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Knowledge from the inside and outside in participative development and research on participative development

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ABSTRACT

When trying to learn about a group of users, a researcher will interpret their behaviour on her or his own background, achieving an outside understanding. Inside understanding means to know how the people themselves interpret their own behaviour.

The usefulness of inside and outside understanding is argued in the following areas: 1) information systems research, 2) concepts that relate the roles of developers and users, 3) the system development process, 4) design perspectives, and 5) system development techniques.

Obtaining both inside and outside knowledge in research increases the reliability as compared single-sided studies. Studies of user participation and involvement in the literature are challenged because they ignore the difference.

In system development, descriptive techniques give preference to outside knowledge elicitation for the developers, while co-operating techniques favour inside understanding. A mixture of techniques should thus be employed in general, while outside knowledge is of specific importance for restructuring larger parts of organisations.

1 INTRODUCTION

Researchers have tried to understand how people who work in organisations consider their work and their use of computers. Quantitative measures of, for example, user satisfaction, have been carried out in information systems research (Cheon et al., 1993) and human-computer interaction (Landauer, 1988). Qualitative methods have been applied in action research to learn about users' conceptions and knowledge in particular work settings (Greenbaum and Kyng, 1991). Galliers has discussed the appropriateness of various research methods (Galliers, 1992). He argues that all methods, except theorem proving, are possible when studying individuals and groups.

A researcher starting to learn about a new organisation will enter the process with prejudices based on general knowledge about organisations. This process is similar to what anthropologists do when learning about a new culture. When approaching a foreign culture, we always have to interpret what is going on through the values, concepts, relations, and

explanations of our own culture. We can choose to let the persons in the culture control our interpretations, or we can continue to observe what they are doing.

The term etics was coined by Pike to denote an outside observation of cultural phenomena (Pike, 1967). The operations for obtaining etic knowledge is observation and measurement of material phenomena and of behaviour. Knowledge of intentions, meanings, values, rules, etc., has to be inferred from the behavioural patterns. The way to test whether or not an etic description is adequate, is to relate it to observations of people's behaviour, without asking them about their own opinion of the descriptions.

To contrast etics, the word emic denotes the viewpoint when studying behaviour as seen from persons inside the culture (Pike, 1967, p.37). Emic operations include interaction with the persons in the culture, in order to learn about their own accounts of their plans, goals, values, meanings, etc., and their own explanations of their behaviour (Harris, 1990, p.53). The evaluation of whether an emic description of people's thoughts is adequate and accurate, depends on the opinion of the people themselves (Harris, 1975, p.159).

Pike and Harris discussed emics and etics in linguistics and anthropology, while the pair of concepts has not been considered in information system research. As a subgoal of this paper, and as a means for discussing emics and etics in information system development, the usefulness of emic and etic knowledge in research will be argued and illustrated in Sections 4 and 5.

Cooperation between users and developers depends on developers being able to understand users' points of view; thus, developers need emic knowledge about users. This emic knowledge seems necessary for the development of systems for whole organisations, for information systems design and purchase of application software, and for detailed design of functionality and user interface.

Professional developers of information systems have to act like researchers at least during the traditional analysis phase, when trying to understand the organisation and the work tasks in which the systems are going to be used. The developers do not have the same points of view and the same knowledge about use of computers in the users' work as have the users. In some cases, users may develop their own systems, and developers may also be users of the systems made. However, a traditional division of roles will be assumed in this paper. Since system developers partly act like researchers, some of the conclusions for research may also apply to development.

The emics/etics distinction has not been considered in information system development. Unlike anthropology and most information system research, which aims at understanding, system development aims primarily at change. This paper will therefore discuss the relevance of eliciting emic and etic knowledge in system development.

The concepts of emics and etics are further explained in Section 2 and 3. Sections 4 and 5 discuss the usefulness of emics and etics for definition of variables in quantitative research and interpretation in qualitative studies. The remaining parts of the paper discuss implications of emics/etics in selected concepts, techniques, and design principles. These issues are selected because they constitute central sources of normative knowledge for participative information system development.

The term "user" is discussed separately in Section 6 because it goes to the heart of the distinction. Section 7 argues why both emic and etic accounts should be considered in system development. Perspectives on design of computer systems are considered in the light of

emics/etics in Section 3, and corresponding development techniques are suggested in Section 4.

