# Materialisation of Relationships Using an Adapted Mental Landscapes Workshop

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**ABSTRACT**
April 14, 2022. In this paper, the use of the Mental Landscapes Toolkit is demonstrated and compared to a revised adaptable physicalization toolkit prototype. This was done by executing two workshops that aimed to use the designed toolkits to learn more about the changed relationship with technology during COVID-19. As a result, a list emerged with similarities and differences between the two toolkits as well as points of improvement. In the end, an answer is given to the research question which is: *How could a more accessible version of the mental landscape toolkit facilitate discussion about relationships compared to the original?*

**Author Keywords**
Thinking with things; Mental Landscapes; Co-design; Qualitative Research; Design Research; Material Practice

**CCS Concepts**
Surveys and overviews; Visualization toolkits

**INTRODUCTION**
Experience or idea physicalizations can be a good way to explore relationship dynamics. People have used artefacts, sketches, diagrams, arrangements, gestures, movements, or other physical representations of their ideas for this to enhance their communication of said ideas [27]. Creating physicalizations can help people communicate their ideas, feelings, or experiences that might be difficult to share with just speech. As such, it can help create a shared understanding of more abstract topics. There are many tools to facilitate this physicalizations process [e.g. 1,2,7,11,12,15,25,26,29], but often the resulting physical representations contain elements whose metaphoric meaning is derived from its topological (i.e. position, shape, colour, texture, materiality or other static properties), connective (i.e. relationship qualities to other elements, often informed by the materiality) or performative (i.e. movement, shape change, sound or other dynamic qualities) aspects [10,13].

One toolkit, in particular, that explores and exploits all three aspect types is the Tangible Thinking workshop [13], which takes the Mental Landscapes kit [22] as a topological core and adds connective and performative elements to the base in different stages.

These stages result in a rich 'landscape' that represents a dialogic and shared understanding of the topic based on the different experiences of the participants. This workshop took about three-and-a-half hours and has currently mostly been applied to discuss the topic of interdisciplinary work [14]. In addition to the workshop itself being arguably quite time-intensive for the participants, the materials for the Mental Landscapes kit are also not that greatly accessible. This is because the necessary variety of landscape elements needs to be (laser)cut from cardboard or paper in a large quantity and spectrum of colours to facilitate the landscape creation process of each individual participant, as to mitigate the risk of participants taking needed materials from each other or being limited by a lack of materials.

This workshop and toolkit could possibly be made more accessible for both researchers and participants, from a time and material preparation perspective, by adapting the workshop setup and materials to a 'simpler' and more limited list of materials, which might even increase the creative use of the materials by the participants [23]. This accessibility for a workshop would in the first place be of importance for design researchers doing exploratory research, as this stage often needs to be done 'quick and dirty' to go to the next stage of research. This goal has been translated into the following research question:

> *How could a more accessible version of the mental landscape toolkit facilitate discussion about relationships compared to the original?*

This paper seeks to give an exploratory answer to this question using the topic of the change of relationship between (design) students and technology caused by the COVID-19 pandemic. This topical and relatable topic was chosen since participants did need recent and strong experiences that they could visualize. However, the essence of this research was not about finding out more about this change in relationships. Nonetheless, the prototyped method in this paper could help participants with further communicating the complex experiences they had during the COVID-19 pandemic beyond using oral interviews and adds to the current array of physicalization tools and workshops.

Especially for students, this could be a highly relatable topic. The COVID-19 pandemic caused most students to shift to a remote working and learning setting, which resulted in a change in technology usage by these students, as they now used lecture streaming and video calling platforms to participate in educational activities [28]. Although online education was experienced as lower quality by most students, the COVID-19 pandemic did bring the opportunity to innovate in the digital learning environment, which could be used once the pandemic is over [19].

The lockdowns caused online education to become the temporary norm but also caused a surge in other digital use, such as delivery services, online socialization and collaboration, workplace monitoring and all-around even increased prominence of- and reliability on the internet in our daily lives as compared to before the lockdowns [5,17]. This caused the relationship dynamic between people and technology to change, for example, a study by de Melo et al. showed that the pandemic's consequences caused people to show an increased degree of altruism towards autonomous machines such as computers [16].

However, the pandemic and its direct and indirect consequences such as unemployment, working from home and withdrawal from social life have also caused mental health problems for a lot of people, such as anxiety, depression and stress [20,21]. This is especially the case for children and adolescents, and long-term consequences caused by the pandemic and lockdowns should be mitigated by the right interventions [8,9]. A study by Pandya et al. shows that the pandemic caused people to increase their screentime drastically, which caused sleep problems for children and young adults, which caused further emotional and mental health problems. In addition to sleeping problems, excessive digital use also causes impaired emotional and social intelligence and mental illnesses such as depression, anxiety, and technology addiction [18]. Another study shows that the pandemic also caused a reduction in a sense of control, which contributed to an increased level of social media addiction, which further caused an increase in anxiety symptoms and other negative mental health outcomes [4].

How the COVID-19 pandemic changed the relationship between technology and people, and especially young adults, could be further explored beyond technology use and mental health problems.

This paper first explores the related works on relationship physicalization and then sets out the formative method design and evaluation method. Next, the results from the evaluation will be presented, discussed with respect to the bigger picture of material physicalizations and finally be concluded into the core findings.

## RELATED WORKS

This section discusses physicalization methods that uses metaphors to make complex ideas and feelings tangible. Although briefly discussed earlier in the introduction, this section also adds information on the Mental Landscapes kit and the Tangible Thinking workshop.

The Mental Landscapes kit by Delanie Ricketts & Dan Lockton [22] uses cardboard cut-outs shaped like landscape elements such as mountains, trees, fences, rivers, and more to facilitate the creation of a 'mental landscape' using nature-inspired metaphors. This kit has successfully been used during individual and group workshop assignments, where the participants created landscapes visualizing and physicalizing their career paths, life journeys, project method. A pilot test showed the importance of three-dimensional objects for this facilitation.

The Tangible Thinking workshop by Dan Lockton et al. [13] builds upon the Mental Landscapes kit by having a three-phase workshop session. In the first (topological) phase participants create a landscape using the Mental landscapes kit. In the second (connective) phase, the participants add material such as wires and strings to connect the elements in their landscapes. Here the materiality of the connective tissue gives metaphoric meaning to the relationships. The last (performative) phase adds a time component to the landscapes, where the participants make their landscapes dynamic by moving elements or for example turning lights on or off. This workshop method has mostly been used to understand the mental model of participants on interdisciplinary work.

New metaphors is a workshop method by Dan Lockton et al. [15] with the goal of refraining perspectives on problems and solution by creating novel metaphors using a combination of cards with visualised phenomena (e.g. Sweetness, Waves, etc.) and textual concepts (e.g. Self-Care, Culture, etc.). These newly created metaphors can help represent difficult to describe ideas with just a couple of cards and some imagination.

