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Enterprise System Implementation and the Linguistic Shaping of Organizational Knowledge

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Abstract

This contribution reports on the development of a theoretical framework as a foundation for the understanding of the influence of enterprise system implementation on organizational knowledge and learning. Our conceptualization of enterprise systems as symbolic systems gives rise to the study of enterprise system implementation in terms of semiotic and linguistic categories. While drawing on the concept of "model power," on the notion of "programming as theory development," and on the weak interpretation of the Sapir-Whorf hypothesis, we are able to show how enterprise system implementations influence organizational knowledge and organizational learning via linguistic processes.

Keywords: enterprise system, linguistic engineering, organizational knowledge

1. Introduction

Enterprise system packages have become the de facto standard for providing comprehensive and integrated business information systems for organizations, be them public, private, or, non-profit. As DAVENPORT (1998) states: "Enterprise systems appear to be a dream come true. These commercial software packages promise the seamless integration of all the information flowing through a company—financial and accounting information, human resource information, supply chain information, customer information." Yet the influences of the implementation and subsequent use of enterprise systems on processes of constitution and change of organizational knowledge in the respective organizations has so far not received much attention in the academic literature.

The relationship between technology and organization has long—if not always—been an issue in organization and management studies. Most prominently are approaches that are inspired by organizational contingency theory (e.g., Lawrence and Lorsch, 1967; Chandler, 1992), consequently claiming a causal relationship between features of the technology and features of the respective organization. Such approaches find their expression in, for example, critical success factor models of information system implementation, where the variable "success" is dependent on both technological and organizational variables (e.g., DeLone and McLean, 1992; Gable et al., 2003), and in the concept of alignment, based on the assumption that the economic success of an organization depends on the alignment between business strategy and IT strategy as well as between organizational structure and IT structure respectively (e.g., Henderson and Venkatraman, 1993; Luftman et al., 1993).

The understanding of the relationship between (information) technology and organizations in terms of law-like contingencies has been criticized ever since. On the one hand, there are approaches that claim that neither (information) technology nor organizations should be conceptualized as distinctive and objectively given phenomena. Rather they claim that both organizations and (information) technology can only be understood as results of processes of

social construction (e.g., Bijker et al., 1987). On the other hand, there are approaches that claim that both organizations and (information) technology can be considered as given, but that the relationship between those two cannot be conceptualized by means of causal relationships, but must be understood as results of ongoing social practices that eventually determine the relevant features of organizations and (information) technology as well as the relationship between them. Hence the study of social practices must precede any study of the relationship between (information) technology and organizations (e.g., Suchman, 1987).

Since none of the above listed approaches can account for the influences of the implementation and subsequent use of an enterprise system on the constitution and change of organizational knowledge in the respective organization (hence, on organizational learning), we recognize a strong need for the development of alternative conceptualizations of the relationship between information technology and organizations.

Drawing on concepts such as "model power" (Bråten, 1973; 1983; 1988), "programming as theory development" (Naur, 1985), "linguistic engineering" (e.g., Klemperer, 1947; Orwell, 1946; 1949; Ji, 2004) as well as "linguistic relativity" (e.g., Sapir, 1949; Whorf, 1956), we propose a framework that—while focusing on the constitutive role of language for the development of (organizational) knowledge—eventually allows a theoretically sound conceptualization of the influence of enterprise system implementation and use on processes of organizational learning.

We explicitly demarcate our conceptual development from approaches that seek to understand the "impact of enterprise systems on organizational knowledge" in terms of a functionalist knowledge management perspective (e.g., Baskerville et al., 2000) as well as from approaches that analyze discourses that accompany the selection and implementation of enterprise systems (e.g., Alvares, 2000; Oliver and Romm, 2003).

The goal of this paper is not to present a full-fledged theory, but to propose a theoretical framework that could serve as a starting point for further elaboration of the linguistic shaping of organizational knowledge through the implementation of information technology in general, and of enterprise systems in particular.

The remainder of the paper is structured as follows: First, we introduce a number of concepts that inspired our conceptual development and serve as the foundation of our approach. Second, we outline a conceptual framework that allows the theoretically sound conceptualization of the influence of implementation and use of information technology on organizational learning via linguistic and semiotic processes. Third, we apply the framework on the conceptualization of the relationship between enterprise systems implementation and organizational learning. Fourth, we conclude with a summary and an outlook on further research.

2. Fundamental Concepts and Theories
The conceptual framework for construing the interrelation between organizational learning, organizational knowledge and enterprise systems assembles a range of concepts and theories. It seems to be appropriate of summarizing them at the outset, since we are aware that others might attach different connotations to the words we are using.

