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The iceberg model, derived from systems thinking, is one of the powerful methods for understanding the hidden dynamics and complexities that influence decision-making. By examining the various layers of the iceberg metaphorically, one can gain a deeper understanding of the interconnectedness and interdependencies within systems, enabling one to make more informed and connected decisions and foster sustainable change in a complex world. By employing the iceberg model, *systemic design oriented leadership* could gain a holistic understanding of the hidden dynamics that drive behaviours and outcomes within their organisations. Such leadership could even enhance a learning culture that encourages the exploration of mental models, challenges assumptions and promotes critical thinking. Through dialogue and reflection, leaders could surface underlying beliefs and values, thereby supporting a deeper understanding and empathy within the organisation.

Leadership that embraces the iceberg model might effectively drive sustainable change. By focusing on mental models and systemic structures, systemic design oriented leaders can design interventions that address the root causes of challenges rather than applying quick fixes. This approach fosters a culture of continuous improvement and adaptability, positioning the organisation for long-term success.

This paper explores the application of the iceberg model as a physical play in systemic design oriented leadership, highlighting its significance in identifying and addressing underlying factors that impact organisational behaviour and performance.

KEYWORDS: leadership, systemic design, systems thinking, iceberg model, play, mental models

RSD TOPIC(S): Cases & Practice, Economics & Organizations, Health & Well-Being, Methods & Methodology

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Introduction

The role of leaders in today's complex and interconnected world might demand a systems thinking-oriented approach that goes beyond traditional command-and-control structures. Companies are faced with major economic challenges and societal expectations that are shaped by values and sustainability (Polman et al., 2021). These conditions require a systemic perspective to address the complexity and "wicked problems" (Beehner, 2019). Leadership must be aware of these conditions and able to take active action, but this requires the right methods and interconnected thinking.

Systemic design oriented leadership (SDOL) can be an approach to leadership that emphasises understanding and addressing complex problems from a systemic perspective (Mugadza et al., 2019). It involves recognising that many challenges and issues faced by organisations and societies are interconnected and require a holistic understanding to find effective solutions.

Systems thinking has its foundation in systems theory, such as the general systems theory of Bertalanffy (1976), and has been applied in various disciplines. Other authors, such as Meadows (2008), explain the definition of a system by its elements, interconnections and purpose, whereas Richmond (2004) defines systems thinking "as the art and science of making reliable inferences about behaviour by developing an increasingly deep understanding of the underlying structure". Systems thinking seems to be a powerful way of thinking to understand complexity without using reductionist

thinking. It can be used to understand socio-ecological problems as well as dynamic behaviours (Senge et al., 1994).

The iceberg model, a tool in systems thinking, offers valuable insights into the hidden aspects of organisational systems, helping leaders recognise and navigate the deeper layers of complexity (Kim, 1999). It is a concept that has been widely used and referenced in systems thinking literature. The model serves as a metaphor to illustrate the deeper dynamics of a system and its application can be found across various systems thinking literature.

While there isn't a specific book or publication solely dedicated to the iceberg model terminology, it has been discussed and mentioned in various texts on systems thinking and related fields. Authors such as Senge (2006) introduce the concept of systems thinking and its application to organisations. While the term the iceberg model is not explicitly mentioned, Senge has a clear explanation of the direction of an iceberg metaphor. He discusses the importance of looking beyond surface-level events and addressing underlying systemic structures in order to understand mental models. In comparison, Meadows (2008) explores the hidden structures and feedback loops that underlie system behaviour, which aligns with the core concepts of the iceberg metaphor. Also Checkland (1981) offers an introduction to systems thinking and the application of the soft systems methodology. While the iceberg model may not be explicitly mentioned, Checkland explores the concept of systems as a whole, emphasising the need to consider both visible and invisible elements within a system.

Stroh (2015) explores systems thinking principles and their application to social change. He is one of the authors who explicitly refers to the iceberg metaphor. Stroh discusses the importance of understanding the deeper dynamics and structures that shape complex problems and provides a practical tool for systems thinking with his sketch of the iceberg metaphor.