Relational Material Mapping is a multi-sensory design tool by Ulloa & Paulsen [1] that can be used to gain insights on systemic relationships. It does this by physicalizing these relationships by connecting elements using different materials, which in turn have different meanings associated to them (e.g., hemp meaning nature, Nylon meaning transparent etc.). This tool has been used in the context of public services.

A chapter by Rygh & Clatworthy [26] describes the design process behind the creation of physicalization tools, using a framework that is based on the use of metaphors and affordances. This is done with the goal of presenting the design and use of tools that support cross-disciplinary work in the healthcare sector. This research showed that the tangibility of physicalizations can ease communication that would otherwise be hindered by jargon.

Self-Constructed Representations by John Fass [7] looks at three case studies related to the physicalization of digital experiences in participatory design research and,

in addition to other findings, shows the importance of the materiality in these physicalizations.

Alternative Unknowns Method by the research studio Extrapolation Factory [29] is a physicalization tool to explore dynamically improvised simulations of systems using a script and paper props.

New Ways to Think by Rodriguez & Herzog [12] explores how a method can be designed to help the physicalization of mental health experiences. Their final prototype uses different geometric shapes from different materials and colours that can be connected to each other and create new metaphors that helped participants communicate their experiences beyond the typical metaphors for mental health.

Making Magic Machines by Kristina Anderson [2] is a workshop designed for children in which they create non-functional 'magic machines', which are lo-fi props that facilitate speculative use scenarios. These created props are a kind of physicalizations of the possibilities that new technology could bring. The Magic Machine Workshops by Andersen & Wakkary [3] uses this same set-up, but with different participating demographics. This shows the importance of freedom of expression with the creation of highly personal physicalizations.

LEGO Serious Play [11] is a method that uses LEGO bricks to create physicalizations of scenarios, concepts and ideas in a business context. Although the single bricks are not customizable by participants, they are the building blocks for assemblies that can represent complex ideas.

## METHODS

The Mental Landscapes workshop [14] can be used for gaining qualitative data by translating human experiences and phenomena into physical representations using a form of co-design. This is done by giving participants access to materials with a variety of characteristics and tactility to best express their experiences into physicalizations. It gives them the opportunity to discuss their objects with other people in groups and try to find connections between their experiences. The actual data is then mostly gained from the discussion between participants with the physicalizations being a vehicle for encouragement of this discussion and thought. The workshop consists of three sessions which explore how ideas can be made more physical – topological, connective and performative by using the analogies of landscape, connection, and dynamics.

### The research based on the Mental Landscapes workshop

During this study the research question "*How could a more accessible version of the mental landscape toolkit facilitate discussion about relationships compared to the original?"* was investigated.

The first step to research the difference between the two toolkits were to get a first feeling of what people in the target group were thinking about the topic, semi-structured interviews were conducted with 5 participants (P1-P5). Semi-structured interviews consist of a series of open-ended questions that encourage spontaneous and in-depth responses [24] (The semi-structured questions can be found in Appendix 2).

Next to this, the method of sentence completion was used to invite the participants to discuss their feelings towards the subject in a more summarised way. Sentence completion means that the first part of a sentence will be given to the participant, and they will add the second part and thus finish the sentence. For this, the structure mentioned in the research of Dittmann-Kohli & Westerhof (1997) was used which divides the indictors based on time: present, future, past and neutral as well as evaluation: positive, negative and neutral [6].

The purpose of the interviews was to gain insights on which metaphors and mental models students use to describe their relationship with technology during the COVID-19 pandemic. The relationship change between the students and technology throughout the COVID-19 times was used to ground the workshop and get insights into how students talk about relationships.

After conducting the interviews in which the sentence completion method was used, the audio files were transcribed to analyse the results. Subsequently, these transcripts were uploaded into a qualitative data analysis tool Taguette which is suitable for coding with multiple researchers [30]. Using this software, the researchers involved in this study assigned categories to the transcripts of the interviews. The categories are based on the metaphors that were used by the participants to describe their experiences. The metaphors were translated by the researchers into a list of materials (for example see Table 1) with which those metaphors could be built (Appendix 3). The materials were chosen to afford a diverse range of constructions and are easy to come by. "Easier to come by" ensures that a wide range of design researchers would be able to adopt the material list for their study.

| Category | Quote from interview | Materials based on used metaphors |
|---|---|---|
| Difficulty | P5 - "I've noticed that I find it hard to get to work when you're stuck at home the whole time." | Heavy objects (hard to move), stuck (Objects that can be placed on top of other things to ensure no movement), depression - substance that smears surfaces |

**Table 1: One example of the material list used during this workshop**

**Figure 1: The materials used in the first (left) and second (right) workshop.**

### The workshops

Two workshops were organised by the researchers in the attempt to answer the mentioned research question. The customizable workshop was executed with 4 participants (P6-P9) and the Mental Landscapes workshop was executed with 3 participants (P10-P12). In both workshops, the participants were asked to use the elements in front of them to visualize their relationship with technology. The materials used during the workshops are shown in Figure 1. The session started with the participants working on their personal construction. This way they were able to experiment with the toolkit themselves.

Afterwards they were asked to present their own creations to the researchers and to each other. This was implemented to see if the toolkit would aid the participants in talking about their experiences. After that the participants were asked to join their constructions to start a group discussion. This was done to start the group discussion to compare the two workshops as well as testing out if the toolkit made it possible to join experiences together. In the adapted workshop (the first workshop) the participants had tools with which they could adapt the materials, like scissors, glue, and needles.

In the Tangible Thinking workshop (the second workshop), the participants were asked to not adapt the material. This was done because the material was lent to the researchers and to better compare it to an adaptable one.

During the workshop, the researchers would observe the participants and were inspired by the following questions:

- How long does it take to make choices?
- Why do they choose certain object? (Thinking out loud)
- Variety in material choices
- How do participants influence each other
- How much do participants customize materials
- Do they participants still use the materials to create metaphors, or do they try to recreate objects more directly?
- What do they say about their relationship with technology?

After the workshop, the researchers asked the participants following questions:

- What were your first thoughts when you got introduced to the toolkit?
- How did you experience the start of your creation process?
- How did your experience change during the process?
- To which degree did you feel like the toolkit supported you in your expression? Why?
- Do you think the materials in the toolkit are sufficiently adjustable/customizable? Why?
- Did you ever feel like the toolkit limited your ability to express yourself? Why?
- Which materials influenced your design process the most? Why?
- Which materials would you like to see added to the toolkit? Why?
- How did you experience the interaction with other participants?

