



## Tools for Ideas: Making Conceptual Information More Tangible

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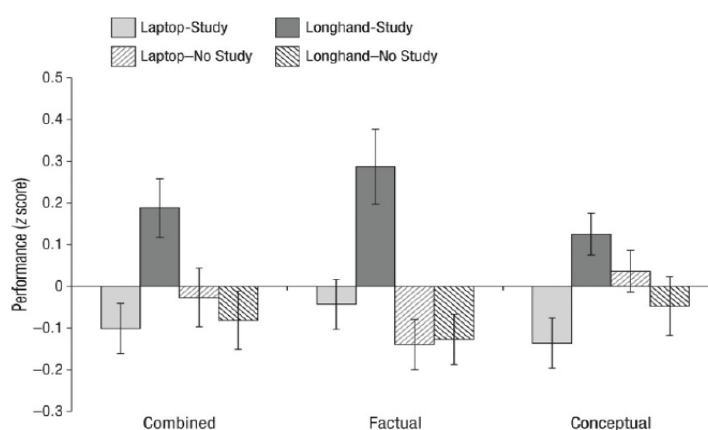
### Abstract

Humans produce gestures while they are talking or explaining something. Their hands play a significant role in learning and cognition. According to several research papers, hands connect to the brain and enhance thinking ability. This research aimed to develop a tactile toolkit through a combination of the concept of “thinking with hands,” and creative brainstorming used to make conceptual information more tangible. The toolkit came in various materials. Each material, with its unique characteristics, could represent different situations, meanings, and thoughts, allowing users of the toolkit to relate their brains to their hand gestures in their verbal communication.

**Keywords:** *Thinking with hands, Brainstorming, Tactile, Gestures, Creativity.*

### 1. Introduction

Brainstorming sessions that are appropriately done encourage the participants to come up with thoughts and ideas in a relaxed and informal environment, allowing them to expand on their ideas in many directions. Moreover, the atmosphere during any such session in a meeting or classroom is full of large sheets of paper pinned to the wall or layer out in a table, with Post-it notes, colored pens, and such simple tools used to capture ideas on paper by hand. Writing or drawing something by hand tends to boost one’s ability to retain information, comprehend new ideas, and be more productive with the added benefit of eliminating the distraction of electronic devices (Frisch, 2016). Mueller and Oppenheimer (2014) said that paper notetakers’ brains are working to digest, summarize, and capture the heart of the information, promoting understanding and retention. They found that participants who took notes on laptops performed worse on conceptual questions than those who took traditional paper notes (Figure 1).



**Figure 1** Scored performance on factual-recall and conceptual-application questions as a function of note-taking condition (Mueller & Oppenheimer, 2014)

Pallasmaa (2009), in his book titled ‘The Thinking Hand,’ argues that “The initial mental image may emerge as a visual entity but it can as well be a tactile, muscular or bodily impression or a vague feeling that the hand concretizes in a set of lines projecting a shape or structure. One cannot know whether the image

[1957]



first arose in one's mind, and was then recorded by hand, or whether the image was produced by the hand independently, or whether it emerged as a result of a seamless collaboration of the hand and the drawer's mental space. It is often the act of drawing itself, the deep engagement in the act of unconscious thinking through making, that gives rise to an image or idea. The second meaning of the word 'drawing' is pulled. Points to this essential meaning of the drawing as a means of pulling out, revealing, and concretizing internal mental images and feelings as much as recording an external word. So, the creative is a condition of haptic immersion where the hand explores, searches, and touches semi-independently."

When people express them though by hand, it will produce a gesture of hand even in thinking process such as finger tapping, stroking the chin or touching the head, or communicate the ideas process such as waving the hands while explaining. The gesture people produced while they are thinking has a connection between hand and mind. It can reflect the brain and improve our thinking (Goldin-Meadow, 2006). Moreover, Lunenburg (2010) said that "gestures reveal how people are feeling, they tend to gesture more when they are enthusiastic, excited, or energized, and they tend to gesture less when they are demoralized, nervous, or concerned about the impression they are making".

