Language as Action in Design Meetings:

From theory to practice

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Nothing is more practical
than a good theory
— Attributed to Kurt Lewin

Abstract

Quotations from the book *Understanding Computers and Cognition: A new foundation for design* by Winograd and Flores (W&F) [18] highlight concepts that even ten years after publication continue to be relevant for information system (IS) design. The observation that *language creates reality* has been a consistent influence in my own work within design meetings. I have synthesized additional concepts and theories from other sources to include aspects of partnership, speaking into commitments, reflection-in-action, and coaching. This has led me to a new appreciation of how fundamental and radical (in the sense of "returning to the root") are the W&F language/action challenges to conventional wisdom and accepted beliefs about design. The "theoretical" insights presented by W&F can have practical effects in the way we conduct our design meetings — offering new opportunities for successful transfer of IS theory and models to practice.

1 Introduction

The book *Understanding Computers and Cognition: A new foundation for design* (W&F) [18] is an important stimulus for innovative design in information systems (IS). This influence is acknowledged in the Call for Papers for the LAP'96 Workshop, in many of the papers in the Language/Action Perspective Literature listed on the World-Wide Web page for the LAP'96 Workshop, and in many of the submitted papers. Indeed, (W&F) was recently selected by Byte Magazine [10] as among the ten books "that have advanced the state of computing, that best chronicle the past two digital decades ...". Upon sampling papers in the Perspective Literature list and those submitted for the Workshop, I was struck by the variety of ways that language is of central importance. People making an IS model create abstractions from the concrete details of specific applications. The developers of other models use language to create new distinctions as they extend earlier models to apply in new situations. Still other contributors describe application of speech act analysis as they examine systems in the field and as they consider the flow of ideas in meetings.

In this paper I will begin by reviewing the concepts in *Understanding Computers and Cognition* (abbreviated as W&F) that I interpret as particularly important in design. Next I will show how some of the ideas in W&F have been influential in my own work, and I will relate them to my practice as a "designer of meetings." As a practitioner, I have adapted and adopted additional theories and models to complement those in W&F. Finally, I will suggest how these ideas may be relevant to the participants in this workshop as they carry forward their activities related to IS design.

My interpretation of the theoretical concepts presented in W&F has changed over the last decade, and I have come to understand aspects of W&F that I had not fully understood upon my initial reading. Writing this paper has renewed for me an appreciation of the difference between comprehending concepts intellectually and translating those concepts into practice. And I can understand the personal transformation required to shift from one way of acting consistent with a given world-view to a new way of acting in accord with a changed world-view.

2 A Retrospective Interpretation of *Understanding Computers and Cognition*

In this 10th year since publication it is fitting for us to review the breadth and depth of the ideas presented in the W&F book. In preparation for this workshop I read W&F again, and I was impressed by how relevant the ideas remain today. The "speech act theory" frequently referenced in the IS literature is only one of the many important ideas presented.

Winograd and Flores challenge fundamental assumptions that we as a society make about "what it means to be human." [18, p. 13] They begin by calling into question the usual background assumption of "subject and object" separation. They observe the influence of "the rationalistic orientation" as a kind of "mind-body dualism that accepts the existence of two separate domains of phenomena, the *objective* world of physical reality, and the *subjective* mental world of an individual's thoughts and feelings." [18, p. 30]

As the topics of design and the question of design problems unfold in the book, W&F note:

... the rationalistic tradition ... tends to grant problems some kind of objective existence, failing to take account ... [that a] 'problem' always arises for human beings in situations where they live, ... in relation to a background. Different interpreters will see and talk about different problems requiring different tools, potential actions, and design solutions. In some cases what is a problem for one person won't be a problem at all for someone else. [18, p. 77]

This importance of context shows up in development practice. When we consider the relevance of theoretical IS design ideas in a specific development situation, we often observe that applicability depends on the details of that situation. W&F characterize a "breakdown" as a declared opening for committed designer action, "the interrupted moment of our habitual, standard, comfortable 'being-in-the-world' ... revealing to us the nature of our practices [and our commitments]." [18, p. 77] From this declaration comes an opportunity for design: "A design constitutes an interpretation of breakdown and a committed attempt to anticipate future breakdowns." [18, p. 78] Toward the end of the book, W&F observe:

The most important designing is *ontological*. It constitutes an intervention in the background of our heritage, growing out of our already-existent ways of being in the world, and deeply affecting the kinds of beings that we are. ... Through the emergence of new tools, we come to a changing awareness of human nature and human action, which in turn leads to new technological development. [18, p. 163]

Continuing, "[Good design provides] the right coupling between [user] and action in the relevant domain" [18, p. 164] "The [designer] designs the language that creates the world in which the user operates." [18, p. 165] This is, of course, a fundamental challenge and a big responsibility for those creating theories, models, and instances of IS. The language of our theories, interpreted in our speaking and listening, creates a world embodied in the IS as constructed.

