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The Exploration by Means of Repertory Grids of Semantic Differences among Names for Office Documents

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ABSTRACT

We used repertory grids to investigate the differences in names assigned to a selected list of 11 frequently mentioned office documents. The assumption is that naming reflects a classificatory decision and is based on a complex set of perceived aspects (which we call constructs) of the documents being named. We describe repertory grids as used in this application and summarize the resulting analysis.

1. INTRODUCTION

People use a variety of terms to label everyday objects, such as the documents they keep and use in their offices. Sometimes the same term is used to label seemingly different documents (e.g., "a report") and sometimes seemingly similar documents are given different labels (e.g. "periodical" and "journal").When a person has made a choice about what to call something in a given situation, the behavior is significant in terms of classification because an object or group of objects that is named can be said to be terminologically distinguished from other objects. In other words, by assigning a name to a document, a person says, in effect, "This document and all other documents with the same label are similar enough to be grouped under the same term." Thus, a label is evidence of a classificatory decision.

In dealing with this variability, one approach is to maintain that if a person has used a different word to label a document, then the "meaning' and, therefore, the classification of that document is different. Thus, two objects, one named "journal" and one named "periodical," must be different from each other in some way because the person assigned two different labels. The difference might be small, but it is there nevertheless -- otherwise, why bother to have two terms? Following this argument, then, it is not possible to have perfect synonyms.

The problem is compounded, however, because people are not consistent in the terms they use to describe objects. For instance, a person may call the same document a "periodical" one day, and a "journal" the next, or even in the same utterance. Moreover, people differ among themselves in the terms they apply to documents and the documents to which the same term is applied. For example, the seemingly unambiguous term "book" is applied to a variety of actual documents: a traditional bound book on the shelf, a book in manuscript form, and a book being written, on a word processor. One person calls several volumes comprising one title a "book," while another person calls each volume of the same set of objects a "book."

Rather than thinking of term use as an all or nothing decision on the part of the person using the term, another way to approach this phenomenon, and the one that is adopted by this study, is to think of the label assigned to a document as a convenient summary of not one, but a number of salient characteristics or *constructs* that apply to that document. That is, the label summarizes a complex number of factors that contribute to the meaning (or semantics) of the document. This meaning is not static; it can change as the situation changes. In addition, the constructs that are associated with the document are not all equally important in determining its meaning, and the same constructs are not always in the same role as the most important ones. So, for instance, if we say that two constructs that pertain to the term "book" are "has a binding and a spine" and "a lengthy piece of text about a topic that is published," then, in the situation of arranging documents on a shelf, all sorts of objects might be conveniently labelled "book" if they fit the salient criterion of having a stiff spine that allows the document to stand upright. On the other hand, if we are manipulating electronically stored documents in our computer, then the length and comprehensiveness of the text and the fact that it is destined for publication may become the salient determiner of what is called a "book."

A convenient way to summarize the different conditions that can apply in the assigning of labels to documents is borrowed from the work of Shaw and Gaines (1989).

	Same construct	Different Construct
Same term	**Consensus**	**Conflict**
Different term	**Correspondence**	**Contrast**

If there is *consensus*, then the person or people are using the same term and mean the same thing by it, that is, the set of constructs that contribute to the meaning of the term are the same. If there is *conflict*, then the same term (homograph) is being used, but the contributing constructs are different. If two different terms are used, but the underlying constructs are the same, then we call this *correspondence* (or synonymy). Finally, if neither the constructs nor the terms match, then there is *contrast*. (What one person calls trash is another person's treasure).

In a previous study (Kwasnik, 1989), eight participants who were asked to describe the classificatory decisions for documents in their offices and to sort a day's mail, generated hundreds of document labels such as:

Graduate-level textbooks that I had when I was a graduate student a note from somebody about lunch

Of the labels that contained a head noun that described the form of a document ("letter," "report," "photograph") there was a very small degree of overlap among participants in their choice of names. Fifty-five percent of all names assigned to documents were used by one participant only; 78 percent by one or two participants. Only one term was used by all eight participants ("books"), and only one by seven out of eight (letters"). The result is what one might expect based on a similar result achieved by Furnas, et al. (1987). In a study of spontaneous word choice for objects in five application-related domains, they found the variability to be large. "In every case two people favored the same term with a probability of less than 0.20."