This paper presents the implementation of a physical and playful three-dimensional iceberg model for dealing with increasing complexity using the systems thinking approach to enhance SDOL.

The iceberg model

The iceberg model, as a metaphor, is used in systems thinking to understand the underlying dynamics and behaviour of complex systems (Stroh, 2015). It encourages systems thinkers to go beyond simple cause-and-effect relationships and to consider the complexity and interconnectedness of the various elements within a system (Green, 2016). It suggests that what is observed on the surface is just a small portion of the system, while most of the important elements and influences are hidden beneath, analogous to an iceberg where only a small portion is visible above the waterline.

The model is a powerful tool for systems thinking and analysis, helping SDOL and organisations to move beyond superficial observations and address the root causes of complex problems. It highlights the need for holistic thinking and the recognition that changes in one part of the system can have unintended consequences elsewhere (Foster-Fishman et al., 2007). In the context of systems thinking, the iceberg model in Figure 1 illustrates two main components of a system: the visible and the invisible (Senge, 2006)

> **Visible components:** These are the observable elements of a system that are easily recognised and measured. They include tangible aspects such as events, processes, and outcomes. These visible components are usually the focus of attention and can be addressed through direct actions and interventions. Most leaders' decisions are made at this level, only treating the symptoms and overcoming situations as quickly as possible instead of looking underneath the problems to achieve long-lasting solutions (Al-Homery et al., 2019).
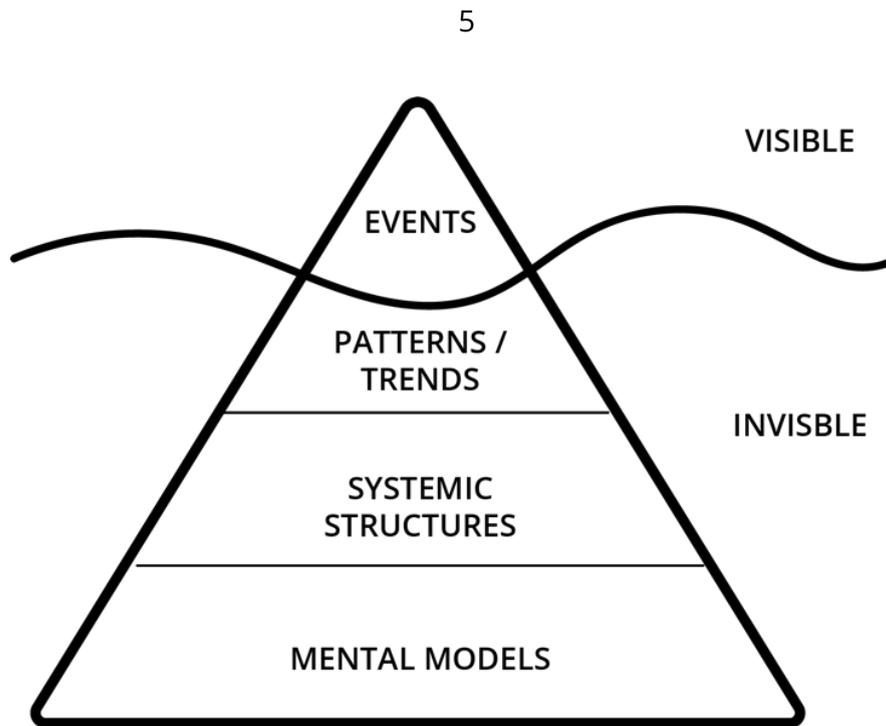
Figure 1. The iceberg model. Source: Adopted from Senge, Peter, The fifth Discipline, 2006.

> **Invisible components:** These are the underlying factors that are not immediately apparent but greatly influence the behaviour and outcomes of the system. They are typically less visible, harder to measure and often involve intangible aspects such as mental models, patterns, trends, systemic structures and models (values, beliefs, assumptions). These invisible components are the driving forces behind the visible aspects and play a significant role in shaping the system's behaviour over time. The deeper level shows the interconnections of different components in a system and reveals the mental models.

