



# Collaborative Sketching with Tangibles: Let's Stop Soulless Meetings

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## ABSTRACT

During meetings, one person is often the owner of the whiteboard or PowerPoint to sketch the problem or idea. This person commonly “owns” the meeting leading to passive meeting moments for others. In this course, we will bring the whiteboard to the table to start with collaborative sketching. By also using tangibles, a topic can be discussed in a more interactive and efficient way. We will also learn how to apply the techniques in micro-communications such as coffee machine talks. Participants will leave the course with own hands-on material to use back home. Let's stop having daily soulless meetings.

## CCS CONCEPTS

• **Human-centered computing** → *Human computer interaction (HCI)*.

## KEYWORDS

knowledge transfer, communication, tangible interaction

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## 1 BENEFITS

Participants will learn how to discuss an idea or problem by means of collaborative sketching combined with tangibles. The techniques will empower participants to change passive meetings to true collaborative and interactive moments. They will moreover learn how to apply storytelling, draw sketches as a story blueprint and use tangibles (Playmobil and 3D printed artefacts) to efficiently tell their story to the group. This story is then used to start an interactive discussion where collaborative sketching with tangibles is introduced. During this collaborative activity, communication through tangibles is also used as a way to express one's opinion in a neutral way. Participants will thereby develop their professional soft skills in the communication of complex topics and in moderating a collaborative and interactive meeting. The practical work is directed

towards own experiences and presented works at CHI. Participants will thereby return home with sketches and tangibles to answer the question “How was CHI?”. Additionally, topics about CHI will be discussed during the collaborative activities such as accessibility, community creation, ecological footprint, industry participation and science communication. The outcomes will be feedback to the particular CHI chairs.

## 2 INTENDED AUDIENCE

Attendees who are interested in improving their communication skills to make daily meetings more efficient and interactive. All attendees are welcome.

## 3 PREREQUISITES

There are no prerequisites.

## 4 CONTENT

In a first theoretical part (20min), we will provide a state-of-the-art outline that let the audience understand the advantages of physical sketching and using tangibles, where in daily activities sketching is most beneficial and which methods there exists to support communication of complex topics during meetings. The second part, will introduce the techniques that will be used during the practical work.

Existing research has analysed physical writing compared to digital solutions in education and workplaces by focussing on *what we write down* such as notes [4] and sketches [1], *when sketches and notes are taken* such as at the start of or during specific intervals within an activity [1, 4, 14], *with which purpose they are taken*, such as to increase communication or creativity, to explain and understand or during analysis tasks [1, 2, 5, 14] and *why sketching is done on paper* such as the multi-sensory aspects and physical affordances [3, 4, 11].

With regard to using tangibles as a supporting medium for communication, we observe various solutions in education and industry. In education, solutions have been researched for learning words via tangible letters [8], the perception of time as in TimeBlocks [6] and even haptic feedback during STEM brainstorming [10]. In industry, we can observe a similar “back to physical” approach where physicalisation is used to increase creativity in innovation modelling workshops based on the use of Playmobil [9] or the Serious Play methodology<sup>1</sup> by Lego.

The advantages that physicalisation brings to our mind lies in the fact that manipulating objects and handwriting triggers certain

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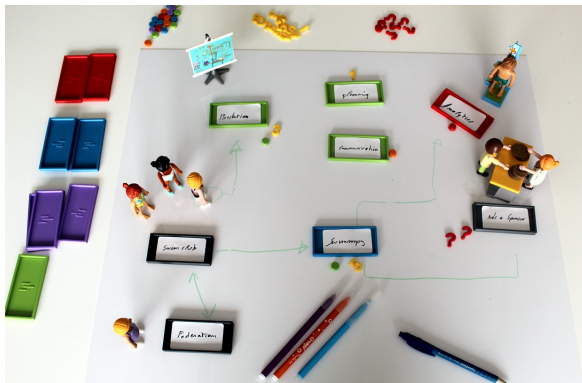
<sup>1</sup><https://www.lego.com/en-us/seriousplay/background>

brain processes which augment our ability to learn. MRI scans confirm this interplay in education settings [7, 12, 13].

In this course, we will go deeper into the question why sketching with tangibles is beneficial and how we can apply it within meeting environments. The techniques are designed by Innoty over the past years and combine scientific findings and experiences from innovation workshops using tangibles as a communication channel.

## 5 PRACTICAL WORK

For the exercises, we will be using the Sticx Boards designed by Innoty. The boards are writable placemats where we use coloured writable tags, 3D printed artefacts such as pins and Playmobil to sketch the story as illustrated in Figure 1. Note that the boards can easily be replaced by a paper sheet when applying the technique back home. However, participants will be provided a Sticx Board which they can take with them after the course.