2. RESEARCH QUESTION

The research question for the present study was: What are the semantic differences between the various names assigned by a person to documents commonly found and used in offices? That is, when a person calls one document a "journal" and one a "periodical" how and to what extent is the difference lexical (same concept -- different words) or semantic (different concepts -- different. words)? Moreover, when different people use the same name to describe a document, what is the basis of difference or consensus among them in the semantic use of these names. A secondary goal was to explore the utility and appropriateness of repertory grids, described below, in the investigation of this research question.

3. METHOD

Repertory grid analysis, the technique used in this study, is based on George Kelly's (1955; 1970) Personal Construct Theory and can be viewed as a particular form of structured interview (Fransella & Bannister, 1977). The intermediate outcome of repertory grid technique is a two-way classification of data consisting of a matrix of *elements* and *personal constructs* pertaining to those elements.

The concept behind the repertory grid is that people's conceptual structures are characterized by the distinctions they make among significant elements in their domains of knowledge and experience. These distinctions may be labelled as constructs applying to the elements, and the elicitation of elements and

constructs may be used to make the structure of their thought processes explicit (RepGrid Manual, 1990, p. A-2).

Repgrids are a way of exploring a person's or group of people's system of cross-references between personal observations of the world and personal constructs or classifications (Shaw & Gaines, 1989). It was used, for example, in determining distinctions used in assigning bird names (Coltheart & Evans, 1981). In the context of this study, we use repertory grid techniques to discover what constructs are used to distinguish a document of one name from a document having a different name. Put another way, what are the important dimensions along which people decide what name (from among several options) to assign to a document?

4. PROCEDURES

The process of construct elicitation, generation of grids, grid analysis, and inter-grid analysis *was* accomplished with the aid of RepGrid 2, a system of tools for Macintosh computers designed at the Centre for Person-Computer Studies, Calgary, Alberta. We used 10 participants recruited from among the faculty, staff, and masters and doctoral students at the School of Information Studies at Syracuse University. This small sample size was felt to be adequate for this initial evaluative and exploratory research. There are four main steps to using repertory grid technique.

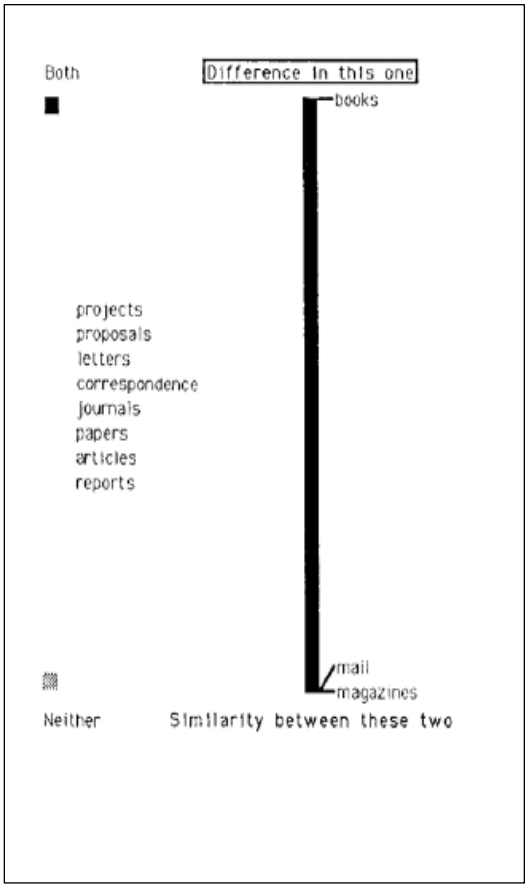
4.1 Choice of elements.

The elements can be elicited from the participants, or, as in the case of this study, the elements can he supplied by the researcher. We chose the 11 documents names most frequently mentioned by the respondents in a previous study of document classification (Kwasnik, 1989):

books	**mail**	**projects**	**proposals**
letters	**journals**	**magazines**	**papers**
articles	**reports**	**correspondence**	

4.2 Construct elicitation.

The **10** participants were divided into two groups. The first group of five was used to "harvest" a representative set of the constructs that pertained to the 11 document names. There is a number of methods available in repgrid technique for elicitation of constructs. We used the triadic method. The 11 document names were entered into the program, which then displayed the names in random triads. Each time a triad was displayed, the program asked the respondent to think of a way in which two of the documents are alike with respect to each other and also different from the third. They were asked to click on the element that seemed different. Once they showed their choice by clicking, the elements were displayed at opposite ends of a pole: one element at one end, and the other at the other end. Each end was labelled with the construct that the respondent had supplied. In repertory grid technique, the constructs are articulated as opposite values, such as long/short" or scholarly/popular.