The iceberg model emphasises the importance of looking beyond the surface-level symptoms and addressing the underlying causes and systemic structures that give rise to them. By understanding and addressing the invisible components, SDOL might gain a deeper understanding of the system's behaviour, identify leverage points for intervention, and create more effective and sustainable decisions (Blockland et al., 2020). Overall, the iceberg model as a systems thinking tool might be a useful tool for visualising and analysing complex systems, enabling practitioners to uncover hidden dynamics, challenge assumptions, and develop more comprehensive and long-lasting solutions.

Haptical recording experience

The physical iceberg model play

OVERVIEW

Applied methods from systems thinking, such as causal loop mapping or iceberg model, have so far remained represented on a two-dimensional level and cannot fully illustrate complexity in a three-dimensional framework. A physical model of the iceberg might make the concept tangible and visible. It might allow us to look at, touch and tamper with the model to develop a better understanding of the different layers and their relationships to each other. The physical presence of the model can make the abstract concept of the iceberg more real and tangible. Therefore, the aim of the author was to design a physical and three-dimensional model of the iceberg called the "Haptical Recording Experience", which is part of an ongoing research work in playful leadership development. The Haptical Recording Experience play is based on Stroh's iceberg model, which has four stages, starting on the visible iceberg component "Event" (What happened?), followed by "Trends& Patterns" and then focusing on the invisible component "Systems structures" and "Mental Models". The model is read top-down. The levels of different iceberg models start from three levels to five levels (Al-Homery et al., 2019).

The Haptical Recording Experience uses only three levels of visualisation and systemic analysis -"event" as the visible level and "pattern/ structures" and "mental models" as the invisible level (Figure 2). It promotes the use of systems thinking methods within a playful context. This play is supposed to be applied to concrete ecological, economic or social problems within an organisation in order to deal with the complexity of systems in a haptic way and through dialogue. Players are confronted with an event, the deeper causes of which they have to explore and which would usually not find a place for discussion in everyday work because it is too complex is perceived as "unpleasant" and is not even addressed or because it is difficult to reach a compromise despite conflict. For this purpose, players have a physical system available.
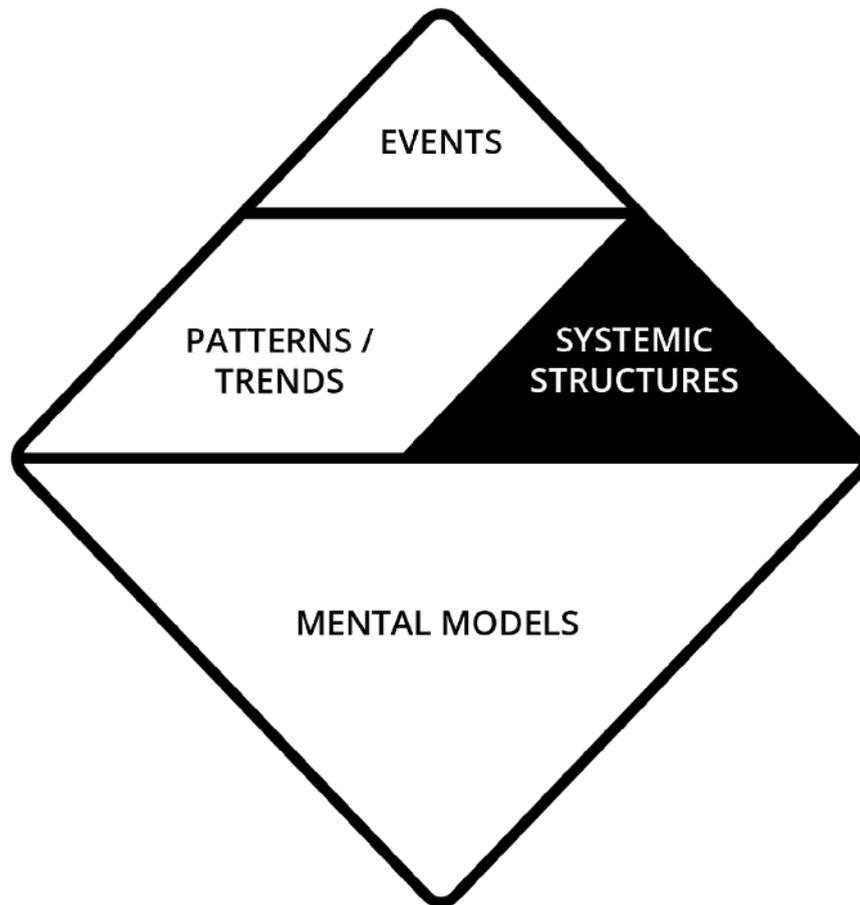
Figure 2. Three levels of the iceberg model for Haptical Recording Experience play.

