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On Ethical Dilemmas of an Information Systems Scientist as a Researcher or as a Referee

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On Ethical Dilemmas of an Information Systems Scientist as a Researcher or as a Referee

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ABSTRACT

We scientists prefer the high quality of the published papers and we like to reduce the number of revisions required before a manuscript gets published. Most relevant problems in information systems often require knowledge in reference sciences, too. Those needs above increase competence requirements for authors and referees, and may at the same time create ethical dilemmas. Do we only follow practices, directions and rules of the information systems science or should more carefully consider practices, directions and rules in reference sciences, too. The latter is supported when we in this paper evaluate and criticize the three articles published in the highly ranked journals. Potential explanations for weaknesses recognized are also given.

Keywords: Experiential learning, Social cognitive theory, Organizational change, Competency, Correctness

1. INTRODUCTION

We expect that the scientific knowledge differs from other knowledge in such a way the scientific knowledge is understood as justified true belief, but reasons behind other knowledge are unknown or it has no reason. We scientists have therefore a great responsibility for truthfulness of our knowledge published in journals. To increase quality of articles in the journal, referee are used to pre-evaluate submitted papers. Concerning the submission referees recommend either its acceptance or rejection. A senior editor often follows recommendations of referees. To this end, referees are also responsible for quality of the published articles. If we can improve our articles, we can better support practitioners, who are applying our results to problems encountered in practice. If we both as scientists and as referees do our job better and our results are better, we are approaching our ideal goals. This means that improving both the research process and its results will have positive practical and scientific consequences.

Guideline "publish or perish" encourages us to publish the results of our studies as soon as possible, in other words, we do not have time to reflect our own work. A researcher can then have many ethical dilemmas (cf. Gattiker and Kelley, 1999). First, a researcher can think whether she has time to check her premises and theoretical background or to trust her tentative view based on preliminary or second-hand information. Secondly, when a researcher has earlier performed a minor departure from the general rule accepted in the scientific community and this has taken place without any criticism from the scientific community, e.g. from referees, she may continue in the similar line. Third, a researcher is so enthusiastic over her new discovery on a certain relationship that she forgets to write the reasoning path where she step by step shows the relationship.

Science has an intersubjective nature. It also itself corrects its results. I am in this paper following that principle. I think that I have found some deficiencies in some papers, and I shall show what the deficiencies are. I also try give some normative rules how to avoid the similar deficiencies in the future.

My collection contains three articles (Simon et al. 1996, Compeau et al. 1999, Dos Santos and Sussman 2000). When the authors of those articles do not have chance to immediately respond, I think that it is fair that I give a floor for them by copying the abstract they have included into their article. Thereafter I shall present the authors' presentations (problematic view(s)) where I have found deficiencies and problems. Finally, I shall discuss potential conclusions and propose normative recommendations how to get away in the future.

2. ARTICLES

Simon S.J., V. Grover, J.T. Teng and K. Whitcomb (1996), The relationship of information system training methods and cognitive ability to end-user satisfaction, comprehension, and skill transfer: A longitudinal study, Information Systems Research 7, No 4, 466-490.

Abstract

This study compares traditional and nontraditional training techniques with regard to computer related training. Its purpose was to determine which training methods could best be utilized in computer related training to maximize a trainee's retention of material and transfer of learning. A field experiment was conducted using two hundred members of active duty U.S. Naval Construction Battalion as subjects. Evaluation of trainees included a pre-training screening, post-training evaluation (immediately after training), and follow-up session (four weeks after the post-training session) utilizing previously validated instruments. Training treatments included instruction (lecture), exploration (independent study), and a nontraditional technique – behavior modeling (an enhanced combination of the other two methods). Performance outcomes were operationalized using hands-on task performance and comprehension of the computer system as dependent variables. End-user satisfaction with the computer system was also measured. Two covariates, cognitive ability and system use, were also introduced into the study. The use of hands-on training methods, especially behavior modeling, resulted in superior retention of knowledge, transfer of learning, and end-user satisfaction. Cognitive ability failed to be a good predictor of trainee success but a connection was established between training methodology, system use, and end-user satisfaction.

