are fundamentally attributed to human agents (Jones and Karsten 2008, Poole 2009). To resolve this controversy, Markus and Silver (2008) propose two different concepts that are not defined as properties of a technology but as *relations* between technical objects and human agents: “functional affordance” and “symbolic expression”. In Markus and Silver (2008)’s conceptualization, human behaviour and, by implication IT use as well, is partly influenced by the structures provided by IT (i. e., functional affordances and symbolic expressions). Since the properties of IT are not directly attributed to the technical object itself but to the relation between technical objects and user, this conceptualization emphasizes the importance of technology-human interactions. The outcome of IT use strongly depends on how the user perceives, understands and grasps the structures that are provided by technical objects and how these structures are enacted in practice.

3 A Reconceptualization of IT Use

The framework developed by Markus and Silver (2008) serves us as a foundation to study the effects of IT by distinguishing between technical objects and their relationships with users through the two

channels of functional affordances and symbolic expressions. These two relational or bridging concepts contribute to the behavioural outcomes of IT use and second-order effects such as improved decision support (Poole and DeSanctis 2003), and help to explain how technical objects ultimately affect user behaviour. We suggest that the framework and the underlying perspective of AST allow for a thorough conceptualization of the IT use construct and provide additional constructs to explain the benefits of IT use. In the following section, we use AST and Markus and Silver (2008)'s concepts as a starting point. We extend and detail their concepts, and we also propose new sub-constructs for conceptualizing IT use. Figure 1 summarizes our research model and provides an overview of the assumed relationships. We claim that the structure provided by the IT system through the channels of functional affordances and symbolic expressions has a direct effect on IT use. The actual behaviour in turn is understood as a social process that comprises different types of IT uses.

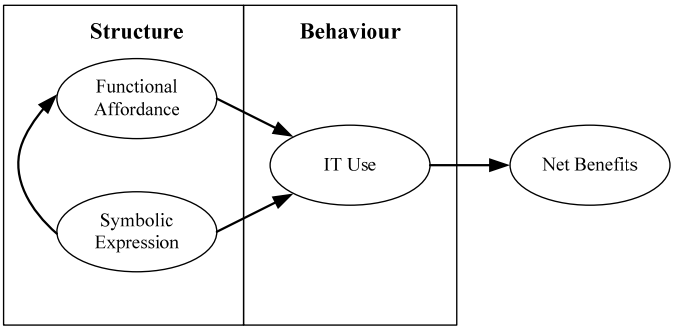

Figure 1. Relationships of Functional Affordance, Symbolic Expression and IT Use

3.1 Functional Affordance

The term "affordance" refers to actionable properties between any real-world object and an actor (Gibson 1977). Affordances are relations between objects and actors in special situations and can be described as cues and instructions that are offered by an object in order to provide opportunities for particular types of individual behaviour (Chemero 2003). Although every object has specific affordances, what researchers are dealing with are not the affordances themselves, but rather the combination of the perceived affordances and the behavioural constraints that are placed upon them, such as physical, logical and cultural constraints (Norman 1999). *Physical* constraints refer to technical possibilities of an object. For example, it is not possible to move the mouse cursor outside the screen. *Logical* constraints mean logical reasoning to determine alternatives, such as when a user is asked to click on five locations but only four are actually visible. Thus, the user knows that there must be another location. *Cultural* constrains can be understood as shared conventions by a cultural group. For example, the colour red can have different meanings in different cultures. Depending on the aforementioned constraints, the possibilities that technical objects afford for action may or may not be perceived by several individuals in differing ways, and may therefore elicit different kinds of behavioural outcomes. Above this, an object is not composed of different qualities; what individuals perceive is not the quality of an object but what the object offers to do ("what the object affords") (Gibson 1979).

In the IS context, *Functional affordances* comprise "the possibility for goal-oriented action afforded by technical objects from designers to a specified user group (potential use of an IT object)" (Markus and Silver 2008). They can be understood as potentially necessary (but not necessary and sufficient) conditions for appropriation moves (IT uses) and the consequences of IT use. Therefore, the functional affordances of an IT system refer to the potential uses one can make of a technical object. The concept of *functional affordance* provides a perspective that recognizes how features of certain technical objects favour, shape, invite or at the same time constrain a set of specific uses (Markus and Silver 2008).