PLAY COMPONENTS

Event cards
An event card describes an event that players will deal with. The events are graded in their level of complexity.

Mobilé
The hanging artefact "mobilé" is the main structure of the play. It is made of acrylic glass and symbolises the iceberg model with three levels. This is where the dialogue takes place. The first level is determined by the event cards; then, players can deal with the underlying patterns/structures and mental models.

Speech bubbles

The speech bubbles are made of metal and are labelled in dialogue with key terms from general perspectives on the event card and attached to the second (patterns/structures) and third levels (mental models) of the mobilé.

Comments and emojis

Comments and emojis are made of acrylic glass and have a magnet to attach them to the speech bubbles. Comments are labelled with personal perspectives and experiences. Alternatively speech bubbles can also be annotated with emojis, which simplifies the game dynamic.

Interconnection Ropes

Interconnections consist of a yellow rope and a clip at each end, allowing, to connect the speech bubbles systemically and across levels. The idea was to show the interconnections between the levels as authors such as Meadows (2008) described in her definition of systems.
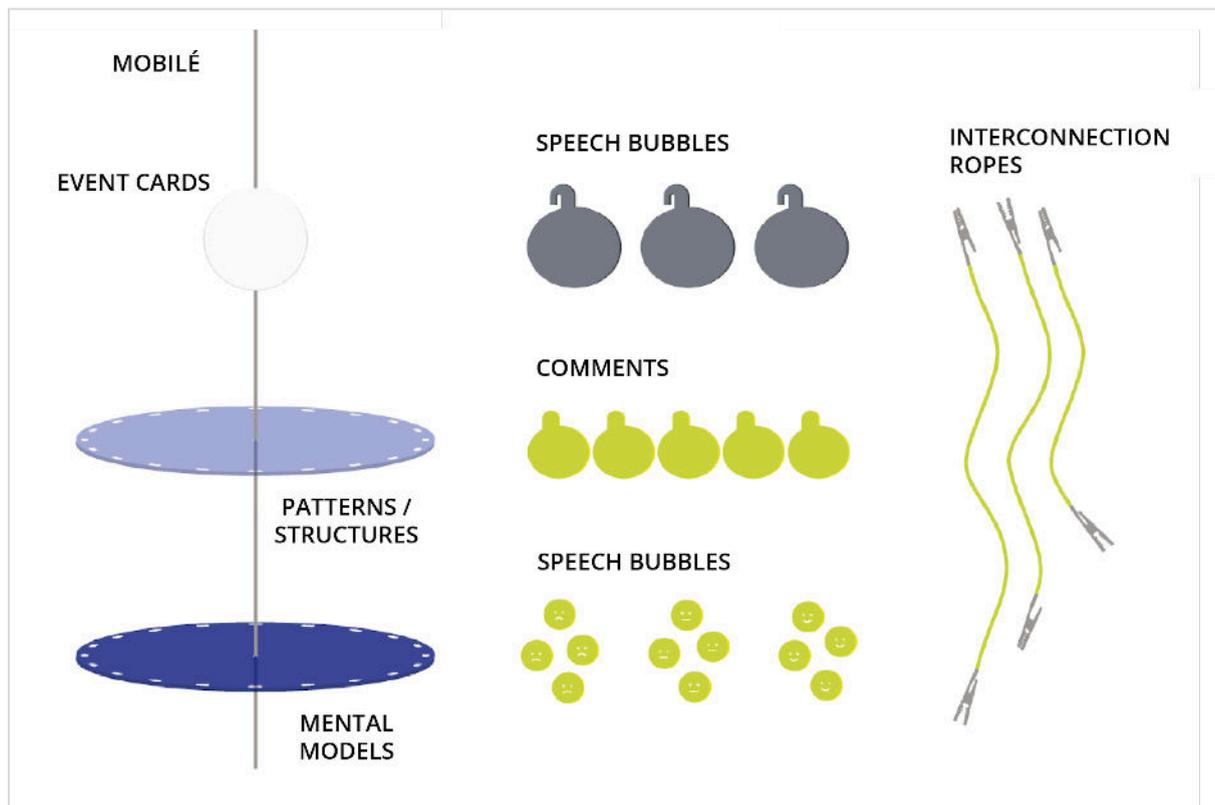
Figure 3. Play components of Haptical Recording Experience. Source: Adapted from Celik et al., Ludic Innovation Experiences, 2023.