Next, the respondent was asked to rate all the other elements, one by one, on this scale. This is done by dragging the element name to the scale and placing it there. Any part (including the constructs) can be changed or adjusted at any time. These steps were repeated far all five of the first group of respondents. Each offered several sets of constructs that seemed to describe the ways in which he or she thinks about and categorizes the documents. They were asked to think about the documents in the context of their personal use rather than in more abstract ways. Triads were presented and constructs elicited from each respondent until each could think of no more ways of *expressing* similarities or differences among the elements.

Each respondent generated from five to ten construct sets and a set of ratings of elements on these constructs. This data can be used to generate a number of analyses for each respondent individually, but because the constructs were expressed using a variety of terminology we would have been unable to use the facility in the software that compares data *among* respondents (Sociogrids). The second stage or construct elicitation was designed to overcome this problem. We analyzed the list of all the constructs generated by the five respondents and found that there was a high degree of similarity among many of them. Using our own judgment, we collapsed the similar ones into constructs using a uniform terminology but that included terms that seemed to reflect the original wording most faithfully. We eliminated constructs that seemed to be overly general (i.e., described many phenomena besides documents -- for example, "part/whole") and those that were too specific (i.e., described a particular document only -- for example "cost $5.95"). This yielded a set of 12 construct pairs:

Not personal	:	Personal
Produced by me	:	Not produced by me
Group effort	:	Individual effort
Not work related	:	Work related
General audience	:	Specialized audience
Covers many topics	:	Narrow focus
Recreational/pleasure	:	Professional/ research
2 directional communication	:	1 directional communication
Informal	:	Formal
Completed	:	Work in progress
Longer	:	Shorter
Composed of many chunks	:	Composed of one chunk

4.3 *Generation of Grids.*

The next group of five respondents were asked to rate the 11 elements (document names) using the constructs listed above. They followed the same procedures as the first group, except that instead of generating their own constructs, they were asked to rate the elements on constructs that were provided by the system. Each respondent rated 11 elements using 13 sets of constructs. This resulted in five sets of data which we then used for analysis both at the individual level and also among the five respondents.

4.4 Analysis of Grids.

The final step is to analyze the resulting *grids* (matrices of elements rated against constructs) to see if there are any patterns. Do some elements share the same set of construct values? Are some constructs used similarly to distinguish between the same elements? To what extent and how do respondents agree with one another? The results of this analysis yield insight into the dimensions that a participant sees as important in distinguishing one element from another and in grouping like elements together.

5. ANALYSIS OF THE DATA

The Repgrid2 program uses the raw data from each respondent's repgrid and performs three kinds of analysis. The output of analysis can be presented in a variety of formats both "textual" (i.e., the actual values of the computations) or graphical. In the interest of space, we present only a few of the possibilities.