Problematic views

Simon et al. (1996) wrote: "In this experiment, the Kolb Learning Model provides a theoretical foundation for application to the training realm. The dimensions of this model will serve as a framework to interlink the elements of the study. The active / reflective dimension furnishes the continuum for training methods while the concrete / abstract dimension provides the basis for a dichotomy between the information types. An examination of Figure 1 depicts the horizontal axis representing the continuum of training methods, the traditional instruction method corresponding to reflective observation, a condition where the learner / trainee has a passive role in the

preprogrammed training process. In this treatment, the trainee listens and reflects on the ideas presented by the trainer. The independent exploration treatment matches the active experimentation anchor. This training technique emphasizes the concepts of hands-on interaction and practical application as a means to learn material. The third training technique, behavior modeling, is non-traditional technique occupying the middle of the spectrum. This method seeks to change the environment and conditions through which a trainee understands and grasp material. The delivery is one which uses a combination of the previous concepts, providing a lecture format driven by specific learning points and hands-on experimentation. During the modeling treatment there is continuous feedback between the trainer and the trainees, which encourages trainee participation and experimentation. These three methods also met the objectives of the Navy, which sought to develop computer training which is time and cost effective and could be exported to deployed field units."

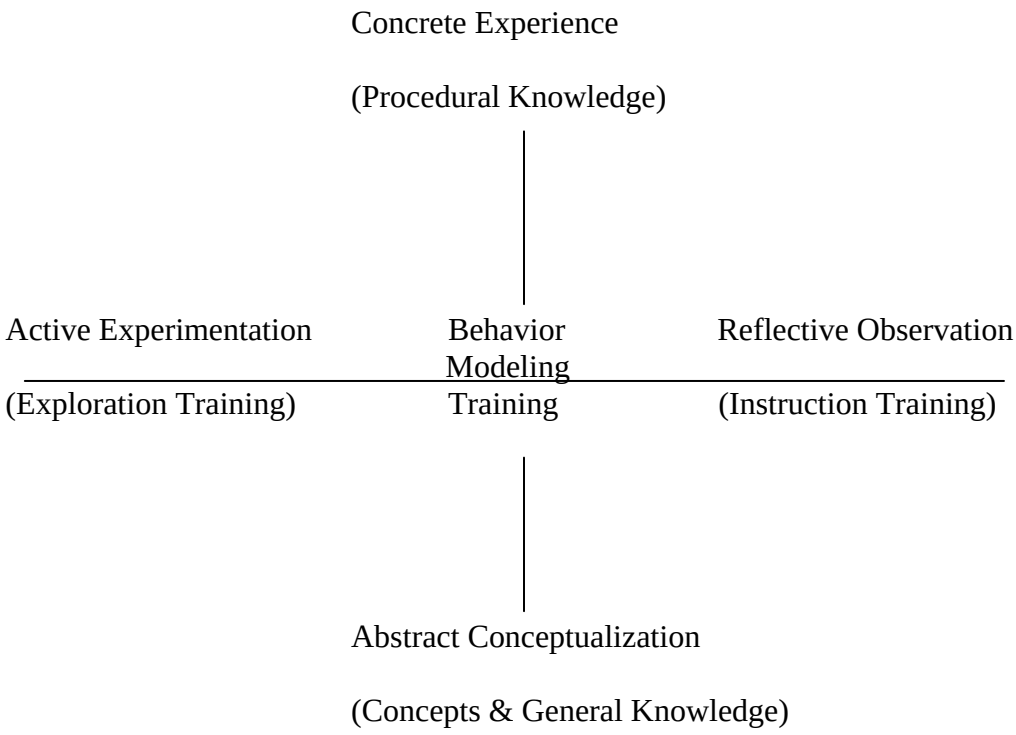

Figure 1 Comprehensive Experimental Training Model (Simon et al. 1996)

