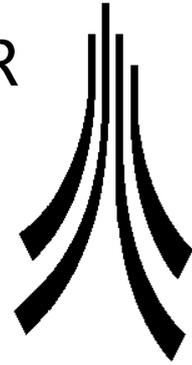LANCASTER
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The contribution of ethnomethodologically-informed ethnography to the process of designing digital libraries

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ABSTRACT

We describe ethnomethodologically informed ethnography as a methodology for information science research, illustrating it with the results of a study in a university library. We consider the issues that arise in coordinating the results of this research with the needs of information systems designers. As well as showing how ethnography can be used to inform systems design, this also carries implications for addressing the problems of coordinating ethnographic results with the work of other information science research methodologies. We describe our approach to addressing some of the problems of interdisciplinary working between system designers and ethnographic researchers.

Keywords: ethnography, methodology, ethnomethodology, situated practice, generalisation, interdisciplinary collaboration in design.

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Abstract:

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Introduction

Within the field of library and information science (LIS) there is a concern with the development of information technologies supporting the browsing, searching, retrieving of information in library contexts. To this end, questionnaire surveys, observations and interviews with library users, case studies, protocol analysis, transaction log analysis of online catalogues have been used in conjunction with cognitive theory and the matching model as the primary means of developing an understanding of how users 'go about' retrieving information. Although modest technological advances have been achieved, expectations have yet to be fully realised (Borgman, 1996) and critics in the field suggest that the enterprise needs to develop means of understanding that take better account of the 'reality' of the information

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retrieval situation (Frohmann, 1992; Bates, 1989; Lamont, 1995).

One means of addressing this issue has been to turn to ethnography (Kuhlthau, 1993; O'Day & Jeffries, 1993; Nardi & O'Day, 1996; Sandstrom & Sandstrom, 1995; Squires, 1997; Mellon, 1990; Zeitlyn *et al*., 1997). Solomon's recent explication of information behaviour and sense-making (Solomon, 1997 a, b & c) epitomises the ways in which such studies have been conducted and ethnographic findings treated within the field. In reporting on the definition of meaning, construction of sense and use of information in a work planning process, Solomon elucidates what are taken by many to be central tenets of method, not only in LIS but across the broad spectrum of the social sciences.

By way of contrast, this paper aims to describe ethnomethodologically informed ethnography, as an alternate methodology for information science research, and to describe how the results of such research can be understood and applied by designers of information systems. This involves the explication of ethnomethodologically informed ethnography, its rationale, illustrations of its use and its relationship to other methodologies. We also describe how this form of ethnography can be used to inform the systems design process, constructively addressing the problems of interdisciplinary working.

We have structured the paper into two rather uneven parts. The first part, the bulk of the paper, is chiefly written by the ethnographers in the team. It explores the nature of ethnomethodologically informed ethnography in particular, its intellectual foundations, practical issues in undertaking a study and the relationship to other methods including activities labelled by others as 'ethnography'. A study undertaken in a university library is used to illustrate the issues. The second part is chiefly written by the computer scientists in the team. It explores the difficulties in making use of ethnographic findings and describes the mechanisms we have evolved to address the problem. We have attempted to preserve the reporting styles of the two disciplines. Although this may lead to rather jarring transitions, we believe it serves to emphasise the differences in approach and language use that are one of the difficulties of interdisciplinary working.

What is Ethnography?

Originally developed out of the 'strange tales of faraway places' of early Social Anthropology and adapted for sociological employ through the 'naturalistic stance' of the Chicago School and Symbolic Interactionism, ethnography's concern is 'to balance detailed documentation of events with insights into the meaning of those events' (Fielding, 1994: 154).

As we will argue in some detail below, ethnography is not in any sense a unitary method, if indeed the word method is applicable at all to its varied practices - but is a gloss on various and different *analytic* frameworks, and it is here that a good deal of confusion arises with regard to just what it means to *do ethnography*. While an ethnographic stance arguably entails a minimum orientation, which has to do with seeing the social world from the point of view

of participants, one particular approach to this, which has strongly influenced our own work, is the ethnomethodological one, in which members' methods for accomplishing situations in and through the use of local rationalities becomes the topic of enquiry. We shall expand upon this orientation and its distinction from other analytic frames within which ethnographic techniques are cast throughout the course of the paper.

Ethnography for Systems Design

Efforts to incorporate ethnography into the systems development process have stemmed from the realisation, mainly among systems designers, that the success of design has much to do with the social context into which systems are placed. Systems are used within peopled environments which are, whatever 'technological' characteristics they may have, 'social' in character. Ethnography, with its emphasis on the *in situ* observation of interactions within their natural settings, seemed to lend itself to bringing a social perspective to bear on system design.

The main virtue of ethnography lies in its ability to make visible the 'real world' sociality of a setting.[1] As a mode of social research it is concerned to produce detailed descriptions of the 'workaday' activities of social actors within specific contexts. It is a naturalistic method relying upon material drawn from the first-hand experience of a fieldworker in some setting. It seeks to present a portrait of life as seen and understood by those who live and

work within the domain concerned. This objective is the rationale behind the method's insistence on the development of an 'appreciative stance' through the direct involvement of the researcher in the setting under investigation. It is, as Fielding (1994) suggests:

> *"a stance which emphasised seeing things from the perspective of those studied before stepping back to make a more detached assessment. …. mindful of the Native American adage that one should 'never criticise a man until you have walked a mile in his moccasins'"*

(Fielding 1994: 156)

In summary, the advantage of applying ethnographic methods lies in the 'sensitising' it promotes to the real world character and context of settings; and in the opportunity to ensure system development resonates with the circumstances of systems use. In attempting not only to document or describe activities but to account for them, ethnography seeks to answer what might be regarded as an essential question: what to automate and what to leave to human skill and experience.

Doing Ethnography – practicalities and analytic orientations

As we have already mentioned it is not at all uncommon to see ethnographic approaches employed in LIS research, approaches marked by the immersion of a fieldworker within a library setting, gaining an insiders' familiarity with and gathering descriptions of given areas of activity within a library or some similar setting. In this regard our approach is in no way different: we are faced with the

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[1]   Ethnography has a long history in social research (Ackroyd and Hughes (1992); Hughes *et al*., (1993a) Hughes *et al* ., (1994)).

practicalities of gathering data about the fieldsetting and its constituent phenomena, and typically produce dense textual descriptions and sketched outlines of the ecology of the workplace and the activities which constitute the work within it. Where permission is given the ordinary flow of conversation and workplace chat is recorded and transcribed at a later date, forming an important part of the ethnographic record. These recordings and descriptions are accompanied, where appropriate, by the use of video and still photography, which, in combination with description set out to capture a sense of the 'real world, real time' nature of the work as it actually takes place, rather than some idealised version of events.

Field descriptions - the 'stuff' of the ethnographic record – have a tendency, then, often to appear idiosyncratic, messy and occasionally confusing at first glance. Some kind of order needs to be brought to bear whereby the record can be organised and findings extracted and made publicly and professionally intelligible. The extraction of findings from the record is called 'analysis' and as Solomon points out:

> *'A key aspect of the analysis process [is] the development of a classification scheme for coding of [the] data.'*

> (Solomon, 1997a: 1102)

It is at this analytic level that the ethnomethodological approach we favour breaks in a fundamental, foundational sense from the vast majority of LIS and other social scientific approaches. Our concern does not, then, lie with the *doing* of the ethnographic

study as such, but with what is *done with the findings* of that study. As we will explicate in detail below, we reject the notion that the findings of such study should be *post hoc* 'slotted into' debates as evidence for or against certain theoretical frameworks, leading to the rejection or reformulation of these theories or the construction anew of 'improved' theories.

It is precisely in this context – that of the theoretically-oriented use to which the findings of ethnographic studies are put – that confusions tend to arise when considering just what ethnography *is*, and what it is *for*. As Shapiro (1994) reminds us, 'ethnography' denotes little more than a distinction between quantitative and qualitative research methods in itself. As such 'ethnography can be put to the service of virtually any theoretical school: there are for example functionalist, structuralist, interactionist, Weberian and Marxist ethnographies' (Shapiro, 1994: 418) and as even the most cursory glance at LIS literature makes clear, ethnography has been put to the service of multiplicity of theoretical schools within the field. This is not the place to explore the differences between the various schools of thought at work in LIS. It is, however, to note that 'ethnography' is anything but a unified method, indeed it is not really a method at all but, as Shapiro points out, rather a gloss on various and different analytic frameworks. One of our key concerns in this paper is to delineate the distinct position of ethnomethodologically-informed ethnography in this regard.