2 THE PROCESS OF ACQUIRING EMIC AND ETIC KNOWLEDGE

Developers and researchers approaching a user department will be in a situation that is somewhat similar to studying a foreign culture. Initially, the developers do not know the values, plans, and rules of the user department. However, they can give etic descriptions of, for example, the flow and storage of data.

The following case study is extracted from a research project in which the researchers tried to make the workers in an inventory department realise that their computer system functioned as a communication channel between the persons attached to the database (Nurminen et al, 1986).

> The initial representation included the goods, the worker with his intentions, the data, the computer, the program, the update, several other users of the same database, reports generated, etc. All these may appear equally as components or processes to represent. This is a typical "computer-based system" perspective or "information system" perspective
>
> The researchers did not use the emics/etics concepts. Their description is etic, because it is done regardless of what the users tell about their thoughts.

In general, system developers and researchers starting to learn about a group of users will approach the users with the categories that the developers already knew, this is the developers' emics. Compared to the users, this will constitute an etic background, since the assumptions and the general knowledge have not been compared to the opinion of the users.

> The researchers interviewed the workers, with the aim of discovering whether they thought in terms of giving information to each other and to other departments when working at the terminal. The researchers started off with very neutral questions, but the answers were negative. Finally they suggested that there could be some communication through the computer, but the workers did not see it that way. They simply felt that they were feeding various numbers into the computer because it was their job to do so (Nurminen et al, 1986, p.188).
>
> The workers did not think of who would read the data, nor did they consider who had supplied some particular piece of information. They refused to accept the perspective of the observers. The workers in an inventory department have the goods as their main object of work, and they use a database in the computer to keep account of the goods. They try to make the data in the computer represent the amount of goods. When things go smoothly, they can keep their attention on the handling of the goods which constitute the main objects of work. Sometimes, they have to consider the representation in the database more closely, and sometimes, they have to pay attention to the hardware and software interface of the computer, which serves as a link in the chain of events between worker and data.

Any system can be considered from a given etic viewpoint (Pike, 1967, p.37); etic phenomena and classifications are available before studying a particular phenomenon. An

emic account can, on the contrary, only be found by interacting with the persons in the organisation or the culture to be studied. The emic organisation must be discovered (Pike, 1967, p.37–38).

Two phenomena are etically different when instrumental measurements can show them to be so. Phenomena are emically different only when they elicit different responses from the people acting within the system (Pike, 1967, p.38).

> A developer creating a database for inventory control may create a field to catch the colour of articles, because he can observe the colour. For the inventory workers, the colour may be irrelevant, while the production date of the parts makes a difference.

The researchers in the inventory case unsuccessfully tried to extend the workers' conception of their object of work to include messages to colleagues. Therefore, the researchers concluded that their etic view of the workers' thoughts were erroneous.

3 COMPARISONS TO RELATED CONCEPTS

To argue for the uniqueness of the emic/etic distinction, this section will compare emics/etics to related pairs of concepts.

3.1 Subjective/Objective

The pair subjective/objective distinguishes non-scientific from scientific ways of studying (Harris, 1990). The difference between emic and etic depends only on whether the observer tries to obtain knowledge of the view of the persons under study or not. Therefore, both emic and etic knowledge may be both subjective and objective. For example, a measurement of the error frequency in human computer interaction is etic and subjective if the study does not fulfil scientific criteria like replicability and validity. A scientific survey of people's opinion of an operating system is emic and objective.

3.2 Mental/Behavioural

The mental includes people's intentions and motives, and how they understand the world. The distinction between mental and behavioural studies refers to whether persons' thoughts or actions constitute the object of study. The distinctions between emics/etics and mental/behavioural leads to four types of observation and description, which are summarized in Table 1.

Table 1: Emics and Etics of Mental and Behavioural

	Emics	Etics
Mental	The persons' opinion of their own values, goals, reasons, intentions, etc.	The observers' inferences of the persons' values, goals, reasons, intentions, actions, etc.
Behavioural	The persons' opinion of their own actions and of other processes, structures, material phenomena, etc.	The observers' observations of actions and of other processes, structures, material phenomena, etc.