"The vertical axis, concrete experience / abstract conceptualization, is used to represent the type of information provided to trainees. Kolb (1984) suggests that the learning experience is a comprehensive process and this study transfers those ideas to the training model, especially in the computer related training. Figure 1 shows that two types of knowledge were provided to trainees during training treatments: general and procedural knowledge. General knowledge provided background information about computers - some history, components, and how computers work. Procedural knowledge, on the other hand, is specific knowledge about software

commands and machine operations. To test the transfer of knowledge two types of evaluation instruments were selected. … "

Identified problems

To my mind, in Figure 1 and in the text explaining it there are two problems: a) learning and b) knowledge problems. In the Figure 1 there are many *learning problems*. First, the Kolb Learning Model consists of four modes of learning in the following order: Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC) and Active Experimentation (AE). Experiential learning according to Kolb's (1984) ideas takes place as follows: CE -> RO -> AC -> AE -> CE -> RO -> AC -> AE -> … .This means that if learning is studied according to the Kolb Learning Model, the whole cycle (CE -> RO -> AC -> AE ->) and its repetitions must be studied, i.e. unit of analysis is the whole cycle (with repetitions), not only one mode of learning.

Secondly, Simon et al. assume that all the training methods can be located on the continuum with the traditional instruction (lecturing) in the one end and the independent exploration in the other end, and behavior modeling somewhere between those end points. But there are many other training methods, for example, experiential learning, where a trainer organizes situations where a learner can get experiences and hence follow the cycle of CE -> RO -> AC -> AE ->. A trainer can help (but it is not necessary) a trainee to reflect her experiences, and can help in other stages, too, but it is not necessary.

Third, Kolb assumes that a learner is active, i.e. she seeks experiences, reflects her experiences, derives abstractions and conceptualization, and experiments her new conceptual structures. Experiential learning is based another assumptions, how a human being learns than the traditional instruction, i.e. lecturing. Experiential learner herself constructs a new knowledge, when a trainee listening on ideas presented by the trainer believes transfer of knowledge.

Concerning knowledge in Figure 1 and its types I have two problems. First, as I showed above, the cycle of CE -> RO -> AC -> AE -> describes the Kolb Learning Model with four different learning styles, but they do not have anything to do with knowledge types, in other words, Simon et al. fully arbitrarily connect two knowledge types with two learning styles. Secondly, Billett (1996) referring to (Anderson 1982) defined two forms of cognitive structures. Propositional knowledge or knowledge 'that', also termed declarative knowledge comprises facts, information, assertions, concepts and propositions. Procedural knowledge, also termed *knowledge 'how'*, enables skilful action and comprises techniques, skills and the ability to secure goals. Vessey and Conger (1994) used the similar differentiation between declarative and procedural knowledge as above. The differentiation between general and procedural knowledge used by Simon et al. at least slightly differs from the definition above.

Conclusions

We can conclude that Simon et al. (1996) and referees with the associate editor (here called group members concerned) did not understand the Kolb Learning Model. They all do not seem to

have enough knowledge of education, although education clearly is the reference science in the study, which the article describes.

The group members concerned did not also exactly know the classical differentiation between declarative and procedural knowledge, although knowledge and knowledge types are one of the central themes in information systems, the primary science of the group members concerned.

The dilemma, which the group members concerned had, is that they did not identify or admit, that they did not have enough competence in education science. We know what we know, but we don't know what we don't know.

Recommendations

Based on the conclusion above I generalize and propose
Recommendation 1. The author(s), referees and the associate editor must honestly analyze their own competence and, if necessary, to openly admit, that they do not have enough competence of the problem domain.

As a natural consequence of recommendation 1, I hope, the author will voluntarily learn more about the problem domain. The referee will immediately inform the associate editor that the submission does not belong to her competence. The associate editor will do the same to the editor-in-chief.

Compeau D.R., C.A. Higgins and S. Huff (1999), Social cognitive theory and individual reactions to computing technology: A longitudinal study, MIS Quarterly 23, No 2, 145-158.