An example of popular set of tools used for enabling the connection between hands and mind to enhance communication within a workshop framework is the LEGO Serious Play (LSP) (Figure 2). Participants are given a set of short exercises by a trained moderator who sets the guidelines and time limits to build models of a theme or an idea using the Lego bricks, following which all the participants take turns to discuss their creations. By doing so they fire up more parts of their brains than just the working memory. This is called hands-brain-connection where people are more creative and imaginative when using their hands in the context of mental work (Mccusker, 2014). Another aspect of LSP is to tell the stories using metaphors that relate to their models everyone has built. Metaphors help to give a deeper meaning to the Lego bricks as the participants do not just build their ideas by physically representing them with the Lego bricks. Hence, LSP is not about constructing, instead, the participants give meanings to the bricks by using metaphors and link these meanings to a story that goes beyond the physical models (Grienitz & Schmidt, 2012). Participants use blocks as mediating artefacts to build symbolic or metaphorical representation of abstract concepts. In this way, the participant's conceptions of intangibles and ideas are concretised by the Lego model.



**Figure 2** LEGO Serious play (Tang, 2018)

Another recent contender which is very similar to the LSP is the Playmobil Pro (Figure 3), based around the iconic Playmobil figure. The system includes a carrying case filled with unpainted Playmobil characters and accessories (Zahn, 2019). The participants then give meaning to their creation, and the lack of features allows them to interpret their idea in multiple ways.

[1958]

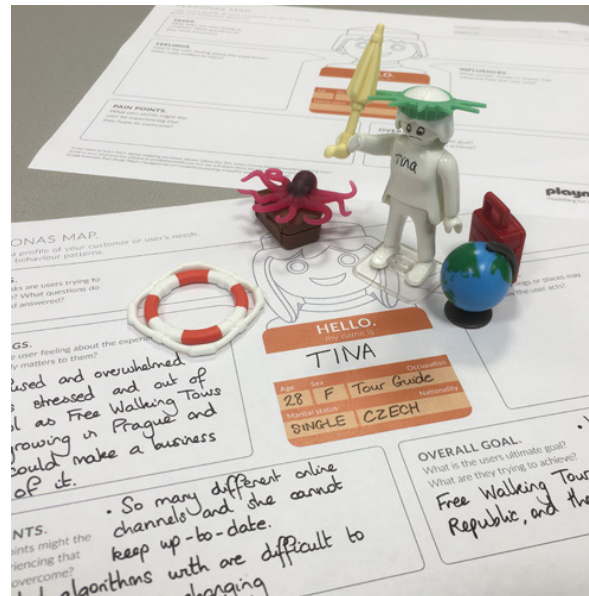


Figure 3 Playmobil pro (Playmobilpro, online)

This research wanted to use the importance of using hands to communicate thinking through the tactile material to help people who cannot articulate by writing or drawing to expand the ideas in the brainstorming process.

## 2. Objectives

To design tools to encourage people to represent ideas through tactile materials.

## 3. Methodology

This work starts from observing behavior and tools used in the brainstorming process and literature survey of the importance of learning or presenting through tactile objects and reviewing related case studies.

A set of prototypes of a tool kit is created to display the user's ideas.