3.2 Symbolic Expression

Similar to the concept of functional affordance, a *symbolic expression* is not a property of a technical object but a relational concept that connects technical objects and users. Symbolic expressions are "the communicative possibilities of technical objects for a specified user group" (Markus and Silver 2008). They are potentially necessary (but not necessary and sufficient) conditions for user interpretations of IT and the consequences resulting from those interpretations. For example, symbolic expressions include "messages" that help users interact with technical objects, or messages pertaining to designers' or users' goals and values. Symbolic expressions can also refer to expressions about functionality. Such expressions may be erroneous; functional and value-oriented symbolic expressions may be in conflict with each other. Moreover, a technical object may have many different symbolic expressions for a specified user group, just as it may have many functional affordances. Symbolic expressions are not to be confused with designer's intentions or user's perceptions. It is true that IT systems express "messages" and provide information intended by designers. However, they may also provide information that is not intended by designers and users may or may not perceive certain signs, symbols, or messages due to the fact that every user has a different background, expertise, or knowledge base. Referring to de Souza and Preece (2004), Markus and Silver (2008) mainly focus their definition of symbolic expression on the conveyance of values, even though the concept is not inherently limited to the domain of values. We argue that symbolic expressions are even more important when it comes to the conveyance of meaning. While meaning of a symbol does also promote some kind of values because the concept is inherently connected to values of a symbol, meaning is mostly considered as the interpretation of an underlying real-world phenomenon (or concept) that the symbol refers to by a user (Margolis and Laurence 2006). In general, IT systems can promote values such as freedom or equality on an aggregate level; however, the understanding of certain perceptual cues needs to be considered in more detail. For instance, concerning the example of Wikipedia, does the user understand what the meaning of the "edit button" is and how it has to be used?

What this discussion amounts to is that we propose to subdivide the concept of symbolic expression into two distinct new sub-concepts: *communication of values* and *communication of meaning*. The first concept, communication of values, can be understood as the general intentions and values that are provided by an IT system, whereas the latter sub-concept deals with the meaning of functionalities and symbols that are provided by an IT system. Defining the concept this way has the advantage of supporting potential analyses of the relationships between functional affordances and symbolic expressions. Ultimately, this conception also allows directly answering the question whether and how different user groups understand and "construct" the functionalities of IT systems (Bijker 2010). The two sub-concepts *communication of values* and *communication of meaning* help us to (a) sociologically deconstruct IT artefacts and (b) to explain the IT artefacts in terms of the structural features provided by IT systems for relevant user groups.

3.3 IT Use: The Behavioural Outcome

As has already been mentioned, IT use is a social process that considers the interaction between a user (or user group) and an IT system. Consequently, IT use involves more than the extent or time a user spent with an IT system. The perspective of AST provides a rich theoretical foundation that grasps different kinds of IT use behaviours as well as the quality of IT use through the concept of *appropriation moves* (DeSanctis and Poole 1994). Appropriations, the use of structure provided by the IT, are described as immediate visible actions that evidence deeper structuration processes and therefore instantiate structures. They are not automatically and completely determined by IT designs. Rather, people actively select how technology structures are used, and therefore use practices vary among different users.

DeSanctis and Poole (1994) identify three types of appropriation moves[1]: (a) direct *use of the structure*, (b) *relate the structure* to other structures and (c) *constraint or interpret the structures* as they are used (for more details see DeSanctis and Poole 1994). Direct use includes the direct interaction with the IT, whereas the relation of structure and the constraint of structure comprise the adaptation, reinterpretation and combination of structures provided by the IT. Thus, in contrast to already prevalent IT use measures, the definition of IT use from the perspective of AST subdivides the construct IT use in those three sub-constructs and therefore takes different alternatives of possible IT use behaviours into consideration. This is why we suggest that the consideration of different types of appropriation moves provides a much richer conception of IT use. IT use is a social process depending on different structural possibilities a technical object offers and how IT users understand and make sense of them in order to use them. Consequently, if IT use is inconsistent with a technical object's structural potential, the outcomes (net benefits; e.g. individual performance improvements) will be less predictable and generally less favourable (Poole and DeSanctis 2003). Figure 2 summarizes the revised research model as well as the reconceptualizations of symbolic expression and IT use. The symbolic expression and its sub-concepts have an impact on functional affordance and the structure provided by an IT system has an impact on IT use. We propose that the understanding of different types of technology use is fundamental to determine how IT leads to desirable outcomes.