2.1. Symbolism

The notion "symbolism" refers—in its most general sense—to the understanding of experiencing world through and by means of symbols. An early account of symbolism can be seen in CASSIRER's "Philosophy of Symbolic Forms" (1953–1957) and "An Essay on Man" (1944), in which he develops a comprehensive anthropology by conceptualizing men as "animal symbolicum"—a conceptualization that has major epistemological and methodological consequences. Related lines of thought can be found in VYGOTSKY's (1978; 1986) work on the development of cognitive abilities in young children, in UEXKÜLL's (1934) work on cognition in animals, and in BLUMER's (1969) concept of "symbolic interactionism."

The main tenet of symbolism rests with its fundamental assumption that we do not perceive and act towards some objectively given world, but only to the meanings certain 'things' have for us. Thus, the 'things' we perceive and act towards are of symbolic nature and, consequently, they are open to various interpretations. "The contention that people act on the basis of the meaning of their objects has profound methodological implications. It signifies | immediately that if the scholar wishes to understand the action of people it is necessary for him to see their objects as they see them. Failure to see their objects as they see them, of a substitution of his meanings of the objects for their meanings, is the gravest kind of error that the social scientist can commit. It leads to the setting up of a fictitious world. Simply put, people act toward things on the basis of the meaning that these things have for them, not on the basis of the meaning that these things have for the outside scholar" (Blumer, 1969, pp. 50–51).

The meanings we may identify should be conceptualized by reference to certain "symbolic forms," i.e., forms of knowledge, such as scientific, mythical, or narrative (Cassirer, 1953–1957). Such a reference is essential if we want to understand the processes that have contributed to the emergence of the meanings we identify. Since symbolism refrains from solipsistic, i.e., radical individualistic interpretations of meaning creation, such processes necessarily involve social, i.e., symbolic interaction. Hence, when aiming at studying the meanings certain 'things' have for certain people, we have to study the symbolic processes that led to the constitution of the respective meanings. It is without doubt that language is the most significant means for symbolic (inter)action.

Conclusively, if we adopt the epistemological and methodological position of symbolism and aim at an understanding the consequences of the implementation and use of enterprise systems for processes of organizational learning, we have to study the symbolic interactions in organizations that eventually lead to the constitution of enterprise systems. Such a study necessarily involves the study of symbolic interactions between various actors involved in the implementation and use of enterprise systems, such as users, consultants, and management.

Adopting symbolism as the foundational framework for the study of the relationship between organizations and technology is well-supported by a large body of literature in organization studies, where "organizational symbolism" is a major field of inquiry (e.g., Daft and Wiginton, 1979; Pondy et al., 1983; Jones, 1996). Yet the notion of symbolism has to be clearly demarcated from the language–action approach (e.g., Goldkuhl and Lyytinen, 1982), since this approach takes a rather functionalist stance towards language and does not share the interpretive perspective taken by symbolism.

Whereas symbolism provides a foundation that addresses the symbolic nature of human cognition and knowledge, linguistic relativism addresses the specific linguistic influences on the constitution of knowledge.

2.2. Linguistic Relativism

The notion of linguistic relativism can be traced back to comparative language studies by WILHELM VON HUMBOLDT (1836). After comparing the structure of different languages he concluded that the structure of a language ultimately determines the structure of reality of the respective language community. This idea was amended and further developed by SAPIR (1949) and WHORF (1956), whose work eventually led to the so-called "Sapir-Whorf hypothesis." The essence of this hypothesis finds its expression in following two quotes:

"Human beings do not live in the objective world alone, nor alone in the world of social activity as ordinarily understood, but are very much at the mercy of the particular language which has become the medium of expression for their society. It is quite an illusion to imagine that one adjusts to reality essentially without the use of language and that language is merely an incidental means of solving specific problems of communication and reflection. The fact of the matter is that the 'real world' is to a large extent unconsciously built up on the language habits of the group" (Sapir, 1949, p. 162).

"We dissect nature along lines laid down by our native languages. The categories and types that we isolate from the world of phenomena we do not find there because they stare every observer in the face; on the contrary, the world is presented in a kaleidoscopic flux of impressions which has to be organized by our minds—and this means largely by the linguistic systems in our minds. We cut nature up, organize it into concepts, and ascribe significances as we do, largely because we are parties to an agreement to organize it this way—an agreement that holds throughout our speech community and is codified in the patterns of our language. […] We are thus introduced to a new principle of relativity, which holds that all observers are not led by the same physical evidence to the same picture of the universe, unless their linguistic backgrounds are similar, or can in some way be calibrated" (Whorf, 1956, pp. 213–214).

