Multi-paths process: an interaction design case study

Abstract
Models of creativity usually define linear structures that guide the design process. Methods such as brainstorming or participatory design envision creation as a process ordered by time. This paper introduces a non-linear view on the creative process, observed through a ‘multi-paths’ lens. After presenting some historical foundations for this concept, and defining what is ‘multi-paths’, I will discuss how this new position applies to interaction design. Then, I show how this approach applies to the design process of a tangible interface for communication, the Message Table. The last part explores the values of ‘multi-paths’ perspective on design processes. I will focus on specific points such as intentional focus, fertile interactions and communication aspects in respect of their different dimensions in the design process.

Keywords
Design, creativity, multipaths, multiple perspective, bricolage, process, hacking

ACM Classification Keywords
H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.
Creative models in interaction design

Interaction Design is the discipline of defining and creating the behaviour of technological systems [3]. Examples of these systems are software, products, mobile devices, environments, services, wearables, and even organizations themselves. Interaction design defines the behaviour (the "interaction") of an artefact or a system in response to its users over time. It is a very interdisciplinary field where different expertises are needed in domains such as design, art, technology and sciences.

This field uses frequently different creative models. One of the oldest is certainly ‘brainstorming’, a hierarchical set of rules that leads to maximum idea generation (ideation). More recently, other methods such as TRIZ or MindMapping have proposed variations also based on hierarchical structures, or polyarchical in the case of MindMaps. Even if these approaches imply non-linear skills [5] they represent processes as ordered structures. Other approaches such as User-Centered Design or Participatory Design [4] e.g. the ‘Interactive Thread’ [2] also envision the creative process as a linear structure, most of the time ordered along a temporal variable. This vision of processes is valuable but incomplete.

In the last fifty years, many researches about processes have developed non-linear models. Inspired by biology, these models have replaced classical hierarchical structures by multidimensional ones. An example of this ‘non-linear turn’ is the book ‘mille plateaux’ by Gilles Deleuze [1]. This book is written as a series of “plateaus”, a concept derived from Gregory Bateson, each identified by a particular date and title. Each refers to a peculiar age or date in which the state described in each plateau, had a central role in the world. The book reflects Deleuze and Guattari’s rejection of hierarchical (arborescent) organization in favour of less structured, "rhizomatic" growth. In this perspective, interaction design process could benefit from a non-linear view, rhizomatic or multidimensional.

‘Multi-paths’ approach

In addition to linear models of creativity in interaction design, there is space for a non-linear model of the design process. The term ‘multi-paths’ refers to the many ways through which a final object is materialized in the world. These paths are of different and unrelated nature. Basically, the idea is to frequently replace our spectacles, therefore always shift from one creative activity and its conclusion to another one, relating to each of them as further experiment on the way.

The different paths we take during a creative process could be different approaches, vehicles, scale or contexts as long as we find a new frame to look through we may bring fragments of insights to the development of the concept. These paths interfere between each other, sometimes in constructive ways, and sometimes on more selective or destructive manners.

The next section shows how this approach applies to the design process of a tangible interface for communication, the Message Table. Then, a discussion of the values of ‘multi-paths’ perspective on design processes will . The focus will be on specific points such as intentional focus, fertile crossing interactions and communication aspects in respect of their different dimensions in the design process.
Case study: the Message Table
The message table is an answering machine, designed according to our novel interpretation: This answering machine is separate from the phone and physically merged into a table. For each message received, a box appears on the table. In order to listen to the message one has to open the box - and for deleting it, the box must be pushed back into the surface. The teamwork of two individuals, coming from divers background, enriched the creative process. An architect trained in design, and a computer scientist skilled in electronics, creating a dialogue in the attempt to join together their skills and knowledge. It is possible, that the need to communicate personal thoughts and bridge the professional gap allowed multiple paths and contributed to the process.

Information as volumes
We decided to represent the messages as volumes in the personal environment, to focus only on the device that collects messages and the interaction with them. At that point we analysed the functionality of the device and in the same time started to conduct some experiments. These explorations approach a wide spectrum of aspects: technical issues, materials, semantics, physical constrains etc. In four weeks we developed a working device.