### Analysis

A thematical analysis was done for the transcripts of the two workshop sessions by using the analysis tool Taguette. Besides the group interviews, the final explanations of both the individual and group landscapes were transcribed and analysed too. The themes used for this were focussed on the workshop experience. This is unlike the analysis of the first interviews, since these themes focussed on the participants' actual relationship dynamic with technology during the COVID-19 pandemic. For each theme the main findings were identified per workshop, and these were then compared (Appendix 4). More about this can be read in the findings part of this paper.

Furthermore, to analyse the creations the participants built, the researcher noted, which material was used and how the participant descripted their creation.

**Figure 2: Timeline landscape from P7.**

Those explanations were coded by using the same categories as during the first interviews. The material is ordered by the metaphors that were used during the interviews and the workshops. The list of categories was shortened after the workshop because some categories were not used during the workshops and were too specific to the topic of COVID-19. This list can be found in Appendix 6. Furthermore, the filled in observation grids can be found in Appendix 7.

## FINDINGS

During the first interviews, the material list was created based on the used metaphors by the participants. Quotes like:

*"I think it's difficult for me to see the **balance** between [work-life balance]."*

lead to materials which have the material quality of creating balance or endangering it. Round objects and firm objects were considered, as well as objects with different textures to ensure that participants can express their discomfort or comfort levels. Other participants mentioned: *"I would do things **together with my roommate**s during the pandemic, like have lunch together in each other's rooms and sit together so to create a bit of **separation** between personal life and work."*.

In this quote, separation and different actors are being mentioned. The materials that are different actors were wooden statues, Lego figures and objects with different shapes. The materials for the metaphor of separation were clay, scissors, and varied materials to create spaces, like paper. The final list consisted of 15 categories which are based on 5 different interviews (Appendix 3).

The most described category was relationship during the adjusted toolkit workshop. Metaphors that were analysed during the interviews, reappeared in the explanations of the prototypes during the workshop. Multiple actors, connectors and objects with different properties were used to explain treasured relationships, or strong bonds. In every physicalization, different representation of actors and metaphors were being positioned in dependency of one another. Ropes or cable ties were used to show the connections between those actors (Figure 2).

The participant shows overview of the different states of the relationship between themselves and technology.

| Category | Material | |
|---|---|---|
| Change | **P6** – Divider = Clay wall | **P7** - Connector = Rope, Building a construction = LEGO blocks |
| | **P8** - Building a construction = Cable ties | **P9** - Building a construction = Tower |
| Relationship | **P6 –** Multiple actors = Lego figures, wooden figures, Cable ties | **P8** – Multiple actors = cable tie |
| | **P7** - Multiple actors = Wooden figures, Lego figures, shells | **P9** - Shiny tokens, Rope |
| Representation | **P6** - Value - Clay car | **P8** – Round shape – Cable ties |
| Difficulty | **P6 –** Stuck - Clay wall | **P7** – Heavy, stuck - heavy crystal and a lifting weight |
| Social | **P6** – Connection – Cable tie | **P8 –** Connection – Cable ties |
| | **P9** - Connection | |
| Positive | **P9** - Cotton balls, Pink bright colors | |
| Space | **P7** – Four semi structured areas with different material islands, rope, shells, sponge | |
| | **P6** – Distance - Paper islands | **P9** – Rope, Tower with different arms |
| | **P8** – Clutter of cable ties | |
| Overwhelmed | **P7 –** Overflowing / Crushed - Crumbled paper snake | |
| Work-life balance | **P6 –** Different textures – sponge | **P7 –** Order - Box, heavy things |
| | **P8** – Dependency – cable ties | |

**Table 2: List of materials and their associations as used in the adapted workshop.**

| | Mental Landscapes Toolkit | Customizable Toolkit |
|---|---|---|
| Similarities | • Use of metaphors and non-abstract element<br>• Enjoyment of workshop and group collaboration/discussion<br>• Participants influence each other's design process<br>• Variety in material is appreciated<br>• Difficulty starting off process<br>• Picking materials based on ideas | |
| Differences | • Desire for more customizability<br>• Faster creation<br>• Getting ideas from the materials<br>• Combination of individual landscapes into new one<br>• More interaction between participants during workshop<br>• Main theme barriers | • Appreciation of customizability<br>• Easier to create metaphors<br>• Desire for more structure in the material setup<br>• Placing individual landscapes relative to each other to show relationship<br>• Feeling that there was a limited amount of some 'special' materials.<br>• Might be difficult for less creative people<br>• Sharing more positive experiences<br>• Main theme relationships |

**Table 3: The similarities and differences between the workshops.**

Starting with a heavy feeling which is represented by the crystal towards the clutter of responsibilities during the phase of working from home, which was represented by the lifting weight.

The last phase is the present in which the participant experiences a more structured work-life balance, which is shown by sponges that represent nature and structured packaging of the sealing rings.

The identified category, space, was physicalized through metaphors like distance, clutter, or islands. Those were built with paper islands; tower constructions or cluttered cable tie assembles. It meant that participants were located in different countries than their loved ones or colleagues,

it meant as well that everything was connected throughout the times of COVID-19 due to our constant usage of the digital devices. Every interaction happened through the computer.

Heavy objects were used to show either a strong bond between two loved ones or the heaviness of technology, meaning the participant felt crushed by technology. Connectors, like a rope or a cable tie were used to express relationships, closeness, correlation but were used to portray an arrow to show the movement of time. These and more associations are shown in Table 2.

Comparing the two methods gives a good insight on how the adaptable toolkit works during workshops. This comparison is based on a thematical analysis from interviews at the end of each workshop. The thematical analysis also showed some similarities between both workshops. An overview of the analysis can be seen in Table 3.

Starting with the similarities, the biggest similarity was that in both workshops the participants used both metaphors and non-abstract elements in their landscapes. Although both workshops used the same topic, each workshop had different themes to display their metaphors and non-abstract elements.

In both groups the participants liked not only the workshop but also the group-aspect of the workshops. The group-aspect helped participants in both workshops to get more help and get influenced by the stories and materials the others were using. In some cases, participants got reminded of certain topics during the COVID-19 lockdown they wanted to incorporate into their own landscape as well. Although the materials were different for both workshops, both groups liked the variety of materials they could work with. Both groups also found it difficult to start creating their landscape. Although the group with the original toolkit started of quicker due to the materials being pre-cut. This made it also easier for the original toolkit group to use metaphors in their landscapes.

The biggest difference in both workshops was adaptability. The group with the adaptable version of the toolkit quite enjoyed the number of options the toolkit offered whereas

the group with the original version wanted more options such as added objects or the ability to customize it. This included both cutting things up and drawing on the materials provided.