PLAY MODE

In this first play round, players are confronted with everyday situations that they are allowed to deal with from a systemic perspective in order to approach the play sequence. In the second level, the complexity of the events increases. The event cards describe global events that require systemic thinking. Finally, in the third level, players are asked to deal with events they have defined themselves (possibly from a leadership or organisational context) using blank cards.

PLAY SEQUENCES

The players choose an event card from the three levels of complexity and label the first level of the mobilé with the event by attaching it to the string. Then, the speech bubbles are labelled and attached to the second level of the mobilé ("Patterns/Structures"). This is repeated on the third level of the "mental models".

After the second and third levels have been labelled with speech bubbles, players have the opportunity to step back and reflect on the dynamic construction. After the reflection, players are motivated to leave reactions in the form of comments and emojis on the speech bubbles. They are then allowed to connect the commented speech bubbles with each other across levels. Again, there should be a moment of reflection in which players can observe and reflect on the new construct. The haptic phase is finished.

Afterwards the participants are divided into groups. From the observations made earlier, players should now select an area from the construct and create a speculative question. Once the question has been formulated, the group has to develop a scenario (determine the time, describe the environment, set the scene, distribute roles, ...). The scenarios are presented by the players in a Speculative Role Enactment. Finally, the space for a final reflection is opened.

Results

The play was tested with 10 participants from the university context (School of Design and Culture, HTW Berlin) in order to test the game dynamics in a three-hour workshop. The event was dedicated to the topic of "Cultural Appropriation in Design", as it has triggered a number of debates over the last few years, especially in design, and is considered a so-called wicked problem. The aim was to provide the space for systemic debate. In the workshop, participants learned to apply the basics of systems thinking to the chosen event with the help of the serious game. After a short round of introductions, the rules and components of the play were explained. As a warm-up, the group was asked to test the game with a slightly "easier" event card with the title "Secretly you are annoyed because the elderly woman in front of you in the supermarket takes so long to count her coins" that the group chose. Participants had a total of 15 minutes to go through all the sequences of the play and explore mental models.

After the warm-up, the event "cultural appropriation", which has been widely discussed in social media, was presented ("Designer Isabel Marant is facing legal action and backlash following accusations of cultural appropriation of Mexican indigenous cultural

heritage") and the systemic thinking with the help of the three-dimensional physical iceberg model could start.

This workshop was the first testing of the physical iceberg model Haptical Recording Experience Play. During the workshop, numerous impressions were gathered from the participants through observations and recorded feedback, which will be included in the further development of the play.