Within this larger context, which is itself created in language by W&F, "language as action" takes on a broader meaning than the one usually cited by IS designers who invoke "speech act theory" as a perspective. To be consistent with W&F, the design perspective should include: the understanding of "language as an act of social creation" [18, p. 11], the shift from "language as description to language as action," and "to be human is to be the kind of being that generates commitment, through speaking and listening" [18, p. 76].

With these radical (in the original sense of "returning to the roots") observations as background and context, speech acts are then seen to provide for "the analysis of language as meaningful acts by speakers in situations of shared activity." [18, p. 54] The implications of these ideas, taken seriously, go far beyond speech act theory as a convenient way to attach categories to utterances. They suggest that utterances create a reality, not just describe it.

These brief excerpts can not do justice to the depth and breadth of the ideas presented in W&F — and the challenge we face in our environment to put them into practice. Four reviews [16] reveal a variety of additional reader interpretations and perspectives. I particularly recommend the thoughtful and insightful comments of W. Clancey followed by the response of W&F to the reviewers.

3 Events Shaping My Interpretation

I have been extremely fortunate to live in the geographic vicinity where many of the events that culminated in the W&F book took place. I was able to participate in courses and workshops that gave me opportunities to work, with teachers and coaches, *in* the context of language as contrasted with reading *about* the context of language.

In addition, my professional position within the IBM Research Division provided many occasions to work with people in the academic community. These projects included a study of computer systems as used in the field [9], a modeling project with Kieras and Polson [8], work with Winograd in the development of the "Human-Computer Interaction" course program at Stanford University [11], work with other people bridging from theory to practice [3], suggestions for bringing usability into the development process [5], and work with developers in the system design community [2]. In all these activities, I have been strongly influenced by the kind of philosophy represented in W&F as I sought: "the understanding of social reality that we can gain through combining theory and practice." [18, p. xii]

Recently I worked with Winograd on the book *Bringing Design to Software* [19]. This series of essays, by people experienced in design disciplines on the periphery of software, evolved from another workshop. The book serves as an invitation for people working in software to reflect on how experience in these other disciplines could influence a continuing shift from technology-driven development to user-responsive design in computer software.

From these activities I became open to the observation: "[Through] language ... we create and give meaning to the world we live in and share with others." [18, p. 78] This is in contrast with the conventional (since Descartes) interpretation that language *describes* reality.

[Background and the listening that lives within it ... [creates] the space of possibilities that allows us to listen to both what is spoken and what is unspoken. ... Meaning is created by an active listening, in which the linguistic form triggers interpretation, rather than conveying information. [18, p. 57]

4 Relation to this Workshop

How does this connect with our LAP'96 Workshop? Many of the participants have created elegant models, webs of distinctions and relationships with great promise for achieving results in practice — *if* the distinctions can be brought effectively into the experience of the practitioners who build the information systems. That is, we ask, "What must happen for the theories to trigger interpretations that are useful in the application situation?"

Those who constructed the models presented at the workshop may welcome practical application by interested readers. Practitioners applying the ideas represented in the models could report their experiences in ways that would be constructive for the evolution of the models. But people working in the system development domain are seldom rewarded for writing — nor do they have much time to read scholarly papers. The transfer of ideas is likely to be limited to exchanges in design meetings.

One typical example of anticipated need is given by Janson and Woo:

Communication, often in the form of spoken discourse, is essential to determining information requirements. [This leads to] ... evaluating and analyzing the communicative interaction between the analyst and the user ... so that we can consider ... factors that affect IS [development] success, such as the personal characteristics and human limitation of analysts and users ... [13, pp. 1, 2]

These observations also apply to the discourse between the model builder and the development analyst. I take this as an important challenge for the application of models in IS practice.

How might successful conversational exchanges be constructed, and what concepts, activities and skills would be useful — even necessary — in such meetings? Are there theories that can help guide us toward practical action in these situations?

5 An Evolution from Theories to Practice in Design Meetings

Design occurs when an individual designer converses with the medium in which he works [Schön, in 19, p. 176] — in this case the representations that evolve into the IS system. Design also takes place in conversations within the community of people who work together to realize their shared vision of the evolving design.