Although the new version of the toolkit provided more adaptability the participants found it a bit chaotic. They wanted more structure in the material setup, so it was clearer for them what materials were provided and they had a better overview of all the materials at the start of the workshop. The variety of materials also made sure that participants were inspired by others using different materials. One participant even used left-overs from another participant. One participant also mentioned that they would've liked more of some materials, as some materials were limited and thus felt special. She, therefore, did not use any of these materials. Because there was more variety in the materials provided, the adjusted toolkit group also found it more difficult to

**Figure 3: Combined landscape adapted workshop.**

create a landscape out of all the individual landscapes. They ended up not combining their landscapes. However, they did place their landscapes next to each other to indicate how they related (Figure 3). The original toolkit group created a new landscape from all their individual landscapes (Figure 4). They also mentioned that the variety of the materials and the need to get creative with them before they visualized an experience might also lead to difficulties for people who are less creative. One last difference that should be mentioned is that some participants using the mental landscapes toolkit mentioned that they sometimes got ideas by looking at certain materials and sometimes picked materials based on the ideas they already had. Participants from the customizable toolkit group only mentioned the latter.

Interaction wise there were also some differences in both workshops. The group using the original toolkit had more interaction during the workshop itself. When somebody talked about what they were doing and what materials they were using other participants asked questions or shared memories.

This was less in the adjusted toolkit group. Although they did not discuss as much as the original toolkit group,

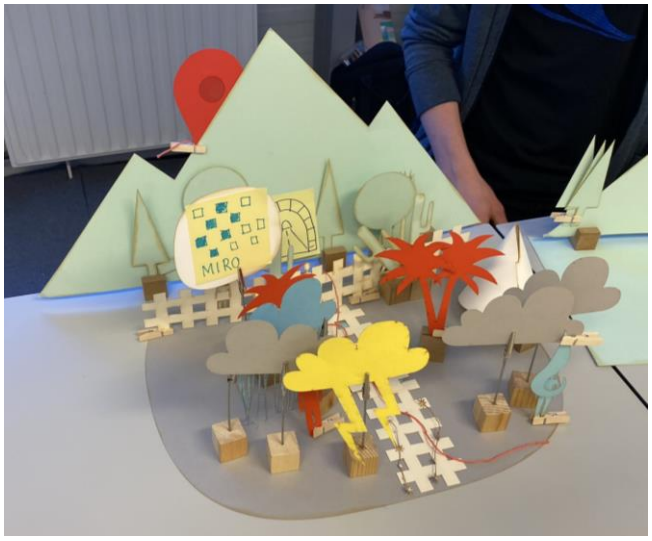


**Figure 4: Combined landscape Tangible Thinking workshop.**

they did share more positive feelings, not only about the toolkit but also about their time in the COVID-19 lockdowns. This is also reflected in the main themes that were identified for the workshops. For the customizable toolkit workshop, one of the main themes people tried to visualize was relationships, while during the original toolkit workshop more focus was put on barriers.

## DISCUSSION

The workshop toolkit was created based on a specific topic: How could a more accessible version of the mental landscape toolkit facilitate discussion about relationships compared to the original? Three out of the four participants mentioned mostly negative experiences throughout the time of the pandemic. Therefore, the toolkit's shopping list is painted by categories like difficulty and overwhelmed. Researching the topic of relationship with a more neutral research question, could have provided a less negative annotated category list. Different participants could have an influence on this outcome as well. Once a negative experience came up during the workshops, more negative stories were told. This could be caused by specific participants group.

The diverse set of materials helped the participants to decide which story they want to tell. The representations of the timelines varied by person as well as the presented detail of different relationships. When comparing the detail of the two workshops, it could be argued that the more material is available, the more personal the creations will be. Seeing the difference in storytelling, colours that were chosen and amount of detail let us believe that people can identify themselves more with different materials and can tell their story in a different way.

The material list at the workshop was based on metaphors used by the participants during some interviews. Those metaphors are based on a specific cultural background because the participants were all from similar cultural backgrounds. This makes the material list limited to the world like we see it and not to how it could be. The interpretation of the metaphors and the imagination for the materials are limited by what the researchers experienced in their lives,

During the workshop, some participants mentioned that the materials provided were too much. In some cases, it even confused them with what to use rather than getting inspired by the varied materials. Therefore, it is important to only select essential materials based on the interview.

The wide variety of materials made it also harder for the participants to combine their individual landscapes. Keeping the materials in a specific theme might solve this. However, participants did say that they disliked the combining of the landscapes because they had to remove parts from their individual stories to fit the group landscape, this would make the landscapes less their story. They also found it difficult to adjust their story to fit the other's.

Besides this the participants liked the addition of the combining to hear more about other people's stories and how that relates to their own story. It is therefore important to look whether or not combining is a necessary element when looking for materials.

As said earlier the participants all studied Industrial Design. Since these students are mostly creative it is necessary to conduct this test with other disciplines too. This would create a better understanding if this toolkit would also be beneficial to people who are less creative.

Due to time constrains the participants have not been asked for feedback on the analyses of the workshop. By doing this you get a clearer understanding if you understood the participants correctly and the participants can also still add some things you might have missed.

Lastly, a future research is necessary to see if the adapted toolkit is also suitable for other topics. The current study solely focused on the relationship with technology before, during and after the COVID-19 pandemic and not on other topics. To see if this toolkit can be used in a wider variety of topics more topics should be tested.

## CONCLUSION

The aim of this research was to compare the mental landscape toolkit to an adapted more accessible version of it. Firstly, the topic of 'How people's relationship with technology changed during the COVID-19 pandemic' was used as a probe to perform interviews. These interviews were done to gather data on how material metaphors could be created around the stories participants expressed. Out of this, an adapted toolkit was created. For this adapted version of the toolkit, no specific list of materials exists. However, it consists of several material attributes. Based on this, materials can be gathered to form a toolkit.

This toolkit was then tested and compared with the original during two workshops, each one testing one of the versions. The goal of this research was not to create a new toolkit to replace its original, but more so to analyse what happens when participants get more freedom to customize and adapt the materials offered to them when making a physical representation of their past experiences and feelings. Next to this, to discover what the impact is of offering a larger variety of materiality. It is difficult to make strong claims about the data collected during this research due to its qualitative nature in addition to the relatively low number of participants. However, some suggestions can still be made.

Both toolkits seemed to be quite capable of encouraging the discussion around the topic of people's relationship with technology during the COVID-19 pandemic. All participants during both workshops seemed capable of expressing their experiences into physical objects using the provided materials. Moreover, all participants created metaphors and extensively discussed their materializations with each other. They also mentioned that the creation process helped them with remembering experiences to talk about, but it did not give them new insights.