Abstract

A model, based on Bandura's Social Cognitive Theory, was developed to test the influence of computer self-efficacy, outcome expectations, affect, and anxiety on computer usage. The model was tested using longitudinal data gathered from 394 end users over a one-year interval. Significant relationships were found between computer self-efficacy and outcome expectations, and between self-efficacy and affect and anxiety and use. Performance outcomes were found to influence affect and use, while affect was significantly related to use. Overall, the findings provide strong confirmation that both self-efficacy and outcome expectations impact on an individual's affective and behavioral reactions to information technology.

Problematic views

The research model used to guide the study is shown in Figure 2. This model is a subset of the one first tested by Compeau and Higgins (1995). The model identifies the linkages between cognitive factors (self-efficacy, performance-related outcome expectations, affective factors (affect and anxiety)), and usage.

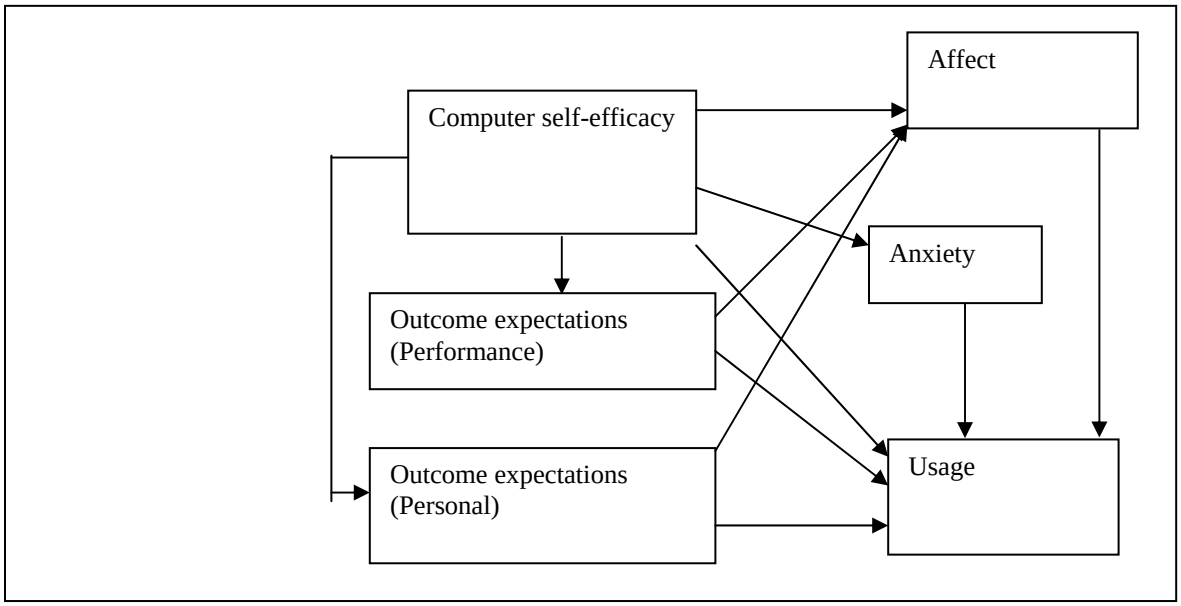

Figure 2. Compeau, Higgins and Huff's (1999) research model

Identified problems

I have two problems with Figure 2. First, the model from which Figure 2 is a subset is in Figure 3.

The comparison of models in Figure 2 and in Figure 3 raises a question: What is a *unit of analysis* in both models? To our mind, the unit of analysis in Figure 3 is larger than in Figure 2. Both research models are based on Bandura's Social Cognitive Theory (Figure 4). Bandura's Social Cognitive Theory (1986) is based on the premise that environmental influences, such as social pressures or unique situational characteristics, cognitive and other personal factors, including personality as well as demographic characteristics, and behavior are reciprocally determined. Thus, individuals choose the environments in which they exist, in addition to being influenced by those environments. Furthermore, behavior in a given situation is affected by environmental or situational characteristics, which are in turn affected by behavior. Finally, behavior is influenced by cognitive and personal factors and, in turn, affects those same factors.