An argument against etic description of mental issues is that observers cannot know what others think without asking them. However, when a person for example expresses her positive attitude towards a computer system, and an observer knows that she has not used the system when expected, the observer may etically judge her attitude to be negative, which does not correspond to the emic description. In general, etic inferences about people's mental states are necessary to describe lies, confusion, forgetfulness and repression.

In information system research, in system development, as well as in other social processes, etic observations not supported by emic statements appear. For example, when every user tailors her personal computer to how she wants her computer support (emics of mental), the result may be that the data transfer and sharing of software becomes impossible (etics of behaviour). This is a case where individual action creates collective results that no individual intended. To understand the mechanism behind the unintended result, knowledge of both the mental and the behavioural is needed.[1] Only through inquiring both emics and etics can unintended consequences, lies, and other social mechanisms be unveiled.

4 DEFINING RESEARCH VARIABLES

A research method will determine the way knowledge is elicited, hence whether the result is emic or etic knowledge. In this section, it will be argued that quantitative studies of user participation in design should be explicit as to whether they employ emic or etic operations. The next section will argue for the usefulness of the concepts in interpretative studies.

In a paper on user involvement, Barki and Hartwick (1989) separate user involvement from user participation. "A user is involved when she considers a system to be both important and personally relevant" (Ibid., p.53). Involvement is therefore an emic property. User participation is the activities performed by the users in the system development process. These activities are observable through etic operations. Based on empirical findings from other disciplines, Barki and Hartwick conclude that it is the involvement of the users who participate that influences positively on system design. User participation may aid indirectly through enhancing involvement. The lesson for further research was to study participation and involvement separately.

Saarinen and Sääksjärvi have studied the effects of user participation on systems success (Saarinen and Sääksjärvi, 1990). In their survey they asked the project managers to assess the involvement of the users. They found that the managers' assessment of user involvement correlated with many variables indicating system success, while the extent of participation made no difference. Barki and Hartwick emphasise that the user herself has to determine whether she is involved, implying that their measure is emic. However, Saarinen and Sääksjärvi have asked others to judge the users' involvement, thus an etic observation has been used, see Table 2.

[1] Kaasbøll *Counterfinal changes of computer systems* Submitted for publication

Table 2: Research on user participation and involvement

	Emics	Etics
Mental	Barki and Hartwick's (1994) measurement of involvement	Saarinen and Sääksjärvi's (1990) measurement of involvement
Behavioural	Barki and Hartwick's (1994) measurement of participation	Barki and Hartwick's (1990) suggestion for measurement of participation

To carry out studies that are commensurable with Barki and Hartwick's concepts, emic operations should be applied to elicit user involvement.

In a quantitative study, Barki and Hartwick (1994) presented a questionnaire to users to assess their participation, involvement, and attitude. The response received was thus the users' emics of their behavioural (participation) and mental (involvement and attitude). The latter measures the psychological state of the users, see Table 1. To measure the degree of participation, etic behavioural observation might have been expected. Barki and Hartwick asked yes/no questions to the users about their participation, eg, "1. Were you a member of the team that developed this system?" and "9. Did you have responsibility for the success of the new system?" (Barki and Hartwick, 1994, p.80) An etic observation of behaviour might have given a different measure. Concerning, eg, question no.9, etic observation might have shown the responsibilities documented in minutes of project meetings. The emic answer that Barki and Hartwick received may reflect a user's involvement because she feels responsible, rather than formal designations of responsibility. The response to other questions, eg, question no.1, may be less problematic. Barki and Hartwick do not argue for their emic measurement of the behavioural. They conclude:

> Together, these results provide strong evidence for the distinctiveness of user participation, operationalized behaviourally, and the psychological constructs of user involvement and user attitude. (Barki and Hartwick, 1994, p.72)

However, their emic measurement of behaviour leaves an open question as to whether the way they have operationalized user participation is very distinct from the psychological constructs.

In general, variables designed to elicit emic knowledge should be measured by emic operations. Applying etic operations to the same variable can provide data for triangulation.

5 INTERPRETING QUALITATIVE DATA

Separate emic and etic operations of the mental and the behavioural enable observers to explain the etic observations or to question the credibility of the emic statements. Such issues should be considered in qualitative information systems research.