Participants during both workshops stated that they really appreciated the group aspect and interaction. However, one main difference between both methods is that the participants using the original method seemed to be able to combine their separate material landscapes more easily into one. The ability to do this did facilitate more discussion around the topic, but it did not provide entirely new insights. Despite the fact that the customizable toolkit is harder to combine, just trying to combine the landscapes already facilitated a lot of discussion. Therefore, the negative effects of this shortcoming were mitigated. For the tangible thinking toolkit, the design process went more quickly. There is a high probability that this is caused by the pre-produced nature of its materials compared to the materials that often still need to be customized in the other kit. Therefore, the original might be better for sessions for which less time is available. Nonetheless, participants did state to highly appreciate the adaptability of the objects in adjusted toolkit. Furthermore, participants in the customizable toolkit workshop expressed a desire for more material customizability to convey their ideas.

This research also provides further validation for the mental landscape toolkit. Beforehand, only limited research had been done with it. These workshops were related to the topic of people's experiences with interdisciplinary work. This paper thus also provides evidence that the kit can be effective for various topics. Moreover, insights were gathered about providing the participants with a customizable toolkit compared to a fixed one. This showed that it gave the participants more freedom to express their experience and be able to create a wider variety of metaphors.

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## AUTHORS' CONTRIBUTIONS

All authors contributed equally to this research and paper.

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# Appendixes

**APPENDIX 1 – INFORMED CONSENT FORM**

Dear Sir/Madam,

You are asked to take part in a scientific study for educational purposes which is part of the course DDM140 Research methods.

Participation is voluntary and requires your written consent. Please read this information carefully before deciding to participate and please ask the investigator for an explanation if you have any questions. You may also discuss participation or the questions with other people.

1. General information

This study has been designed and is being conducted by Lucas Bakker, Nina Bremmers, Jules van Gurp, Marloes Habraken & Anna Merl at the Technical University of Eindhoven under supervision of Panos Markopoulos & Regina Bernhaupt.

2. Purpose of the study

The purpose of this study is to compare a Mental Landscapes toolkit developed by research group with a pre-existing toolkit. Students participating in a workshop will be asked to use these toolkits make physicalizations of their relationship with technology during the COVID-19 pandemic. Discussion about the objects that are produced during this workshop will follow. This will either result in validation for this new more adaptable toolkit or more validation for the other.

3. What participation involves

You will participate in a workshop, in which you will be asked to visualize your relationship with technology during the COVID-19 pandemic using one of the Mental Landscapes toolkits. Afterwards, a discussion about your object will follow together with other participants and the researchers. This workshop will be audio- and video-recorded for analysis purposes. The workshop will take about 75-90 minutes.

4. What is expected of you

In order to conduct the study properly answers need to be answered honestly to your knowledge.

5. If you do not want to participate or you want to stop participating in the study

It is up to you to decide whether or not to participate in the study. Participation is voluntary.

If you do participate in the study, you may always change your mind and decide to stop at any time during the study. This includes before, during or after the workshop.

6. Usage and storage of your data

The collection, use and storage of your data is required for this explorative research project and to internally publish the resulting insights within the Research Methods elective of the faculty of Industrial Design at the technical university of Eindhoven. We ask your permission for the use of your data. You will be asked again for consent if the results are to be published outside of the course. Data gathered will be destroyed upon request, or 10 weeks after the course has been concluded on April 14th.

7. Any questions?

If you have any questions, please contact Lucas Bakker (l.r.bakker@student.tue.nl).

If you have any complaints about the study, you can discuss this with the supervisor Panos Markopoulos (p.markopoulos@tue.nl) or if you prefer not to do this, you may contact the data protection officer at the Technical University of Eindhoven. The Data Protection Officer can be reached via telephone number 040-2476079 and/or email address dataprotectionofficer@tue.nl.

8. Signing the consent form

Please sign below if you have had sufficient time to reflect and would like to participate. By your permission you indicate that you have understood the information and consent to participation in the study. The signed consent form is kept by the researcher in accordance with the TU/e codes of conduct. Both the researcher and you receive a signed version of this consent form.

Thank you for your attention.

Name: …….

Date: …….

Signature: …….

**APPENDIX 2 – INTERVIEWS QUESTIONS**

Explain consent form

This interview will be audio-recorded for transcription purposes. If your webcam is turned on during an online interview, the video feed will also be recorded. This video recording will not be used at all during this study. The interview will take about 15-30 minutes, depending on your availability. You can stop participating in this research at any time. Do you still have any questions? Do you consent to participating in this study?

Start recording

Ask for consent

Explain the brief

The purpose of this study is to gain insights on which themes, metaphors and words students use to describe their relationship with technology during the COVID-19 pandemic.

You will participate in a semi-structured interview, in which you will be asked questions about the topic of relationships with technology before, during and after the Covid-19 pandemic lockdowns.

Semi-structured questions

- Chit chat

1. Which technologic devices are you using in your day-to-day life?

Before pandemic

2. How would you describe the relationship with your devices before the pandemic?

During pandemic

3. How did the relationship with your devices change during the pandemic?
4. How did the relationship with your computer change during the pandemic?

Now

5. How is the relationship with your devices now?

Sentence completion

In this section, we will ask you to complete some sentences. The questions are used to understand how you feel about your relationship to technology now and how it developed throughout the Covid times.

Present

6. Compared to the past...
7. It is difficult for me...
8. I am proud that...

Present

9. It is difficult for me during the pandemic to...

Future

10. I plan to...
11. I am afraid that I...

Past

12. During the pandemic I have noticed that I...
13. When I look at my past life, I regret...

Neutral

14. I think that I...
15. I have noticed that I...
16. What I don't like about my relationship with technology is...
17. What I do like about my relationship with technology is...

Debrief

Thank you for participating.

The data will be managed with care and if you want to have some data removed, please do not hesitate to inform us.

**APPENDIX 3 – MATERIAL LIST BASED ON INTERVIEWS**

| Category | How was it used in text | Metaphors (materials) |
|---|---|---|
| Change | P6- "the difference is that when we're all set at home and couldn't go out, that's when the online meetings of course **skyrocketed. "**<br>P1- "I would say it is a **rollercoaster**. "<br>P6 - "And for my switch is mostly the differences that normally you can also play with **friends.** "<br>Friends and families,<br>P6 - "I still spend a lot of time behind the **computer**"<br>computer and human | connector, divider, rocket, Lego - blocks to create construction, markers of paths – location pins, arrows |
| Relationship | P2 - "I would do things together with **my roommates during the pandemic**, like have lunch together in each other's rooms and sit together so to create a bit of separation between personal life and work."<br>P2 - "I think that it's beautiful that technology can **connect people** that I otherwise would not easily visit. But I also think it can **disconnect people.** People don't talk to each other in the supermarket or on the train." | multiple actors, glue, rope, clips, scissor, balance, special actors (varied materials, shapes and colours) |
| Devices | P4 -" I am using an **electric alarm clock** to get me up."<br>P4 - "I have an electric toothbrush"<br>electric devices, in bed, at home | electric wire, soft things - comforting to touch |
| State | convenient, easy, difficult, distraction, connected<br>P2 - "I think that it's beautiful that technology can **connect people** that I otherwise would not easily visit. But I also think it can **disconnect people.** People don't talk to each other in the supermarket or on the train." | buttons, switches, slider, glue |

