Integrating User Experience into the Design Process with the Repertory Grid Technique: Some Preliminary Notes

Daniel Fallman

Umeå Institute of Design, Umeå University, Sweden
<daniel.fallman@dh.umu.se>

The Repertory Grid Technique (RGT) is a structured and empirical eliciting technique that can be used for getting at the user experiences of interacting with artifacts, including affective factors. We believe that successfully integrating and applying RGT in an iterative design process provides crucial data—both qualitative and quantitative to its character—into the users' experience of the product or service being developed in the process. Recently, I and some colleagues have been working actively to find ways of incorporating RGT into the design process to be able to design *for* specific user experiences, rather than applying RGT as a stand-alone evaluation method *after* the design process. We believe that while the latter is interesting, the former would clearly constitute a much more powerful tool for designers. In this note, we present some of this work in progress.

The Background

Before RGT is introduced, it might be useful to consider the use of the word *experience* and what it implies. Buchenau & Fulton Suri (2000) talk about experience in relation to interactive system design as:

> […] a very dynamic, complex and subjective phenomenon. It depends upon the perception of multiple sensory qualities of a design, interpreted through filters relating to contextual factors. For example, what is the experience of a run down a mountain on a snowboard? It depends upon the weight and material qualities of the board, the bindings and your boots, the snow conditions, the weather, the terrain, the temperature of air in your hair, your skill level, your current state of mind, the mood and expression of your companions. The experience of even simple artifacts does not exist in a vacuum but, rather, in dynamic relationship with other people, places and objects. Additionally, the quality of people's experience changes over time as it is influenced by variations in these multiple contextual factors (p. 424)

Hence, user experience is indeed a very complex phenomenon. In fact, it is a concept so complex that the traditional scientific way of approaching it would be to try to separate it into smaller parts to be able to measure each part individually, and then complete the picture by putting all the smaller parts together. In their definition above, Buchenau & Fulton Suri hint at this when they say that an experience "depends upon the perception of multiple sensory qualities of a design, interpreted through filters relating to contextual factors" (p. 424). A principle which underlies our work is that for design work—which in this case is seen as separate from a scientific approach to the subject matter (Fallman, 2003)—is that we want to avoid having to break down the experience into smaller constituents. This is because we believe that while an individual part of an experience, for instance the snowboard bindings in the quotation above, is indeed on some level a part of the experience, but looking in detail at the individual part will not reveal any important information about the experience itself. The snowboarder running down the mountain is in a thriving, adrenaline-generating, whole-bodily and holistic state of being-in-the-world (to become a little phenomenological). It is an experience that is not simply the sum of things that you can put down on a list and study individually. Clearly bordering a cliché, but yet important—and often overlooked; any experience is more than the sum of its parts.

This is the direct opposite of a traditional scientific approach, which rather directs us into striving to break things down to be able to study them in detail and to see what they in turn are made up

of. This kind of thinking permeates us and (perhaps implicitly) suggests to us that this is the way we should go about to really find something out, and that we have found something out when we can explain the cause of that something. The traditional scientific account is however less good at handling and dealing with the lived, holistic 'effects' of that cause—in this case the user experience. (Fallman, 2004)

If these arguments hold, then they have impact on the way in which user experience needs to be dealt with in design. If so, designers need to pay less interest in things like snow conditions, the weather, the terrain, the temperature of air in your hair, your skill level, and so on, and rather look for ways to measure *the whole, lived experience* at once. We think that the repertory grid technique might be a useful tool for approaching the issue of user experience from such a holistic point of view.

Furthermore, our view is that any attempt at getting at users holistic experience of a product or service must involve a sharing of meaning between the experimenters and the user or group of users. To share meaning with someone else necessarily means involving oneself in the game of human language. But if one accepts the argument that sharing complex structures of meaning requires language, we must remember that the role of language and the relationship between language and meaning is still far from obvious and uncomplicated. Somewhat ironically, for instance, in our ordinary language we tend to assign many kinds of meanings to the word meaning itself. In a study from 1923, the word was found to be used in at least 16 different ways, in sentences such as "What's the meaning of this?", "I meant to call you", and "Exercise means everything!" (Ogden & Richards, 1946). Hence, while RGT opens up for holistic views, using it is not in any ways unproblematic and straightforward at all times. RGT requires a lot from the experimenter in terms of engagement, a willingness to try to understand other people, seeing what they see. All methods and techniques have their pros and cons.

The Technique

Repertory Grid Technique (RGT) may be regarded as a methodological extension of Kelly's *Personal Construct Theory* (Kelly, 1955). While it is not necessary to fully buy into the underlying theory to use RGT in practice, Kelly argued that we make sense of our world through our own 'construing' of it. That is, we tend to model what we find in the world according to a number of personal constructs, which are bipolar in nature. For instance, Kelly argues, we perceive other people through construct such as *Tall—Short, Light—Heavy, Handsome—Ugly,* and so on.

