The 2nd International Conference on Design Creativity (ICDC2012)
Glasgow, UK, 18th-20th September 2012

EMPLOYING RANDOM PROCESSES AND STORYTELLING FOR DESIGN CREATIVITY

D. Oswald and A. Kettenhofen

Design in Business Communication Management, Berlin University of Applied Science (HTW), Germany

Abstract: This paper describes and demonstrates teaching methods and results from seminars that employed random processes and combinatorics in the ideation phase, and storytelling for concept development purposes. The seminars where focussed on multi-touch software applications, but the processes and methods can as well be transferred to other areas of design. With the help of random based creativity techniques, a huge number of ideas were generated in a limited time. In a second step, promising ideas were further evolved with a storytelling approach, ensuring a user-centred view. The resulting stories then were used as a source for use case descriptions and the design of activity-diagrams.

Keywords: *ideation, creativity, user centred, storytelling, multi-touch, tablet-PC, interaction*

1. Introduction

In a global market and with emerging digital products, ideation and concept development has become more and more important for the design discipline. Creativity techniques help to increase quality, originality, and speed of ideation and conceptualization of innovative products and services. In traditional product design the functions of a product often seems to be given. In the times of physical, mechanical, and electro-mechanical products, the functionality of products has rarely been questioned — they were simply set by tradition, or by cultural convention: A chair is something to sit on, a car is used to drive from A to B, and a telephone is needed to speak with absent people (Oswald, 2010a). Yet already in the era of functionalism of the 1960s, it was known that objects can switch their functionality in different contexts, by the activity of the user: A wooden chair can become a ladder, a small table, or even burning material (Krippendorff, 1961), but this phenomenon has not been a great challenge for design in the past. Today, defining the scope of functionality of a product should be the first step in the design process. Design should not start with problem solving — which is finding solutions for problems that are given by tradition, or by somebody else. The designer should rather start with questioning and defining the problem, thereby developing functional requirements for products and services. In the case of furniture and tools like power drills, shavers, etc., the functional scope has apparently not changed too much in recent decades. In contrast, in digital technology and software application design there is only little functionality defined by tradition. Especially when developing applications (apps) for new devices like tablet PCs or smartphones, there is hardly any tradition to build upon. The functionality of these products is not set or determined, it has to be invented and developed, or it has to be derived from analogue predecessors. Therefore the design process has to begin with the very question of what the functions of the new product should be, or rather what a user would want to do with it (figure 1). Whereas traditional product design (too) often starts with the question “How do we do it?”, design of interactive products must first answer the

question “What do we do?”. Hence, to develop innovative products in this area, a lot of effort has to be put into ideation and conceptual development. In order to overcome common patterns of thinking, which usually lead to common results, random processes can be very helpful. If we want to avoid obvious ideas and concepts, we have to “stop making sense”.

Figure 1. Paper prototype of a motion and dance analysis software — functionality which is unconventional, not based on tradition, and without analogue predecessors.

2. The burden of reasoning

One of the keys to creativity is the ability to get rid of goal-oriented thinking and reasoning — at least temporarily for the first ideation phase. Human perception is to a great extent based on analysing, sorting, classifying of what we see, hear and feel — finding *gestalt* in perceptive patterns and thereby making sense (Wertheimer, 1923). This permanent process of making sense also influences human thinking, and can hardly be switched off in everyday live. In the normal mode of thinking, our thoughts are permanently checked, filtered and being controlled. Avoiding weird and crazy thoughts is definitely helpful or even essential to cope in everyday live. However, when we try to generate innovative ideas this mode of controlled thinking is a significant handicap. On top of this evolutionary-biological aspect, formal education has a great tradition in successfully teaching pupils to first and foremost avoid mistakes, to keep them from taking risks, and from experimenting (Robinson, 2001). Without taking risks, without making mistakes, without allowing useless or weird thoughts, innovation and creativity is impossible. There are means that help to overcome disciplined and controlled thinking, for instance: time pressure, random processes, and combinatorics, which will be described in detail in the following paragraphs. They were employed by the authors in several seminars on ideation and prototyping of innovative software applications at different universities with study programs ranging from computer science to digital media design and business communication management. (Oswald, 2011)