## 4. Results

### 4.1 Observation result

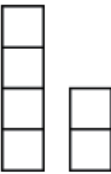


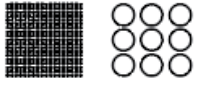



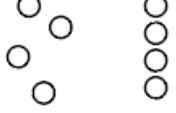


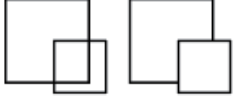
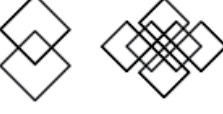
During the brainstorming sessions, it was observed that a relaxed and informal environment encouraged people to come up with ideas and expand their ideas in multiple directions better. When one of the participants was stuck, sharing one's idea with others to find a new way of thinking helped them get through. The tools used to communicate the ideas also had a significant influence on thinking. It was observed that the participants decided to use physical tools such as large sheets of paper, post-it notes, and colored pens because these kinds of simple tools allowed them to see the whole picture much better than the electronic devices such as a tablet or a laptop. Another interesting observation was that these simple tools allowed the gestures of the body, thereby connecting to more parts of their brains.

### 4.2 Presence

Connor (2019) stated that "When thinking of shapes, these are the first to come to mind. Shapes include squares, triangles, circles, and hexagon. These shapes are easily identified and have been given names. The shapes with straight lines and angles usually symbolize structure and order, while the shapes with curves are softer and represent connection and community. Abstract shapes are recognizable in form, but are necessarily not real as they are simplified versions of organic shapes."



Hall (2012) also mentioned that the compositions have two dimensions in his book titled “This Means This, This Means That: A User’s Guide to Semiotics Visual.” He explained that the two dimensions have the two elements of placement and presence. Presence suggests what something is, or is described as being along with how it is rendered.

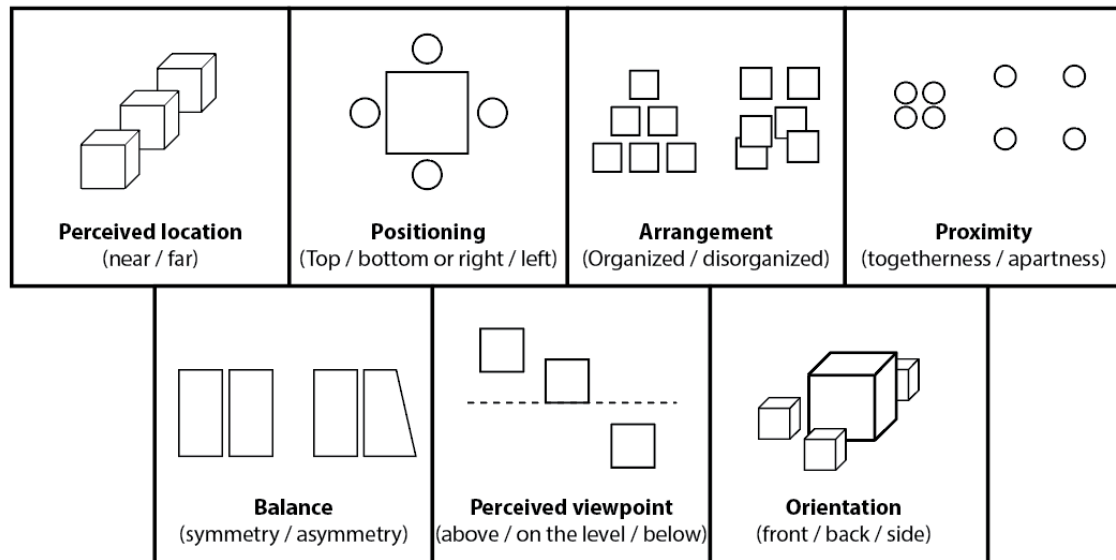
 <p><b>Number</b> (many / few)</p>	 <p><b>Size</b> (large / small)</p>	 <p><b>Colour</b> (hue / saturation / brightness)</p>	 <p><b>Detail</b> (fine / coarse)</p>
 <p><b>Shape</b> (regular / irregular)</p>	 <p><b>Texture</b> (rough / smooth)</p>	 <p><b>Movement</b> (static / dynamic)</p>	 <p><b>Arrangement</b> (organized / disorganized)</p>
 <p><b>Contrast</b> (high / low)</p>	 <p><b>Tone</b> (light / dark)</p>	 <p><b>Transparency</b> (clear / unclear)</p>	 <p><b>Demandingness</b> (simple / complex)</p>

**Figure 4** Element of presence (adapted from Hall, 2012)

Figure 4 shows that the difference in number, size, shape, texture, color, or arrangement communicates different meanings and feelings, and these elements, depending on the context in which they are used—for example, using big size to show the importance or comparison of the element or using red color to emphasize or warning.