Through a hack of an infrared light barrier kit and a white foam core box, we made a quick functioning prototype of one message container. We discovered that the white lid of the box reflects the infrared light from the emitter of the barrier to the receiver. When the lid is opened, the infrared light is no longer reflected back, therefore, the light path is “broken”. We hacked this system to activate the answering machine and the result is that by opening the box, a message is played. From this technical experiment we gained a practical valuable knowledge of physics and optics, which can be applied in our further design, this insight will influence other paths: our choice of colours, shapes and materials.
In parallel to technical and aesthetic experiments, we tried to examine in depth the semantics of our physical metaphor for the messages. We tried to provide a visual presentation of the messages as well as a tangible one. Each box appearing on the table contains an audio message (two boxes, mean two messages), and the height of the box represent the length of the message (a tall box, means a long message). We wanted to test the coherency and the vision of this new language, in terms of the experience.

We created a short story describing the ‘home coming ceremony’. In this video scenario we ignore the low of physics and focus only on the simulation of that new language. This short scenario provided us with the flavour of such experience, confirming the semantic coherency. In addition the detachment from technical limitation allowed us to create a radical situation, which manifest a fantastic image: the messages as personal skyline in the home.

In order to explore the physical design, we built small foam core mock-ups. While looking at those three dimensional structures, we got an insightful view that we fail to notice before through the drawings. In these models the section beneath the table revealed new possibilities, the presence of the boxes under the surface resembled hidden organs of the table, which were identified with the table legs. This fresh point of view provoked an original association. Now the boxes could be perceived not only as containers of messages but also as dynamic structure, which hold the table.
**The values of a ‘multi-paths’ approach**

There are many values of taking a multi-paths approach on the creative process. Among them I have identified three main ones, presented here with no particular order.

- An intentional focus on one aspect of the creation, detached from the overall view and constrains

- Fertile crossing interactions. A view of some aspect allows symbiotic association, encourages fertile inter-disciplinary creation, hybrid solution, fresh fusion combination etc

- A flexible vehicle for communication during the process, within the team

**Intentional focus**

There are countless dimensions in the design process, not all of them can be questioned from the same position. By approaching each aspect in this parallel way (separately yet simultaneously), it is possible to question each of the project aspects independently, allowing development of the concept regardless of the constrains caused by their combination. Putting a side the possible future limitations allows a particular examination in depth and liberates the authors to experiment with unexpected characteristics.

**Fertile crossing interactions**

Linking the results of the various paths generates new interpretations. The meeting of an insight regarding to a social behaviour combined with a new technical solution, may provoke innovative development or create new interactions and aesthetics. The diverse outcomes of a non-linear process lead to a pile of fragments, a stimulating environment, where the different samples may influence each other. One experiment may be well integrate with a different path, but also might contradict the other – a conflict would lead to a creative dispute, which examines the significance in order to keep the coherency of the creation. Although a path that was taken and then not applied might be perceived as a misspent development or energy, it still brings a great value to the process. Its investigation assists the discussion and shaping of the concept.

**Flexible vehicle for communication**

The investigation and re-presentation of various aspects of the concept provide the creators with a collection of ‘snap-shots’, which help to establish a discussion and clarify core ideas. This is especially beneficial in creative process relating to technology, where usually it is a work of a team, including persons from different backgrounds with different expertises and skills. Often, not only they have different knowledge but also a different way of thinking and different ‘languages’ to communicate it.

The diverse mediums used to convey specific aspects during the process, provide flexibility of expression to sharpen them, furthermore a new mode of expression may expose new angles and enrich the perception of the concept in unexpected ways. This may be valuable to make a progress in the understanding of the concept, and mostly assist in constructing the coherent discussion during the creative process. The result of various investigations and experiments support the communication and discussion for decision taking during the creative process.
Conclusion
This paper introduces a conceptual exploration of the values of non-linear perspectives on the creative process through a case study, the Message Table. The results of this conceptualization show that modelling or representing non-linear processes is not trivial, but keeping in mind their values leads to insights and new ideas for design.

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References