The following example will illustrate the advantages of obtaining several persons' emic knowledge about both the behavioural and the mental, and of making etic observations and inferences. To evaluate functionality, user interface, or other aspects of a computer system, a method of study is to make users "think aloud" while using the computer. This is an emic operation, because the users tell in their own words what they experience.

In a research project on language and computerisation, Berit Holmqvist has studied work at the Postal Giro in Stockholm (Holmqvist, 1989). The work task is to register numbers from paper slips at the keyboard of a computer terminal. Quotations from "thinking aloud,"

interviews, and Holmqvist's interpretations are given below. I have added the left column to indicate the emic/etic distinction.

Etics of behaviour	Holmqvist:	The following … is taken from … a girl who is thinking out loud while working at her work station.
Emics of behaviour	Girl:	the last digit there is the control digit, and therefore I have to type
		… and then five, then it's the total
	Computer:	'beep'
Emics of mental	Girl:	I can't flip through the slips when I want to
Emics of behaviour	Girl:	… that was wrong
		… then I have to remove this warning signal,
	…	
Etic observation of behaviour	Holmqvist:	She is given an error message and she cannot continue with her job unless she adopts a certain course of action.
Etic inference of mental	Holmqvist:	She interprets the signal as action control:
		Signal: re-adjust your previous action
		No signal: keep going
	…	
Etic of behaviour	Holmqvist:	A coordinator's job is to establish routines for production and cooperation on an overall level.
Emics of behaviour	Coordinator:	… and then we sometimes worked with sound signals in order to interrupt the working against the slip and introduce the working against the monitor display.
Etic inference of mental	Holmqvist:	He (the coordinator) interprets the sound signals as attention control in a conceptual sphere that could be described like this:
		Signal: look at the monitor.
		No signal: look at the slips
	…	
Etic inference of mental	Holmqvist:	While the coordinator tends to look at the electronic digits as the real work objects in the process of registration, and the paper as just a necessary evil that causes error:
Emics of behaviour	Coordinator:	we must interrupt this sitting and looking at the slip and registering
Etic inference of mental	Holmqvist:	—the girl views paper as the real work objects and the computer system as a necessary evil that control her activities:
Emics of mental	Girl:	I am not allowed to flip through the slips the way I want to.

Holmqvist's case illustrates three points.

- First, emic knowledge of use of computers is biased according to the roles and interests of the persons studied.

- Second, etic knowledge is necessary to relate the emic observations. For example, Holmqvist needs to know the girl's tasks and the coordinator's responsibilities to interpret their utterances.
- Third, user models have to be derived from emic knowledge. A user model can explain and predict aspects of human computer interaction. Holmqvist makes etic inferences of the mental of both the girl and the coordinator, explaining how they react to signals and no signals. These explanations are models that could also be used for predicting future behaviour of the persons. Therefore these models are user models. They are based on emic knowledge, but they are not uttered by the persons in the way Holmqvist expresses them. Etic inferences seem to be necessary to express the user models such that the models can be of use for support, training, or design.

The lesson to be learnt is that etic knowledge is necessary for interpretations in research methods that emphasise emic knowledge elicitation.

6 CONCEPTUAL BIAS

While anthropology and linguistics have improved understanding as their goal, information system development aims at change. The emics/etics concepts are thereby brought into a new context, creating a new combination of ideas. It becomes possible to ask for the difference between change based on emic and etics. There are different development processes and different solutions that may require emic and etic knowledge to various extents. The different needs for knowledge in development processes are described in Section 5. Solutions based on emic and etic knowledge are described in Section 8. Techniques for system development are classified according to emic or etic knowledge elicitation in Section 9, and the techniques are coupled to the corresponding processes and solutions.

Prior to considering knowledge from the inside and the outside in user participation in system development, a possible emic or etic bias introduced through the concepts "user" and "system development" will be discussed.

6.1 "Users"

The persons who use computers in their work do not consider themselves as "users" (Yourdon, 1989; Grudin, 1993). They may call themselves clerks, nurses, or managers, according to their occupation or their major tasks. Grudin suggests that computer scientists therefore should abandon the word "user" and talk about clerks, nurses, and managers instead, at least when the full generality of "user" is not required. He argues that the term "user" falsely suggests that there exists a typical range of users.