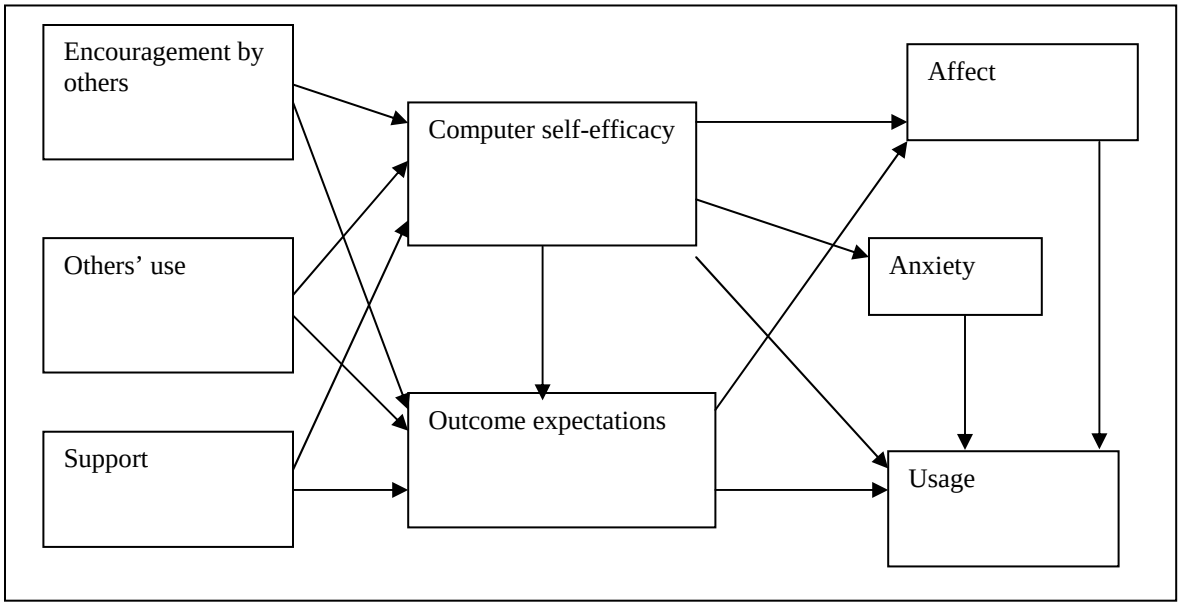

Figure 3. Research model by Compeau and Higgins (1995)

Returning to compare Figure 2 and 3, we can now say that Compeau, Higgins and Huff (1999) excluded environmental factors from their research model. Referring to Figure 4 as Bandura's Social Cognitive Theory, it is no more correct to speak about "a model, based on Bandura's Social Cognitive Theory", when Figure 2 is under discussion.

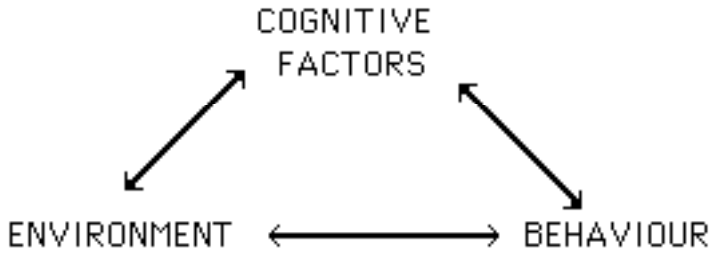

Figure 4. Bandura's Social Cognitive Theory - Triadic Reciprocality

Secondly, the model in Figure 2 (and in Figure 3) is problematic, because it has one-directional arcs. Compeau et al. (1999) write in their article that Bandura's Social Cognitive Theory "explicitly acknowledges the existence of a continuous reciprocal interaction between the environment in which an individual operates, his or her cognitive perceptions (self-efficacy and outcome expectations), and behavior (Bandura 1986)". The authors give the following reasons for one-directional relationships: "The reciprocal nature of relationships … makes drawing causal conclusions more difficult. In any research, without longitudinal separation of