Yet the hypothesis of linguistic relativism is open to two rather different interpretations, commonly known as the "weak" and the "strong" interpretation. The strong interpretation claims that the language native to some community has a deterministic consequence of the structuring of reality—quite similar to the claim made by HUMBOLDT (1836). This interpretation is questionable, since it would exclude meaningful translations between different languages, or, different linguistic systems. The most prominent critic of the strong interpretation is CHOMSKY, whose concept of generative grammar rests on the assumption that humans have an innate linguistic system (deep structure) that provides the common root of the grammar of each natural language (surface structure) (e.g., Chomsky, 1957). The weak interpretation does not assume a "linguistic determinism," rather it claims that language—not as an abstract system but as practice—influences our structuring of reality. But this structuring is not at the mercy of the grammar of a language, rather it is due to certain discourses, or "language games" (Wittgenstein, 1953). For example, if we adopt the language game of systems, then the rules of the game do not allow certain moves, meaning certain propositions are not allowed within this language game, e.g., propositions using a terminology not being part of the game. Hence, the rules of language games frame the generation of propositions, thus influencing the constitution or change of knowledge. The intentional creation or modification of language games became known as linguistic engineering.

2.3. Linguistic Engineering

The notion of "linguistic engineering" refers to the conscious shaping of a language, be it in the form of the development of an artificial 'natural' language such as Esperanto, the development of a formal language such as a programming language, or the change of a natural language, e.g., through totalitarian political systems, or through the development of professional languages.

The intentional change of natural languages has probably been an issue ever since the inception of rhetoric. With the recognition that a certain language use has a strong impact on what people understand and think upon hearing or reading propositions, the avenue was open to the conscious change of language. In the 20th century, totalitarian political systems perfected "linguistic engineering." Several authors have addressed the intentional politically motivated change of language. The most prominent depiction of linguistic engineering is certainly ORWELL's "Nineteen-Eighty-Four" (1949), describing—inspired by the totalitarian systems of the Soviet Union and the Third Reich—a dystopia, in which the government aims at controlling people's thought by means of linguistic engineering. A detailed and very personal account of linguistic engineering is given in KLEMPERER's "LTI—Lingua Tertii Imperii—The language of the Third Reich" (1947). This book is based on the diary of KLEMPERER, a Jewish philologist who survived the Third Reich as a factory laborer—while meticulously documenting the linguistic engineering performed by the Nazi government and related organizations. A most recent publication by JI (2004) reports on linguistic engineering in communist China after 1949. In order to provide the reader with an authentic description of the tenet and major consequences of linguistic engineering, we quote from the Appendix of ORWELL's "Nineteen-Eighty-Four" (1949):

"NEWSPEAK was the official language of Oceania and had been devised to meet the ideological needs of Ingsoc, or English Socialism. In the year 1984 there was not as yet anyone who used Newspeak as his sole means of communication, either in speech or writing. The leading articles in the Times were written in it, but this was a tour de force which could only be carried out by a specialist. It was expected that Newspeak would have finally superseded Oldspeak (or Standard English, as we should call it) by about the year 2050. […] The purpose of Newspeak was not only to provide a medium of expression for the world-view and mental habits proper to the devotees of Ingsoc, but to make all other modes of thought impossible. It was intended that when Newspeak had been adopted once and for all and Oldspeak forgotten, a heretical thought—that is, a thought diverging from the principles of Ingsoc—should be literally unthinkable, at least so far as thought is dependent on words. Its vocabulary was so constructed as to give exact and often very subtle expression to every meaning that a Party member could properly wish to express, while excluding all other meanings and also the possibility of arriving at them by indirect methods. This was done partly by the invention of new words, but chiefly by eliminating undesirable words and by stripping such words as remained of unorthodox meanings, and so far as possible of all secondary meanings whatever. To give a single example. The word *free* still existed in Newspeak, but it could only be used in such statements as 'This dog is free from lice' or 'This field is free from weeds'. It could not be used in its old sense of 'politically free' or 'intellectually free' since political and intellectual freedom no longer existed even as concepts, and were therefore of necessity nameless. […] A person growing up with Newspeak as his sole language would no more know that *equal* had once had the secondary meaning of 'politically equal', or that *free* had once meant 'intellectually free', than for instance, a person who had never heard of chess would be aware of the secondary meanings

attaching to *queen* and *rook*. There would be many crimes and errors which it would be beyond his power to commit, simply because they were nameless and therefore unimaginable."

