

Generative tools for context mapping: tuning the tools

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INTRODUCTION: GENERATIVE TOOLS

Recent directions in design require designers to become more and more aware of the user's experience, emotion, the situation of product use, and social and cultural influences. Designers need insight in the diverse contexts surrounding a product's use, and especially within the field of participatory design, a number of techniques have emerged to more widely explore the user's life than had been customary in traditional, function-centered design.

Among these techniques are the cultural probes (Gaver, Dunne, & Pacenti, 1999) and the generative tools pioneered by SonicRim (Sanders, 1999; 2000; 2002), in both of which respondents are asked to make designerly artefacts to express aspects of their situation, their life, their worries and joys, etc. For instance, respondents are given a 'toolkit' of words and images and asked to make a collage expressing good and bad aspects of their home or work situation. These collages are then used for inspiration by the design team and (in SonicRim's generative tools) the respondents also present their collages to each other. These presentations carry much information that may not be directly apparent from the collages. These collages and transcripts of the presentations are analysed using elementary statistical methods, such as counting the co-occurrence of images and words. More sophisticated analyses, such as using multidimensional scaling to reveal the patterns in chosen images and words, can also be performed.

In the design development process, generative methods such as collaging can be used together with other methods in a converging perspectives approach (Sanders, 2000) that draws simultaneously from three perspectives: marketing research ("*what people say*"), applied anthropology ("*what people do*") and participatory design ("*what people make*"). When all three perspectives are explored simultaneously, we can understand the experience domains of the people we are serving through design. When we bring these people through guided discovery and give them the generative *make* tools, we have set the stage for them to express their own creative ideas.

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Generative techniques mentioned above are extremely rich sources of information. But the statistical work that is involved in analysing the sessions is laborious and mind-numbing. In joint research of TU Delft and SonicRim we try to validate assumptions about how toolkits should be constructed, and to optimize the way in which the resulting data are analysed, both in making it less cumbersome and more rich in analysing the structure of collages and presentations.

We describe a series of small experiments in which respondents were asked to make a collage expressing their 'home' experience (a task which for which data exists now from Europe, the USA, and Asia). Between the experimental conditions we varied (1) toolkit imagery (pictures versus abstract shapes) to test the assumption that pictures lead people to express emotions and memories, abstract shapes lead to diagrams expressing processes; (2) we varied structure of the artefact (picture collages versus verbal mindmaps) to gauge the influence of pictorial information on the resulting artefacts and presentations; (3) we varied the medium (pasting pictures and words on paper versus arranging a collage using computer software), in order to see whether computer tools lead to richer or less rich artefacts and presentations. The last question is of great practical importance, as using computers has the promise of facilitating the statistical analysis in many ways, but runs the risk of stifling people's creativity, as is often found in creative design tools (e.g., Stappers & Hennessey, 1999).

EXPERIMENT

The experimental sessions took the form of a condensed-style generative tools session. Participants were students of Delft University of Technology who did not have collage-making techniques as part of their curricula (i.e., not students of Industrial Design Engineering or Architecture). In the sessions, each participant made an artefact to express their "home experience: past, present and ideal", then presented his or her creation to the other participants. One week before the session, participants received a small diary workbook with questions and exercises about their current living situation; this was done to sensitize them to the topic, i.e., to set them reflecting about the home experience before the session. Session leaders were students of Industrial Design Engineering carrying out the sub-experiments as part of an introductory research methods course.

Overall Experimental Design

The series of experiments compared groups of participants creating and presenting expressive artefacts in one central, and three differential conditions. Because the central condition was so important, two sessions were held for this condition. For each of the differential conditions, only a single session was held.

The differences between the conditions for the independent variable lay in the material they used to make the collages. In the analysis we looked at the use that was made of these materials in the artefacts, the form of these artefacts, and most

importantly, the content of the presentations. Figure 1 gives an overview of the overall design of the experiment, Figure 2 shows examples of artefacts created in the sessions.

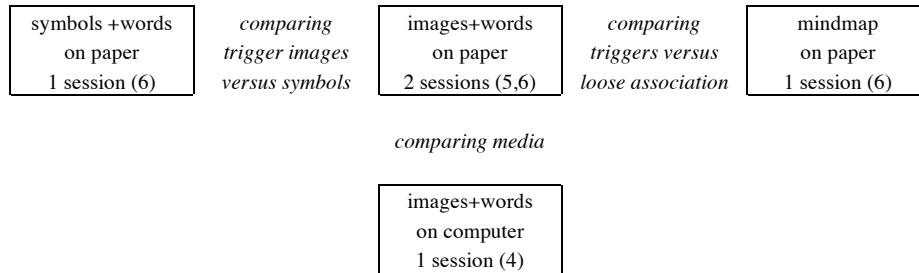


Figure 1 Conditions in the experiment, and the number of sessions that were held in each condition. The numbers in brackets behind the sessions are the number of participants in each session.