Theoretical Frameworks, Codification and Analysis

A consideration of Solomon's (1997a,b,c) ethnography illustrates our concerns with much of the analysis to which ethnographic material is subjected, as a means of producing some kind of intelligible 'tale' from the raw findings. Though an ad hoc procedure developed 'on the run', the *method* of classification Solomon employs is anything but idiosyncratic, being common practice in social research, and consists of following coding instructions providing for the application of pre-formulated classification categories. Coding instructions do not apply themselves and the codification of data through the application of a classification scheme's categories relies on the discretionary exercise of judgement in-the-face of the local events the schema's categories are intended to analyse (Garfinkel, 1967b). Solomon elected to apply Elion's (1968) taxonomy of communicative events and Dervin's (1992) sense-making framework of 'situations', 'gaps' and 'uses' to the data, for example, in conjunction with an ad hoc framework developed in the course of the research for dealing with other witnessed local events.

The point and purpose of codification and classification is to *make* the social organisation of the setting - the ways in which people make sense and thereby produce information in this case - visible.

> *'Ultimately, such codes provided a basic mechanism for tracing patterns and identifying themes in the data.'*

> (Solomon, 1997a: 1102)

In tracing patterns and identifying themes, the organisation of the setting is thus rendered apparent. Again, this is not idiosyncratic behaviour but bona fide social scientific practice. The practical problem of tracing patterns and identifying themes, and understanding them rigorously or 'scientifically', is resolved through the use of the 'documentary method'.

The documentary method is employed to establish a correspondence between actual witnessed appearances and underlying patterns. Its use consists of

> *'treating an actual appearance as "the document of", as "pointing to", as "standing on behalf of" a presupposed underlying pattern. Not only is the underlying pattern derived from its individual documentary evidences, but the individual documentary evidences, in their turn, are interpreted on the basis of "what is known" about the underlying pattern. Each is used to elaborate the other.'*

> (Garfinkel, 1967a: 78)

The 'layman' interprets documentary evidences on the basis of his or her common sense knowledge of society; on the basis of 'what anybody knows'. The social scientist (or cognitive scientist or information scientist etc.) interprets documentary evidences on the basis of the corpus of disciplinary and inter-disciplinary knowledge. In addition to Dervin (1992), Solomon employs Weick's (1995) narrative on sense-making in organisations; Hymes' (1986) framework for analysing communicative events; Giddens' (1984) account of structuration and Kuhlthau's (1993) narrative on cognitive processes. Individual

documentary evidences are interpreted - and patterns thereby traced and themes identified - through the use of concepts derived from pre-defined analytic frameworks. For example:

> *'Hymes analytical framework highlights key elements in a communicative event ... It provides a facetted framework for identifying patterns of behaviour within and among communicative events as well as highlights those factors that need to be considered in analysis.'*
>
> (Solomon, 1997b: 1115)

The work of analysis is completed and made professionally intelligible and of 'objective' status through the embedding of findings in the master narratives the corpus of disciplinary and inter-disciplinary knowledge consists of (Livingstone, 1997). Thus a rigorous, 'scientific' understanding of sense-making is achieved and made available to design through the use of:

- Ethnographic descriptions
- Coding instructions
- Non-indigenous taxonomies
- Non-indigenous classification schemes
- The documentary method of interpretation
- Pre-defined analytic frameworks
- Master narratives

These are the orthodox practices in and through which much social science qualitatively treats and thereby makes sense of the sociality of information production. These practices consist of treating witnessed appearances through the application of pre-defined rules and procedures of interpretation

vis-à-vis *abstraction* conceived to provide for rigor, scientific status and the generalisation of findings, *ceteris paribus* applying[2].

As practising ethnographers we disagree with the 'orthodoxy' outlined here. Our disagreement is not based on an alternative theoretical basis but on methodological grounds. The understanding or *knowledge* of sense-making generated by the orthodoxy is the product of the ethnographer's situated performance of the practices of social science[3] *not* of the practices that constitute the setting. The orthodox practices in and through which the record is treated we refer to as the practices of 'constructive analysis'.

The problem of constructive analysis

It might be thought that the 'scientific' and professional character of constructive analysis warrants persistence with the approach. As Solomon puts it

> *'Such an understanding seems basic to future efforts to advance theory and practice.'*
>
> (Solomon, 1997a: 1107)

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[2] A curious feature of abstract generalisations in social science is that unlike abstract generalisations in natural science or mathematics, the generalised features of individual cases cannot be rigorously recovered. As Sacks (1963: 93) points out, this curiosity is a consequence of social science practices of description which systematically gloss and thereby remove the particularities of the case whereas the descriptions of natural science and mathematics 'retain the features of the particular cases: [thus] given the generalisation one can always recapture the particular object.' The issue is a central one and will be addressed in due course.

[3]Specifically, of the practices in and through which the ethnographic record is treated: of codification, classification, documentary interpretation, analysis of patterns through the use of pre-defined analytic frameworks, and the achievement of rigorous status and professional intelligibility through the use of master narratives.

Following Garfinkel, we are not convinced by such intellectual promise. The issue of codification serves to elucidate the nature of our objection. As Garfinkel (1967b) points out, coded results are treated as 'disinterested descriptions' of witnessed events. The disinterested or 'objective' character of coded results - which is the actual material of (constructive) analysis *qua* analysis in contrast to the ethnographic record itself - is seen to be provided by the coding instructions. Coding instructions are treated as 'scientific procedures' which in their application provide for the rigorous description of the social organisation of the setting. Insofar as the ethnographic record is a product of that organisation on any occasion of inquiry and in so much as the coding instructions are applied to that record, then the coded results are taken to be a part of the actual social organisation - the work of making sense and producing information say - they purport to describe. Thus, coded results make visible the social organisation of the setting.

As Garfinkel describes it, in treating the ethnographic record in this way social science treats coded results

> *'in much the same way that one might treat a person's report on his own activities as a feature of his activities.'*

(Garfinkel, 1967b: 24)

Such a report does not describe the activities of which it is a feature however; the activities themselves remain to be described.

Therein lies the reason for our scepticism regarding the promise of constructive analysis and part of the reason why members' social practices of producing information have been 'unnoticed' to date. Coded results are akin to a person's report on his or her activities and as such the activities or social practices the coded results emerge from *remain to be described. A fortiori,* under the auspices of constructive analysis, the social practices in and through which members make sense and produce information have *not yet* been described. Furthermore: the methodology of constructive analysis denies the technology development effort any prospect of supporting those practices.

That prospect is denied in that constructive analysis' practices have been designed to satisfy criteria of scientific rigour incongruent with the subject matter of the *social* sciences (Winch, 1958; Garfinkel, 1967a; Button, 1991; Hughes & Sharrock, 1997). The phenomena we see, and thus the understanding we generate through the practices of constructive analysis, are the products of those practices not of the practices constitutive of the phenomena itself. As such, the practices of constructive analysis can do no other than pass members practices by[4].