However, the difference between "clerks, nurses, and managers" and "user" is not primarily a question of generality, but of emics and etics. Nurses do not use the expression "user" in the same sense as system developers or information systems researchers do because "computer users" is not a relevant concept in the nursing profession. Nurses may say "patients" or "hospital users" when talking to colleagues about the people whom they nurse. When talking about patients, health professionals can use their own, etic expressions, they do not have to use the emic concepts of the patients. However, when professionals talk to the patients, most of the people who are ill would prefer to be called by their names, this is an

emic concept which they know. They may even feel insulted if a doctor called them "medical care users."

Similarly, computer scientists should be careful to use the emic concepts when talking to those who use computers. When talking to other computer professionals who are aware of the distinction between "clerks, nurses, and managers" and "user"; the word "user" can be applied. The battle to be fought is to make computer scientists aware of the distinction between their own perspective and the perspectives of their users. It is not a battle against the concept "user."

Grudin (1993) also argues against the concept "user interface." Computer scientists may deal with a computer's interface to other devices and its interface to users. Thus for developers and researchers, "the user interface" is the obvious name for the computer's interface to its users. Grudin also says that "the computer interface" is preferred by users as their emic expression for the same thing. However, the users may also include, eg, documentation, training, colleagues, and user support service as parts of their emics of the computer's interface.

Again, the difference is between emics and etics. Grudin suggests that neutral terms such as "interface" or "human-computer interface" should be chosen instead of the emic and etic expressions. However, when recognising the difference between the emic and the etic positions, both kinds of concepts should be used to make it clear from which perspective the story is told.

6.2 "System development"

The term "system development" indicates that there is something that can be identified as a system, and that someone considers the changes of the system to be improvements. From a system developer's point of view, a computer system usually consists of programs that can process related data. System developers may, eg, change the user interface of one system to align with a new standard, and since the aim is improvements, the computer scientists may call the change "system development." This is a view that is aligned with general categories in our science and hence it is etic. Users who use this system in addition to several other systems, may consider the new interface to be inconsistent with the old ones and with the user interfaces of the other systems they use. They may experience the change as reduction of quality of the computing resources at their disposal. In their emic view, the computing resources available to them may constitute "the computer system." A user's emics of "system development" may therefore mean improvement of the total computing resources available for her or him.

In summary, both "user" and "system development" are etic concepts of the system developer about users. Accepting this, "user" and "system development" are also parts of the emics of the system developers, being their preconceptions of their world. When these preconceptions are about others, the preconceptions also become etic knowledge of the others.

The problem formulation in this paper is biased towards system developers and information system researchers as opposed to users. If the ideas of emic and etic were to be presented for users, the problems would have to be expressed differently.

7 EMIC AND ETIC DESIGN

For the sake of simplicity, we call design only based on etic knowledge *etic design,* and correspondingly *emic design* when only emic knowledge is considered. These are ideal types, and a design process may come closer to one or the other.

To consider alternative organisational structures and technological solutions, general categories of information systems may provide unified views of several places in an organisation. Since the concepts and structure of such views to a small extent is derived from the users' knowledge, design based on general information system knowledge is close to etic design. It has been known since long that design only based on the knowledge of developers endangers system quality (eg, Lyytinen and Hirschheim, 1987, p.290).

Users who develop their own applications carry out emic design. They can make the systems according to their own imagination, and they know whether the system satisfies their needs. It has been noted that users tend to want new systems to be replica of the older ones with some functionality added.[1] To mirror existing solutions is not innovative and possible benefits from exploiting new technology may be lost. In addition, the personal emic systems may have a poorer technical quality and the systems may not suit other users. However, innovative computer solutions have been made by users who also have the necessary technical knowledge and imagination.

To avoid the pitfalls of pure etic or pure emic design, the development of computer systems should be based on both emic and etic knowledge.

8 KNOWLEDGE REQUIREMENTS FOR DESIGN PERSPECTIVES

Design perspectives of use of computers, such as a data system perspective, or a medium or tool perspective, address basic functionality with different views on computers, humans, and organisations. The perspectives have been used as guidelines for system design. Guidelines, which favour a design that suits emic knowledge, should be accompanied with development techniques, which emphasise emic knowledge and correspondingly for etics. Therefore, these design perspectives are characterised according to the emic/etic distinction in this section.