#### 4.3 Placement

Placement is about the things as perceived location, where something is located, or is represented as being located.



**Figure 5** Element of placement (adapted from Hall, 2012)

Figure 5 shows the difference in position and arrangement that give a difference in perceived location and meaning. For example, the position placed can represent the importance or order of the element, and proximity can show the group of elements.

#### 4.4 Prototype of the tool kit

From these observations and study about the psychology behind the hand-mind connection, the author has searched for physical objects that can encourage the user to communicate their ideas more effectively. Adding a layer of complexity, not only by using these tools to communicate their ideas, but the tools themselves have some character in terms of texture, color, temperature, and size, thereby compelling the user to apply a deeper level of thinking while using these tools for brainstorming.



**Figure 6** Prototype of the first set of the tool kit



The author was looking at the real materials, which have a different characteristic such as texture, color, weight, or temperature and selecting materials that people are familiar with the story of each of the selected materials as follows.

1) Plastic, the human-made material gave a softer look, softer feel. The selected type of plastic to use in this project is silicone and acrylic, which have a different character as soft and hard, clear, and unclear.

2) Wood, its narrative, can bring people to the feeling of nature. Each piece of wood has its characteristics, its texture, and color are not the same. The selected type in this project is rubberwood and teak wood.

3) Metal is the human-made material that has shiny, reflective, and heavy. The selected type of metal is aluminum.

4) Stone, the symbol of strong in nature, rough surface it gave more feeling of texture while touching. The selected type of stone is Granite.

For the form of each material in the tool kit, the author chose a cube form as it has six sides, which give a different view and one abstract form for the user to practice metaphor meaning abstractly.

The size of each piece is approximately 5 by 5 centimeters, which the users can easily hold in their hands.

#### *4.4.1 Starter workshop*

The purpose of using the tools is to identify characteristics of the material and explore how these relate to the user's context, let everyone sharing their thoughts about the material the form and the placement, metaphor give a deeper meaning to the material. The participants did not compose their ideas just by physically representing them with the material, but the participants gave meanings to the material by using metaphors and linked these meanings to a story of physical material. It was the step that the participants started the process of sharing and reflection.

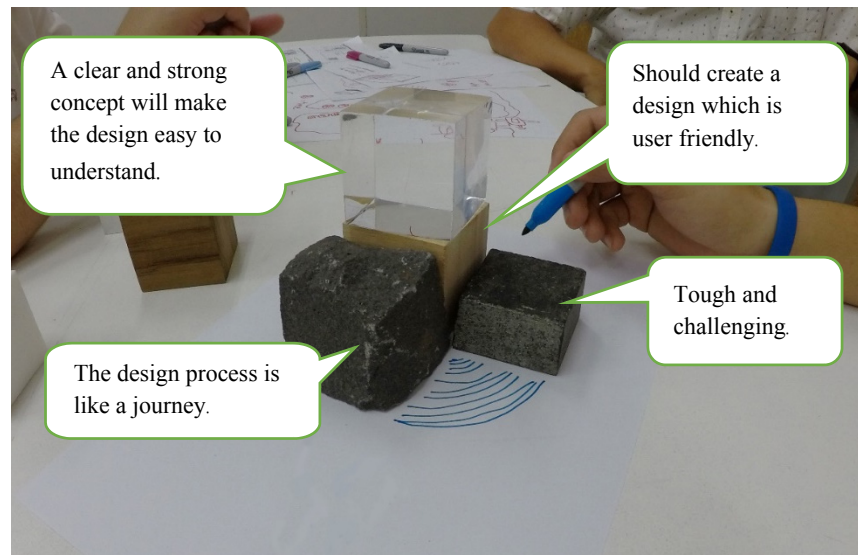
The first step was for the participants to familiar with the tools. They were asked to choose one piece of the material to describe their character, sharing the story by explaining how the selected material relates to their character.