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[4] This is not to say that the findings of constructive analysis are necessarily mistaken or just plain wrong. Rather, insofar as they do produce factual knowledge of a calculable status - i.e. knowledge that through the rules and procedures governing its production is construed as generalisable and warrants inference and action, the implementation of social policy or specification of requirements in system design say - then it is through practices other than those sanctioned by the scientific community. One such practice is the documentary method which is formally eschewed. Logico-empirical methods are advocated instead but, as Garfinkel's (1967c) pioneering work in the field clearly demonstrates, taking the documentary method out of the loop has proved to be a recalcitrant and central methodological problem in social research. Formulating a solution to this problem is in many respects *the* methodological theme of this paper. That

Before proceeding further, it should be said that insofar as we have used Solomon's work to elucidate this point then it is not towards the end of criticising that work. We are not interested in criticising Solomon's work (or work like it), it is work of the first order, hence our selection of it as our choice of example. What we want or hope to achieve by explicating the ethnographic practices engaged in by Solomon - i.e. the practices advocated by the conventional social sciences which Solomon has so craftfully and competently performed - is to point out the limitations of those practices. Specifically, that in the performance of the practices of constructive analysis, the 'real world' practices in and through which members make sense and produce information are glossed over and obscured. Constructive analysis cannot do otherwise.[5]

Ethnomethodology and the orderliness of the social

In and through *'doing'*[6] the work of glossing members' 'real world' practices - i.e.

in doing coding, interpreting, analysing and embedding results - information production comes to be conceived in terms of underlying structural and cognitive procedures and processes. As Suchman (1983) points out, the procedural structure of organisational activities is the product of the orderly work of the setting, rather than the reflection of some enduring structure that stands behind that work. As Hughes *et al.,* (1994) point out, it is through the social practices, of which the setting's orderly work consists, that process emerges. We take ethnography's task to be one of explicating and making available to design these social practices, and thus the 'real world' practices in and through which members produce 'procedural structure' and its corollary 'process'. The methodological question is how might we 'go about' doing that?

Doing coding results and subsequent practices of interpretation, analysis and the achievement of professional intelligibility gloss 'real world' practices of sense-making. As such, Garfinkel suggests that

> *'Coding instructions ought to be read instead as a grammar of rhetoric; they furnish a "social science" with a way of talking so as to persuade consensus and action within the practical circumstances of the [settings] organised daily activities.'*
>
> (Garfinkel, 1967b: 24)

Recognising the limitations social science grammars of rhetoric place on the ethnographic record, we advocate that the methodological policies of constructive analysis be abandoned in the effort to achieve a rigorous

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is to say, we are seeking to develop means of producing factual knowledge of a calculable status that emerges from the phenomena itself on any occasion of inquiry as opposed to documentary practices of inference based on the interpretation of coded results.

[5] This is not to ridicule or ironicise constructive analysis. Its achievements are unquestionable. However, for practical purposes of social research and system design alike, we want to know 'what more' there is to sense-making and 'what more' do we have to do in order to find that out? Insofar as the practices of constructive analysis prevent us from answering that question, we seek alternatives (Garfinkel, 1996).

[6] The use of 'doing' in ethnomethodological studies is designed to emphasise the achieved and accomplished character of the activity. Thus one might speak of 'doing reading', 'doing driving' or 'doing writing a paper'.

understanding of sense-making practices involved in producing information and the development of appropriate technological support.

As we said before, ethnography is a gloss on various and different analytical frameworks and ethnomethodology (EM) is one such analytic framework, and a 'radical' one at that. The radical character of EM is to be found in its unique policies and practices. In the first instance, EM is a determinedly 'unconstructive' enterprise - it rejects the practices of coding and classifying the ethnographic record through the instructed application of pre-defined taxonomies and analytic frameworks, and rejects achieving a rigorous understanding of social organisation through the construction of master narratives or models *explaining* the 'real world'[7].

Ethnomethodology refuses to *theorise* practice in that, and precisely because, members' 'real world' practices are only discoverable, not imaginable. Ethnomethodology offers no theories then, it does not build theories and does not build them because it has no work for them to do: social practice *qua* practice in 'real time' cannot be discovered through such rational practices of

the imagination. EM instead places methodological emphasis on the rigorous description of the situated practices in and through the performance of which a settings' activities are produced and accomplished by that setting's ever changing staff day-in-day-out. Thus, in the first instance, EM's findings should not be read as theories but as literal descriptions of the embodied social practices in and through which members produce and accomplish the daily activities of the setting: browsing, searching, finding and retrieving information in libraries, say[8].

The methodological issue of course is how we 'go about' producing such descriptions - i.e. what are the EM's practices of explicating and thus producing factual knowledge of a calculable status regarding a setting's social organisation? It is to a consideration of this issue that we now turn our attention.

Discovering social practice

In keeping with the ethnographic tradition we 'go about' producing literal descriptions of members' practices by adopting the naturalistic stance. We seek to portray the practices in and through which members organise, produce and accomplish the daily activities of a setting from the point of view of parties to the setting's

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[7] EM is not in the business of 'explanation' as that notion is understood in the social sciences. The business of explanation - of abstracting from witnessed appearances and constructing master narratives or models according to the rules and procedures governing the production of factual knowledge of a calculable status - *trades on, offers accounts of and about*, rather than makes visible, the social practices in and through which members produce and manage the daily affairs of a setting. Thus EM eschews explanation and urges the researcher to treat practice as a topic of inquiry through and through rather than a resource for building explanatory constructs (Zimmerman & Pollner, 1973).

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[8] The insistence that EM's findings not be read and thereby treated from a theoretical stance is, as Sharrock and Button (1991: 139) point out, 'invariably disattended, thus allowing its arguments and studies to be read as straightforward exercises in sociological theorising, directed toward constructing a sociological apparatus and, inevitably on this reading, found to be inadequate for the purpose.' We urge the reader not to 'disattend'; we offer no theory or model of information retrieval - our studies should not be read or treated as explanations - but as literal descriptions of the 'real world' practices in and through which members, in this case, make sense in the library and thereby produce information of relevance.

daily work. By 'point of view' we do not refer to any individual's personal perspective on the work but to their *performance* of the work within an organisation. Thus, we seek to describe the 'lived production' of the work - the practices in and through which the work 'gets done' time and time again by any competent member and which we believe good design should, therefore, seek to support.

This does not mean that we believe the technology development effort ought to reproduce in one-to-one detail the practices in and through which a setting's work 'gets done'. In details of performance those practices may well be 'constrained' by the contingent design of current technologies and artefacts of work - new technology clearly offers members the opportunity to accomplish the daily work of a setting in a more efficient, easy and prospectively different manner, transforming the work and working relations in its implementation. In order to bring about such a state of affairs however, it is necessary to understand what 'getting the job done' actually entails: in understanding the practised ways in which members deal with and make everyday contingencies routine accomplishments of work; the practised ways they interweave or coordinate their activities; the local knowledge and small constellations of assistance that enables the work.

Consequently, when we approach the job of description we ask and seek to explicate in indigenous 'happening' detail what is being done, how is it being done and done again, and why is it being done in the ways that it visibly is. Discovering answers to these questions in details of the work's actual performance enables us to identify what is contingent on current technology and what is necessary to the continued *performance* of the setting's daily work: to the production of information in libraries for example. Thus, in explicating the lived and enacted practices in which current technologies and artefacts are embedded, we seek to predicate the development effort on realistic possibilities for design: in this case, on social practices that are integral to the job of producing information in libraries, physical or (potentially) digital.

Insofar as we are concerned with explicating the enacted practices people engage in, in order to get the work of the setting done, then we do not impose pre-specified procedures on the work of description. Thus, we do not 'hypothesise' the research problem; we do not 'operationalise' theoretical constructs; we do not formulate 'classification schemes'; we do not engage in 'representative sampling', and so on (Bradley, 1993). In other words, we do not pre-figure the research but instead let the phenomena drive it.

In order to perform the work of analysis, researcher needs to assemble coherent and concrete cases or *instances* of the discrete activities the daily work of the setting consists of (Blomberg *et al.*, 1994; Crabtree, 1998). These concrete cases should preserve and *display* the lived details of the work. Thus, *performed activity* as represented by the 'instance' is the direct unit of analysis, instead of coded results[9].

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[9] In today's research environment it is not uncommon for researchers to compile the ethnographic record and assemble concrete cases or instances through the use of hypermedia and other computer-based support. Computer-based tools and techniques have also

Having assembled a concrete case of a performed activity displaying the lived details of that activity's work, the work of analysis proper may be undertaken. In conducting analysis in an ethnomethodological mode, the researcher is not 'looking' for patterns but the social practices in and through which patterns emerge. Thus, analysis does not proceed through the application of pre-defined analytical frameworks to the case-at-hand. Nor does analysis proceed through the construction of hypotheses as 'suggested by' the data-at-hand and the subsequent attempt to demonstrate support for those hypotheses (Bogdan & Taylor, 1975; Packer & Addison, 1989; Tesch, 1990). Analysis in an ethnomethodological mode is not in the business of making 'suggestions' in that and precisely because the *making* of 'suggestions' relies on the documentary method of interpretation. In the documentary method the data 'suggests', hypothetically, a meaningful pattern, which is then used to elaborate the data. Back and forth the researcher goes until the 'hermenuetic circle' is complete, and complete through ordinary and imaginative practices of interpretation, in contrast to a thorough explication of the data's intrinsic features (Garfinkel, 1967c).