hypothesized causes from effects, it is difficult to draw conclusions about the causal implications of relationships observed (Vitalari 1991). Given the reciprocal relationships posed by Social Cognitive Theory, this problem is magnified." I refer to Langley (1999), who proposed Temporal Bracketing strategy to decompose the time scale into successive 'periods' and she expressed argumentation as follows: "This can be especially useful if there is some likelihood that feedback mechanisms, mutual shaping, or multidirectional causality will be incorporated into the theoretization." - I would still like to return to reciprocal relations and pay attention to Giddens' (1984) Structuration Theory, which also has reciprocal relations and it has often applied to problems in information systems (e. g. Orlikowski and Robey 1991).

Conclusions

We can conclude that Compeau et al. (1999) both consciously excluded environmental factors from their model in Figure 2 and consciously selected one-directional relationships instead of reciprocal ones into their model. After those actions they still called their model as a derivative of Bandura's Social Cognitive Theory. To my mind their procedure, which referees and the senior editor also accepted, was illegal, because the reciprocal relationships and three big groups of factors (environment, cognitive factors and behavior) are essential building blocks to Bandura's Social Cognitive Theory (Figure 4).

The dilemma, which the authors, referees and the senior editor had, is that they knew that their procedure was against Bandura's Social Cognitive Theory (Figure 4), but they nevertheless did it.

Recommendations

Based on the conclusion above I propose
Recommendation 2. The author(s) must not use the name of the holistic theory and the referees and the senior editor must not accept it, if the essential building blocks of the holistic theory are excluded.

Dos Santos B. and L. Sussman (2000), Improving the return on IT investment: the productivity paradox, International Journal of Information Management 20, No 6, 429-440.

Abstract

Over the past four decades, information technology (IT) has had a profound effect on US economy, resulting in a shift from a manufacturing to an information economy. This effect, however, has also produced what may be labeled the paradox of IT productivity. While the percentage of a firm’s budget spent on IT continues to increase, there is increasing evidence that firms fail to obtain the benefits of these expenditures within the anticipated time frame. The reason for delays in obtaining the benefits is due to management’s failure to strategically leverage the full potential of IT and their failure to overcome resistance to change. These problems are discussed in depth and solutions for them are suggested. (*)

Problematic views

To solve the paradox Dos Santos and Sussman write that "our prescriptions for solving the paradox are based on two assumptions. First, the causes highlighted in this paper, failure to think strategically, and senior management's failure to overcome resistance to change, are inextricably related. They are interdependent rather than independent causes. Senior managers, a major source of resistance to change, also conceive and execute strategy. Thus any specific prescription should address both these causes simultaneously. Second, the prescriptions should reflect a systemic and holistic view of the organization. This view would underscore the major targets or foci of the change while highlighting the interdependent dynamic of that change.
These two assumptions are reflected in Leavitt's (1964) classic model of organizational change. This model posits that any organizational change focuses on one or a combination of four interrelated targets: people, structure, task and technology. Moreover, changing any ones of these four necessarily affects the others. Changing the technology should and will impact people, structure and task. Yet, most IT development and implementation efforts fail to change one or more of the above targets as required.
In fact, the problems discussed earlier are, quite simply, the result of failure to equalize the rates of change in the four components. The technology changes are the most dramatic, but the rates at which the people, structure and tasks change are far slower than necessary to take advantage of the investments in technology. The real problem, therefore, is to find ways to identify and change people, tasks and structure so that their rate of change is in concert with the changes in technology." (cf. Figure 5)