The next step is to introduce the process of composing physical material to represent the ideas. The participants were asked to build the house by composing the material. Everyone had to describe their own house, mainly using metaphors.

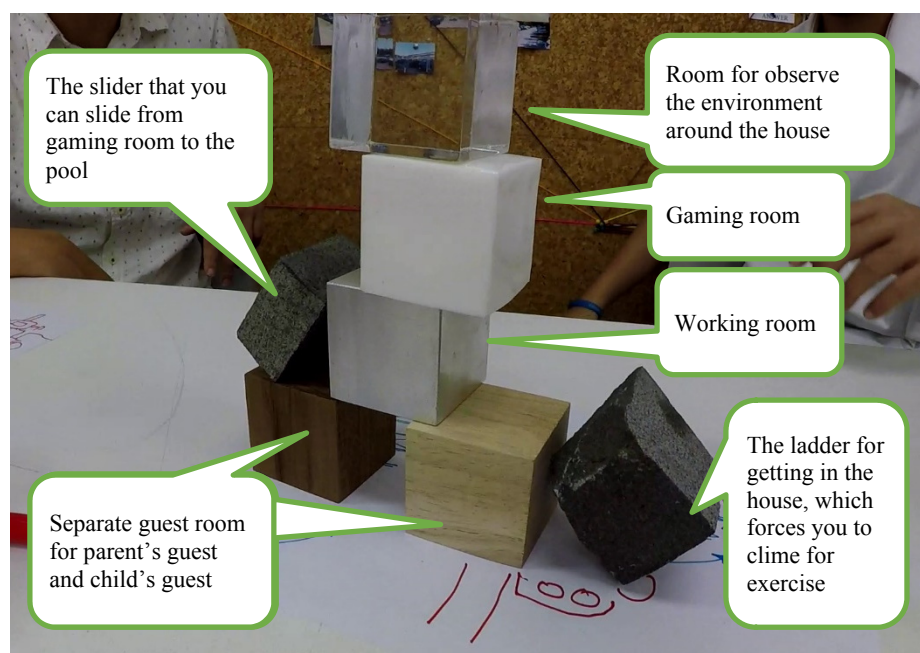
The last step is to introduce the process of composing symbolic representation with the tools. The participants were asked to compose the material to describe the more abstract ideas, such as the exciting experience in their life context, encourage participants to try to tell a story by using the material that participants have composed.

According to the starter step, the author had implemented the prototype (Figure 6) with participants who are Master students in Fine Art in the Design, Rangsit University. The participants were asked to compose the material to describe the interest in the design class (Figure 7) to explain the abstract concept and build the dream house (Figure 8) to explain the concrete concept. These processes required the participants to discuss their models in details and listen to the ideas of others.





**Figure 7** Participant used the tools to represent their thinking about the interesting in Design class



**Figure 8** Participant used the tools to represent their thinking about the dream house

Using the character of material and form as a metaphor helped the participants to pay attention to what was being said in the explanation of the abstract concepts and concrete concepts, thereby assisting in a higher level of concentration and creativity in brainstorming sessions.

## 5. Conclusion

The author designed tools based on the hands-on principles that encourage users to interact with them. The tools' unique character due to differences in materials and textures help the users to communicate



their ideas better and apply their imagination to convert their ideas to a more concrete form and can be useful in encouraging the user to apply symbolic into the model and sharing with others.

The design process could be studied more to develop a joint to connect the materials to the making of tools, which are like a model that can be added, changed, or adjusted and the making of more parts of the materials and forms for creating complex models.

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