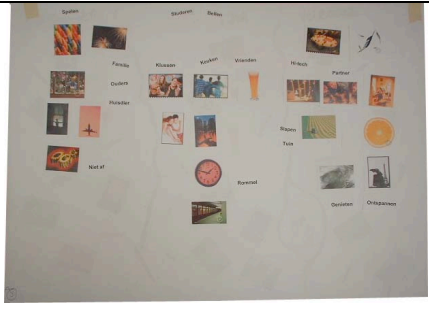
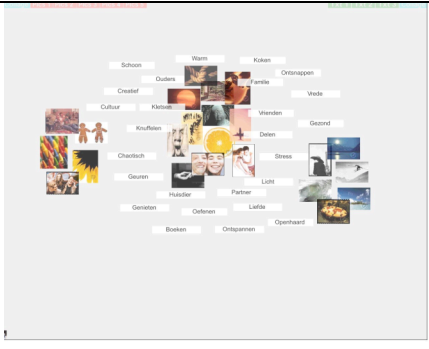

In the central condition, participants received 125 images and 108 words which served to trigger associations. These triggers were given to them on sheets of A3 size paper. The images were chosen to cover feelings, things, ideals, etc. that people might associate with the home experience. Participants made their image and word collages on an A2 size sheet of paper. They were also given a set of large markers with which they could add lines, words, or drawings. In the differential conditions, variants of these materials and instructions were given to the participants.

In the 'computer' condition, the same triggers were used, but instead of working on paper, participants used a custom-made computer program. This program resembled the central condition as far as possible. Also, the program was designed to pose as little 'interface' distractions as possible. Participants could navigate between their collage and pages of words or images by mouse-clicking tab fields on the top of the screen; they could import words or images into their collage by clicking these images or words; then, in their collage screen, they could rearrange the words and images. Unlike in the other conditions, the program did not permit participants to add new words or draw lines into the collage. This feature was left out in order to keep the program simple to use.

In the 'symbol' condition, the trigger images were replaced by brightly coloured symbol shapes, such as hands, circles, arrows, hearts, each large enough that something could be written inside them.

In the 'mindmap' condition, participants received an A2 sheet of paper on which an organic, hollow triangle ending in three branches was already sketched in. They had to choose a starting image that best represented their idea of 'home', and then 'grow' the mindmap by adding associations as branches. No further trigger words and images were given. Because participants were expected to be unfamiliar with mindmaps, they were shown an example of a complete mindmap about a different topic, taken from Buzan (2000), and were given a sheet of helpful hints, such as 'make it pretty', 'branch out', 'use colour', 'draw small pictures', and 'ask

yourself: who? what? where? why? ...". These hint sheets were previously used by Keller (personal communication 2001).

	Example artefact	Observations (as compared to the central condition)
central		<p>General observations were that in all conditions different compositions occurred, where diagonal, three vertical columns, triangles and large clouds were the most common.</p> <p>(The mindmaps form a special case, where all compositions were branching out)</p>
computer		<p>Participants take shorter time to create the artefact, because the possibilities for aesthetic improvements are limited. The presentations take as long as with paper. Artefacts are simpler, more crisp, but artefacts and presentations are not less expressive or rich in depth and width.</p>
symbol		<p>Presentations take longer, and appear to have the same breadth (number of topics addressed) as the image+word condition, but more depth (number of statements made). The presentations are more structured, but also less anecdotal.</p>

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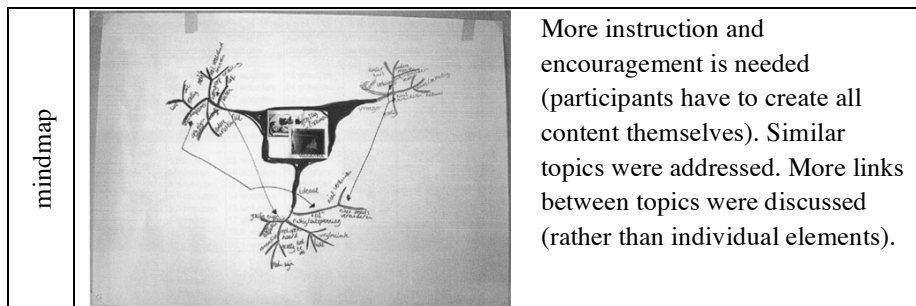


Figure 2 One sample collage and observations for each condition.

RESULTS, DISCUSSION AND CONCLUSIONS

Both artefacts and presentations were studied. For the artefacts, the number of triggers and the compositions of the artefacts were compared. For the presentations, we measured the length (how long did the participant talk), the breadth (how many different topics did the participant address), and the depth (how informative were the statements about these topics). (e.g., the statement "it used to be less structured, now I am more organized", for the topic "chaos"). Because of the exploratory nature of this study, and the length available here, we do not present details of the analyses, but summarize our general impressions in Figure 2.

The overall results of these experiments were encouraging. We have seen that non-designers can express themselves creatively using a variety of different generative tools. There were no winners or losers among the conditions; each captured unique and useful insight into people's lives and expectations for their future. The symbol+word collages are best carried out after the picture+word collages (as is the current practice): the former help participants to group and summarize the ideas they received from the more emotionally colored associations that they produced in the latter. The mindmaps can be a practical way to either start or summarize, and require little preparation. Finally, the computer condition is especially promising, as it showed that digital media can be integrated in a creative process. The key in moving ahead will be to learn the best possible applications of each and to continue to explore more efficient analysis methods. In further work we also intend to look at possibilities to make more use of the computer-recorded data, e.g., position and time data of construction and create a tool that enables the analyser to immerse him- or herself by playing with visualised relations.

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