| | | |
|---|---|---|
| Representation | "P2 - From my professional **perspective** "<br>viewpoint<br>"P2 - I think that I **value** [the devices] more as a tool to stay in contact with people"<br>"P2 - I use it to be more **aware** of the number of social media I use, and I have a timer for one and a half hours per day for social media"<br>"P2 - I think it is an excellent feature for people to gain **insights** into their screentime of certain apps."<br>P2 - "I'm in a sort of **flow-state** while working I don't get distracted as much."<br>P2- "I would do things together with my roommates during the pandemic, like have lunch together in each other's rooms and sit together so to create a bit of **separation** between personal life and work."<br>P6 - "I regret **not being proactive** in my work"<br>P6 - "I've noticed that I find it **hard to get to work** when you're **stuck at home** the whole time."<br>P1 - "I've noticed that I if I start **not answering anyone** anymore that that is a sign for me of being close to a **burnout**. To being really overworked and stressed."<br>P3 - "**Overcome hurdles** in meeting people and getting things done." | magnifying glass, round things, things they can look through – toilet roll, money, rivers, balance |
| Difficulty | | Heavy objects (hard to move), stuck, depressive feelings - substance that smears surfaces |
| Decrease | P6 - "I think maybe the pandemic also made it a bit of a larger barrier to ask for help or like cause you're not collaborating with people next | Lessening of something, scissors, ripping apart, needles, hammer, making a wall for separation |

| | | |
|---|---|---|
| | to you so sending them a message is a bit more of a **higher barrier.**" | |
| Social | Connecting people, friends, communication<br>P2 - "that technology can **connect people** that I otherwise would not easily visit." | Talking, communication, closeness, connection |
| Increase | P1 - "Before the pandemic I was just studying and meeting friends still. I moved countries in-between as well, so it is not just the pandemic. But I also think that because of the pandemic, **it also increased**." | Glue, things that inflate - balloons, |
| | Everything having to be online<br>P4- "Technology quite **fogged up some brains** from people, and that's quite hard to see," | |
| Negative | P1 - "That **during that time that I hated my computer and online meetings**. And I also hated talking to loved ones, because that was the only way possible. And that made me sad." | Dark colors, paint,<br>Heavy objects (harder to move), substance that smears surfaces |
| | P1 - "I can also see people, so now I enjoy it more. Now I can **see the benefit of being flexible** because of my devices." | |
| Positive | P1 - "Compared to the past I **value the options** I have through technologies more"<br>P3 - "That it gives me **fast access** to the people I want to see." | Bright colors, paint, soft materials - cotton balls, shiny objects (people always want the pretty new things) |
| Space | Connections, Distance, dislike of space, connection of different people<br>P6 - "I think going to like the place of university gives you a **mode switch**, as I would call it. So, you know, at the university, I'm going to work and when you're in your own room, you also use it to chill."<br>P2 - "don't like to be in my room for **every activity all day**." | Different actors, connectors, dividers, ways of showing distance and closeness and making islands, objects that remind of places – nature, cities etc. |

| | | |
|---|---|---|
| Overwhelmed | Too much technology<br>P1 - “There was a time in between during the pandemic where I really **didn't use technology that much anymore** because it got too much for me because **everything was on the phone and on my computer.** Every meeting was there.”<br><br>P1 - “I've noticed that I if I start not answering anyone anymore that that is a sign for me of being close to a burnout. To being really **overworked and stressed.**” | Overflowing, crushed materials, tension on materials/near to breaking, unstable objects |
| Work-life balance | Rest, stuck at home, roll out of bed<br>“P2 - To have a healthy **work-life balance**. I feel like that for more students it is hard to sleep in the same place your life and work in. I found that quite difficult.”<br>P2 - “I would do things together with my roommates during the pandemic, like have lunch together in each other’s rooms and sit together so to create a bit of **separation between personal life and work.**”<br>P6 - “I would say a bit because of the, well, you won't go to work, so you would just get up and **roll out of your bed and into your work station.**”<br>P4 - “I think it's difficult for me to see the **balance between**.” | Heavy, things that can be placed in dependency of one another, Order and stable objects, unstable objects - round object (wooden ball), objects that feel good – different textures, |
| Time | P6 - “**spending more time in bed looking at my phone.** I already did that in the weekends, but maybe now it's also a habit for me on workdays.”<br>P6 - “**decrease** screen time”<br><br>P4 - “working physically and changed it up with some really **deep work times and some normal active times**.” | |

**APPENDIX 4 – THEME COMPARISON WORKSHOPS**

| Theme | Workshop 1 | Workshop 2 | Conclusion |
|---|---|---|---|
| Emotion | -Enthusiastic about the toolkit<br>-Using the toolkit based on emotions | -Anger because of difficulty starting of process | More positive feelings for the first toolkit |
| Enough option | -Enough<br>-Variation in soft/hard or long<br>-You can use the same material in different ways | -A lot of options<br>-Did not use everything | First workshop liked the amount of option (could become cluttered), while the second would have liked more options |
| General description | | -Instead of describing relation with technology, more the lockdown was described | - |
| Group dependent | -The toolkit would be used differently if used with less creative people | | Maybe good for discussion/future works |
| Metaphors | -Describing ideas using metaphors<br>-Line through the story<br>-Rock of wisdom<br>-Weight for heavy moments<br>-Different clocks for different work times<br>-People without faces because you do not really know them | -Describing ideas using metaphors | Both toolkits were good for creating metaphors, but both also created some non-abstract elements |
| Non-abstract | -Making a laptop<br>-Making a car | -Skype logo and MIRO board | See above |
| Overwhelmed | -The choice in materials was a bit much<br>-It should have been more structured | | First toolkit should be displayed a bit more structured |
| Positive | -Liking the materials<br>-Liking the toolkit<br>-Using the materials in diverse ways | -Fun teambuilding activity<br>-Nice method, removes seriousness | -Both liked the team aspect<br>-Liked doing the workshop |