A 'construct' is hence a single dimension of meaning for a person allowing two phenomena to be seen as similar and thereby as different from a third. Kelly suggested RGT as a structured procedure for eliciting a repertoire of these conceptual constructs and for investigating and exploring their structure and interrelations (Bannister, 1985). While RGT is a technique for eliciting personal constructs, a *repertory grid* in itself is the outcome of a successful application of the technique. It is a table, a matrix, whose rows contain constructs and whose columns represent elements, i.e. the phenomena under investigation. Repertory grids also typically embody a rating system used to quantitatively relate each element in relation to the qualitative constructs. An individual repertory grid table is constructed for each subject participating in a RGT study.

First, an individual participating in an elicitation session produces his or her own constructs, i.e. what bipolar dimensions of meaning the person see as the most important ones for talking about the elements (the investigated phenomena). The construct elicitation process is typically eased by the use of triads, where the subject becomes exposed to sets of three elements at a time and is asked to describe and put a label on what he or she sees as separating one of the elements in the group from the other two.

A typical setup is as follows: A participant sits at a table with the experimenter. On the table, a fixed number of cardboard cards are displayed. Every card contains a photograph of the elements of the study (i.e. the artifacts under investigation) and an identification number. In each session, the participant is exposed the elements in groups of three—*triading* in RGT's technical language. On a paper-based form designed especially for the study, the experimenter puts down three identification numbers taken from a pre-prepared list. The experimenter and the participant then find the corresponding cards on the table and group them in front of the participant, while the remaining cards are put in the background. The participant is then asked to think of a property or quality that he or she considers singles out one of the three elements in the group, and to put a name or label on that property. For instance, among a group of three elements, a participant singles out one of them that she thinks is *'warm'*. The participant is then asked to put a name or label on the property or quality that the other two elements in the triad shares in relation to the experience of the 'warm' artifact. She then labels their shared quality as *'cold'*.

Second, after having provided their own individual, qualitative constructs, the participant is asked to rate the degree to which each element in the study relates to each bipolar construct according to some scale (typically a binary or Likert-type scale). Hence, in RGT, constructs and elements are the two building blocks of each individual's own repertory grid table; which are quantitatively related to each other by use of some rating system. The constructs represent the qualities the participants use to describe the elements in their own, personal, words (Fransella & Bannister, 1977); constructs thus embody the participant's meaning and experience in relation to the study's elements.

A typical setup is as follows: On the form designed especially for the study is also a pre-printed table containing the elements, each with its own seven-grade Likert-type scale. This form is now handed over to the participant with the instruction to grade each of the elements of the study (i.e. not just the three in the triad, but all of them) according to the bipolar scale that she has just constructed (i.e. *Warm—Cold*). That is, for each element of the study as a whole—also those that did not appear in the specific triad from which a particular construct pair was established—the participant was asked to rate or grade that element on a seven-graded scale, where left would represent a high degree of the property found to be embodied by the singled out artifact (very 'warm') whereas right would represent a high degree of the property embodied by the two other artifacts in the specific triad (i.e. 'cold').

Thus, for each triad exposed to a participant two kinds of data were being collected. First, a personal construct was elicited, i.e. a one-dimensional semantical space that the participant thought meaningful and important for discussing and differentiating between the elements of a triad. This process provides the study with qualitative data; insight into the participant's own meaning structures, values, and preferences. Second, as each elicited personal bipolar construct was then used as the scale by which the participant rated all of the seven elements in the study, data was also gathered about the degree to which participants thought their construct had relevance to a specific element. This provided the study with quantitative data, in that the ratings may be used to find out how the different elements compare and relate to each other and to the constructs.

While RGT is an open approach that results in a number of highly individual repertory grid tables, some basic structures are shared among the participants which opens up for a number of different analysis techniques. Each table consists of an open number of bipolar constructs, but a fixed number of elements and a shared rating system. Given this, there are at least two very basic ways in which different participants' repertory grid tables may be compared and analyzed interpersonally. First, the finite number of elements and the shared rating system provide the basis for applying statistical methods that search for variations, similarities, and other kinds of patterns in the series of numbers occurring in the numerical data (the ratings). Using relational statistical

methods such as cluster analysis, it becomes possible to compare and divide all constructs from all participants into groups of constructs showing some degree of similarity. This may result in interesting and unexpected correlations between constructs whose relation would likely have remained unnoticed if one had only looked for semantical similarity. This analysis method may hence be called *semantically blind* as it is driven primarily by each construct pair's quantitative data in relation to elements.

Second, what appear to be several semantically related and overlapping construct pairs often appear across the participants of a particular study. It is hence possible to go through the list of all participants' constructs and gather in groups those that bear semantical resemblance to each other, and analyze these groups using a suitable interpretative technique, e.g. discourse analysis. This approach could be regarded as *statistically blind*, as it is driven by an interpretation of the semantical content of the constructs, not taking the numerical ratings into account.