**Figure 1: Sticx Boards; a plastic desk plate, pens, plastic tags and Playmobil**

Participants will form groups of six persons since this is the most common meeting size. We will do five exercises where the first two are individual tasks and the remaining target different kinds of meeting settings. Each exercise will start with a theoretical introduction followed by the hands-on activity. After each exercise, some participants will present their work where a discussion will follow.

### 5.1 Exercise 1: Using Sketches and Tangibles to Formulate Key Concepts

The first exercise is an introduction on how to combine sketching and physical coloured tags to describe the key concepts and their relation to the story to tell. Participants will introduce themselves to their group by using this technique. After the round-table, each group will present to the others their lessons learned.

### 5.2 Exercise 2: Micro-Communication Through a Storyline

The second exercise is directed towards the practise of building a 2-minute story using the sketching with tangibles technique. Participants will draw up to 3 scenes (sketch + tangibles) that give an answer to the question "How was CHI?". They may use all

available artefacts to design the scenes. The outcome can be used by the participants to support their answer when arriving home. Micro-communications often take place at a coffee machine, in an elevator, during lunch, etc. We will thereby also focus on the temporal limitation when communicating the drawn scenes.

### 5.3 Exercise 3: Yes, No, Maybe - Giving Your Opinion

In this collaborative task, we will use tangibles as a communication channel to express an opinion. This makes it easier for people who are not as vocal to voice their opinions and reduces the dominance of very outspoken individuals. Participants will work in groups and review a number of statements. They will use green, blue and red tags to express agreement, neutrality or disagreement; in those same tags they will write the rationale behind their decision. Placing all tags on the board, the group will collaboratively design the scene that expresses the group's pro and cons for the given statement. The goal of this exercise is to teach participants how to make everyone heard in a discussion.

### 5.4 Exercise 4: Starting Collaborative Sketching from a Person's Story

Participants will be presented a scene with a story about a topic that lives at CHI, for example, accessibility, science communication, community building, etc. They will have to collaboratively sketch a new scene that expresses a solution to the given problem. Each participant will first place a tag to the scene with its opinion and/or possible solution. Next, a joined agreement on possible approaches will be reached by identifying core tags (i.e. main solutions) and secondary tags (i.e. limitations, backup solution, etc). Finally, the scene will be drawn around the tags to bring the story to life.

### 5.5 Exercise 5: Starting with a Blank Board

In this last exercise, participants will use sketching with tangibles in a creative setting. Moreover, each group will draw a scene that illustrates how Augmented Reality can be of value to their daily meetings when applying collaborative sketching. They will be introduced to two AR techniques, namely a see-through approach using a mobile phone and the Microsoft HoloLens. We will provide a demo for each approach where the Sticx Boards are augmented with digital media. Participants will be able to test both approaches as an inspiration to the assignment.

## 6 INSTRUCTORS' BACKGROUND

Innoty is an expertise centre in optimising knowledge transfer in workplaces and education. As an expertise centre we have research collaborations with the Vrije Universiteit Brussel (Belgium). Sticx is the primary brand of Innoty that valorises research outcomes in products and services.

dr.ir. Sandra Trullemans received her PhD in HCI directed towards the design of prosthetic memory solutions for personal unstructured physical and digital media at the workplace. As a follow-up to her PhD, she broadened her expertise into sharing unstructured information among co-workers, how knowledge transfer is done in different kinds of companies and how physicalisation can

improve understanding among individuals at the workplace. Sandra is also active in science communication where she participated in ChiLites at Glasgow and is giving tutorials in high-schools on sketching.

Jorge Valadez is PhD student in a joint-research project between Innoty and the Vrije Universiteit Brussel funded by the Flemish Agency of Innovation. His research is exploring opportunities that augmented reality can bring to the collaborative sketching technique and how the industry findings can inform the digitalisation of education.

## 7 RESOURCES

The course information and more details on our current research as well as the Sticx Boards can be found at <https://www.sticx.be/research>.

## 8 ACCESSIBILITY

The course will be fully accessible to participants with disabilities. Moreover, dr.ir. Sandra Trullemans is herself wheelchair-bounded. Bringing the traditional whiteboards to the table makes it easier for disabled persons to participate. Additionally, the tangibles are of significant size (i.e. Playmobil instead of Lego) so that participants with a decreased hand-mobility can still manipulate the artefacts.