| | | | |
|---|---|---|---|
| | -Creative stimulation<br>-Talked about more positive relationships in this workshop | -Fun | -First workshop talked more about positive stories during Covid |
| Adaptability | -People make different things from the same material<br>-Liking the adaptability | -Want more texture, color, and shape<br>-Would like to change length or draw on it<br>–Low but quick to work with | First workshop liked the adaptability, the second wanted more |
| Combining | -Could keep on adding new stuff to their object<br>-Not knowing in which direction, the process would go<br>-Chaotic which components to use | -Connecting the barriers<br>-Finding the combining meh | First workshop had a harder time combining objects and got more placed next to each other while the second really made a combined landscape |
| Difficulties | -Thinking out loud a bit hard<br>-Start was hard<br>-Combining was hard due to differences in materials and concepts | -Starting off was hard<br>-Got stuck<br>-Hard to change story once started | -Bit harder to start off for both<br>-First workshop more chaotic<br>-Combining problems (see above) |
| Experience | -Liking being in groups | -Did not get insights they did not know of before<br>-It takes away the seriousness<br>-A bit childish | -Liked doing the workshops |
| Interaction | -Feeling like you should make something great because someone else does it<br>-creative stimulation | -Easier if you can talk about it<br>-Relating to other's experiences<br>-Having to change stories because otherwise it might not fit into yours | -The group aspect influenced and helped the participants for both workshops<br>-They liked the group aspect<br>-In the first workshop people got inspired to |

| | | | |
|---|---|---|---|
| | -stimulation from researchers for think aloud | | use certain materials because others were using it |
| | -others guiding unconsciously others' process | | -During the second workshop people discussed more things |
| | -Liking the workshop better because of it | | |
| | -Using each other's leftovers | | |
| | -Other people's ideas got stuck in head (laptop) | | |
| Limits | -More Lego<br>-Wanting more of certain objects (rock)<br>-Time limit<br>-Less creative people might be limited<br>-Liking the variety<br>-Using materials, they would normally not use<br>-Would have liked to have more Lego | -Lack of adaptability (color, texture, etc.) | -The first workshop wanted more of some materials where the second workshop wanted to customize the toolkit more<br>-The first participants mentioned that the toolkit might be harder to use for less creative people |
| Material | -Did not want to use certain things because they were so special<br>-Could make everything as long as you have paper, scissors, and tape<br>-Wanting a sticky surface | -Wanting more man-made object (e.g., house)<br>-Liking variety in trees | -During the first workshop some materials were seen as special which influenced the process<br>-Both groups liked variety in materials |
| Process | -Unclear at the start<br>-Interpret it figuratively<br>-First having ideas and then picking materials<br>-Starting off with a base and decorating it later | -Goes quickly because it is precut<br>-Should think less about metaphors because the materials are already in metaphorical form | The second workshop started of more quickly because the shapes were precut. This also made it easier to come up with metaphors in relation to the first workshop |

| | | | |
|---|---|---|---|
| | -Did not feel the need to add extra things | -Is easier once you started the process | |
| | -Would be able to do it again | -The materials also gave them ideas | |
| | -Not wanting to add bells and whistles | | |
| | -Would have liked more smaller sessions (having smaller time limits) | | |
| | -Timeline | -Nature | Toolkits lead to different themes |
| Theme | -Connections | -Barriers | |
| Thoughts | -Quite quickly had an idea but unsure what to do with it | -Helps with reminding and sharing stories | - |
| | | -Would have said less without it | |
| | -Liking the materials | -Helps with telling stories | -In both workshop the participants enjoyed the session. |
| | -Sufficiently supplied | -Removes seriousness | |
| Toolkit | -Liked the session | -Nice to explore topics | |
| | | -Vision formed out of seeing object | In the second workshop the participants were more aspired by the materials rather than only finding materials that fit their vision |
| Vision | -Object chosen out of vision | -Object chosen out of vision | |

**APPENDIX 5 – INTERVIEWS THROUGH WORKSHOPS**

**Observation:**

- How long does it take to make choices?
- Why do they choose certain object? (Thinking out loud)
- Variety in material choices
- How do participants influence each other
- How much do participants customize materials
- Do they participants still use the materials to create metaphors, or do they try to recreate objects more directly?
- What do they say about their relationship with technology?

**Questions**

- What were your first thoughts when you got introduced to the toolkit?
- How did you experience the start of your creation process?
- How did your experience change during the process?
- To which degree did you feel like the toolkit supported you in your expression? Why?
- Do you think the materials in the toolkit are sufficiently adjustable/customizable? Why?
- Did you ever feel like the toolkit limited your ability to express yourself? Why?
- Which materials influenced your design process the most? Why?
- Which materials would you like to see added to the toolkit? Why?
- How did you experience the interaction with other participants?

**APPENDIX 6 – ANALYSIS OF PICTURES AND CONSTRUCTIONS BUILT DURING THE ADAPTED WORKSHOP**

| Category | Material | How material was used |
|---|---|---|
| Change | **P7** - Connector = Rope<br>Building a construction = Lego building blocks<br>**P6** – Divider = Clay wall<br>**P8** - Building a construction = Cable ties<br>**P9** - Building a construction = Tower | **P7** - Lego building blocks = diverse ways of work environments<br>Rope = laid down as arrow to show change<br>**P6**- Clay wall = People could not visit each other<br>**P8 –** Cable ties = Difference in memories<br>**P9 –** Tower = shows the online interactions (friends & work) |
| Relationship | **P7** - Multiple actors = Wooden figures, Lego figures, shells<br>**P6 –** Multiple actors = Lego figures, wooden figures, Cable ties<br>**P8** – Multiple actors = cable tie<br>**P9** - Shiny tokens, Rope | **P7** - Wooden figures = friends/colleagues<br>Lego figure = self-presentation<br>**P6** - Wooden figures = friends, colleagues, partner<br>Lego figure = self-presentation<br>Cable ties = connection with their friends and work colleagues / representations of how they connected to others<br>**P8** – Cable ties = visualize different activities & relationships to the computer<br>**P9** - Shiny tokens = shows people that are precious & used as actors.<br>Rope = shows the relationship connections to different actors via the online channels |
| Devices | | |
| State | | |
| Representation | **P6** - Value - Clay car<br>**P8** – Round shape – Cable ties | **P6** - Clay car = freedom of driving somewhere<br>P8 - cable ties = to show different activities which are connected |

| | | |
|---|---|---|
| | | **P7** - Lifting weight = always being online and no structured work life felt heavy and unsustainable for the participant |
| | **P7** – Heavy, stuck - heavy crystal and a lifting weight | **P6** - Clay wall = separation to others |
| Difficulty | **P6 –** Stuck - Clay wall | |
| Decrease | | |
| | | **P6 –** Cable ties = Social and professional connection between friends and colleagues |
| | | **P8** - Visualized the conversations and interactions with friends on the computer |
| | **P6** – Connection – Cable tie | |
| | **P8 –** Connection – Cable ties | **P9** - Different arms showed different activities with different actors in which they were social |
| Social | **P9** - Connection | |
| Increase | | |
| Negative | | |
| | | **P9** - Bright colors = The emotions of the participants seem positive towards the experience. |
| | | Cotton balls = safety |
| Positive | **P9** - Cotton balls, Pink bright colors | |
| | | **P7** – islands = Different experiences of relationships with technology and colleagues/friends during distinct phases of the pandemic |
| | | Rope = time-based representation and clustering |
| | | Shells & sponge = nature and free time |
| | | **P6** – paper islands = Participant was located in a different country than people they worked with |
| | **P7** – Four semi structured areas with different material islands, rope, shells, sponge | **P8** – cable ties = “the clutter” shows that it is not nice to be in my computer (mentioned the computer as a space/place more than a tool) |
| | **P6** – Distance - Paper islands | |
| | **P8** – Clutter of cable ties | **P9** – Tower & Rope = Everything is connected, and different online spaces are shown through the different arms |
| Space | **P9** – Rope, Tower with different arms | |