The power and importance of the concepts outlined in W&F have become particularly clear to me in design meetings addressing human-computer interaction (HCI) issues. Participants typically include representatives from at least two very different backgrounds, and often each participant has a quite different perception of what is important for the ultimate success of the system.

Technically oriented programmers, data base experts, and engineers tend to focus on the issues of system function, cost to build, and development schedule. Other participants — psychologists, sociologists, human factors people — tend to be oriented to the ultimate system users, and they focus on different issues such as what users will see, must know, and can or must do:

- What the system users will *see* as a context for their action,
- What the users will have to *know* in order to interpret data displayed by the system, and
- The complexity of the action sequences the users will have to take (what they must *do*) in order to gain the results

potentially available through use of the system.

Questions derived from these concerns can reveal complexities in the design that will hinder the productivity of the eventual users.

Participants come together in HCI design meetings to fill a special need. The management sponsoring the system development understands that the resulting system must be both technically sound and also be responsive to the needs of the ultimate users. Thus, all the skills represented in the meetings are needed for success. The challenge for those on the design team is to create, in language, a context and a way of working together effectively. If the team does this, the skills and insights present in the room can be applied successfully in practical action to construct a system that performs in the required way.

In such situations I seek ways to assist the participants to build and maintain effective partnerships between themselves and within the team as a whole. [6] Language concepts outlined in W&F, and extended through my interpretation of

complementary theoretical constructs and concepts, have played a major role in my own practical action as a contributor to design content, and as a participant and facilitator in design meetings.

A number of activities are helpful for building bridges to join these differing perspectives. One way is through constructing pictures and diagrams of the evolving system so that participants from diverse backgrounds can arrive at a shared understanding of design problems and opportunities. A general discussion of the process for using representations, typically displayed on walls, is presented in [14].

Given my experience as a participant and facilitator in design meetings, I am particularly interested in how the models described in the LAP'96 Workshop papers will be interpreted as application-oriented readers study them and apply the generic concepts to specific situations. Just as in the HCI design meetings I mentioned above, the participants from the academic community and those from the IS development communities come from quite different backgrounds, work in different traditions, have quite different skills and experiences, and often have fundamentally different value systems. Therefore, the participants may find it challenging to work together effectively. The process of concept transfer will be most likely to succeed if those interpreting the theories and those applying the theories become *partners* in this enterprise. The models introduced below for building partnership, speaking into commitments, reflecting while in action, and creating collaborative coaching are described in more detail in the referenced publications. I trust that the general relationship among these models will be clear enough for our purpose here.

5.1 Building Partnerships

I have found the concepts relating to partnership as formulated by John Henderson [12] particularly valuable. Though Henderson originally developed his generic principles in the context of strategic management, I have adapted his model in my work with people in design meetings. [7]

The people in the project must have a purpose, a commitment to results (though the details of the purpose and the needed results may evolve.) Effective partnerships and teamwork depend on the willingness and skill, demonstrated in meetings, to:

- 1) Establish common goals. This requires outlining a shared vision of what could be accomplished by working effectively together. The envisioned result is often one that could not be obtained by working separately.
- 2) Build mutual trust and respect through, in part, coming to value the differences in perspectives. This often requires us to deal with explicit and implicit questions. From W&F, "Every questioning grows out of a tradition — a pre-understanding that opens the space of possible answers. ... [tradition is] a way of understanding, a background, within which we interpret and act." [18, p. 7] We become aware of our own tradition by bringing "into conscious observation that which invisibly gives shape to our thought." [18, p. 8]
- 3) Acknowledge distinctive competencies and experiences, skills and abilities as part of what is necessary for the success of the project. What is of particular value emerges from the concrete specifics of the project.
- 4) Share theoretically-based and application-specific knowledge as needed to achieve the project result.
- 5) Attend to mutual benefit by creating ongoing conversations that reveal the current status of perceived personal value and that check to see that each member of the partnership/team is served in the collaboration.

Note that application of the principles follows a natural order. Without a foundation established in step 1, step 2 is not possible — and so on through the list. [6]

"Yes, yes, of course," you may say. "Naturally I would do all those things." It turns out, however, not to be easy to put the generic principles into specific practice — especially when the partnership/team contains participants from strongly differing backgrounds and traditions.