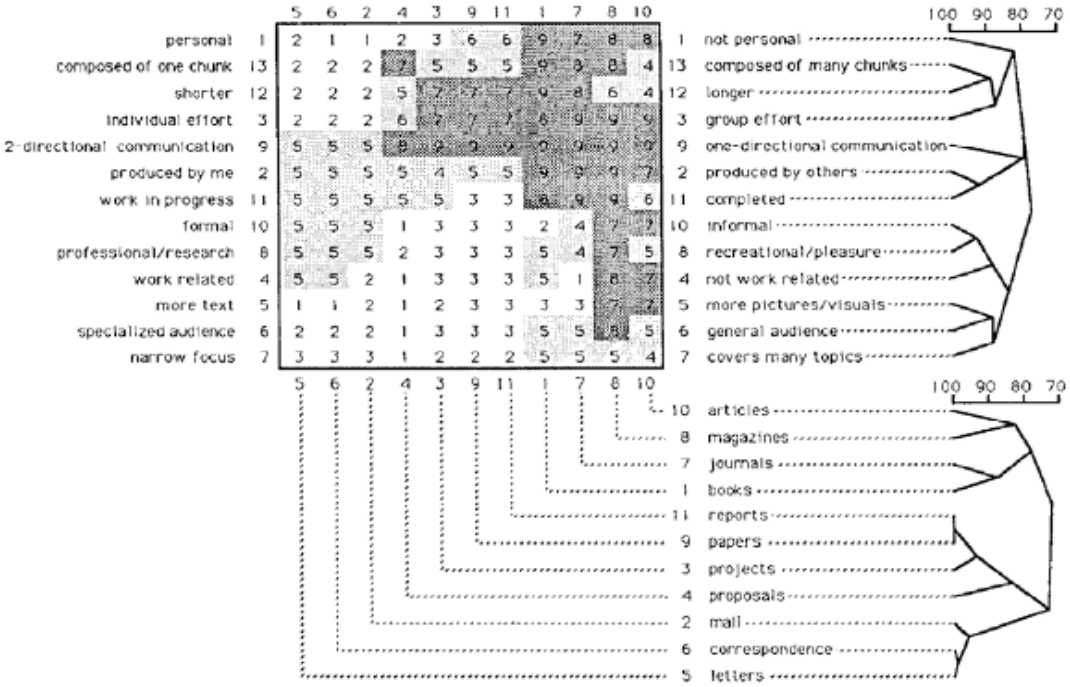


Fig. 2 Example of a Focussed Grid

5.1 Focussed Grids.

The original use of grids was as an aid in therapy. The researcher would visually assess the "raw" grid and look for patterns and similarities. These would be presented to the respondent as stimulus for further discussion and as an aid to understanding. In the present application, the program we use helps in systematically accomplishing what was once done manually. Once a grid has been generated, the raw data can be rearranged by shifting the columns and rows of the matrix so that similarly rated elements and constructs appear near each other. In addition, the "poles" of the construct pairs can be flipped to aid in visualizing the similarities among the various parts of the grid. The result is called a focussed grid. It shows the same data as the raw grid, but presented in such a way that it is possible to see which elements shared the same values in terms of constructs and conversely, which constructs were applied similarly in terms of the elements.

Fig. 2 shows an example of a focussed grid. For the elements, we can see that this person had a 100 percent agreement in how he rated "reports" and "magazines" in terms of the constructs, an almost 100-percent agreement on "letters" and "correspondence," and a little over 80 percent agreement on the constructs applied to "articles" and "magazines." In terms of constructs, we can see that the way elements are rated on the scale "formal/informal" is similar to the way they are rated on the scale "professional-research/recreational-pleasure." Put another way, for example, for this person, documents that are "produced by others" are also often seen as "completed," whereas documents "produced by me" are often seen as "work in progress”.