The aesthetic of visual, haptic and interactive components of the play were rated most positively. Likewise, all the participants found it very valuable to have physical elements to exchange. Three of the participants had the impression that if the workshop had only taken place with notes on paper, the content would have been "just written down and left there". But this way, they reported that they had to be much more careful with what they wrote on the acrylic sheets:

"(...) I think if it had been just a few pieces of paper again, we might have all fallen on our necks. That's why I found the care with which everything was prepared, and also the interesting fragility of the construct, that you have such an edifice of thoughts in front of you, reflecting the whole thing relatively well. (...)"

Eight of the participants opened up to the topic on the day of the workshop and experienced moments of vulnerability, both in dealing with the topic itself and in recounting personal experiences. In this regard, one participant stated that she was "in the here and now" during the workshop and had managed not to think about anything else during the workshop. In fact, several participants commented on how quickly the three hours had passed:

"(...) But I found it a pity that it was so short. I think it would be great if it was actually a course and you could go deeper into it." A further statement was: "In addition, I would like to emphasize again that the encounter itself was great, especially working in a group that you don't know and where this topic is perhaps not yet so easy. I thought it was good that we approached each other while working and then sought distance again, just like the distribution of the whole thing in stations. (...)"

Furthermore, the speculative component did not work as intended: Participants were able to form speculative scenarios but did not get to the actual role play. Instead, participants requested a longer discussion and feedback session. There is also the

alternative of asking participants to make a statement for the future instead of a speculative role-play:

"The only thing I could imagine additionally would be to hear some positions and ideas from the perspective of the community and the relevant stakeholders. Via audio, text, video or if possible even in real life as experts on site. That would certainly expand the thinking by a few completely new levels."

The systemic complexity of the chosen issue, although there was still a sense of insecurity in the room at the beginning, was easier to deal with, and the exchange took place both in the room and on the object: "You can see the complexity of the topic very well. (...) But it reflects the mindset in people's heads quite well. In order to extract things from it, you would have to be able to transfer the contents again somehow. (...) On the other hand, it promoted the exchange very well: the togetherness, this sneaking around, searching around, handling the materials carefully..."