2.4. Model Power and Model Monopoly

The concept of model power was conceived by BRÅTEN (1973) when he studied communications that, according to the traditional understanding, should lead to a "democratization in societal and organizational contexts." Yet he realized that communication not necessarily has the effect the traditional understanding of communication would claim. On the contrary, BRÅTEN's findings suggest that under certain conditions—that can be found frequently in societal and organizational contexts—communication has the adverse effect of actually hindering democratization. In order to explain his findings, he developed the concept of "model power," which describes how a "model monopoly" of a participant in a communication process undermines the very goal of the communication process.

The concept of model power is based on the cybernetic notion of a cognitive system. In order to be able to process information, a cognitive system needs to command over a model, which not only allows the cognitive system to make sense of the information received from the outside world, but also provides the cognitive system with the means to simulate and to anticipate future developments in its environment. Model power evolves if a cognitive system interacts with another cognitive system. For example, if one cognitive system has a more comprehensive model of the environment than the other cognitive system, open communication between the two cognitive systems will contribute to the further development of the models of both cognitive systems, but of the already more comprehensive model at a faster rate. Thus, the model power of the model-strong cognitive system over the model-weak cognitive system will increase during open communication. This is due to the fact that the simulation of the environment includes the simulation of the other cognitive system. With a more comprehensive model of the other cognitive system, the model-strong cognitive system is able to anticipate the behaviour of the model-weak cognitive system and can thus intentionally behave in a way that will further increase its power. Thus, the model-strong cognitive system can manipulate the other, i.e., the model-weak cognitive system.

In order to be able to break the model monopoly of the model-strong cognitive system, the model-weak cognitive system has to recognize the manipulative communicative action of the model-strong cognitive system; it must question the validity of the information received from the model-strong cognitive system. "A model monopoly is generated by those submitting to it, attributing to the original source the exclusive access to eternal truths. Through this act of submittance they lend symbolic power to the source, acknowledging it as the final authority with the one valid replies to questions about the domain, and in this process, passivating any rival perspective" (Bråten, 1988, p. 207). With other words: "To attribute to someone, who could be oneself, the privileged access to reality, and acknowledge the power to yield the one set of valid replies to questions about a given domain, is to deny the relevance of any complementary perspective" (Bråten, 1988, p. 211).

2.5. Programming as Theory Building

The "theory building view" of programming was conceived by NAUR (1985), when contemplating on the nature of computer programming (software development) and the role of programmers' knowledge that transcendents what is documented by the programs and the respective documentations eventually created. His theorizing is driven by a critique of a rather narrow view on the activity of software development, yielding an understanding of

programming as an activity that is concerned with the "production of a program and certain other texts" (Naur, 1985, p. 253).

NAUR based his theorizing on observations that cannot be accommodated by the narrow view on programming depicted above. Such observation can be made especially if unexpected situations arise, such as erroneous program executions, or if modifications of a program are required. In such situations it becomes evident that programming is not just about producing programs and documentations thereof. In his theorizing, NAUR draws on the notion of "theory" as conceived by RYLE (1963): "[A] person who has or possesses a theory in this sense knows how to do certain things and in addition can support the actual doing with explanations, justifications, and answers to queries, about the activity of concern" (Naur, 1985, p. 255). Programmers need to develop theories in order to be able to understand how a certain program will support a certain environment. Thus, programming requires not only a knowledge about computers, programming languages, and the like, but also about the context in which the program developed will eventually be put in use. It is the latter knowledge that is not considered by the traditional, narrow view on programming.

In short, a programmer having a theory about the environment in which the program will be put or already is in use is able to (1) "explain how the solution relates to the affairs of the world that it helps to handle," (2) "explain why each part of the program is what it is, in other words is able to support the actual program text with a justification of some sort," and (3) "respond constructively to any demand for a modification of the program so as to support the affairs of the world in a new manner" (Naur, 1985, p. 256).

NAUR illustrates the merits of the theory building view by reference to the "life" of a program. He argues that a program "dies" if its programmer team, holding its theory, dissolves. A "[r]evival of a program is the rebuilding of its theory by a new programmer team." NAUR emphasizes that such a revival is fraught with difficulties since it is unlikely that a different team will be able to develop a theory identical to the one held by the team that originally 'wrote' the program (Naur, 1985, p. 258).