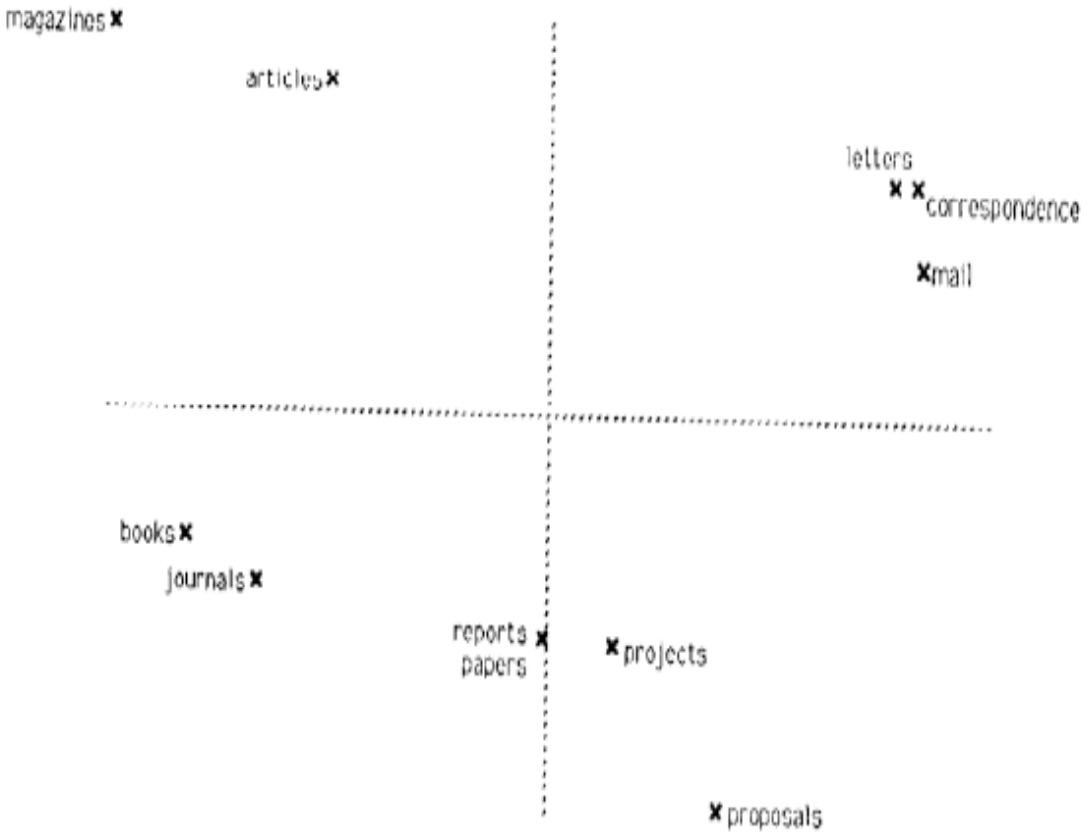


Fig. 3. Example of a Principal Components Graph for Elements

5.2 Principal Components Analysis

Another way to present the raw repgrid matrix data is to calculate which elements and constructs are closest to each other in terms of the values assigned to them in rating elements on construct scales. When the program performs this analysis, the outcome can be shown graphically, demonstrating how the elements, constructs, or both, cluster with respect to each other. Fig. 3 is an example of a Principal Components Graph for the same respondent whose focussed grid is shown in Fig. 2. It is another way of showing this person's perception of the grouping of elements with respect to the 13 construct pairs. When the elements are "close" to each other it means that they have been perceived similarly in terms of the constructs. A similar graph can be produced for the constructs, and also for elements and constructs together. The axes of the graph represent the two construct pairs that are orthogonal to each other, that is, the two that are the best at distinguishing among the elements. The representation of "distance" on these graphs is not exact because it is two-dimensional, whereas, in fact, there are as many dimensions as there are construct pairs. Nevertheless, the principal components graphs offer a visual way of assessing patterns, similarities and differences.

5.3 Sociogrids

The focussed grids and principal components analysis are performed on the repgrids produced by individuals. It is also possible to compare, two by two, the grids of each individual

with that of every other individual. In the case of this study, this produced a total of 10 comparisons. The results can be shown graphically, but an example is not provided here.

6. RESULTS AND DISCUSSION

The analysis we performed using repgrid technique was very preliminary because of our small sample size and also because the intent of this study was to explore the feasibility and appropriateness of this tool rather than to come up with a conclusive set of findings. In general, the repgrid data support previous findings and our assumption that people not only use a variety of terms to describe phenomena -- even such ordinary and seemingly unambiguous phenomena as office documents -- but that underlying these differences, for the same person and among people, is a complex set of individual ways of constructing meaning.

6.1 Consensus and Conflict

There was very little agreement among the respondents on how a given element was perceived with respect to the constructs. If two respondents agreed at least 80 percent of the time in their rating of an element, we considered that consensus. Of the possible 10 combinations among respondents, only 60 percent of the pairs of respondents had consensus on only one term: "magazines." That is, Respondent 5 agreed with Respondents 1,2, and 4; Respondent 4 agreed with Respondents 2 and 3; and Respondent 3 agreed with Respodent 2 at least 80 percent of the time on how the element "magazines" was perceived with respect to the 13 construct pairs. This does not mean that they all had the same ratings; just that they agreed when compared two by two. The rest of the elements had much lower levels of agreement, and two *elements* ("projects" and "mail") had no two respondents agreeing above the 80-percent mark. Even for the very common term "¯book," only 3 pairs of respondents had consensus.