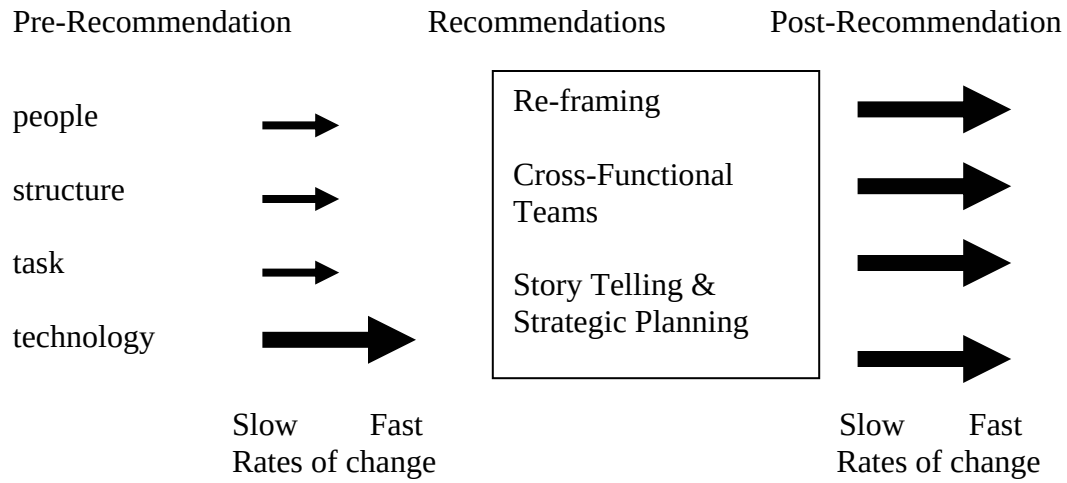

Figure 5. Projected effect of recommendations on rates of change

Identified problems

The advantage of Leavitt's model (Figure 6) is that it contains relationships between all its components.

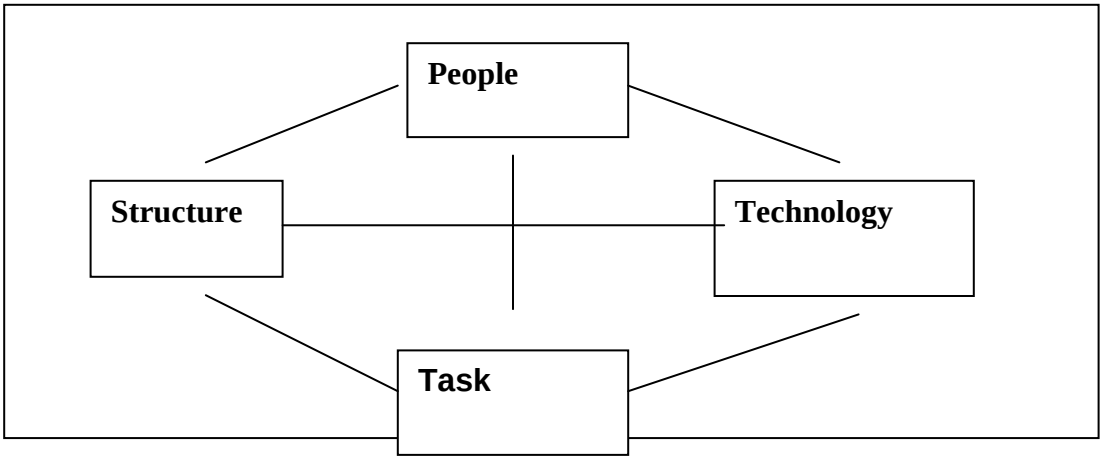

Figure 6. The Leavitt's (1964) classical model.

Concerning the main purpose of Dos Santos and Sussman I like to critize their article in two ways. First, Dos Santos and Sussman want that firms will strategically use IT, but the Leavitt's model do not have any connection to the strategy of a firm nor any idea of the strategic use of IT (cf. Earl 1989). Second, the Leavitt's model has some weaknesses found earlier (look at Lyytinen et al. 1998). Kwon and Zmud (1987) augmented the model with concept of environment, Davis and Olson (1985) added the concept of organizational culture. I would like to add a new one. The Leavitt's model has the technical resource (technology) and the social resource in two forms (people and structure) but not the knowledge, information and data resource (Levitin and Redman 1998). When innovations are considered all three kinds of resources should be taken into account. Thirdly, Dos Santos and Sussman were afraid that "the technology changes are the most dramatic, but the rates at which the people, structure and tasks change are far slower than necessary to take advantage of the investments in technology". To my mind, Dos Santos and Sussman seem to believe technological determinism, but Markus and Robey (1988) presented that we may also have organizational determinism and emergent perspective, the latter may most often explain social effects of IT. Thus, the fast change rate of technology does not necessarily demand equal changes in people, tasks and structure.