Having outlined the inspirational sources and fundamental concepts and theories of our approach, we present our basic theoretical framework in the following—while drawing on the aforementioned concepts and theories.

3. Basic Theoretical Framework

Understanding the influences of the implementation and use of information and communication technology on organizational knowledge and organizational learning requires a conceptualization of the interaction between organizations and information and communication technology. Such a conceptualization must be based on conceptualizations of (information) technology, organizations, knowledge, and learning that allow the theoretical sound integration of the respective concepts. In order to arrive at such a conceptualization, we draw on symbolism—an epistemological theory with far-reaching methodological consequences.

Symbolism helps to overcome the traditional view of information and communication technology as being means for information processing. This view is based necessarily on a subject–object dichotomy that renders both organizations (and members thereof) and technology as distinct empirical phenomena. According to the information processing view, technology consists of neutral artefacts that have no immediate influence on organizational knowledge and organizational learning. Understood as tool, information and communication

technology may support communication processes in terms of storing, processing and distributing information but does not immediately impact organizational knowledge and learning.

By conceptualizing the interaction between humans and their environment as being symbolic in nature, it is possible to conceptualize information technology as being constituted by symbolic processes. Combined with our presupposition of the language-based constitution of knowledge, it becomes possible to link technology and knowledge via language-based symbolic interaction.

Symbolic interactions by means of language are the prerequisite for the constitution and dissemination of knowledge within a community. The notion of weak linguistic relativism implicates that the processes of knowledge constitution and dissemination are influenced by the language used. The implementation and use of new (with respect to the organization) pre-fabricated information technology such as enterprise systems necessarily introduces a new language that needs to be accommodated by the respective language community. Hence, discourses within the community will change, otherwise it will not be able to accommodate and use the technology.

Yet the change of the discourses is not immediate. It is quite common that consultants serve as mediators between the new information technology and implementing organizations.[1] Consultants are familiar with the technology, not only knowing its functional features but also the underlying theories and the models that are embedded in the technology. Supporting the implementation and adaptation of the technology, consultants have to find ways to bridge the gap between the knowledge that is available in the organization and the knowledge that is required in order to successfully use the technology to be implemented. Hence, consultants have to engage in symbolic interactions with the organization. Such interactions are initially prone to substantial misunderstandings, since the professional language used by the consultants is most likely not identical to the professional language used in the organization. Members of the organization attribute meanings to the utterances of the consultants, which were an outcome of the history of symbolic interactions, hence of discourses within the organization. The same is true in the opposite direction. In order to overcome this language barrier, the discourse of the consultants and the discourse of the organization have to converge eventually. As with the "language of accounting" (e.g., Riahi-Belkaoui, 1995), the language of consultants is not a natural product but the result of linguistic engineering—aimed at supporting the selling of a product.

The 'inter-discourse' communication can be conceptualized in terms of the concept of model power. It is quite obvious that the consultants have the stronger model with respect to the technology to be implemented. Hence, during the 'inter-discourse' communication the members of the implementing organization are confronted with a model monopoly. Critical questioning the claims made by the consultants is hardly of any use, since the consultants have been hired by the management and thus can be sure of a management supporting their model power. Thus, the members of the organization are not in a position to propose

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[1] It is not necessary to refer to consultants in this context. The mediation can take different forms, such as discourses within the implementing organization, or even the form of a monologue, in which a person consciously develops an explanation for new experiences. In the latter case, the concept of model power refers to the relation between an old model of past experiences and a new model that is being developed in order to accommodate new experiences that cannot be accommodated by the old model. Both models are being held at the same time, yet only one (successful) model will remain.

alternative models, rather they have to accept the claims made by the consultants at face value. Yet even such an acceptance, if to be genuine, requires an understanding of the model 'possessed' by the knowledgeable consultants. Through continuous symbolic interaction the members of the implementing organization become familiar with the language game 'played' by the consultants. In order to gain this familiarity the members of the organization have to develop a theory that allows them to make sense of the models presented by the consultants. They have to reconstruct the theory that has ultimately guided the development of the respective technology. Thereby, it is not very likely that this theory will be identical to the theory of the developers of the technology—leaving some room for accommodating traditional values and conceptualizations from the organization in the reconstructed theory; leaving also some room for conceptualizations that are not compatible with the technology.

Having outlined our theoretical framework in this section, we provide an illustration of the application of the framework on enterprise system implementations in the following section.

