Using the haptic qualities of origami to develop cognitive abilities

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Introduction

We postulate that the method used for **memorization** influences the potential to obtain and retain information. When people are in a familiar situation their memorizing skills are enhanced.

Haptic design gives the opportunity to build a representation of an object or an environment, which can be memorized and kept in our memory for later use. The body, exteroceptive perception, and sequenced and progressive actions all contribute to information processing.

In 2014, a special needs educator asked me to work with his group of adults who had severe cognitive disabilities. The aim of this workshop was to **develop their cognitive skills and ability to be creative**. With the art of origami they could learn, and become familiar with a sequence of actions, in a reassuring space.

Question 1 Cognitive abilities

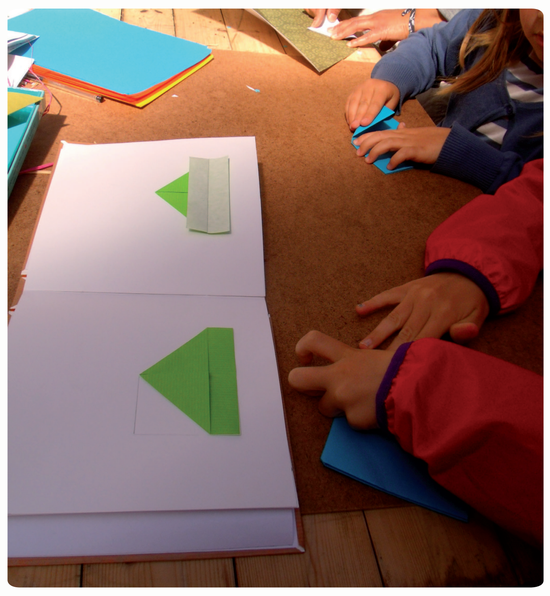
When our cognitive capacities are dysfonctionnal, when one of our sensory faculties is missing, or when the circumstances disturb our attention, how can we develop our concentration, memorization and mental or sensitive representation ?

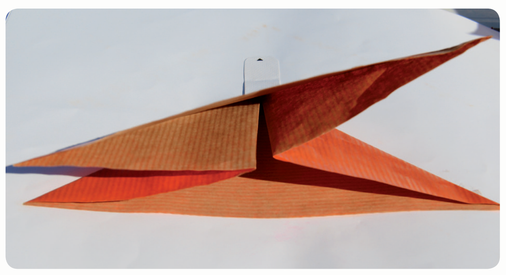
Question 2 The haptic qualities of origami and spatial geometry

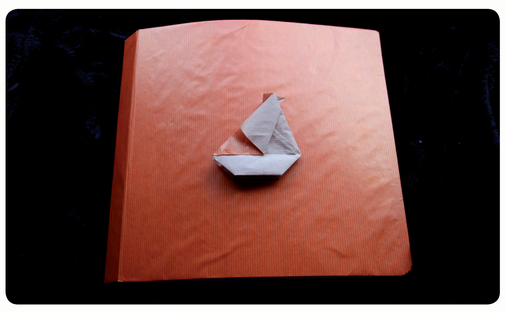
How can we use haptic modality to develop cognitive fonction ?
How does origami give the opportunity for this ?
How can we help people to understand how a 3-dimensional structure is built ?

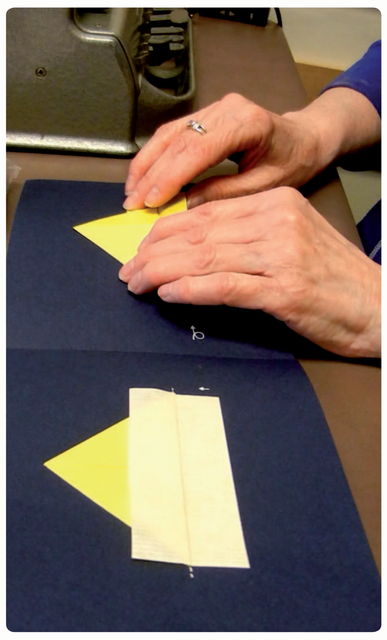
The haptic qualities of origami

- Origami gives the opportunity to **understand step-by-step** how a volume is built, always following the same principles. The foldings could be similar in different origami, as for example in the illustration on the right.
- With our method, people can **practise the manipulation of each step** and understand without help or text explanation.
- The paper has different textures on each side, giving cutaneous and visual references.
- The manipulation of the paper **requires focus and concentration**, and practise, with both firmness and flexibility.
- The size of the book offers an adequate environment in which to prioritise concentration and avoid distraction and stimulation.









Participants and methods

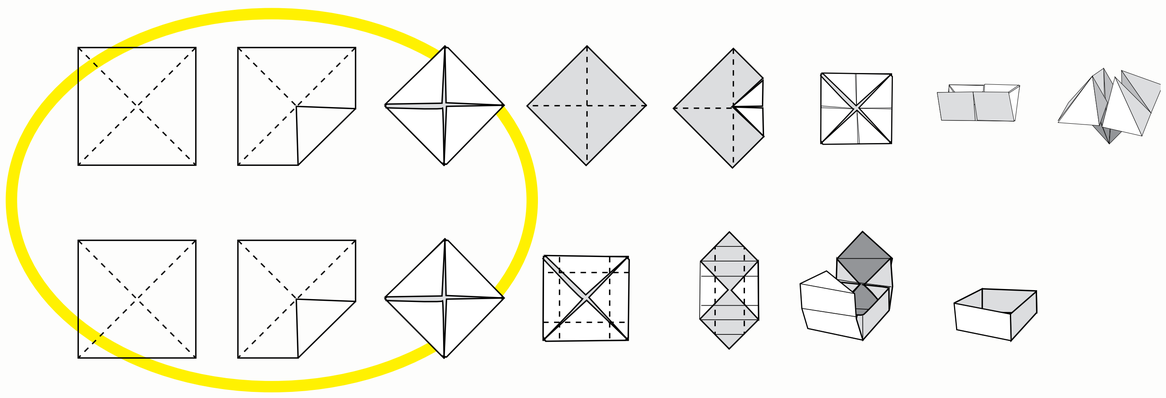
The first group was composed of 7 people, who had different mental disabilities. They were all in their 50's. Through 9 workshops over the course of one year, we took time to explore and find the best way to develop their cognitive abilities.
After each workshop, I observed and documented :

- **what and how they explored** (book, image, spontaneously, tentatively ...)
- their actions during **the workshop** (folding strategy, speaking, ...)
- their capacity for concentration (on one folding, the full length of the wrokshop,...)
- their behaviour and participation in the group (doing by themselves, helping others, waiting for other people to do for them, remembering and telling stories about origami, ...)

Among the 7 participants :

- **4 stayed voluntarily more than 2.5 hours per workshop**
- **5 of them memorized the mouvement of some foldings and could fold without help**
- **4 of them were able to retain and share folding skills with others**
- **1 of them was able to acquire vocabulary in terms of spatial geometry such as the triangle for which he had not previously had any form of representation**

- This educational method was created during this experience.



The second group was composed of 78 trial subjects from 6 different groups and situations. For these groups time, concentration, focus and knowledge were limited in order to evaluate the efficiency of the method.

- 50 people of all ages in a noisy environment
- 8 teenagers from 14 to 16 years old in a competition against the clock
- 4 healthcare personnel, impromptu during a coffee break
- 4 child of 5 years old
- 2 foreigners
- 5 blind people

At the first attempt
70 % succeeded their origami without help.

Discussion

How could this method be developped for young people at school who have difficulties with spatial geometry and concentration ?

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