

December 1997

Discovering Meaning in IS Design (research in progress)

Jim Underwood
University of Technology, Sydney

Follow this and additional works at: <http://aisel.aisnet.org/pacis1997>

Recommended Citation

Underwood, Jim, "Discovering Meaning in IS Design (research in progress)" (1997). *PACIS 1997 Proceedings*. 79.
<http://aisel.aisnet.org/pacis1997/79>

This material is brought to you by the Pacific Asia Conference on Information Systems (PACIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in PACIS 1997 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Discovering Meaning in IS Design (research in progress)

Jim Underwood

*Lecturer in Information Systems
School of Computing Sciences
University of Technology, Sydney
PO Box 123 BROADWAY 2007
email: jim@socs.uts.edu.au
phone: (02) 9514 1831
fax: (02) 9514 1807*

Executive Summary

Many of the problems which emerge in computer based information systems can be traced to misunderstandings which occur during systems analysis and design. In analysis we attempt to understand how particular business processes operate, how they fit into the organisation as a whole; in design we describe processes which will only exist in the future. The opportunities for misunderstanding are great. Most systems development methodologies try to deal with this problem by proposing a "good" description language, a language in which the proposed system can be described clearly and unambiguously. The claimed basis of "goodness" varies: mathematical rigour, the way people think (Jacobson, 1992, p42) or the way language works (Stamper, 1992). In this research I investigate the proposition that any attempt to find a special language which clearly describes information systems is bound to fail, because words used will find their meanings in different existing special languages used by different design stakeholders, and because language is the trace of the power play which is an essential part of the design process.

This research starts with semiotics, considering design documents, meetings and prototypes as texts, and attempting to understand to what they refer. I expect to discover (not surprisingly) that these "texts" mean different things to different people; I will attempt to relate these differences to the background disciplines of the various stakeholders (the cultural context) and to the way in which the texts were constructed and are interpreted (the situational context). The situational context is illuminated by Foucault's analysis of power/knowledge (1980) and Giddens' structuration theory (Cassell, 1992). A more detailed analysis of how systems development works is provided through Latour's actor-network theory, where the system itself becomes a stakeholder in the development process.

My work so far has been theoretical, looking for tools which can be applied to the problem of misunderstanding in the design process. No single theory will suffice: we have to combine models from different disciplines, just as we do in the design process itself. The next stage, the field research, will study cases of IS design in a small number of organisations. I will analyse documentation of recently completed systems and attend design meetings for systems currently under development. I will refine my interpretation of these texts through interviews with those involved in their creation.

The practical outcomes of this research are not clear at this stage. There certainly will be no new development methodology: this research is more concerned with finding limitations which are essential to any methodology (see, for example, Fitzgerald, 1996). There may be recommended techniques for surfacing misunderstandings and alternate meanings during various design activities. Hopefully the major contribution will be to make our theories of information systems development more firmly grounded in what actually goes on. While this will not make the development process simpler, faster, more peaceful or more predictable, it should mean that the systems produced are more robust and more helpful to the work of the stakeholders. The issues of differing languages will not be solved once and for all during systems development, but it should be possible to build systems which deal with these issues on a continuing basis.

Introduction - Misunderstandings in IS Design

Misunderstandings between clients and designers are endemic in any design process. They seem to be particularly problematic in the design of computer based information systems. The clients "keep changing their minds" and the designers "never give clients what they want". This may be because information systems are difficult to conceptualise, because we have not had time to evolve good ways of communicating about information systems, or because we are often designing with surrogate clients.

One view is that designers and clients fail to connect because they have conflicting interests, inappropriate social relationships or incompatible cognitive styles; misunderstandings can even be deliberate, involving

subterfuge and deceit. An alternative view is that the language (words, diagrams, models) used to discuss the design is inadequate and confusing. If only we had the right design tools our communication problems would be solved.

While both views have considerable merit, this research concentrates on the intermediate phenomenon. I am trying to unravel how particular language is understood in particular environments. What do particular designers and clients mean when they use particular words in particular situations? My research is inspired by Lacan's views on the inadequacy of language ("... there is always a difference between what a speaker means and what the speaker's words mean." (Sarup, 1992, p57)), Foucault's genealogy of power/knowledge (Foucault, 1980) and Latour's analysis of heterogeneous networks of actors (Latour, 1987, 1996).

Looking for Meaning in Language

Semiotics is a "science of signs". The signs which feature in my research are words and graphic elements, but also whole documents and running computer systems (prototypes).

Within semiotics, Morris distinguished three distinct branches of inquiry: **syntactics** (or **syntax**), being the study of "the formal relation of signs to one another", **semantics**, the study of "the relations of signs to the objects to which the signs are applicable" (their designata), and **pragmatics**, the study of "the relation of signs to interpreters" (1938: 6). (quoted in Levinson, 1983, p1)

We might imagine that meaning can be found through semantics, but the very definition of semantics makes strong assumptions about the nature of language. These assumptions and their problems are discussed in the next section. In practice most discussions of meaning drift toward either syntactics or pragmatics. In this research I will favour pragmatics.