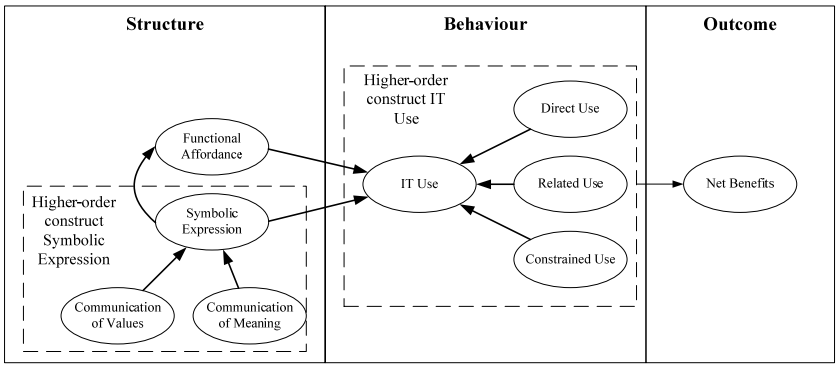

Figure 2. Revised Research Model (Structural Equation Model)

4 Instrument Development Process

The focus of this paper is on users of a computerized student IT system in place at a university. The IT system provides students with information about lectures, seminars, their current grades and offers the possibility to plan and administer the entire semester. The use of the IT system is only mandatory for the registration for exams, thus traditional channels to obtain information are available to users, albeit procedurally cumbersome. The students are already familiar with the IT system and use it for at least one year. Before our model can be tested in practice our constructs have to be operationalized for this domain. To ensure content validity of our measures, we followed the two-staged approach proposed by Burton-Jones and Straub (2006). We interviewed four students in order to find out about the most common functionalities and to understand the use of the IT system from the point of view of a student. Based on our research model, the theoretical deliberations and the interviews, we created candidate measures that tie together the constructs in our research model and that seemed suitable to reflect our underlying causal relationships. We operationalized the constructs as reflexive effect indicators (the latent variable – the construct – causes the indicator) because the primary goal of our research is to test a theory and only secondarily we want to give guidance for practice, for which the use of (formative)

[1] A fourth type of appropriation move, *make judgments about the structure*, has been removed, since this type in our conceptualization is attributed to the concept of symbolic expression.

cause indicators is better suited (Bollen and Lennox 1991). For assessing the validity of our instrument, we follow the procedure proposed by O'Leary-Kelly & Vokurka (1998). In order to counter the many corrupting elements embedded in measures (i. e., measurement error, informant bias), establishing construct validity involves the empirical assessment of the adequacy of a measure and requires that three essential components be established: unidimensionality, reliability and validity (O'Leary-Kelly and Vokurka 1998). To ensure these components, the development of our measurement instrument is carried out in three stages (Moore and Benbasat 1991). First of all, the new items for the defined constructs are created based on our theoretical deliberations. The second stage is concerned with the item development process and a pre-test assessment of the measures. The final stage, instrument testing and factor analysis, is not part of this paper but will be carried out in future.