3. Time pressure

In the first session students were introduced to the general topic of the seminar and the schedule for the semester. Due to the big group size of more than 30 students, a classic brainstorming method — students associating freely and a moderator taking notes on a board — did not seem promising. Experience shows that the bigger a group gets, the smaller the percentage of people contributing to a discussion gets (Bass 1965). In large groups the fear of making mistakes or saying something stupid increases, therefore controlled, goal-directed thinking tends to dominate again. Explaining and emphasizing brainstorming rules (“there is nothing like ‘wrong’ or ‘stupid’, and no killer phrases allowed”) does not help to avoid this effect completely. Instead of a public brainstorming, the students were asked to collect terms they associate with given topics, each on their own, on a piece of paper. The topics were related to the seminar's general topic, for instance “mobile multitouch applications”. The corresponding topics were: leisure, living room, touch, mobile, and technology. In order to avoid

reflecting and filtering their associations, the students were told to write down as many terms as possible in only two minutes time — with the student producing the longest list being the winner. The results show that time pressure is a great remedy against reasoning and controlled thinking, and of course it is helpful when a lot of input has to be generated in a short period of time. Even though there was actually nothing to win, a group of 30 students produces a set of several hundred terms in only two minutes. One might think that the share of terms that are not too relevant for the topic might be a problem and that these should be filtered out in a following step. The opposite is true — filtering should definitely not be done. The generated lists provide a well-balanced mix of terms closely related to the topic on one hand, and a good amount of inspiring "off-topic glitch" on the other hand. (Oswald, 2011)

4. Random processes

The next step is creating combinations from the collected terms. This can be done based on paper, or with the use of a software script. Later, the derived word combinations are used as a source for ideas for innovative products. This method was inspired by Burroughs' *cut-up technique* (Robinson, 2011) and Zwicky's *morphological box* (Zwicky, 1967, 1969).

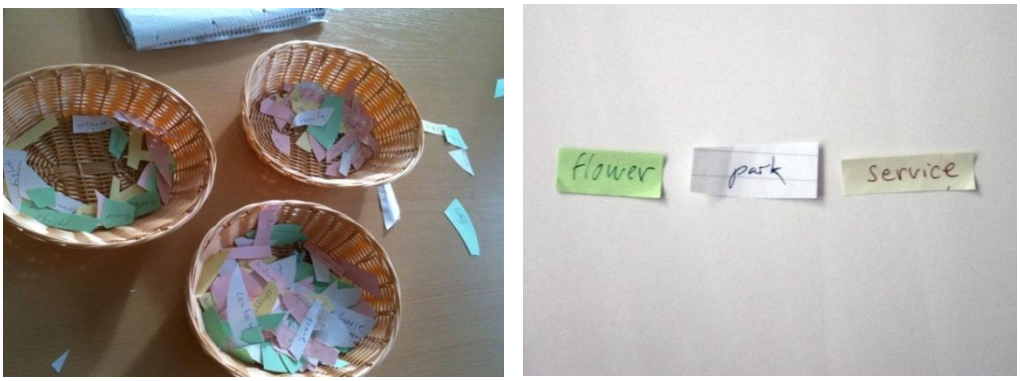

Figure 2. Using paper based random processes to generate input. © Oswald.

4.1. Paper based method

The lists of terms are cut up into paper snippets containing one term each. These paper snippets are collected in individual baskets for each topic (leisure, living room, touch, mobile, etc.). Then, the students are asked to draw one paper snippet from each of the baskets, by that creating a combination of terms from each topic (figure 2). In the next step, this combination has to be transformed into a short description of a product or service. In order to avoid censorious thinking, only again a very short time is given to come up with a product description of only two sentences using all the words that have been drawn from the baskets. Of course most of the hastily written "concepts" are rather funny than useful – but all in all there will be more than enough for a first round of discussion, filtering, and selection for further consideration. With the described method, several hundred product ideas can be written down in only half an hour time. Even if only five percent of the output will trigger ideas for innovative products, the results are plenty enough to build teams of two or three students with one great concept each. (Oswald, 2011)

4.2. Random process based on a software script

The process of randomly picking and combining terms from thematic lists can also be done automatically. To that end, the authors have developed a web-based application, which provides multiple text areas for the collected terms (see figure 3) — instead of baskets. Of course the separate text areas do not have to be assigned to semantic categories (like technology, leisure, and mobile). One could as well assign syntactic parameters to them, like *verb*, *adjective*, and *noun*.