8.1 Data system perspective

In a data system perspective, people may either be regarded as mechanistic parts of a system, or they are totally rational beings served by the data system (Nurminen, 1988). A mechanistic system is predetermined, thus the concepts and knowledge needed for its operation is known independently of the people present in the system. A data system perspective comprises some predefined categories like, for example, data, information, process, structure, computer, user, algorithm, database, and format. These categories are general concepts from informatics, and there is no evidence that users will regard themselves and their work by means of computers as parts of a data system. Examples like the inventory workers and other documented studies (eg, Holmqvist, 1989; Perby, 1987; Turkle, 1984) indicate that a data system view is often far from the perspective of users. Etic knowledge is therefore considered sufficient for design in a data systems perspective.

8.2 Media perspective

The researchers who interviewed the inventory workers, tried to make the workers regard the computer system as a means for communication—they argued for a medium perspective on the computer system.

Media for identified receivers, for example mail, telephone, pneumatic despatch, memos, and messages on scraps, may be analogies for many office applications. The sender of electronic mail defines the receivers, while a conference system is more like an office mass medium, in which contributions in the conferences can be read by everyone given the right privileges.

Mass media in general also constitute analogies for computers (Andersen 1986, p.68). This can be interpreted in two ways. First, one can consider the developers as the senders and all the users as receivers. The developers send record formats, labels, prompts, and error messages, all to be read by the users. Second, a large database for public use may be regarded as a mass medium. The developers are still senders, while additional senders, who provide the data, make up for most of the contents of the messages.

The medium perspective was etic in the case of the researchers and the inventory workers, and since the inventory workers did not accept it, it was not emic. To decide whether or not a computer system functions as a communication medium, it is necessary to know how the users experience the communication. This was also what the researchers in the inventory tried to do. Therefore, the medium perspective requires emic operations for analysis or design.

8.3 Tool

Joseph Weizenbaum has discussed a distinction between “prosthetic tools” as opposed to “autonomous machines” (Weizenbaum 1976). A prosthetic tool is under complete and continuous control of its user like a bodily extension, while an autonomous machine is able to run for itself for a period of time. Some digital equipment can function as prosthetic tools. To draw a rectangle on the screen by means of a mouse can be experienced as being in direct interaction with the rectangle. The mouse thus functions as a bodily extension. Similar experience of directness can for example be achieved when using a computer controlled car brake, or when calculating the sum on a spreadsheet.

The way to decide whether a computer system is a tool in the prosthetic sense is to make the users evaluate whether or not they experience the computer as a bodily extension. This test is an emic operation, because it is necessary to ask the users about their opinion.

The Utopia project aimed at design of a computerised tool for make-up of newspaper pages by typographers (Ehn and Kyng, 1984). A tool perspective was a guideline in the project. Ehn and Kyng report that two of the central aspects of the tool concept developed in the project were (Ehn and Kyng, 1984, p.219):

- Tools are fashioned for the use by a skilled worker to create products of good quality.
- Tools are extensions of the accumulated knowledge of a given labour process.

The knowledge of a labour process is emic. This means that the knowledge behind the design of a tool and the tool perspective is emic.

8.4 Interaction partner perspective

In some computer games the user plays against the computer. In these cases, the computer becomes an interaction partner for the user. Similar effects have been detected in user programs for work, when the users are interviewed and or they think aloud (Andersen and Madsen, 1989). Since this perspective on computer usage depends on the experience of the user, emic operations are necessary to evaluate whether a computer system functions like an interaction partner.

In other computer games, there are animated figures controlled by the user. Players may identify themselves with such a figure, thus make-believe they are the characters in the game, for example a child saying "I am Pac-Man" while playing (Turkle, 1984). An information retrieval system can be designed by similar means, by having an agent in the system that the user can identify herself with. Emic operations are required to determine whether or not this happens.

8.5 Requirements from design perspectives

In summary, etic knowledge is necessary in all design approaches. Emic knowledge is required when designing computer systems intended to support users' tasks, be it a medium, a tool, an interaction partner, or an agent of identification. If a data system is the design ideal of an information system comprising people and machinery, etic knowledge may be sufficient during design.