Eschewing the practices of constructive analysis and documentary interpretation, analysis in the ethnomethodological mode proceeds through the faithful description of the social practices (or *members' methods*) in and through which the witnessed activity was

been devised to support communication between ethnographers and designers in the transformation of ethnographic findings into design specifications (Twidale *et al*.., 1993; Calvey *et al*.., 1997).

visibly achieved. In this description the analyst explicates the 'cultural machinery' in and through which the witnessed activity is produced *and* reproduced by the setting's ever changing staff. As Benson & Hughes describe the matter:

> *'the analytic task is .. to explicate and describe the members' methods that could have been used to produce "what happened in the way that it did". So, in characterising some action, some setting, the description is warranted by showing how the "machinery" being described can "reproduce" the data at hand.'*

(Benson & Hughes, 1991: 132)

Thus, the ethnomethodologist does not seek to explicate patterns per se but the social practices - the cultural machinery - in and through the performance of which 'patterns', 'structures' and 'processes' are produced. That machinery may be explicated on any occasion of analysis in describing *how* the activity displayed by the instance can be reproduced in and through the self-same practices that the instance displays. In doing this, the researcher not only generates factual knowledge from the data itself - in distinction from coded results and pre-defined categories of analysis - but does so without recourse to the documentary method: biography is not imputed but manifest. As Garfinkel proclaims:

> *'EM is not in the business of interpreting signs. It is not an interpretive enterprise. Enacted local practices are not texts which symbolize "meanings" or events. They are in detail identical with themselves. The*

witnessably recurrent details of ordinary everyday practices constitute their own reality. They are studied in their unmediated details not as signed enterprises.'

(Garfinkel, 1996: 8).

As other researchers have noted (Shapiro, 1994), it is this ability to get hands-on 'real world' practice that affords ethnomethodologically-informed ethnography considerable purchase in the technology development effort. That purchase consists of abandoning the policies and practices of constructive analysis and producing factual knowledge of a calculable status through the explication of the orderly work of the target domain in witnessable details of the work's lived production. The work of discovering and thus of producing factual knowledge of a calculable status detailing social practice in 'real time' may be achieved through:

- 'quick and dirty' and concurrent ethnographic study (Hughes *et al.,* 1994).

- compiling the ethnographic record so as to be able to produce instances of witnessed activities.

- assembling instances of discrete activities from the ethnographic record that preserve and display the lived work of witnessed activities.

- describing and explicating in lived detail the practices in and through which instanced activities may be reproduced.

The notion of 'reproduction' furnishes the warrant for ethnomethodological findings[10].

Insofar as the culture provides unique practices for its activities' situated reproduction, then instances of those practices provide for the generalisation of findings. Instances afford generalisation in that:

- they capture and preserve the particulars of the witnessed activity - the machinery in and through which the activity is produced and reproduced by any competent member as a demonstrable and morally and legally sanctionable feature of their competency

- they thus make visible the practices that any competent member engages in order to get the activity done and done again.

We might add to this that the notion of 'generalisation' has as much to do with 'trustworthiness' and 'relevance' as does with scientific 'credibility' and 'validity' from the point of view of system design. Designers need to know whether ethnomethodology's findings are 'typical', are 'generally applicable' to the target domain and may thus be 'relied' upon - in other words, they need to able to trust ethnomethodology's findings. The 'typicality', 'general applicability', 'reliability'

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[10]No matter what idiosyncratic 'doings' any individual might engage in, in the course of performing a distinct activity, the activity consists of a unique *family of practices* which belong to the activity and provides for the production (but not necessarily the successful accomplishment) of the activity on any occasion of its performance. By way of example: consider doing *driving down the freeway.* Consider how unindividual the production of that activity is; how everybody 'goes on' in the same kind of ways; how everyone so visibly engages in the same sorts of practices and conventions in order to get the activity done and done again tomorrow. A study of just a few people over a short period of time, looking at activity on a single freeway can still tell us something about freeway driving in general. Even though every driver is a unique individual, they are not unique *drivers*, otherwise driving would nearly always be fatal.

or 'trustworthy' character of ethnomethodology's findings is furnished in identifying the recurrent social practices through which members manage the irremediably contingent happenings of the setting and thereby accomplish the setting's daily work day-in-day-out *as a matter of course*. Furthermore and underlying the issue of trust: in displaying the social practices in and through which members manage and thus produce the setting's daily work ethnomethodology's findings assume their particular and distinctive 'relevance' to design. Processes are produced through the socially organised practical actions of browsing, searching, finding retrieving etc. While the studies of constructive analysis 'unearth' processes - Taylor's classic question-negotiation being a prime example (Taylor, 1968) - they do not display the actual, lived work the process emerges from. System design must support the *production of process* if the technology development effort is to have any chance of being successful. Constructive analysis cannot unearth that work as its policies and practices systematically gloss the work from which processes emerge. Thus, the 'trustworthiness' and thereby 'generalisation' of findings relies on their 'relevance' to systems design insofar as findings specify work that design must support if effective technology is to developed. It is EM's ability to specify the lived work of a setting from which process emerges that warrants trust in and thus generalisation of its findings. The machinery discovered in one library is neither restricted to the members observed nor that particular library, much as the machinery in

and through which driving down the freeway is not restricted to the driver observed nor the particular freeway. On the contrary, the machinery is, as we all know, generally applicable otherwise persons could not be trained nor display their competency as drivers *anywhere*. As such, instances furnish concrete requirements for design, providing quality criteria in the development of computer support and, reciprocally, a means of monitoring organisational change through technological intervention (Crabtree, 1998; Christensen *et al.*, 1998).

In summary, the aim of ethnomethodologically-informed ethnography is to observe and describe the phenomena of 'everyday life' independently of the preconceptions of received sociological theories and methods, to be 'led by the phenomena' rather than by the concerns and requirements of a particular sociological standpoint. This involves taking a theoretically 'unmotivated' approach to the activities, looking just to see what people are doing, rather than seeking to identify things which are 'sociologically interesting', thereby dispensing with the conventional sociological preconception that there are numerous things which people are doing which are *trivial* and thus not worth studying. In this way the 'false starts', 'interruptions', 'digressions', which are aspects of all activities, are notable features of the phenomena, not so much 'noise' to be eliminated in order to reveal 'sociologically relevant' aspects of the data. The phenomena which are to be investigated are consequently studied in their character as 'phenomena of everyday life', as 'everyday' occurrences for

those who are involved in the activities in question, and the investigator is, therefore, seeking to ascertain what the phenomena *mean* for them. It is not for the investigator to decide what things are, what matters, what is important, or trivial, but to ascertain how things are judged in that way by those who are doing them, to examine the familiarity with and understanding of these matters possessed by those who must live with them. In studies of the kind that ethnomethodologically motivated ethnographers make the concern is with the depiction of 'the working sensibility' of those under study. Thus, attention is focused - in a way which is otherwise almost unprecedented in sociological studies of work - upon the study of *doing the work.*

Examples of the ethnomethodological approach

Below we provide some practical examples of ethnomethodologically-informed ethnography. In furnishing selections from instances of sense-making practices in a university library, we hope to encourage the novice to undertake EM studies of library practice and outline requirements emerging from existing work to the designers of digital libraries.

Here, then, we present three edited selections of sense-making work in the library. Full details are available in (Crabtree *et al.*, 1997 & Twidale *et al.*, 1997). The instances from which they are derived cannot be provided in full due to constraints of space. Despite this and a degree of 'recipient design', we hope these 'snippets' serve to elucidate the

ethnomethodological approach to discovery and analysis in practical detail.