5.2 Speaking into Commitments

Argyris in his book, *Reasoning, Learning, and Action* [1] reports his work over 10 years as a consultant to business. He documents many aspects of learning (individual and organizational) that he has observed in business meetings. This complements his work as Professor of Education and Organizational Behavior at Harvard University.

His book presents several theories of learning supported by transcripts of conversations he has observed in the field. Of particular interest for the topic of "language in action" in meetings are his illustrations of how people respond to one another when they present issues that have potential for controversy.

In his Model 1 Argyris points out the tendency that participants in meetings have to focus on their purpose, seek to maintain control, maximize winning, and appear rational (to avoid argument.) As a result, others in the meeting see such a speaker as defensive, relatively closed to suggestions that might be interpreted as leading to "losing" an argument, and not very effective.

When a speaker is in accord with his Model 2, she is committed to development of valid information, free and informed choice by other participants, and joint control of the discussion. In this ideal, the speaker is seen by others as minimally defensive, the conversation is oriented toward learning, the speaker is open to suggestion, and the meeting can lead to

discovery of outcomes acceptable to all. As W&F point out, "Understanding ... is a commitment to carry out a dialog within the full horizons of both speaker and hearer in a way that permits new distinctions to emerge." [18, p. 124]

Argyris has found, repeatedly, that when he presents these Models to people as part of his training for effective meetings, they all subscribe to Model 2, and they usually insist that they already conduct their conversations in accord with it. He then makes audio recordings of typical meetings with these participants, watches for situations where speakers start exhibiting Model 1 behavior, and then (with permission obtained in advance) interrupts the meeting to bring his observations to the attention of the group.

It is almost always the case, he finds, that speakers do not realize that they have lapsed into defensive and closed behavior. The speakers sometimes become angry with themselves when he plays back the recording, because then they can hear for themselves the effect of their speaking.

The aspect of interest to us, with respect to design meetings, arises from the following. Though the speaker — or two speakers in contentious exchange — may not be aware of language actions, the other people in the meeting *are* aware that the speakers are not creating the result that the speakers intend. However, the others usually do not intervene in the conversation because they do not (or feel they do not) have permission to do so, and they do not know how to intervene effectively.

This is a very important phenomenon. If the speaker in these situations had established a prior "partnership" with a colleague also in the meeting, then each could give the other advance permission to intervene during conversations should the language/action behavior become dysfunctional — in time for the speaker to return to an intended Model 2 behavior. The pre-arranged cues could be quite simple — a question, a particular gesture — and need not be noticed by others in the meeting.

We all have had the experience, after a meeting (when it was too late to do much about it), of recognizing our own unintended dysfunctional behavior. The key idea is that "collaborative coaching" made possible in a partnership — taking place in the moment among equals — would enable us as speakers to recover within the situation before difficult-to-repair damage has occurred.

Partners can also be influential in guiding the course of others as well as themselves during the meeting. If the two partners work as a team when making suggestions during the meeting, it can help people who are getting "off the topic" return to the focus.

These observations establish a need for partnership and the opportunity partnership could provide for responding to dysfunctional behavior. How do we find time to develop partnership skills in the press of life as we experience it today?

5.3 Reflecting While in Action

Donald Schön [15] has worked closely with Argyris to construct theories of his own. "Reflection-in-action" refers to the skill of moving effectively within a situation, exhibiting a smooth response "in the moment" of action while "working in the design medium" — without "thinking" about it. Schön contrasts this with conscious "reflection-on-action" — a "stop and think" that moves from unconscious and tacit expertise flowing with the medium to explicit consideration and deliberation. The distinction between "reflection-*in*-action" and "reflection-*on*-action" is related to an observation in W&F about the everyday behavior in our lives: "Reflection and abstraction are important phenomena, but they are not the basis for our everyday action." [18, p. 97] An example of reflection-in-action is the musician's skilled response to colleagues during the flow of the music in a string quartet or in a jazz improvisation.

Schön draws on his own extensive teaching and consulting experience to report examples of learning to "reflect-in-action" during the teaching and practice of disciplines as diverse as architecture, city planning, music, and psychoanalytic counseling.

In all these situations the novice moves from tentative competence to skilled performance by means of practice and coaching. Schön recommends creating an environment where people have "freedom to learn-by-doing in a setting relatively low in risk" as a way for them to "see on their own behalf and in their own way what they most need to see." He observes that persons can usually not be explicitly "taught" what they need to know, but they can be coached.

Both Argyris and Schön have an academic background, and they interpret their experiences that lead to their theoretical frameworks from that perspective. Argyris gives us conceptual models for understanding the culture within which we act in design meetings. Schön suggests ways in which we can build our skills for "reflecting-in-action" during the course of design meetings.