9 SYSTEM DEVELOPMENT TECHNIQUES

The information systems development literature describes different approaches for developers to be informed about users' knowledge of their work and the use of computers. This section will classify the approaches according to the emic/etic difference.

Even though the paper focuses on participative development, the techniques considered here are selected because they are commonly used, not because they favour participation in particular.

9.1 Related categorisations

Kensing and Munk-Madsen (1993) evaluate techniques for system development according to how the techniques support communication between users and developers. Their aim is to argue for participatory design. They consider three domains of discourse: users' present work, technological options, and new systems. They also consider two levels of knowledge: abstract knowledge and concrete experience.

Kensing and Munk-Madsen assume that users have concrete experience with their own work, and that it is the developers' responsibility to apply tools and techniques allowing them to develop concrete experience with users' work too. "Concrete experience" is not precisely defined. It is stated that the developers need "some feeling for the users' work," and to achieve this "developers must experience users in action" (Ibid., p.80).

Emic knowledge includes how the users experience their work. This implies that emic operations should be carried out to gain knowledge of the users' experience. Kensing and Munk-Madsen find many techniques appropriate for gaining concrete experience with users'

present work, eg, interviewing and think-aloud experiments. These are two techniques that elicit emic knowledge. Observations and "developers doing users' work" are also found appropriate by Kensing and Munk-Madsen. However, developers can make etic observations. Also, when developers do users work, the developers experience this work on their own background. Developers who use the same database for the same tasks as the users may, eg, experience the task to be easier to accomplish than the users experience, because the developers are acquainted with the technology. Thus, the developers do not elicit any emic knowledge. They gain concrete experience, but no "feeling for the users' work."

To provide a more precise characteristic of what it means when developers gain concrete experience with the users' present work, it should be emphasised that the developers need emic knowledge of the users' experience.

9.2 Descriptive methods

Most methods for system development depend on making descriptions of parts of the information system. Examples are dataflow diagrams, object-oriented modelling, and data modelling. These descriptions are all made by means of predefined, partly formal notation. The categories to be described are considered important to the developers, and there is no reason to believe that these categories are particularly relevant for users. The methods therefore have an etic basis in the knowledge of the developers. The ways that emic analyses are included in the methods will be considered below in more detail.

9.2.1 Structured analysis

Yourdon suggests that a project should start with a survey that includes interviews with users (Yourdon, 1989, p.88). This activity is not precisely specified, and it is also unclear about what the developers should ask the users. The developers may achieve some emic knowledge through the interviews.

A central part of the method is to make dataflow diagrams and entity-relationship diagrams. These diagramming techniques belong to the culture of system developers, and the developers are also the ones who are to construct the diagrams, according to the method. The diagrams should be redrawn to be "acceptable to the user" (Yourdon, 1989, p.161). This implies that the users' opinion is considered, while the conceptual framework into which the users' knowledge is included is from the culture of the developers. The analysis thus mainly elicits etic knowledge.

Human-machine border and user interface are to be determined after the diagramming. Yourdon emphasises that users may have different opinions about these decisions (Yourdon, 1989, 380–409). However, there are few guidelines as to how user opinions should be found and decisions made. It is therefore unclear to which extent the developers elicit emic knowledge from the users.

9.2.2 Object-oriented analysis and design

Coad and Yourdon's object-oriented analysis sets out to make an object-oriented model of the problem domain of the information system (Coad and Yourdon, 1991 a). The method advises that the developers should learn directly from the users and use their terminology in the model. It is also recommended to observe work and to read documents. Coad and

Yourdon thus recommend a mixture of emic and etic ways of study. However, the model that describes what the users tell, is structured according to the developers' knowledge, which is the object-oriented description technique. The structure of the description is therefore etic.

To design the human interaction component, the method suggests to describe the users and their tasks (Coad and Yourdon, 1991 b). For each user, this description is supposed to cover the user's needs, wants, age, level of education, computer skills, tasks, etc. This description does not follow a formal notation, and it may open up for other categories than suggested, hence users' emic knowledge may be described. The way how the developers should obtain the knowledge for this description is not specified. It seems necessary, however, to ask the users for much of the information needed, hence emic knowledge may be elicited. The design of the human interaction component thus involves emic operations.

The other parts of the method do not consider emic knowledge. Most parts of Coad and Yourdon's object-oriented analysis and design thus rely on etic knowledge.