1) The physical space and artefact as interpretive gestalt:

A great deal of 'search' behaviour does not entail OPAC use at all. The following account describes practices that members engage in browsing, searching, retrieving and thus producing information from the physical catalogue. Jack is the researcher and Craig, the 'subject', is a third year undergraduate law student who uses a seminar reading list as a basis for performing the search.

```
  Jack: right . what are you looking
for

  Craig: er . I'm looking for stuff
for my employment law seminar

  Jack: yeah .

  Craig: just like . read some cases
and things and then I'm going to try
and er . get on the er . law computer

  Jack: yeah .

  Craig: and try and get some
articles in legal journals about the
criminal justice and public order act

  Jack: right


  Craig and Jack go upstairs to B-
floor, Craig leads the way to the law
section, specifically, the legal
reference books section orienting to
section signs as he goes along;
section signs display general section
categories and classmarks (e.g. 'law'
AZY). Having found the section of the
```

catalogue he wants, Craig explains that the section contains standard reference books citing legal cases. The seminar reading list provides Craig with the title of the cases to be read, the title of the reference books those cases are to be found in and the specific classmark of the reference books. Craig locates the required section by specific classmark - classmarks are displayed on the ends of the shelves and display various categories of information contained therein (e.g. 'criminal' law). Craig browses the category contents of the located section by title and upon identifying the required reference books, Craig browses the index of each one respectively in order to locate the specified cases. Craig then briefly and respectively browses each case.

Having located and identified the required cases, Craig takes the reference books over to the nearest available reading desk, takes out pen and paper and begins to read the front page of the first case. In doing this Craig explains that this type of legal reference book has a specific kind of 'layout' starting with brief summaries or abstracts describing 'the facts' of the case and 'the decision' which are followed by a more detailed description of the case itself. Craig reads 'the facts' and 'the decision' of each case and parts of the more detailed case

descriptions as he deems 'relevant', writing verbatim quotes and references down as he does so. Craig explains that the more detailed case description contains references to other 'relevant' cases in which the legal precedents outlined in 'the decision' have been used

Having retrieved the specific information he requires from the specified reference books in the form of verbatim quotes, Craig commences a new search for the 'relevant' cases. Again, he does not perform an OPAC search but searches the shelves by classmark and by title. Craig the goes on to the 'law computer' to 'find' some other information.

In the above extract, Craig makes sense of the setting and produces information of relevance through: following *signs* displaying *general and classmarks and categories* of information; employing *specific classmarks and categories* in conjunction with a list to *locate* specific categories of relevance; employing *titles* to *identify* items of relevance; employing *indexes* to *locate* articles of relevance; employing the *structure of articles* - their 'layout' (abstracts, titles and sub-titles etc.) to *further identify* information of relevance; *selecting* and writing down *verbatim quotes*; *selecting* and writing down *references* of other potentially relevant articles from which information is produced in the same ways.

Here we see the unreflective social practices of making sense and producing information.

These social practices are embodied, are witnessable and consist of using general and specific signs furnishing the 'public' means to identify and locate first, general then, specific categories of potential information. It further entails the use of conventional external features of bibliographic items (physical documents) such as 'titles' to locate and identify specific items of potential information[11]; the use of its conventional internal structure such as indexes, abstracts, titles and sub-titles to further locate and specify potential information of relevance; writing down selected text and thus information of relevance; and the use of 'references' to identify other potential sources of information. Signs and other conventions - such as books having titles, authors, indexes, titles and sub-titles, references etc. - are intrinsically social. In orienting to and using signs and other conventional features of the catalogue, members *make* sense of the setting and at the same time (or reflexively in doing so) actively produce information of relevance through engaging in the social practices providing for the witnessed, situated achievement of sense. The issue presented here then is not about the physical space per se then but the social *ordering* of the physical space - the organised, ordinary and irremediably *social* practices through which members unreflectively orient to and make sense of the setting and in doing so, 'find' information of relevance. Thus, it is suggested that systems design attempt to support these social practices of sense-making in the effort to develop the digital library insofar as members find these

practices, without reflection, second thought or formal education, normal and natural to do.

2) Talking in the library:

Members frequently encounter problems in 'finding' or otherwise producing information of relevance: all too frequently, with its limited categorical choices, the OPAC fails to provide (from a member's point of view) a precise and / or flexible enough tool of categorisation. In such cases it is not uncommon for members to seek help - turning to the library's service desk staff is a natural solution. The ethnographic material presented below displays the work of involved in 'helping users find what they want' or, as described in the LIS literature and by professional librarians, the work involved in doing 'filtering work'[12].

```
Transcript  1  -  'going  about'
specifying the problem

User:  it's  erm  ..  it's  .  like
information . information about er .
these   particular   products   and
services ... market intelligence and
leisure    intelligence    etcetera
etcetera'


Transcript  2  -  'going  about'
solving the problem

Staff: what have you got there. is
it something you've got written down?

User: yeah . em I'm trying to find
out about this (shows staff a list
```

and points to a titled item on it) this part here

Staff: (looking at list) it sounds more like figures and graphs and things

User: yeah

Staff: aren't they .. um . we'll see what we get just looking under 'title' (initiates OPAC search) cos that's (inaudible) (turns screen towards user) there's a few . options you can use really on the computer . you've got keyword search . you've got subject search

User: yeah

Staff: and once you find a relevant class mark area for the subject

User: yeah

Staff: y' know . then you can look on the shelves to see if its available . er ... what have we got (browsing display - approx. 11 seconds). Staff looks at user then at screen, makes an inaudible comment.

User looks at screen, makes an inaudible comment. Both browse retrieved title display on screen in silence - approx. 6 seconds

Staff: it could be that it's worth looking around that (points at item on retrieval list) .. oh that's a video . that's not very helpful . really .. it's an ancient one as well (inaudible) erm .. (inaudible) class

mark A . it could be . er (types in new search commands). Both browse display making inaudible comments

Staff: it's more to do with science

User: um

Staff: ooh . hey look ... right ...... um that's putting you more in the physics area I think . I think if you don't find it in science what could be worth you looking at is . er . having a word with the subject librarian

User: yeah

Staff: there are a lot of maps that give . er ... I don't know what you're looking for

(Taping interrupted - approx. 30 seconds - staff and user browsing a new retrieval list)

Staff: I think we'll send you to the librarian . cos with me browsing like that .. the subject is quite specific

In the above extract, besides staff asking 'what the problem is', the first thing members - staff and user - do is formulate a vague description of the information requirement thus 'announcing', in a general way, the topic the user is seeking information about - *'it's like information about these particular products and services, market intelligence and leisure intelligence etc.'* Having formulated a vague description, staff 'goes about' finding relevant information by using the on-line catalogue's

categorical organisation - 'title' for example - to identify an appropriate search category and the user's list to formulate a clearer sense of what is being searched for: 'figures and graphs and things'. Having identified an appropriate search category and formulated a clearer sense of what the user requires - candidate categories of solution - staff initiates a search on the on-line catalogue and browses retrieved search items in concert with the user. In browsing the retrieved items, staff and user formulate new candidate categories of solutions: 'science' for example. Searches on these categories are then used in concert to produce further more 'specific' candidate categories of solution: 'the physics area' for example.

In attempting to solve information requirement problems users and staff formulate vague descriptions of the topic the user requires information about. In order to produce information satisfying the users' requirement, the vague description needs to be made intelligible in terms of the catalogue's organisation. This may be achieved through the use of lists[13]. The product of list use is the establishment of requirement 'parameters' or boundaries through the establishment of preliminary information requirement categories: e.g. 'figures and graphs and things'. The formulation of preliminary information requirement categories and, reciprocally, requirement boundaries, provides for the next problem solving action: the formulation of increasingly more specific

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[13] Not all users are in possession of a list and further ethnographic studies reveal that service desk staff use the on-line catalogue to elicit the user's knowledge of the topic and thereby formulate categorisable descriptions.

information requirement categories. Specific information requirement categories are 'worked up' through the use of established candidate categories of solution and the concerted browsing of subsequently retrieved items.