The website and the software script are free to use by anyone, and can will be accessible from the author's website at *www.david-oswald.de/creativity* at the time of the conference.

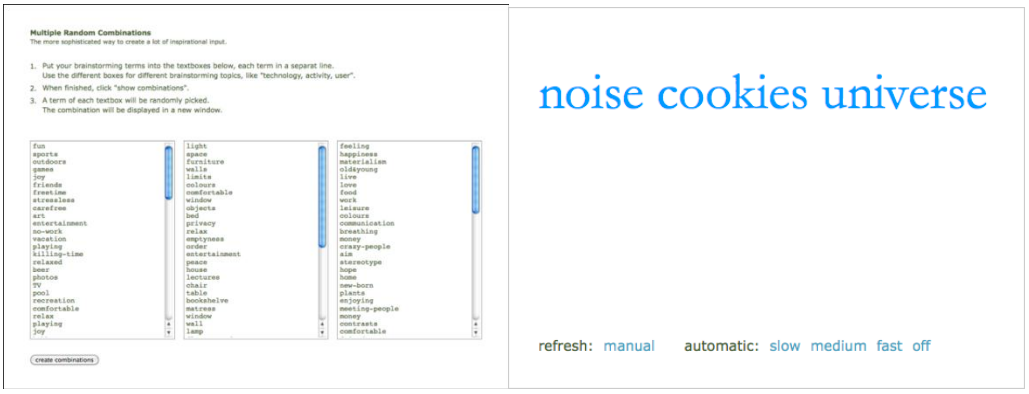

Figure 3. Using script based random processes to generate inspiration. Three lists of input terms (left) and a generated random combination (right). © By the authors.

Already with only 20 terms in each of the three text boxes, more than 200,000 unique combinations are possible. Therefore it does not make sense to generate a complete list of all possible combinations. First, this would lead to performance problems on the executing computer, and second, it would literally take days to read or only scan through the list. Instead, the script displays only one random combination at a time. The user can either trigger the next combination manually, or choose an automatic mode with different refresh rates.

4.3. Combinatorics based on a software script

A more systematic approach is combining every term from a list with every other term of the same list. A simple two-dimensional matrix like this still leads to a long list of combinations, but it does not grow exponentially and therefore stays handable for the generating computer and the reading user — for reasonable amounts of terms. An input of 100 terms will generate almost 5,000 unique pairs, which can be scanned through in 83 minutes when giving each pair only one second of attention. With an input of 500 words, a single person would already need four working days to scan through the resulting list.

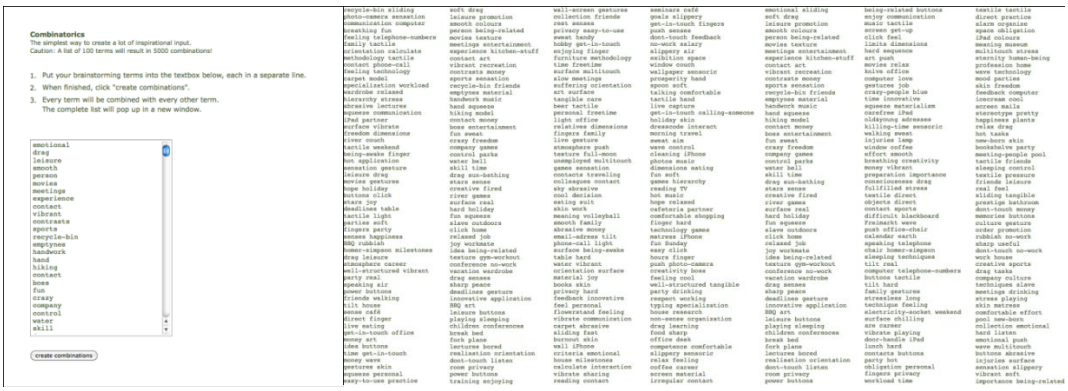

Figure 4. Using combinatorics to generate input. List of terms (left) and resulting combinations (right). © By the authors.