9.3 Participatory design

Cooperative prototyping and participatory design are two, related approaches to active user participation in system development (CACM 93; Greenbaum and Kyng, 1991). According to the ideals, users and developers should cooperate closely on design of computer systems. The typical scene for cooperation is when users and developers evaluate and change a prototype together. During the cooperative development, the developers will gain emic knowledge of the users' work and use of computers.

Some emic knowledge will not be verbalised, because there is no need for making it explicit, or because it is tacit knowledge and cannot be verbalised. Discretionary judgements and the handling of a lacquering pistol are examples of knowledge and skills that are hard to verbalise. Nevertheless, emic knowledge that is not verbalised can be used during design or evaluation. The users may tell that some technical solutions are better than others, without giving any emic reasons. Thus the developers may never learn exactly how the users think; only the consequences of the users' expertise.

10 IMPLICATIONS

10.1 System development practice

It has been argued that both emic and etic knowledge is necessary in design. System development based on pure etic knowledge runs the risk of creating systems that do not meet emic needs. If, on the contrary, the design is based on emic knowledge only, the systems may turn out as replica of the older ones.

System developers starting to learn about a group of users will interpret what the users do according to the developers' etic background. The developer should be aware of the fact that he or she initially has an etic view of the users. To extend the knowledge of the users with emic knowledge, emic operations should carried out. Open interviews with users, cooperative design, and other experimental techniques are appropriate for bringing emic knowledge into design.

Descriptive techniques favour etic knowledge, while participatory techniques focus on the emics. Therefore, both types of techniques should be utilised.

When developing data systems in which every event is predetermined, etic knowledge may be sufficient, and descriptive methods could therefore be used alone. It may be tempting to consider, for example, reimplementation of existing systems as pure technical development. Experience shows, however, that reimplementation usually impacts functionality or user interface of the systems. Hence, also user requirements should be considered, requiring emic knowledge elicitation.

10.2 Curricula

Because of its usefulness in many areas of information systems, the emics/etics distinction could be included in the theoretical basis in information systems development courses. This will serve two purposes: to make future system developers realise that their etics of users differs from emic knowledge, and to teach that emic and etic operations are available in system development techniques and how to use the techniques.

Exercises can include design based on etic knowledge and application of emic operations to learn that the distinction yields practical consequences. The emic operations can be carried out on other students instructed to play the users' roles, if real users are not available. Lessons should include successful examples of emic and etic knowledge elicitation, as well as pitfalls in unbalanced development.

10.3 Research practice

Good research practice should use several research methods for triangulation. Emic operations can be used to control etic knowledge and vice versa. In addition, both emic and etic operations can be applied to both the mental and the behavioural, see Table 1. Appropriate methods can be found in general textbooks on research methods. When studying the use of computers, logging the input/output constitutes a source for etic knowledge of the behavioural, which enables an easy collection of large amounts of data.

It was pointed out in Section 4 that a variable designed to elicit emic knowledge should be consistently measured by emic operations in order to compare results from different studies. If emic and etic operations are mixed in one study, triangulation can be achieved. However, if a variable is measured by emic operations in one study and etic operations in another, there are just two different studies of two different sets of data.

10.4 Further research and development

It was pointed out that the distinctions "abstract/concrete," "people/computers," and "contents/expression" could be made more precise if the emics/etics distinction was considered. The emics/etics distinction may also be useful for the construction of conceptual frameworks for information systems. The Framework of Information Systems Concepts (Lindgreen, 1990) has been criticised for not enabling a user perspective (Kaasbøll, 1992). Introducing emics/etics in FRISCO and in other conceptual frameworks will make the difference between a user perspective and a developer perspective explicitly available.

Corresponding arguments can be given for techniques in system development. Dataflow diagrams favour etic knowledge. User interface properties can be derived from dataflow diagrams (Sutcliffe and McDermott, 1991). If a user interface description is developed into a prototype for testing, emic knowledge of the system can be included in the design process.

Development of system development techniques should also improve the coupling of etic and emic operations.

A few cases of information systems research were considered in sections 4 and 5. Surveys of empirical research will document to what extent improvements of research methods in information systems can be made. It could then be possible both to characterise research methods (eg, Galliers, 1992) more precisely.

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