Thus, while not directly solving the user's information requirement in this instance - enough knowledge about the kind of information required had been established to warrant referring the user to the subject librarian and further more specific category work - the above segments of talk make visible the social practices that 'filtering work' consists of and relies on for its achievement time and time again. Specifically, the formulation of vague descriptions, the formulation of preliminary information requirement categories of candidate solution, and the formulation of increasingly more specific information requirement categories of candidate solution. Vague descriptions are formulated through the use of lists or the categories of the online catalogue. Categories of the on-line catalogue - 'title', 'journal', 'serial' etc. - are not sufficient to formulate preliminary categories of candidate solution - as they only describe what is or may be required in terms of the catalogue's formal organisation. What is required is some means of retrieving items that relate to - 'sound like' - vague descriptions and preliminary categories of candidate solution. This work currently trades on service desk staffs' knowledge of the library in interpreting the details on lists or otherwise elicited from the user. In establishing preliminary categories of candidate solution, staff and user 'bound' the search and

provide for the potential resolution of the problem through the subsequent 'search and browse' formulation of more specific categories of candidate solution. So the work proceeds until a satisfactory outcome is achieved or the search is abandoned[14]. Thus, in 'browsing' the catalogue within the boundaries of established preliminary categories of candidate solution, 'figures and graphs and things' is worked up into something 'more to do with science' and then something 'more in the physics area': a description of the information requirement that in situ is specific and provides for the next problem solving action: referral of the user to a subject librarian and further specific categorisation work. Insofar as members make sense and 'go about' producing information through these *practices* of categorisation in situations where the specification of information requirements is problematic, we suggest that system design attempt to support these social practices of sense-making in the effort to develop the digital library. It is interesting to note that the findings from this study at the service desk show very similar activities to those reported by Fischer and Reeves (1992) in their study of help giving in a substantially different context: interactions between customers and sales agents in a hardware store.

3) Finding the order in the machine:

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[14] Again, further ethnographic studies show that abandoning a search is warranted for service desk staff by the failure to 'work up' and establish further categories of candidate solution - users are usually referred to a section of the catalogue that offers the best potential based on what has been established 'up to now' and encouraged to return should anything more of relevance thereby come light.

This next fieldwork extract is taken from a study of CD-ROM users in a University Library and is concerned with one aspect of the 'sense-making' that accompanies this activity: the recognition that using a CD-ROM is fundamentally about the accomplishments involved in using a machine. Thus one aspect of 'sense-making' which seems especially valuable in the case of CD-ROM users is the ability to discriminate quickly between relevant information and 'noise'. Such expertise becomes important given that whatever their nature, users' errors and failures are always constituted with reference to their actions with the machine. Consequently when the user does succeed in producing an action, they must then interpret the machine response and utilise this interpretation as the basis for subsequent action,

```
Extract : simplified transcript.:

Two students coming to use CD-ROM
to look for articles on 'stress'

"I don't really know what I'm
doing... "

Trying 'Guardian'[UK Broadsheet
Daily Newspaper] 1996 - won't load -
gets help from another user who tries
another machine - changes machines

Doing a 'text search' - types in
'stress' - 1167 hits

- looking on the screen at a
notification of printout of 117 pages

"stress and causes isn't it?"
```

```
   types 'stress and causes' - search
engine does not recognise 'and' -
using 'help' [menu]

   'help' options not very helpful,
doesn't understand - asks for help

   changes search category - one word
between 'causes' 'stress'- 5 stories

   viewing stories - writing down
main points of story


   Writing down details - quits out
of 'Guardian' - accessing
'Independent' [UK Broadsheet Daily
Newspaper] .. "I really don't know
what to do.."

   presses F1 - help [menu] -
choosing database - loading database
.. "What's it doing now?.. " Presses
return (by accident??) "..I may look
as if I know what I'm doing but I
don't.."
```

In this extract the users, in an attempt to find articles about stress, make a series of selections from menus. The design of the system projects the course of the users' actions as the enactment of a procedure for doing the job - and then employs the presumed course of action as the relevant context for interpreting them. What is important, however, is that user and system each have a different relationship to the design plan. The plan directly determines the system's behaviour: the user, however, is required to first find the plan as the product of a set of procedural instructions and a whole series of studies have suggested that people have problems with instructions. In the context of Library users this comment is not an indicator of their inveterate stupidity but instead a pointer the problem of instruction following. As Garfinkel (1967a) indicates with his outline of what he terms the 'irredeemable incompleteness' of instructions, a considerable amount of work is required to carry out instructions. Even when presented with instructions that 'anyone' should be able to understand and follow problems are still arise. Consequently, many users fail to find the implicit plan that is contained in the rationale behind the way in which, for example, searches are organised, materials are presented, or 'help' provided which results in them losing their way. Such a position is usually fateful for users since the possibilities of 'repair' so common in everyday human interaction are comparatively rare in human-machine communication. It is in this sense that for the novice user "thinking can be a mistake" (Carroll & Mack 1984) since they characteristically rush to premature and often mistaken conclusions about what has happened, what is happening, what the machine 'meant', what the machine 'is thinking' and so on.

Integrating ethnography and design

The second part of this paper describes the interpretation and use of ethnographic results and the difficulties of working with ethnographers from the perspective of information system designers.

The designer's perspective

As computer scientists we are concerned less with what ethnography is than with issues of what we can 'get out of' the ethnographers to help us build better systems. It is the results and more specifically the results in an understandable and interpretable form that are of interest. With such a focus, the means of how they are obtained are of lesser interest (although still important where they serve as justification for the authenticity of the findings, an issue of particular importance when those findings are counter-intuitive or counter to traditional descriptions or approaches).

The debate over the relationships between different kinds of ethnography or between ethnography and other approaches as outlined in the first part of the paper might be considered somewhat irrelevant to our concerns, much as the debates about the choice of an object-oriented or procedural approach to the systems design may be deemed an irrelevance to the ethnographers on the design team. By contrast there are issues about the practice of ethnography that it is vital for designers to appreciate if the collaboration is to work.

More pertinent to a computer scientist, and indeed any researcher considering undertaking a collaborative project with an ethnographer are the following questions:

- What will I get from them?
- How do I make use of it?
- How do we go about collaborating?
- How long before I get any results I can use?
- How much time and effort do I have to invest in the collaboration?

- How much about social science do I have to learn / know?
- How can we make generalisations on the basis of concrete cases?
- Aren't their findings all just obvious?

The essence of the argument for ethnographically-informed ethnography, from the perspective of the system designer, is that if your data collection methods and analysis are based on, or informed by, a particular theory then there is a strong chance that the theory will feed through into the design of the information system. Consequently, the designed system may well reflect the *theory* of how library users behave rather than the *actuality* of how they do behave. This mismatch between the designed system and the activities of current users can then lead to a wide variety of problems when the new system is implemented (Bowers *et al.,* 1995), including a significant shortfall in expectations or even system failure (Page *et al.,* 1993).

Design and ethnography

".. ethnographies provide both general frameworks and specific analyses of relations among work, technology and organization. Workplace ethnographies have identified new orientations for design: for example, the creation and use of shared artifacts and the structuring of communicative practices."

Suchman (1995: 61)

Ethnography as an approach to data collection is not a method without problems, many of which have been well documented

(Randall *et al.,* 1995) focusing, for example, on such 'standard' qualitative methodological concerns as 'getting in, staying in, getting out' as well as issues of access and 'gatekeeping', reliability, validity, generalisation and so on. While these are clearly issues of some, though not overwhelming, interest to ethnomethodologically informed ethnographers, here we are primarily and particularly interested in suggesting a number of concerns and practical problems that have arisen in our own usage of the approach. We do not nominate ethnography as a methodological panacea for the design of better information systems. We recognise the problems which arise with the method's application to large scale, highly distributed organisations and the incursion of commercial constraints on budgets, time and resources. In particular, methods such as ethnography must service a number of demands if they are to be widely accepted as a tool to support effective systems design. Such caveats, however, apply equally to all other methodological approaches, and it is important not to be too ambitious for any method, least of all in systems design where new methods follow one another with monotonous regularity and where design is, at best, a 'satisficing' activity.