5. Using storytelling as a conceptual method

Both computer scientists and designers often are not able, or willing, to take a users perspective. Design students often are too self-opinionated to develop empathy with users and a sense for their needs. Computer science students – trained mainly in solving given technical problems – often find it hard to keep themselves from thinking in technological terms. One of the most popular methods to encourage a user-centred view is the use of personas – fictitious prototypical users who are described

precisely in terms of personal and professional background, as well as their needs and goals (Cooper 2004). Developing use cases with specific personas in mind has become a standard method in software usability engineering in the last decade. Today, the so-called agile software development approach works with lists of "user stories": short descriptions of what a user can do, written in everyday language (Cohn, 2004). Especially for students with little experience in user-centred design both of these methods are prone to a rather fragmented view on the design problem and are in danger of neglecting the social context of use. In order to keep a strong focus on the user and their context the authors literally forced the course participants to write stories illustrating a day in the life of a typical user of their new application. Both design and computer science students are not known for their writing skills. In spite of that, the students' feedback was quite positive when the stories had been written and read out in the group. Everyone felt that writing the story had helped getting a clearer idea of what people should be able to do with their product. Especially concepts with an emphasis on mobile and social interaction profit from this approach. By writing stories from an everyday user perspective the narrow focus on concrete features and functionality is broadened in favour of user activities that are not necessarily reflected on the software's interface, but still are crucial for the overall concept.

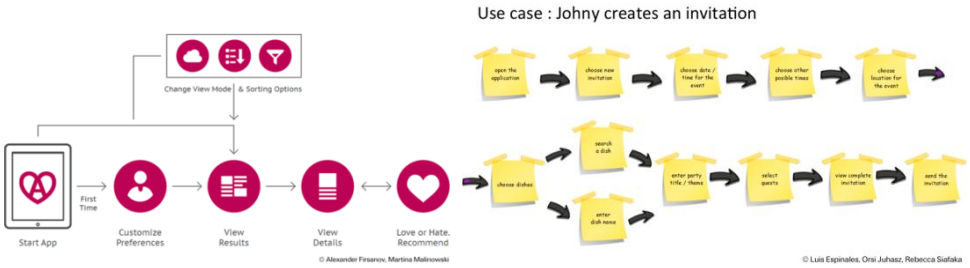

Figure 5. Flow Diagrams derived from verbs in the developed stories.
© By the authors and A. Firsanov, M. Malinowski, L. Espinales, O. Juhasz, R. Siafiaka.

5.1. Extracting user activity and functionality from stories

Chris Crawford, an expert in interactive storytelling, also highlights the role of language as a tool for software design: *Always design the verbs first. Don't start with the technology* (Crawford, 2002). After writing a detailed user story, the next step was to break the story down into single user actions. The easiest way to extract user activity from a written story is by spotting user related *verbs*. Based on the activities represented in these verbs, it is quite simple to layout a use case or flow diagram that displays what the user does and how these activities interrelate.

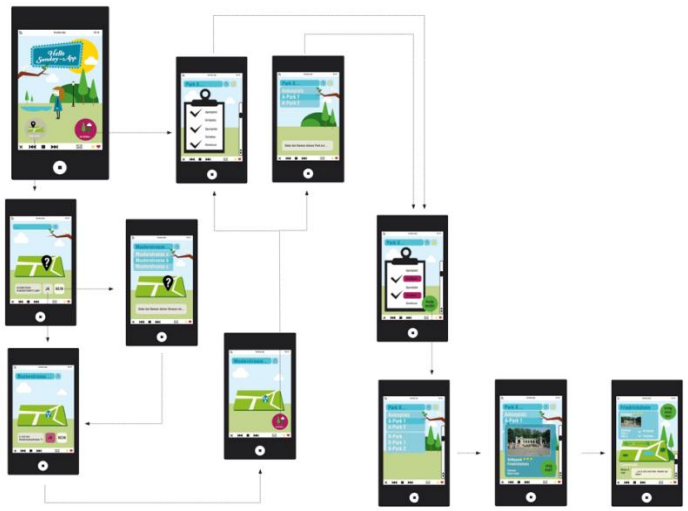

Figure 6. Digital prototype of an app to find public parks.
© By the authors and A. Gunzenhäuser, S. Voigt.