The respondents *agreed* slightly more on how they applied constructs with respect to the elements. For example, of the possible 10 combinations, 7 combinations of respondents (compared 2 by 2) agreed at least 80 percent of the time on how they applied the construct pair "work related/not work related." Even so, two construct pairs had no agreement at this level at all, and of the 13 construct pairs, 9 had less than 50 percent agreement for any two respondents. The construct pairs that had the most consensus were:

work related	--	not work related
produced by other	--	produced by me
specialized audience	--	general audience
formal	--	informal

Since the data was collected at one point in time only, it was not possible within the scope of this study to investigate whether individuals would rate elements similarly against the constructs if they were asked to do so at a different point in time and under different circumstances. That is, we can say the data suggest that among people there is very little consensus, but we could not say whether this lack of consensus applied even to individuals at different times

6.2 Correspondence

In order to explore the phenomenon of correspondence or synonymy, we isolated three document groups that seemed to have a great deal of correspondence. These were:

1. papers, proposals, reports
2. mail, correspondence, letters
3. magazines, journals, articles

At the individual level there were several examples of perfect or near-perfect correspondence. Fig. 4 shows an example of near correspondence for the respondent whose data is shown in the previous figures. In this case, the ratings for the two elements letters" and "mail" are shown, For this person, letters" are a little less "personal" and have a little

"more text" than "mail," and "mail" is somewhat more "work related" than "letters," but otherwise the two are rated very similarly, as shown by the perfectly aligned vertical lines.

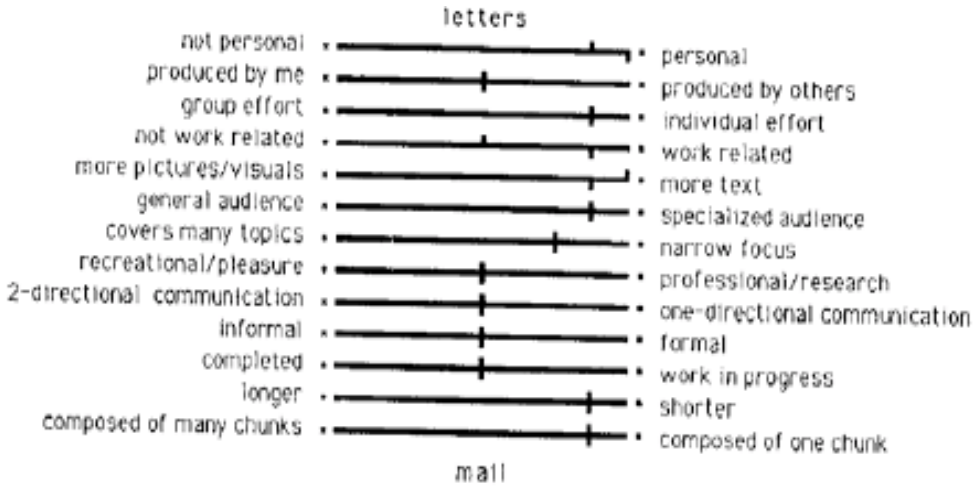


Fig. 4. Example of Near-Perfect Correspondence for Two Elements

Among individuals, however, even when they had perceived the same elements as nearly synonymous, they had done so for *different* underlying reasons. So, for example, if one respondent found that "papers" and "reports" were very similar except that one was more "formal" and the other more "informal," another respondent found that the two elements were very similar except that one was a "group effort" and the other an "individual effort." There was virtually no agreement among individuals on how and why they thought two elements were in correspondence. In fact, all the individuals didn't even agree on which elements were similar. For example, one respondent did not find "mail," "letters," and "correspondence" to be very similar in terms of the constructs.

6.3. Contrast

In comparing the grids among respondents, the program we used measures similarities rather than differences. Therefore, it was not possible to easily determine when the respondents were using different terms and different constructs for the same phenomenon. In addition, this was a laboratory setting. We did not have examples of the documents, nor did we take special care to invoke the recollection of any particular environment. Thus, we cannot tell from this data whether individuals would call the same phenomena different things and use different constructs in making the determination.

7. CONCLUSION

We have described the technique of repertory grid analysis as applied to exploring the differences in the naming of office documents. The technique seems to be successful in graphically presenting the responses of the respondents and is, therefore, a useful tool for stimulating further discussion and analysis. This is the use to which it has been traditionally put. Repgrids are valuable for pointing out overt similarities and differences, but are limited because they capture these similarities and differences at one point in time only. It would be interesting to compare repgrids produced over time, for the same individual as well as for a group of individuals.

Repgrids aim to make implicit perceptions explicit and to help the respondents generate articulations of these perceptions. In this respect, both repgrid technique and the software we used were very successful. The next step is to develop methods of interpreting the results of repgrids in a way that can be used in improving information systems.

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