The role and value of ethnography in design is a matter of controversy (Anderson, 1994; Rogers *et al.*., 1995). However, if 'the turn to the social' within systems design means that designers should be informed about the social character of work, and it is recognised that ethnography is an important means of gaining such knowledge or sensitivity, then serious attention needs to be given to the variety of ways in which ethnographic studies can be used by designers. As Hammersley (1992) suggests;

> *"The purpose of ethnographic analysis is to produce sensitising concepts and models that allow people to see events in new ways. The value of these models is to be judged by others in terms of how useful they find them."*

(Hammersley, 1992: 15)

The purpose of ethnomethodologically-informed ethnography as we have envisaged and practised it is primarily as an *informational input* into design, informing the designer of actual practices which may not normally be captured by other methods. The role of ethnography in design that has developed in our own studies can be stated in terms of its ability to make visible the everyday 'real world' aspects of a setting; to see activities as social actions embedded within a socially organised domain and accomplished in and through the day-to-day activities of its users and to convey this information to designers. Such an approach focuses upon and documents the very activities which designers are concerned to understand, analyse and reconstruct. It is this ability of ethnography to describe a social setting as it is perceived by 'users' that underpins its appeal to designers. Ethnography is consequently valuable in identifying the exceptions, contradictions and contingencies of work activities which are real conditions of the setting but which will not (usually) figure in official or formal representations.

There may be a case made for ethnography (or sociology) having a more far reaching impact upon design, (Hirschheim & Klein, 1989; Shapiro, 1993). Nevertheless, our policy has always been that it is for *designers* to draw *design* conclusions from the results of ethnography; and that the integration of ethnographic materials into design can best able achieved through the *collaboration* of designers and ethnographers. As Button & Dourish (1996) suggest, such collaborations can take a variety of forms: learning from the ethnomethodologist (through their 'stories' of everyday life and work in the library); learning from the ethnomethodological account (of the various activities of users and staff in the library); and learning from ethnomethodology itself (looking, for example, at the kinds of questions raised by Button & Dourish themselves: "what are the implications of the operation and use of member categorisations for questions of individuality and grouping in (library) software systems?"). There is nothing particularly radical in this; the kinds of changes to design which will result from our approach are intended to have an *incremental* rather than a *comprehensively transformative* effect. Fieldwork is concerned with adequately and accurately capturing and portraying social settings, and the activities which occur within them. Ideally, such work should be done independently of *design* preconceptions. Its concern is with the preconceptions and activities of those who inhabit the setting. Through such an undertaking, ethnography provides a 'sanity' or reality check of the designer's preconceptions; to ascertain whether the realities of a given setting conform to the ideas of the designer. There is, thus, a basic tension between the designer's and the fieldworker's roles, but this is a *positive* feature, something which is important to and essential for good design, to highlight the difference between good *abstract* design solutions and good *practical* design solutions.

Bridging the gap: the problems of interdisciplinary working

It is important to acknowledge the difficulties that arise in this form of interdisciplinary collaboration. They are only to be expected. Firstly, we are attempting to make the transition from analysis to synthesis. Even just within computer science this is not easy. More significantly, ethnography and computer science involve two different academic traditions with substantial differences that need to be understood if they are to be overcome. We consider aspects of the problem below and ways in which they can be reconciled in order to learn to work together. In essence, this requires a willingness to devote considerable time to the process of getting to know each other's way of working. We do not have a high-speed solution to offer.

Language

Inevitably there will be a difference in terminology. It requires continual alertness to uncover cases both of using different words to mean roughly the same idea, and terms that are used in completely different ways. Both cases can lead to substantial misunderstanding. An example of the former is in the description of CD-ROM use above, involving 'finding order in the machine'. This appears to be about

issues of Human Computer Interaction (HCI), as well as the particular task at hand. Particularly notorious examples of the latter are the meanings of the words 'model', 'semantics, and 'abstraction'

The question arises of how much of the language of 'the other side' it is necessary to learn in order to communicate effectively (Bradley & Sutton, 1993). Part of the answer is just to be sensitive to when one is losing the audience, and be willing to be interrupted and to try explaining a matter in less technical language. (Note the effort of doing so reveals that jargon does have its uses - it serves as a significant verbal shorthand)

Another way is to attempt to bypass the abstractions and their linguistic equivalents by trading in examples. This approach was directly influenced by one of the methods of the ethnographers to elucidate their findings, namely the telling of stories recounting the details of instances that embody a significant set of practical issues. It is interesting to note that an analogous approach is finding favour within computer science in the form of scenario based design (Carroll, 1995). In both cases, the telling of stories can serve to concretise the issues and focus discussion on the actual real world problems and how technological possibilities could help or hinder their solution. To be very clear here, the ethnographer's stories are not scenarios - i.e. they are not hypothetical constructs but 'real world' stories detailing practical action and associated 'problems' of work as manifest by instances of the work-being-done. Scenarios are designers' way of dealing with those stories, enabling the formulation of

hypothetical systems functionalities and their operations within the context of ethnographers' stories. These hypothetical solutions are put to the ethnographers as potential 'solutions' to the problems that their story has raised and they are asked for comment. This may yield an elaboration of the current story or the provision of another one to illustrate why the proposed hypothetical technological solution is likely to help or not to help, leading to a further revision of the proposed functionality and the different ways it might be used in different circumstances relating to the stories. This back and forth scenario tweaking, accompanied by the supply of further stories or elaboration of existing stories, permits design activity without the use of too much technical language.

The chief difference between scenarios as practised in systems design and the stories emerging from ethnographic studies is that the former are hypotheticals used to explore a design space and range of ways of plausibly using the envisaged system, whereas the whole point of the latter is that they are real observed practice. Thus in the design process we have a sharing of real examples provided by the ethnographers and hypotheticals (in terms of possible functionalities) offered for comment and critique by the systems designers.

The process has many parallels with activities in Participatory Design (PD) (Crabtree, 1998). This is not surprising, since PD is also concerned with addressing the problem of how to engage in a systems design dialogue with people who are not systems designers. Does that mean that ethnographically informed design is just a

variant of PD with the ethnographers standing in for a range of end users? Not at all. Without equivocation, nobody knows the work of the setting better than the potential 'users'. Two problems exist however. On the one hand, although users know what they do, they frequently find it difficult to articulate that knowledge (imagine trying to describe the work of category formulation off the cuff). On the other hand, their knowledge is only partial - they know their job and maybe part of somebody else's. They do not know how the temporally and spatially distributed activities of the workplace are coordinated - i.e. they do not know how their activities are concerted and thus they do not know and cannot therefore elucidate the sociality of the settings work in actual real world detail. It is the very ability to elucidate the sociality of work which, as we have noted, affords ethnomethodologically informed ethnography considerable purchase in the development effort (Hughes *et al..*, 1993b).

Natural Attitude

A key issue in learning to work with ethnographers is in understanding that they may not merely use a different language but also have a different orientation and thus attitude to issues of design. Again, although we will examine the case of collaboration between systems designers from computer science and ethnographers, the point applies as much to a collaboration between ethnographers and a researcher from the theoretically informed social sciences. Compounding the problem for computer scientists is that the consideration of 'worldviews', to use a somewhat provocative phrase, can be rather alien. Self-reflection is not a conventional academic activity in computer science. Albeit somewhat crudely, we will attempt to outline what we take to be some of the central issues here. They are in danger of being reduced to stereotypes and the individual, although conceding a grain of truth in the issues, may deny that the description actually applies to him or her. Nevertheless, an understanding of these stereotypes can help in gaining a better understanding of the views, actions and interests of the 'other' side. The different 'worldviews' lead to a concentration on certain aspects as being of particular interest and a certain sensitivity to particular issues

Stereotyping the natural attitude of ethnographers

The earlier parts of this paper have endeavoured to elaborate this 'worldview'. Ethnography is directed toward detail, toward the production of a 'rich' and 'concrete' portrayal of the situation, rather than an 'abstract' and 'spare' one. Abstraction and simplification are characteristically resisted, for it is the disposition of ethnography to insist upon citing items, incidents, activities or practices within their context, to emphasise that their meaning, or sense, is only properly comprehended within the appropriate socio-cultural situation. To see things 'right' is to see them in their context, and to portray them in the above mentioned abstract and spare way is to divest them of their sense, to distort the understanding of their role. There is, and rightly so, a resistance to simplification. Thus, the product of such studies involves the extensive use of discursive text which

explicates and elaborates upon examples drawn from the field. Ethnography is about understanding the world as it is understood by the participants. Thus it is non-judgmental. It tells you what is, not what ought to be. It does not seek to construct theories that explain behaviour