Conclusions

We can conclude that Dos Santos and Sussman (2000) tried to discuss how to solve the IT paradox, especially how to use IT strategically, but they used such a conceptual structures, e.g. the Leavitt's model, which did not explicitly have relationships between input and output, and between means and ends. The conceptual structures used by Dos Santos and Sussman were not exhaustive but incomplete.

The dilemma, which Dos Santos and Sussman had, is that they did not identify that the explicit relationship between a firm's strategy and IT technology was lacking. They did also identify that

their conceptual structures were not the best possible ones. The same concerns the referees and the associate editor. I can repeat that we know what we know, but we don't know what we don't know.

Recommendations

Based on the conclusion above I generalize and propose
Recommendation 3. The author(s) studying a certain relationship must check that the relating concepts are explicitly considered. The referees and the associate editor must control that the authors follow recommendation 3.

3. DISCUSSION

I found some deficiencies in three selected articles and I collected my proposals into the form of three recommendations:
Recommendation 1. The author(s), referees and the associate editor must honestly analyze their own competence and, if necessary, to openly admit, that they do not have enough competence of the problem domain.
Recommendation 2. The author(s) must not use the name of the holistic theory and the referees and the senior editor must not accept it, if the essential building blocks of the holistic theory are excluded.
Recommendation 3. The author(s) studying a certain relationship must check that the relating concepts are explicitly considered. The referees and the associate editor must control that the authors follow recommendation 3.
My recommendations slightly enlarge guidelines given by Parberry (1989) and Smith (1990) for referees, especially their emphasis on correctness of the content. For different types of studies correctness means different thing. To demonstrate this I little enlarged the taxonomy of March and Smith (1995): build, evaluate, justify, theorize by adding conceptual-analytical studies and mathematical studies (Järvinen 2001). For the latter correctness means correctness of proofs, for the former the most realistic theory or theoretical framework after competition between potential ones. According to March and Smith “research in the build activity should be judged based on value or utility to a community of users” and in the evaluate activity “the efficiency and effectiveness of the artifact and its impacts on the environment and its users”.

March and Smith (1995) are more concentrated on the build and evaluate activities than on justifying and theorizing. They do not give any clear instructions for the latter. Straub et al. (1994) performed a survey of the perceptions of published authors, reviewers, and editorial board members about the manuscript requirements for publication in information systems. The following few criteria were consistently more important than other criteria: Contribution of knowledge, coverage of significant literature, logical rigor and use of theory. Criteria clearly concern justifying research. For theorizing research Klein and Myers (1999) presented the seven principles for conducting and evaluating interpretive field studies in information systems: 1. The hermeneutic circle, 2. Contextualization, 3. Interaction between the researchers and the subjects, 4. Abstraction and generalization, 5. Dialogical reasoning, 6. Multiple interpretations and 7. Suspicion

To return back to the three articles above the lack of the researchers' knowledge in the reference science was explicitly recognized in the first article. But the same reason seems to be valid with two other articles, too. The lack of knowledge does not concern technology, i.e. computer nor information systems, but learning, teaching, human behavior and organizational strategy, i.e. social issues. The regularly behaving computer technology is mastered better than the irregularly behaving human being and human collective. This may explain weaknesses in the three studies above. The cause-effect research models are suitable for technological problems but not for social problems where cyclical and reciprocal relations and the free will of social partner play a central role. Hence, we must use the other types of research approaches to study social problems.

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