The application of the iceberg model was thus perceived as positive by the group as a whole, especially due to the fact that they were able to visually observe and reflect on these different levels: "(...) What was nice in any case was how we dealt with it in a totally sensitive way. For me, that also means mindful reflection.(...) Today I also discovered for myself that I have thought about it much more: What am I writing now? Because then I might have to go down to another level...Going to a deeper level myself was, I think, quite good, also for one's own reflections on the points that one had already stated."
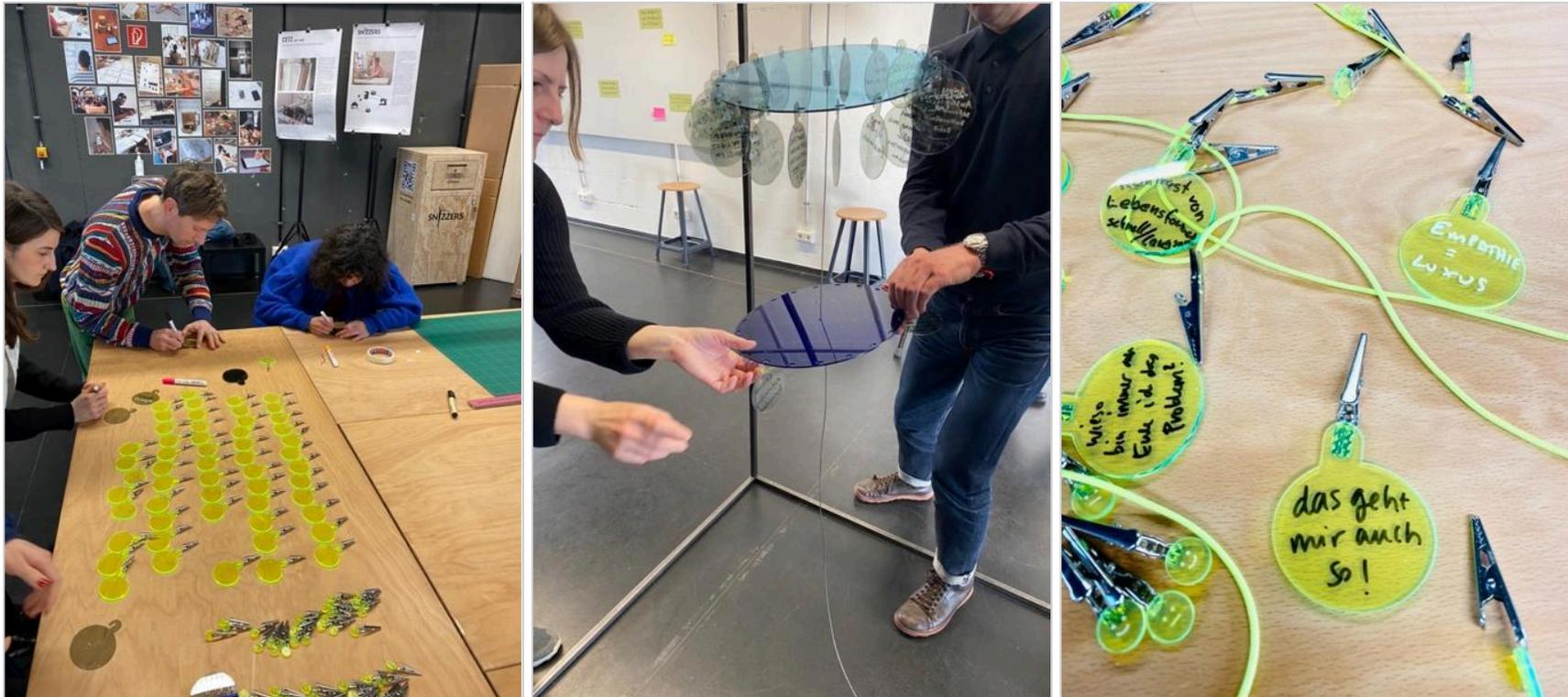
Figure 4. Participants in the play workshop attached speech bubbles and comments on the second and third levels of the model. Credits: Leona Goldstein.

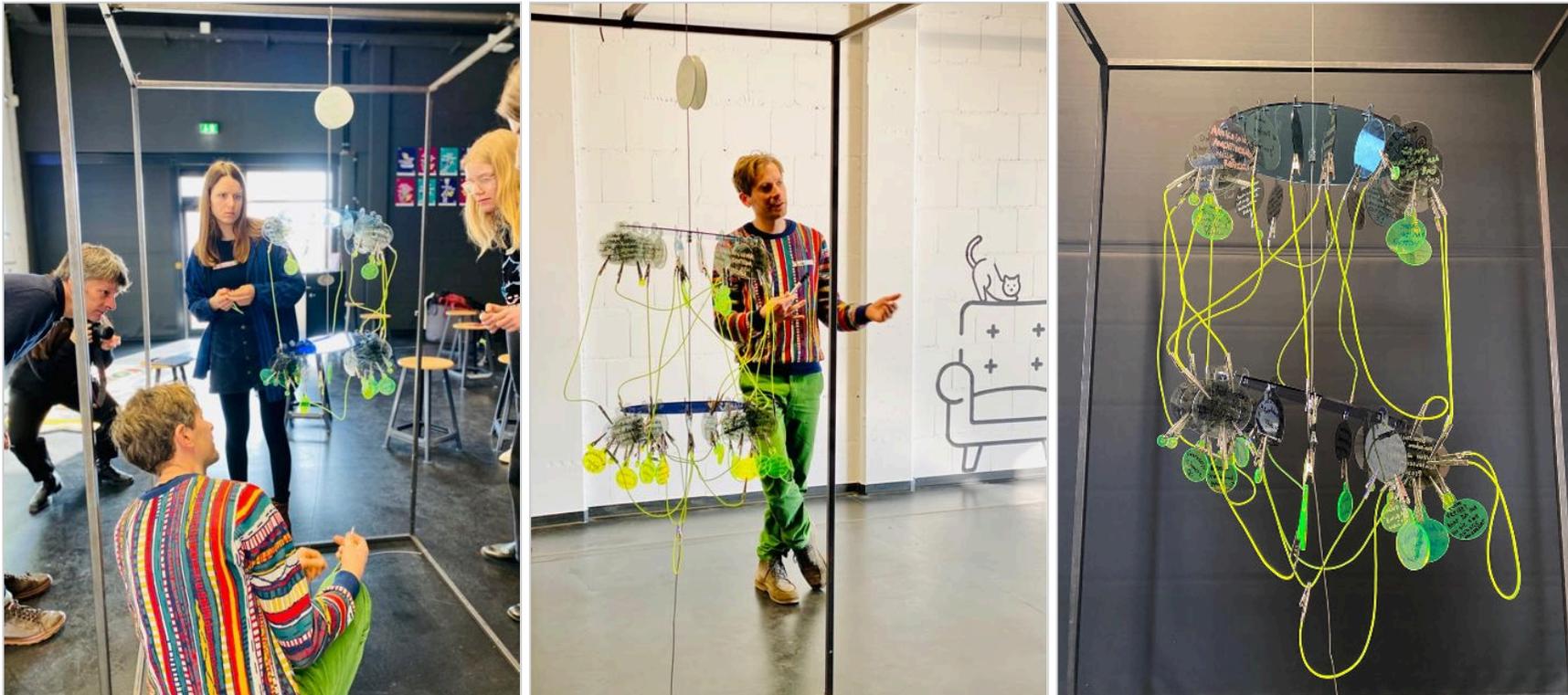Figure 5. Impressions of the workshop. Credits: Leona Goldstein.