4. The Shaping of Organizational Knowledge through Enterprise Systems

Enterprise systems are supposed to provide management with integrated and comprehensive view on the respective organization, and 'simple' users with a view on a relevant part thereof. As such, enterprise systems can be considered as "representational technology," meaning a technology that provides representations of certain states of affairs. Hence, implementing enterprise information systems in organizations is an imposition of a certain representation of the enterprise on the enterprise: "ERP systems in particular promote a very specific vision of what an organization is" (Kallinikos, 2004, p. 14). Since representation is inherently symbolic in nature, they can only be created through symbolic processes—rendering enterprise systems as products of those processes. Such symbolic processes consist of a "reading" and "interpretation" of the text (in a very general sense, including all possible modes of presentation) provided by an enterprise system. Thus, the implementation of an enterprise system can be conceptualized as the introduction of a new text, or, as an initiation of a new discourse about an organization. The new text is characterized by its language that can be considered as a special professional language—a language engineered in order to provide management with the means to control the organization.

Traditional information systems development is guided by the dictum that the system to be developed has to conform to the organization that will eventually implement the system. With the advent of commercial off-the-shelf software packages, this dictum lost its validity. Even if commercial off-the-shelf software packages such as enterprise systems are configurable to a certain extent, they are not indefinitely malleable. Additionally, enterprise systems supposedly represent "best practices," meaning that the texts provided by the system describe they way the organization should ideally look like and should ideally behave. "Indeed, it may be conjectured that the rituals surrounding the implementation of an ERP package […] are, by and large, oriented towards transcribing the reality of particular organizations into the language of the package rather than the other way around" (Kallinikos, 2004, p. 20). "Current wisdom suggests that companies should design their 'to be' processes with the target package in mind […]; in other words, the business should be matched to the software rather than vice versa" (Brown et al., 2000, p. 1030). Current conditions of the implementation of configurational technology (e.g., Fleck, 1993; 1994) such as enterprise systems are also characterized by the imperative of avoiding expensive customizations—amplifying the model power attributed—by means of the imperative—to enterprise systems. Members of the organization are not in the position to challenge the models embedded in those systems—the enterprise system holds a model monopoly.

The transcription of the organization in terms of the enterprise system to be implemented invokes the concept of linguistic engineering. Transcribing an organization in terms of a new enterprise system is not just matching the vocabulary of one language onto another language. The language of an organization is comprised of a large number of discourses that derive their meaning from a history of symbolic interactions. And the discourse imposed on the organization by the implementation of an enterprise system is not connected to the history of those symbolic interactions. In short, the new enterprise system discourse is initially rather meaningless to the organization—the new discourse is a language game that is initially not understood by the members of the organization.

Bridging the gap between old organizational discourses and the new enterprise system discourse is a matter of education. The members of the organization need to learn how to relate the text of the enterprise system that supposedly is a representation of their organization to their organization. They have to turn a "presentation" of yet unknown meaning into a viable "representation" of their organization. With the presentation given, members or the organization are confronted with models of their organization, but they are not able to connect these models with their organizational reality. The new models do not make sense. Since the models are embedded in the enterprise system and are not subject to modification, the only way to cope with the indeterminacy is to change the theory that is being used to interpret the given models. The members of the organization have to reconstruct the theories that have guided the development of the models. And if the new theories are being developed and explicated through symbolic interaction within the organization (or between the organization and, e.g., consultants), discourses change as well.

5. Conclusions

Claiming that information and communication technology is not neutral with respect to organizational knowledge and learning, we have developed a theoretical framework that allows the conceptualization of the influences of the implementation and use of information technology on organizational knowledge and learning. The application of the framework on the implementation and use of enterprise systems illustrates the conceptualization of the influence of such systems on organizational knowledge and learning via language-based symbolic processes.

The language of an enterprise system introduces a new discourse into an organization, thereby changing extant discourses and eventually extant knowledge about the organization. The conceptualization of the process of linguistic shaping of organizational knowledge is supported by the concepts of "model power," "linguistic relativism," "linguistic engineering," and "programming as theory development," emphasizing the role that symbolic processes play during implementation of enterprise systems. The insights from our study suggest that enterprise systems implementations are far more complex than it has been so far acknowledged in the literature.

We are currently working on a further refinement of the concepts we draw on, and on a more detailed elaboration of the relationship between those concepts. We expect that these efforts will contribute to the improvement of the analytical power of the framework, helping us to gain deeper insights into the role language plays in the shaping of organizational knowledge through the implementation of enterprise systems. A most challenging application of the framework will be given in the comparative study of multi-site and trans-cultural enterprise system implementations.

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