Stereotyping the natural attitude of computer scientists

Computer science in terms of systems design is an aspect of engineering. It is about trying to get programs to work and to do something useful. It is about identifying problems and fixing them, both in the workplace by the development and introduction of systems, and in the process of getting these systems to work (by for example debugging). We can see computer science as being in the modernist, optimist paradigm - everything has a technological fix, and the problems introduced by technology can be solved by more technology. Since the 1960s a growing understanding of the 'software crisis' has led to the development of software engineering. This tries to tackle a range of related issues including how to generate code more efficiently and how to ensure that the programs created do in fact yield improvements in efficiency when deployed. This leads to a concern to better understand what the system to be designed needs to do - the process of requirements capture. It is to address this problem that it was first considered that ethnography can make an important contribution. The process of systems design is about abstraction and simplification - the building of models and the concentration on data flows that can be modelled and manipulated. Thus the analysis that precedes synthesis is necessarily reductionist. Design often occurs with the supply of a (supposedly) precise description of the problem and what is to be built. Design is about abstraction and complexity, and the designer is characteristically in search of ways of *simplifying* the complexity of the design situation, often by means of abstractions which will delineate critical features of that situation and of the design problem. The designer wishes to find mechanisms which will quickly and succinctly convey the aspects of a design that are key to meeting the problem at hand. Notations and diagrams abound, and these have specialised meanings and are used to provide design teams with a common vocabulary.

Comparison of natural attitudes This elaboration of worldviews helps to illustrate why it may be difficult for the two groups to work together and why they may frequently talk at cross-purposes. It also reveals why it is important that they should work together given the complementarities of the two approaches. Numerous computing projects have failed because although the resultant program did precisely what it was specified to do, it was the specification that was itself in error because it over-simplified the work activity in classic computing reductionist style, thereby ignoring crucial aspects of the activity that should not be abstracted away. It is the hope that ethnography will help in serving to warn about what should not be ignored while not insisting that everything is important.

There is the danger that the computer scientists will expect the ethnographers to tell

them what to build. Firstly that would be to misunderstand the purpose of ethnography, but at the same time, design does require ethnographers to participate in the process of judging and recommending, something that they may find alien. It is important that the ethnographers are prepared to commit to design decisions.

Although ethnographers generate a lot a data (and even this is a distillation of the huge amounts collected in the field), the resulting reports should not be judged to be the 'result' of an ethnographic study. Rather the result emerges from the ongoing design dialogue with the ethnographers including their selection of illustrative cases to address the design questions and hypotheticals that the designers raise. We would claim that it would be extremely difficult to do an effective design based solely on a written report of an ethnographic study - too much is lost. To a computer scientist, the design dialogue with the ethnographer is itself a form of requirements capture, or knowledge acquisition. We would concur with Rogers and Bellotti (1997):

> "...ethnography is most likely to show its value in being expounded within an ongoing dialogue between collaborating ethnographers and designers about observations and understandings derived from field studies, together with interesting capabilities of new technology configurations."

Undertaking design

We have reported on the design implications of this study elsewhere (Crabtree et al., 1997; Twidale et al., 1997). For this methodological paper, we wish to consider more the general kinds of design implications of using ethnography. The process of using ethnography to inform systems design is difficult because of the differences between the cultures of computing and ethnography. They can be overcome however. Ethnography offers powerful insights into existing work practice that can be used to inform systems design (Heath & Luff, 1991). This is not in the form of explicit recommendations of what to build, but more in sensitising designers, particularly to what is effective in the existing structure and that may be in danger of being lost in the envisaged redesign. Hughes et al., (1992 & 1993b) have considered the issues that arise in attempting to build a system to replace an existing computer-based or paper-based system and how ethnography can serve to inform issues including what is contingent on the current organisation of work and what is more essential.

A persistent theme of the descriptions of work that ethnography provides is how people cope with systems under constraints of time and available information on how to proceed. There is much muddling through and coping behaviour, both using the available functionalities in a manner that an expert would consider sub-optimal, but also cases of using functionalities in ingenious unintended ways to achieve the desired ends. It is all too easy as a computer scientist to react to these stories by declaring "but they are doing it all wrong, if only they would do XYZ they could have got a better result in half the time. Clearly what is needed is a user education programme". In the

case of library information systems, we would claim that an equivalent initial reaction from a librarian would involve horror at the inefficiency of the search strategies being employed and a declaration that the problem can be solved by more reference librarians available or a suitable course of bibliographic instruction. Although the reactions by both are understandable and the solutions proposed might work, we believe that there is an alternative.

The ethnographic descriptions and resulting reactions, not surprisingly, have parallels with work in the early days of HCI where systems designers were shown videotape of regular users struggling to understand the computer interface the team had developed. Much of the effort in HCI especially in commercial systems development contexts was to sensitise designers to the awareness that they were designing for users who did not have a degree in computer science and did not find computers inherently fun and interesting to explore. Thus designing a system, and especially an interface, so that it could be used by the designers and their friends was inadvisable.

In a similar way, ethnography can serve to sensitise us to the differences between end users and those involved in the development process and to help us consider how to design for them rather than for ourselves. We would point out that this may mean the design of systems with features that a computer scientist may find clumsy or long-winded (as with some graphically based interfaces). But in the context of library systems design it may also mean the design of systems with features that a librarian may find clumsy or long-winded.

That is, designing specifically for 'perpetual novices' (Borgman 1996). The lesson of ethnography is to design for people as they are, not as they ought to be. As design inevitably involves compromise, that may mean downgrading the prominence of features that an expert would find more useful. Of course if resources permit, there is always the possibility of adding unobtrusive features or even an entire interface for the power user, but the ethnographically sensitised approach emphasises this as being a secondary rather than a primary concern. This re-prioritisation is easy to state, but harder to act on. One produces and delivers systems for clients, and library patrons do not buy library interfaces, libraries do. Thus the lessons of ethnography will need to be sold to the commissioning client (quite possibly a skilled librarian) as well as to the systems developer.

Ethnography can also be used to effect change in an organisation that does not necessarily involve the design of computer systems. For example Blythin *et al.,* (1997) provide recommendations that involve managerial - organisational changes. Such an approach would be equally applicable in a library context.

Conclusion

In many senses the point of this paper has been to bring a *methodological* awareness to bear on ethnographic study. The methodological guidelines we have presented here may be applied to the study of any setting whether one is involved in systems design or not. Insofar as we are concerned with systems design, issues of methodology inevitably revolve

around issues of relevance - after all aren't ethnomethodologically informed ethnography's findings "just obvious"? Yes! Of course they are insofar as they come as little surprise to members who perform the daily work of the setting *but not to researchers* who have develop technological support for that work. Finding out what the setting's work consists of, what the practical problems of work are, what members do in order to solve those practical problems - really, not hypothetically - and more is a central problem to be addressed on any occasion of design. As such, the practical problem faced by design is one of developing means of 'going about' discovering the real work of the setting. Over recent years, ethnography has emerged as one such means. Immersing a researcher in the setting is not an answer in-itself however, insofar as the product of that immersion - the ethnographic record - is subjected to the policies and practices of constructive analysis which systematically gloss and thus obscure the real work of the setting. More than that there is a danger in developing systems to meet criteria of the theories used to structure ethnographic data with the consequences that design reflects the theory rather than actual practice.

In treating ethnographic study methodologically - rather than theoretically - ethnomethodologically informed ethnography offers a remedy to the limitations of constructive analysis. Thus, while not offering the 'silver bullet' to problems of design, we recommend that the ethnographer produce instances of the discrete activities a setting's daily work consists of and that analysis is performed through explicating the witnessable practices instances manifest rather than through the imposition of external analytic frameworks and explanatory constructs. In describing and thereby making visible the situated social practices persons engage in in order to get the work done, the ethnographer furnishes concrete requirements and quality criteria for design. The warrant for those requirements is furnished by practice itself in that instances portray the recurrent ways in which discrete activities are performed by members time and time again, they are the unique ways in which unique activities get done and done by any competent member. Their relevance to design follows a similar logic, in that in order to support structures and processes designers must provide for the performance of the work from which structure and process emerge. How else could information systems design, indeed any form of design proceed?

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