Language and Reality

The common sense view of meaning is that language represents (in the passive sense) reality, that signs are "applied" to objects. Unfortunately we have no way, except through other signs, of judging how well our signs represent reality.

In semiotics it is often postulated that awareness of the object gives rise to the idea (meaning) for which we then develop a sign (Nöth, 1990, pp89-90). This is the semiotics of analysis. In design we reverse the process. The sign evokes an idea which leads to the creation (or purchase) of the object; the language of design speaks of the future.

Taking the observation that we can only discuss signs in terms of other signs to its logical conclusion, systemic views of language (eg Saussure - see (Nöth 1990, pp56-63)) find the meaning of signs in their network of relations to other signs. The meaning of words is found in the system which is language. If we look up a word in the dictionary we only find another word but if we keep going then eventually (hopefully) everything will become clear. This applies well to designing information systems. As we add more components and understand their relationships everything gradually becomes clear. IS documentation methods include complex cross referencing tools to place component signs in context. The only problem is that we end up with a complex system which is beautiful, consistent, self-sufficient and totally disconnected from reality.

Ultimately, the systemic view of meaning retreats to syntactics. To regain a sense of reality we must turn to pragmatics. Mild (linguistic) forms of pragmatics include speech act theory and systemic functional linguistics (social semiotics). Speech act theory (after Austin - see (Levinson, 1983, p226ff)) concentrates on those cases where language is used to do things (eg apologise, make a recommendation to use Unix) and the situations in which such speech acts will be successful (or not). A problem in IS design is that the people involved are often unclear whether their speech is making statements of fact or doing something else such as promising or threatening. Systemic functional linguistics (Halliday & Hasan, 1985) concentrates on how language differs according to context - the context of culture and the context of situation. In this sense, a text which is quite comprehensible in a design group meeting may be quite meaningless as a contract or a program specification. Halliday also uses the concept of *intertextuality* which means (roughly) that we won't understand what is said unless we understand what went before - a formidable problem for outsiders such as consultants or IT specialists.

The Social View of Meaning

Linguistic pragmatics usually assumes that, although the meaning of language varies with context, there is still a relatively stable linguistic foundation. As we move into sociology everything changes at once. Language, situation and participants are all constructing and reconstructing each other simultaneously. Giddens models this in his theory of structuration.

The concept of structuration involves that of the duality of structure, which relates to the fundamentally recursive character of social life, and expresses the mutual dependence of structure and agency. By the duality of structure I mean that the structural properties of social systems are both the medium and the outcome of the practices that constitute those systems. (Cassell, 1993, p122)

Participants are designing and understanding information systems from within social and technical contexts which they are themselves creating. An established technique for studying such phenomena is ethnomethodology (Heritage, 1984), which studies in detail the language of ordinary people in ordinary situations, as they construct their speech, their interactions, their situation and themselves. If we imagine for a moment that a group of users and technical experts designing an information system are ordinary people in an ordinary situation the following description needs no adaptation.

On the one hand, the actors assume from the outset that they share a common world. On the other, they know that the world displays a perspectival appearance in the two senses (position, relevance) outlined above. It is through a continuous process of adjustment - expressed in the two idealizations - that the actors succeed in resolving the discrepancies which could otherwise throw doubt on the shared nature of their perceptions and cognitions. (Heritage, 1984, p56)

Syntactic and pragmatic considerations are brought together in the work of Michel Foucault (1972, 1980). In his earlier work Foucault adapted the systemic view of language to the specialised 'languages' of various disciplines. He called these languages *discourses*. Thus there is a discourse of accounting and a discourse of systems design. At first Foucault wrote as if a discourse was preserved and 'enforced' by an internal logic, but he later became interested in its *genealogy*, the way the discourse had been built. Related to this is the question of power/knowledge which arises in individual encounters where the discourse is reinforced or altered. Bloomfield (1992) describes power/knowledge events where systems designers enforce technical discourse during encounters with users.

Foucault, nevertheless, usually discusses discourses one at a time. When participants from different disciplines meet to design an information system we have an overlaying of discourses. This multiplies discursive ruptures, places of contradiction and ambiguity. It is not clear how these can be analysed, though some clues are found in Deleuze & Parnet (1987, pp118,143-144).