Constructs	Items
Functional Affordance	The SIS provides a quick access to offered lectures.
	The SIS provides relevant information about seminars.
	The SIS provides information about seminars and lectures.
	The SIS provides information about lectures which are offered.
	The SIS supplies the possibility to create a timetable.
	The SIS provides a summary of my current grades.
	The SIS offers the possibility to create a transcript of my grades.
	The SIS offers the possibility to gather information about teaching staff.
	The SIS offers the possibility to register for exams.
	The SIS offers the possibility to regard registration deadlines.
	The SIS offers the possibility to plan my studies.
	The SIS offers the possibility to plan my semester.
Communication of Meaning	The graphical interface is comprehensible.
	I know the meaning of the link "management of exams".
	I understand the basic design of the SIS.
	I know the meaning of the link "my modules".
	I know how to create a timetable within the SIS
Communication of Values	With the help of the SIS, I have the feeling to organize my studies easily and quickly.
	With the help of the SIS, I have the feeling to be in control over my studies.
	With the help of the SIS, I have the feeling to be able to organize my timetable efficiently.
	With the help of the SIS, I have the feeling to be well informed in terms of my studies.
	The SIS is reliable.
	The SIS is credible.
	The SIS is complete.
	With the help of the SIS, I have the feeling to have organisational control over my studies.
	The SIS is up-to-date.
Direct Use	How often do you use the SIS?
	How long do you use the SIS after each log-in?
	I use all of the functions that are offered.
	I use the schedule of seminars regularly.
	I use the SIS especially at the beginning of each semester.
	I only use a part of the functions.
Related Use	Apart from SIS I use other IT systems or applications (like MS Word or Excel)to plan my studies.
	I export my lectures to my Outlook calendar.
	Apart from SIS I use other IT systems or applications (like MS Word or Excel) to create a timetable.
Constrained Use	I use the SIS for tasks for which it was not intended initially.
	I use the SIS for tasks which exceed the ordinary utilisation.

Table 1. List of Items by Construct

Concerning functional affordances, we tried to create items that capture the most important functionalities that are being offered by the IT system, such as the planning of classes, the registration for courses and so forth. Apart from the information obtained from the interviews, we referred to the functional constrains to create suitable items. The concept of symbolic expression was operationalized with the help of the two sub-constructs communication of values and communication of meaning. Items for the first sub-construct include statements that grasp the overall values of the IT system, for example, if the IT system conveys the feeling of control, reliability or authenticity. The concept of communication of meaning reflects the extent to which users understand the symbols, functions and information provided by the IT system. Here we ask, for example, if users in general understand the functions and information afforded by the IT system. IT use was conceptualized using the three

different appropriation moves. In addition to already established items such as the duration and extent of IT use, we also asked, for example, if some functionalities are neglected or if some information are combined with additional information from other IT systems (Table 1).

In order to guarantee construct validity and to identify ambiguous and poorly worded items, we asked 40 students to sort the items to the aforementioned separate categories. We conducted two sorting rounds using an Excel spreadsheet in which the students could label each item with one of the aforementioned constructs. In order to predict the performance of measures after every sorting round, we applied a substantive validity test to the items of interest. The substantive validity of a measure can be defined as the extent to which the measure is judged to be theoretically linked to a construct under study (Anderson and Gerbing 1991). The index P_{sa}, which calculates the proportion of substantive agreement, indicates the extent to which an item reflects its intended construct. However, it does not indicate the extent to which an item might also reflect other items. Therefore, we apply a second measure: the substantive-validity coefficient, C_{sv}. It represents to what extent respondents assign an item to its posited construct more than to any other construct. For both indices larger values indicate greater substantial validity. A recommended threshold for the C_{sv} index is 0.5 (for computation of validities see Anderson and Gerbing 1991). In the first sorting round we asked the students to complete the sorting task with the 37 items and computed the substantive validities. As illustrated in Table 2 four of the six constructs achieved an aggregated C_{sv} of above 0.5. Only the functional affordance and the communication of meaning constructs fall below this threshold. These low values most certainly originated from poor wording. Therefore, we re-worded 10 items and created an additional new one. Overall, our measurement scale was now composed of 38 items. We conducted a second sorting round in order to test the new items (Table 2). Now, the C_{sv} scores fall above the threshold of 0.5 for all constructs. However, it must be noted that the C_{sv} score for the sub-construct *related use* decreased between round 1 and round 2 by 0.33. An item a priori assigned to related use was now considered by respondents to be representative of direct IT use. Since the score is still above 0.5 we did not reject the item. The second sorting-round indicates that the item reassignment has improved the overall substantive validity of the measurement scale (total C_{sv} scores rose to 0.83 in the second round; P_{sa} scores rose from 0.825 to 0.92).