## REFERENCES

- [1] Sebastian Baltes and Stephan Diehl. 2014. Sketches and Diagrams in Practice. In *Proceedings of the 22nd ACM SIGSOFT International Symposium on Foundations of Software Engineering (Hong Kong, China) (FSE 2014)*. Association for Computing Machinery, New York, NY, USA, 530–541. <https://doi.org/10.1145/2635868.2635891>
- [2] Sarah Candry, Julie Deconinck, and June Eyckmans. 2018. Written Repetition vs. Oral Repetition: Which is More Conducive to L2 Vocabulary Learning? *Journal of the European Second Language Association* 2, 1 (2018), 72–82. <https://doi.org/10.22599/jesla.44>
- [3] Manuela Farinosi, Christopher Lim, and Julia Roll. 2016. Book or Screen, Pen or Keyboard? A Cross-Cultural Sociological Analysis of Writing and Reading Habits Basing on Germany, Italy and the UK. *Telematics and Informatics* 33, 2 (May 2016), 410–421. <https://doi.org/10.1016/j.tele.2015.09.006>
- [4] Leopoldina Fortunati and Jane Vincent. 2014. Sociological Insights on the Comparison of Writing/Reading on Paper with Writing/Reading Digitally. *Telematics and Informatics* 31, 1 (February 2014), 39–51. <https://doi.org/10.1016/j.tele.2013.02.005>
- [5] Gunnar Harboe and Elaine M. Huang. 2015. Real-World Affinity Diagramming Practices: Bridging the Paper-Digital Gap. In *Proceedings of CHI 2015, 33rd Annual ACM Conference on Human Factors in Computing Systems*. Association for Computing Machinery, Seoul, Republic of Korea, 95–104. <https://doi.org/10.1145/2702123.2702561>
- [6] Eiji Hayashi, Martina Rau, Zhe Han Neo, Nastasha Tan, Sriram Ramasubramanian, and Eric Paulos. 2012. TimeBlocks: Mom, Can I Have Another Block of Time. In *Proceedings of CHI 2012, SIGCHI Conference on Human Factors in Computing Systems*. Association for Computing Machinery, Austin, USA, 1713–1716. <https://doi.org/10.1145/2207676.2208299>
- [7] Karin H. James and Laura Engelhardt. 2012. The effects of handwriting experience on functional brain development in pre-literate children. *Trends in Neuroscience and Education* 1, 1 (Dec. 2012), 32–42. <https://doi.org/10.1016/j.tine.2012.08.001>
- [8] Heidy Maldonado and Ariel Zekelman. 2019. Designing Tangible ABCs: FröBel's Sticks and Rings for the 21st Century. In *Proceedings of IDC 2019, 18th ACM International Conference on Interaction Design and Children*. Association for Computing Machinery, Boise, USA, 326–333. <https://doi.org/10.1145/3311927.3323123>
- [9] Claudia Nass Bauer and Marcus Trapp. 2019. Tangible Ecosystem Design: Developing Disruptive Services for Digital Ecosystems. In *Extended Abstracts of CHI 2019, SIGCHI Conference on Human Factors in Computing Systems*. Association for Computing Machinery, Glasgow, United Kingdom, 1–5. <https://doi.org/10.1145/3290607.3298819>
- [10] Sarah Pila. 2019. Can Haptic Feedback Improve STEM Learning for Young Children? Lessons from an Experiment and Teacher Focus Groups. In *Proceedings of IDC 2019, 18th ACM International Conference on Interaction Design and Children*. Association for Computing Machinery, Boise, USA, 742. <https://doi.org/10.1145/3311927.3325348>
- [11] A. J. Sellen and R. Harper. 2001. *The Myth of the Paperless Office*. MIT Press, US.
- [12] Hirohito Shibata and Kengo Omura. 2018. Reconsideration of the Effects of Handwriting. *ITE Transactions on Media Technology and Applications* 6, 4 (2018), 255–261. <https://doi.org/10.3169/mta.6.255>
- [13] Elizabeth M. Wakefield, Eliza L. Congdon, Miriam A. Novack, Susan Goldin-Meadow, and Karin H. James. 2019. Learning math by hand: The neural effects of gesture-based instruction in 8-year-old children. *Attention, Perception, & Psychophysics* 81, 7 (Oct. 2019), 2343–2353. <https://doi.org/10.3758/s13414-019-01755-y>
- [14] Jagoda Walny, Jonathan Haber, Marian Dörk, Jonathan Sillito, and Sheelagh Carpendale. 2011. Follow That Sketch: Lifecycles of Diagrams and Sketches in Software Development. In *Proceedings of VISSOFT 2011, 6th IEEE International Workshop on Visualizing Software for Understanding and Analysis*. IEEE, Williamsburg, USA, 1–8. <https://doi.org/10.1109/VISSOF.2011.6069462>