5.4 Creating Collaborative Coaching

To complete this brief overview of how several theoretical concepts can be synthesized to help form an effective practice, we turn to the writings of John Whiteside. In contrast with Argyris and Schön, his background is in the computer industry. During his years at the Digital Equipment Corporation he worked in design projects and as a management consultant. Whiteside's interpretation of language/action as presented in *The Phoenix Agenda* [17] was heavily influenced by his

participation in an Executive Excellence Program. This was a course developed as an extension of the ideas of Flores. The four sessions, two intensive weeks each, took place over an elapsed time of a year. Whiteside's theoretical framework is focused on practice, and the constructs he presents are illustrated in the book by stories from his experience. Whiteside (with acknowledgment to Searle) presents his interpretation of the four building blocks in transformational language [17, p. 87]:

- Reality probe — a question or inquiry
- Status report — a statement of fact based on evidence
- Action request — a request or promise for action
- Transformational proclamation — an inspirational declaration that generates the future.

His key theme is that language creates reality (as contrasted with "describes reality") and that these four building blocks, in conjunction with the twelve conversational distinctions of *The Phoenix Agenda*, serve as tools for effective action in business.

I have found that the theoretical concepts presented in Whiteside's Chapter 10, "Transformational Coaching," complement and supplement the theories of Argyris and Schön. We have learned from Argyris that even a highly experienced person who intends to speak in accord with the principles of Model 2 often falls unconsciously into Model 1 language. We have observed from Schön that the necessary ability to "reflect while in action" (become aware of one's action in language while acting) is best learned in a special kind of environment. Whiteside adds distinctions that may enable the speaker to achieve the intended outcomes in meetings through the support of a partner.

Whiteside expands the concepts of "coaching" mentioned in the description of Schön's theory. The kind of coaching Whiteside advocates requires that the coach observe the performance of the person being coached with an intention to provide focused and incisive guidance on ways of improving performance. This can enable a person coached to bring forth the best performance available from that person for the undertaking at hand. Thus, the coach focuses on achievement of the person coached *within the commitments of the person coached*.

This presumes that the coach can move beyond his or her own personal agenda — at least while coaching. We could call this "peer coaching" or "collaborative coaching" to distinguish it from the kind of coaching, directing, or mentoring found in sports and found among people in the usual hierarchy common in business — or even in the academic world.

Collaborative coaching takes place among equals. The coaching role can be, and should be, between partners. Each partner speaks in a way that facilitates a clarity of intention in the other. This is done in the language of questions, comments, and suggestions (but not instructions) that supports the person being coached to identify a personal course of action consistent with that person's commitments.

In order for this kind of coaching to be effective, the person coached must grant ongoing permission. It is also the responsibility of the coach to speak in ways that are heard as intended. This is an example of "active listening of a hearer in a context" [18, p. 177] developed in "... the space of possibilities that allows us to listen to both what is spoken and what is unspoken. Meaning is created by an active listening in which the linguistic form triggers interpretation, rather than conveying information." [18, p. 57]

With permission of the person coached, the coach can explore ways of expanding the interpretive framework of the person coached — and often, at the same time, his own interpretative framework. As suggested in W&F:

Knowledge and understanding ... arise from the individual's committed participation in mutually oriented patterns of behavior that are embedded in a socially shared background of concerns, actions, and beliefs. ... [Through] language ... we create and give meaning to the world we live in and share with others. [18, p. 78]

In this way the person coached may come to see possibilities that the coach sees but that the person coached previously did not see.

Thus, two people who have established a partnership can share their understanding of a potential design meeting situation. They can discuss their purpose, plan how to use representations to convey necessary understanding to others [14], and give each other permission to coach and be coached. They create their mutual understanding of how they will support one another during the course of the meeting.

Schön [15] points out the need for a relatively risk-free environment in which to try out new ideas and build skills required for "reflection-in-action." Design meetings usually involve risks, especially when the participants have diverse interests and commitments. But the presence of a partner can help manage the risk of innovation and can lead to a successful "learn-by-doing" experience.

6. Conclusions

In this essay I have suggested how the breadth and depth of the insights that I find in W&F have influenced my own language/action behavior. I can associate some aspect of my own evolution from theory to practice with each of the

selected quotations from W&F. I am aware of the time it has taken me to shift my own interpretation of "what it means to be human" and to learn new actions so that I can (at least some of the time) be consistent with my new interpretation. It has not been easy for me to realize "the practical benefits of a good theory" as suggested by Lewin. I am also appreciative of the role of others — as teachers and partners — in supporting my move from concepts *about* language to practice *in* transformational language.