	First Sorting Round			**Second Sorting Round**		
(Sub-)Constructs	**Items**	**P_{sa}**	**C_{sv}**	**Items**	**P_{sa}**	**C_{sv}**
Functional Affordance	12	0.70	0.40	12	0.82	0.64
Communication of Meaning	5	0.67	0.34	6	1	1
Communication of Values	9	0.79	0.57	9	0.96	0.93
Direct Use	6	0.96	0.92	6	1	1
Related Use	3	0.95	0.89	3	0.78	0.56
Constrained Use	2	0.88	0.75	2	0.92	0.84
Totals/Averages	37	0.825	0.645	38	0.92	0.83

Table 2. Substantive Validity Pre-tests

5 Discussion

In our research, we directly consider the relation between an IT system and IT use through the concepts of functional affordance, communication of value and communication of meaning. Our theoretical foundation serves as a cornerstone that will guide our research on IT use. Therefore we contribute to the understanding of why and how certain IT aspects affect the use of IT. Particularly quantitative studies in the context of post-adoptive IT behaviours can only benefit from a solid theoretical derivation of measurement scales. Many empirical studies undertake the first step in

construct validation and choose empirical indicators that are thought to measure their constructs; however, many researchers then move directly to hypothesis testing without ever assessing construct validity. This can seriously jeopardize the conclusions drawn in a study. In order to counter these elements, we carefully developed our items. In order to finally determine construct validity, the next stage in this research is to conduct a pilot test of the scales inventory developed with a small convenient sample of students. The objective is to ensure that the scale development has been adequate and to obtain further indications for scale reliability and validity. This test will include also candidates that, forthcoming from the scale development procedures, may be candidates for elimination (e. g., related use). This is done to validate and test the initial findings obtained from scale development. The pilot test will result in a first formal reliability assessment. Forthcoming from the revisions stemming from the pilot test will be the final field test that will finally reveal the validity and reliability of the developed scales. We will perform the final test by means of a survey among users of the student IT system. Furthermore, not only will our new measurement instrument be applied in this study; we propose to combine it with a measurement instrument for the IS Success Model (Iivari 2005). We suggest doing this for two different reasons: firstly, we would like to confront our model with the already established IS Success Model. The main question that we seek to answer is if our conceptualization of IT use can contribute to the understanding of beneficial effects of IT use and therefore generate new insights into the human-system interaction. Secondly, we expect some possibilities to advance and adapt the IS Success Model with our research model in order to account for a more sophisticated model for the success of IS. Until now, it is still unclear how the concepts of "system quality" and "information quality" (from the original IS Success Model) relate to functional affordances and symbolic expressions. It is possible that both quality-related constructs are affected by functional affordances and symbolic expressions provided by IT.

Regarding limitations, our scales inventory development is not yet complete. Without testing of the overall questionnaire we could only obtain initial indications of reliability and validity. However, we followed the guideline of carefully documenting and reporting on every step in a research project. A second noted limitation is related to the fact that measurement instruments for functional affordances and symbolic expressions have to be developed each time anew for a specific IT system and user group under investigation. But this is not a mere inconvenience, it is testament to the relations of the real world as described in AST and Markus and Silver (2008)'s conceptualization. Researchers working in this area thus have to carefully observe what factors they consider in addition to the ones discussed here. Summing up, in this paper we clarified why the IT use construct as a main driver and factor that contributes to the success of IS was poorly operationalized in past research and why, consequently, there is a need for a theoretical grounding of IT use. By applying a structurational perspective, we developed a research model that advances the IT use construct and sub-divides it into three sub-constructs: direct use, related use and constrained use. This new conceptualization has the advantage that IT use is not only considered as the amount or extent a user spent with the IT. Rather, the types of IT use as well as the user behaviour are the centre of focus. So far, we established the theoretical grounding for our research and we thoroughly developed our measurement scale for our constructs. The test of substantive validity indicates that the items in the measurement instrument reflect well the underlying constructs, we believe it critical to apply a rigorous analysis to the development of this scale. Structural equation modelling allows us to do this by testing a confirmatory factor analysis (O'Leary-Kelly and Vokurka 1998).

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