The circle is completed by Latour (1987), who turns category error into a virtue in actor-network theory. People and machines, actors and situation, system and environment all merge in a multi-category society. The information system to be becomes an actor in its own right, with allies and enemies drawn from a population which includes users, programmers, managers, chips, theories, advertisements, footballers, judges, CASE tools, electrons and tables of contents. The information system's overriding desire is to exist. In the common sense view of language we invented signs to point to pre-existing objects. In Latour's view (1996) if all the signs align they will create the object to which they point - and the system will achieve its desire. (Notice that these signs can represent the object in the active sense.) The great strength of Latour's approach is that it allows us to map the complexities of the design process without preconceptions as to who or what should be involved.

Discovering Discourses - Doing the Field Work

To ground the above speculations I will conduct studies in a small number of organisations which are developing information systems. The archaeological investigations will involve finding documentation for recently developed information systems and performing high level semiotic analysis to identify significant words, phrases, concepts and graphical elements. I will then use some of the theories discussed above to place these signs into several discourses and social contexts which are discovered within the organisation. These interpretations of design semiotics will be tested in interviews with those who participated in the design process and with current system users.

The genealogy of the design discourse will be revealed by participating in design meetings for current projects. These meetings will be recorded on audio tape, the discussions analysed and the interpretations tested in interviews.

I hope that the field studies will show how the above theories of meaning, even where apparently incompatible, can be combined to clarify the way systems were designed in these cases.

Why Should We Discover Discourses - Practical Implications

Clearly there are risks involved in this type of research. If people working together discover that others don't mean what they appear to mean confusion could increase. If they discover that others mean to appear to mean what they don't mean conflict could increase. If those involved in system design take the time to clarify meaning as part of the design task then system development may take longer. But these risks are balanced by gains in awareness, stability and realism.

Latour (1992) explains how programs of action which are inscribed in technical artifacts are, in normal circumstances, invisible. Argyris (1980) makes a similar point for information systems and points out that these hidden inscriptions can limit the ability of an organisation to adapt to its environment. The type of analysis I propose can increase awareness of these inscribed programs.

Stability in the use of the information system is threatened if the design is based on false agreement, if users have signalled acceptance as a result of misunderstanding. Paying more attention to meaning during design leads to the creation of more robust systems.

Finally, we hope to produce information systems which are attached to the wider realities of the organisation in which they operate. As Schutz (1964, p8) says:

The safeguarding of the subjective point of view is the only sufficient guarantee that the world of social reality will not be replaced by a fictional non-existing world constructed by the scientific observer.

In the past many information systems seem to have taken on this fictional quality. We need to take steps to get back to reality.

References

- Argyris, Chris, "Some Inner Contradictions in Management Information Systems": in Lucas, H.C. et al (eds), *The Information Systems Environment* Amsterdam: North-Holland, 1980.
- Bloomfield, Brian P. "Understanding the Social Practices of Systems Developers" *J of Information Systems* 2,2 April 1992, pp189-206.
- Cassell, Philip (ed) *The Giddens Reader* Basingstoke: Macmillan, 1992.
- Deleuze, Giles and Parnet, Claire *Dialogues* London: Athlone Press, 1987.
- Fitzgerald, B. "Formalized systems development methodologies: a critical perspective" *Information Systems Journal*, 6,1 January 1996, pp3-24.
- Foucault, Michel *The Archaeology of Knowledge* London: Tavistock, 1972.
- Foucault, Michel *Power/Knowledge* New York: Pantheon, 1980.
- Halliday, M.A.K. and Hasan, Ruqaiya *Language, Context and Text* Victoria: Deakin University, 1985.
- Heritage, John *Garfinkel and Ethnomethodology* Cambridge: Polity Press, 1984.
- Jacobson, Ivar *Object-Oriented Software Engineering* Wokingham: Addison-Wesley, 1992.
- Latour, Bruno *Science in Action* Cambridge, Massachusetts: Harvard University Press, 1987.
- Latour, Bruno "Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts" in Bijker, Wiebe E. and Law, John (eds) *Shaping Technology / Building Society* Cambridge, Massachusetts: MIT Press, 1992.
- Latour, Bruno *ARAMIS or The Love of Technology* Cambridge, Massachusetts: Harvard University Press, 1996.
- Levinson, Stephen C. *Pragmatics* Cambridge: Cambridge University Press, 1993.
- Morris, C.W. "Foundations of the Theory of Signs" in O. Neurath, O. Carnap, R. and Morris, C. (eds) *International Encyclopedia of Unified Science* Chicago: University of Chicago Press, 1938.
- Nöth, Winfried *Handbook of Semiotics* Bloomington: Indiana University Press, 1990.
- Sarup, Madan *Jacques Lacan* New York: Harvester Wheatsheaf, 1992.
- Schutz, A. "The Social World and the Theory of Social Action" in *Collected Papers*, v2 The Hague: Martinus Nijhoff, 1964.
- Stamper, Ronald "Signs, Organisations, Norms and Information Systems" *Proc. Third Australian Conference on Information Systems*, Wollongong: October 1992, pp21-65.