When I am asked by people how they might make similar shifts, I frequently recommend "find a partner." In that way, two can converse together, co-interpret their own world-views, and come to a better understand their own commitments and practices. They can also consider how opportunities for partnership, for speaking into commitments, for reflecting while in action, and for coaching each other collaboratively can lead to their own personal growth in their day to day practice. I have focused here on my personal experience in design meetings. If we consider opportunities for transformation in our coordination of actions at the level of IS theory and IS practice, two questions have been important for me throughout the course of my professional work:

- How can the abstractions of theory and research influence practice and application more directly?
- In what ways can practice and application be constructively influential in the evolution of theory and research?

These questions were before us during the workshop. They may also be of interest to readers of these proceedings as they reflect on their own language/action responses in their professional work.

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8 References

1. Argyris C. *Reasoning, Learning and Action: Individual and Organizational*. Jossey-Bass, San Francisco, 1982
2. Bennett J. The concept of architecture applied to user interfaces in interactive computer systems. In: Proceedings of INTERACT'84, London, 1984, pp. 865-870
3. Bennett J. Observations on meeting usability goals for software products. *Behaviour and Information Technology*, 5, 2, 1986, pp. 183-193
4. Bennett J. Collaboration of UIMS designers and human factors specialists. *Computer Graphics*, 21, 2; 1987, pp. 102-105
5. Bennett J. Accepting the Challenge. In: Rudisill, M *et al.* (ed.), *Human-Computer Interface Design: Success Stories, Emerging Methods, and Real-World Context*. Morgan Kaufmann Publishers, Inc., San Francisco, 1996, pp. 375-385
6. Bennett J. Building relationships for technology transfer. *Communications of the ACM*, 28, 3, September 1996, pp. 35-36
7. Bennett J. and Karat J. Facilitating effective HCI design meetings. In: Proceedings of the CHI'94 annual conference, Association for Computing Machinery, Special Interest Group on Computer-Human Interaction (SIGCHI), ACM Press, Addison-Wesley, Boston, 1994, pp. 198-204
8. Bennett J, Lorch D, Kieras D, and Polson P. Developing a user interface technology for use in industry. In: Proceedings of Second IFIP Conference on Human-Computer Interaction INTERACT '87, Stuttgart, Germany, 1987, pp. 21-26
9. Bullen C. and Bennett, J. Groupware in practice: An interpretation of work experiences. In: Dunlop and Kling (ed.), *Computerization and Controversy: Value Conflicts and Social Choices*. Academic Press, Boston, 1991 and 1996, pp. 348-382
10. BYTE. Best books and CD-ROMs. *BYTE Magazine*, 20: 9, September 1995, pp. 91-92
11. Hartfield B, Winograd T, and Bennett J. Learning HCI design: Mentoring project groups in a course on human-computer interaction. In: Proceedings of the SIGCSE'92 Technical Symposium of the ACM, March 1992, pp. 246-253
12. Henderson J. Plugging into strategic partnerships; The critical IS connection. *Sloan Management Review*, 31, 3, 1990, pp. 7-18
13. Janson M. and Woo C. Comparing IS development tools and methods: Using speech act theory. *Information & Management*, 28, 1995, pp. 1-12
14. Karat J. and Bennett J. Working within the design process — Supporting effective and efficient design. In: Carroll, J. (ed.), *Designing Interaction: Psychology at the human-computer interface*. Cambridge University Press, New York, 1991, pp. 269-285

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15. Schön D. *Educating the Reflective Practitioner; Toward a new design for teaching and learning in the professions*. Jossey-Bass, San Francisco, 1988
16. Stefik M. Book Review Editor, review of *Understanding Computers and Cognition: A new foundation for design*. *Artificial Intelligence*, 31, 1987, pp. 213-261
17. Whiteside J. *The Phoenix Agenda: Power to transform your workplace*. John Wiley & Sons, New York, 1993
18. Winograd T. and Flores F. *Understanding Computers and Cognition: A new foundation for design*. Ablex Publishing Company, Norwood, New York, 1986. Currently available from Addison-Wesley, Reading, MA, 1987
19. Winograd T. with Bennett J, De Young L, and Hartfield B. *Bringing Design to Software*. Addison-Wesley, Reading, MA, 1996