4. Results

The concepts that have been developed by the described methods cover a great variety of topics. Due to the authors' focus on digital media, most of the results are software-related. The following list highlights some examples. However, the described processes can also be helpful in brainstorming phases for physical products and services. The most appropriate approach would be not to restrict the type of outcome beforehand. If design wants to be a problem-finder and a problem-solver, then it does not make sense to restrict the solution to a specific medium (physical product, paper, software, service) — even before the problem has been defined. Still most design seminars work like this, students can do anything, as long as the outcome is, for instance, a physical product (Oswald, 2010b).

- Application for organizing lunch with several courses over a social network
- Software that maps incoming phone numbers to personal vibrating patterns
- Non-linear presentation software
- Virtual world-wide aquarium connecting people by personal message-carrying fish
- Social software for organizing challenges and competitions
- Application for generating proposals of what to wear, depending on personal collection, event, style, and weather
- Storytelling application in which the interaction modifies the story
- Fitness trainer application based on personal music collection
- Application that analyzes motion patterns and dance styles, combined with community and mapping functionality
- Application for sharing and rating "guerrilla gardening" locations
- Gamification software for gyms allowing virtual real time competitions with friends in different locations

Apart from the expected and intended learning goals like concept, design and prototyping skills, a rather surprising insight was that there is obviously no "end of innovation" in sight. In the first seminar sessions students frequently complained: *This has been done before, there is already an app for that!* or even *Everything has been done before!* This scepticism was overcome quickly with the presented creativity techniques and the resulting stream of ideas.

5. Conclusion

The genius designer who produces great ideas out of nowhere is a strong cliché, and it implies that using "creativity aids" is almost an act of dishonour. However, the results of the described seminars suggest that great ideas and good concepts can be encouraged a lot by simple methods like creating word-combinations with the help of a software script. Even though design has its great and unique power of visual thinking, a text-based storytelling approach is evidently able to push both concept development and user-centric thinking especially in early phases of design projects. Even though 95% of these were completely useless, the sheer quantity generated a feeling of abundance. An output of only 5% that makes sense may look too small, but with an easily created input of 5.000 the absolute number of useful ideas would be 250 — much more than 30 students could make use of in one seminar.

Acknowledgements

This paper is partly based on (Oswald, 2011). It has been revised and extended, especially by the description of the web-based software that supports the described creativity techniques.

References

Bass B. (1965) *Organizational Psychology*. Boston: Allyn and Bacon

Cohn M. (2004) *User Stories Applied: For Agile Software Development*. Addison-Wesley

Cooper A. (2004) *The Inmates Are Running the Asylum*. Sams Publishing

Crawford C. (2002) *Art of Interactive Design: A Euphonious and Illuminating Guide to Building* Krippendorff, K (1961) *Über den Zeichen- und Symbolcharakter von Gegenständen.*

unpublished thesis, Ulm School of Design (HfG), Ulm, Germany

Oswald, D. (2010a) Funktionen digitaler Produkte und der Mythos von der Intuition,

in: *Proceedings of Jahrestagung Gesellschaft für Designgeschichte 2010*, Frankfurt (Main), Germany

Oswald, D. (2010b) Towards a redefinition of product design and product design education in: *Proceedings of E&PDE2010, 12th International Conference on Engineering and Product Design Education*, Trondheim, Norway

Oswald, D. (2011) Ideation and Design of Novel iPad Apps: A Design Education Case Study, in: *Proceedings of E&PDE2011, 13th International Conference on Engineering and Product Design Education*, London, UK

Robinson, E. S. (2011) *Shift Linguals: Cut-up Narratives from William S Burroughs to the Present.* Amsterdam – New York: Rodopi

Robinson, K. (2001) *Out of our Minds: Learning to be Creative*. John Wiley & Sons

Successful Software. No Starch Press

Wertheimer, M. (1923) Untersuchungen zur Lehre von der Gestalt. In *Psychologische Forschung 4*, 301-350.

Zwicky, F. & Wilson, A. G. (1967). *New methods of thought and procedure*. New York: Springer

Zwicky, F. (1969). Discovery, invention, research through the morphological approach. Macmillan