Integration

RGT has been found to be a useful technique for eliciting people's experiences and meaning structures in several different domains, including organizational management, education, clinical psychology, and particularly in the development of knowledge-based systems. Despite its popularity in these fields, the interest in it from an interactive system's perspective peaked in the 1980s, with a special issue devoted to the topic in the International Journal of Man—Machine Studies (Vol. 13, No. 1, 1980). Since then, the technique's appearance in HCI-related literature has been sparse, while not completely inexistent (see for instance Hassenzahl & Wessler, 2000).

Its early disappearance from the HCI scene may be explained by its fairly strong association with Artificial Intelligence and expert systems development in the 1980s. HCI's interest in RGT appears to have been lost in conjunction with the failing of these projects in their traditional form. But with the need to be able to capture user experience and the structures of meaning that arise in relation to computational artifacts it seems appropriate to suggest that RGT could be revisited as a methodological tool.

Rather than applying RGT as a stand-alone evaluation method *after* the design process—i.e. asking "how did our design turn out?"—we believe that the real power of RGT is in finding ways of incorporating it into the design process, to be able to design *for* specific user experiences. One way in which we so far have tried to deal with this issue is to apply early on in the design project a number of small-scale RGT studies with only a couple of users using sketches and very simple mock-ups as elements, as a reoccurring part of an iterative design process.

A typical setup for integration of RGT into a design process: For instance, a car company is developing a new steering wheel for a particular brand and model that in every part should be "sporty". An industrial designer produces nine or so rough sketches of different steering wheels. Participants are exposed to the elements through the use of triading as explained above.

After one round of such trials with a small group of participants (usually only 3 to 5), there is information to consider in choosing how to move on in the design project:

- Completely new sketches can be produced and the process starts over
- If one or more of the steering wheels are regarded as "sporty" in some way—or if they are perceived using constructs that can be interpreted as being related with something "sporty"—then these sketches are stored and used as the basis for new, refined sketches.
- The experimenter and the participant can together sit down and try to arrange the constructs into groups. This is often useful for eliciting higher-level meanings out of very precise and particular participant constructs, but the experimenter needs to be cautious as not to influence the participant too much.

- The experimenter can ask the participants to grade the elements according to pre-planned constructs. This is a last resort. If the participants do not by themselves find “sportiness” in the elements, it is probably not a very distinguishing quality of one’s design.

Eventually we want to return to the difference between using and thinking about RGT as a design techniques versus thinking about it as a scientific tool. As we have seen, RGT allows designers to work empirically with users towards creating an artifact that the users perceive in a specific way. This is done without the scientific aim of primarily trying to understand the cause of why a particular artifact is perceived in a specific way. The primary aim for a designer is on the contrary typically to actually design the artifacts so that it is perceived as sporty. The difference here is not so much one of knowledge and skills, but rather one of perspective. Ideally, a scientist seeks to understand explicitly and explain that understanding as thoroughly as possible. A designer on the other hand, seeks to understand, often implicitly, in order to design.

If we regard RGT not as a scientific tool but as *a design tool*, then we should judge it not according to how universal the results are (they are not) and classical scientific measures of quality such as its validity and reliability—but whether or not it allows us to produce better designs. When used in this way, RGT works on a different level than traditional science—i.e. on the level of *how the artifact is actually perceived*; what the experience of it is; and how that experience differ from the experience of other, seemingly similar artifacts.

References:

Bannister, D. & Fransella, F. Inquiring man. 3rd Edition. Routledge, London, UK, 1985.

Fallman, D. (2003) Design-oriented Human-Computer Interaction, Proceedings of CHI2003, Conference on Human Factors in Computing Systems, CHI Letters, Vol. 5, Issue No. 1 (Fort Lauderdale, Florida, April 5-10), New York, NY: ACM Press, pp. 225--232.

Fallman, D. (2003) In Romance with the Materials of Mobile Interaction: A Phenomenological Approach to the Design of Mobile Information Technology, Doctoral Thesis, ISSN 1401-4572, RR.03-04, ISBN 91-7305-578-6, Umea University, Sweden: Larsson & Co:s Tryckeri.

Fransella, F. & Bannister, D. A manual for repertory grid technique. Academic Press, London, UK, 1977.

Hassenzahl, M. & Wessler, R. Capturing design space from a user perspective: the repertory grid technique revisited. International Journal of Human—Computer Interaction, 12(3&4), 2000, 441—459.

Kelly, G. The psychology of personal constructs. Vol 1 & 2. Routledge, London, UK, 1955.

Marion Buchenau, Jane Fulton Suri: Experience Prototyping. Symposium on Designing Interactive Systems 2000: 424-433

Ogden, C. K. & Richards, I. A. (1946) The Meaning of Meaning, 8th ed. (First published in 1923) New York, NY: Harcourt Brace Jovanovich.