| | | |
|---|---|---|
| Overwhelmed | **P7 –** Overflowing / Crushed - Paper snake | **P7** - Paper snake = is being crushed by lifting weight: Being cluttered and feeling overwhelmed by always having to be online |
| | | **P7** - Structured box of sealing rings = They have a more structured relationship with technology and have more leisure time on the beach with friends |
| | | **P6** - Sponge = reminds them of nature |
| | **P7 –** Order - Box, heavy things | **P8**- Cable ties = connected in dependency of one another |
| | **P6 –** Different textures – sponge | |
| Work-life balance | **P8** – Dependency – cable ties | |
| Time | | |

**APPENDIX 7 – OBSERVATION GRIDS**

## Workshop 1

| How long does it take to make choices? | Why do they choose certain object? (Thinking aloud) | Variety in material choices | How do participants influence each other? | How much do participants customize materials? | Do the participants still use the materials to create metaphors, or do they try to more directly recreate objects? | What do they say about their relationship with technology? |
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| Shortly after start<br>- Stagnation in the end | - Tie raps → connection. Red = Tue | - Differs per person | - Unclear at this point<br>- Hurt feelings<br>- Lots of agreements/shared experience | - Cut paper<br>- Shorten tie raps | - Quite a lot of metaphors with some recreated objects | - Social via Teams<br>- Work overload<br>- Inability to visit each other<br>- online contact is different than physical<br>- People only seen online, no deeper connections<br>- Isolation<br>- Some advantages being online |
| - For some a bit longer<br>- Some people get stuck later on | - Rock → wisdom<br>- Color methapors<br>- Bush → nature | - Using the red for TUe<br>- Tie raps<br>- Rock<br>- Paper<br>- Clay<br>- Lego<br>- Cable | - They actively listen to each other<br>- They gave each other materials<br>- Asking questions<br>- Give their opinions about the objects<br>- Like to discuss things but less combining landscapes<br>- Happiness at the end | - Drawing on paper<br>- Cutting tie raps<br>- Cutting paper<br>- Crubling for mess | - Information or wisdom<br>- Both → laptop but also colours<br>- Little people → people<br>- Narrow bridges<br>- Wall for being unable to meet<br>- Clocks for time<br>- Weight as heavy and unsustainable | - Building map TUe<br>- Building database<br>- TUe overload<br>- A bunch of laptops |

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| - Differs from participants. Some started right away while others were processing the materials longer<br>- Became quicker when the workshop took longer | - Visualize database, buying new laptop. TUe → red | - Differs from participants, some used 2 and others used 6 | - Listening to each other<br>- Making jokes<br>- Getting inspired by the use of their materials<br>- Asking questions | - A lot but some stayed the same like the rocks and the Lego<br>- The clay was used by one participant a lot | - Differs, one made a laptop<br>- Stone → wisdom<br>- Create a story<br>- Time data → mess | - It changed, social → TUe<br>- Felt a distance |
| - Some participants started right away, others had to think<br>- One participant got stuck halfway through | - Tie raps to demonstrate relationship between technologies<br>- Rock to symbolize knowledge | - Most participants keep adding materials<br>- One person sticks to tie raps<br>- 2 people were using more than 3 different materials | - They ask each other questions about their experiences<br>- People took the scraps of the tie raps to use in their designs | - Mostly the paper got customized | - Use more methapors than recreation<br>- One tries to copy laptop from paper<br>- Use weights to show heavy times | - Living behind laptop because of school<br>- Changed from work to social meetings → barrier between work and social disappeared<br>- They miss the social part of people/meetings<br>- Increase network<br>- No travel time |

**Workshop 2**

| **How long does it take to make choices?** | **Why do they choose certain object? (Thinking aloud)** | **Variety in material choices** | **How do participants influence each other?** | **How much do participants customize materials?** | **Do the participants still use the materials to create metaphors, or do they try to more directly** | **What do they say about their relationship with technology?** |
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| | | | | | **recreate objects?** | |
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| - Quickly | - Making a background<br>- Before COVID-19 and afterwards<br>- Trees don't stay put<br>- Working in layers | - Wire had to be mentioned before it was getting used | - Discussion with each other | - None | - A lot of imagery<br>- Known metaphors from landscape<br>- Fata morgana | - Prisoner feeling → a lot of distraction<br>- Oase<br>- A lot about COVID-19<br>- Offline meetings<br>- Online for comfort<br>- Social media use has become more |
| - Not that long, they got up and got to work | - A lot of metaphors<br>- Clouds to represent distraction | - It was all paper but were also used to make jokes | - I heard one participant say, good idea! And got inspired by another participant<br>- Reading to each other<br>- Using the same materials as others<br>- They really worked together | - None | - Directly sometimes but also metaphors with the clouds for example being distractions<br>- Cloud → online cloud | - It changed → became more individual<br>- Discord was mentioned<br>- Fata morgana (fake comfort zone) |
| - Quite quickly<br>- Quite extensive<br>- Difficulty in visualing ideas | - Clouds → distractions | - Mountains<br>- Clouds<br>- A lot of clips<br>- Cones for tents<br>- Person per tent | - They accidentally take each other's stuff<br>- Relate to each other<br>- Follow up on each other story<br>- Listening to each other instead of making<br>- Disagreeing with each other | - Not really but a lot of experimantion<br>- Standing up does not work perfectly<br>- Some frustration<br>- Drawing Skype and Miro | - Prison<br>- Desert vs forest<br>- Mountain being a hurdle<br>- Ladders<br>- Location pin → end goal<br>- Red thread → main path<br>- People as trees | - Cannot really go outside<br>- Some like online aspects more than others |

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| | | | - Suggesting visualizations<br>- Asking each other questions | | | |
| - All participants dived right in<br>- Some were done quite fast | - Reasembling rooms<br>- Resembling people<br>- Use methapors | - Difference in 2D and 3D | - Engage in conversation together<br>- Help each other visualize things | - None | - Pre-covid people were a forest<br>- Mountain → you can't see past this point<br>- Clouds as distraction<br>- Fata morgana as a fake comfort zone | - Trapped in a room<br>- Difference in professional use and fun |