Figure 6. Participants discussing the result. Credits: Leona Goldstein.

Discussion

The architect and designer Otl Aicher was called a thinker on the object because he believed that "touching and grasping - the relations between thinking and the body are so close that what happens in thinking is often described in the language of the hands" (Aicher, 2015). This Gestalt philosophy of Aicher's is ultimately also expressed in the play "Haptical Recording Experience". The play demonstrates how important it is not only to reflect on one's own attitude and systemic understanding of words and to discuss them in words with others but also to create objects that make these words, especially the thinking processes, tangible.

The Haptical Recording Experience play a physical tool of the iceberg model is a collective, three-dimensional documentation of thoughts, experiences, reactions and linkages in relation to a specific event in order to identify the underlying structures and to understand the mental models. A physical model of the iceberg could serve as a visual tool to illustrate and communicate complex concepts and relationships. It might enable better collaboration and discussion between different stakeholders as the model acts as a common frame of reference. Physical interaction with the model could also encourage stakeholder engagement and participation. By moving and linking the model components, SDOL could explore the impact on the overall dynamics of the system. This promotes a deeper understanding of the underlying patterns and relationships. With a physical model even thought experiments can be conducted to replay different scenarios and changes in the system.

In the very first testing workshop, participants were asked not only to react to an event but also to gradually examine and reflect systemically on the underlying causes and mental models that led to it. By adding or removing elements of the model, the effects on the system could be explored. This allowed a playful approach to complex problems and encouraged creative approaches to solving them.

In addition, the participants learned the basics of systems thinking completely unconsciously by addressing a case of systemic scale in exchange with others and through explorative actions. They did not only learn to react to the visible symptoms of systemic functioning but also to examine the structures and mental models behind and underneath.

The physical iceberg model play might serve as a long-term tool to maintain awareness of the underlying dynamics and principles. It could also be placed in a central location to serve as a reminder and reference point for systemic thinking and action. Leaders could refer to the model regularly to broaden their perspective and improve their decision-making.

The play is still in testing mode and it has to be evaluated if a physical iceberg model can train SDOL in practicing systems thinking methods. For further development, it should also be explored what causes participants to lose the sense of time and the pressure to work performance while playing. An interesting hypothesis could be the haptic and visual experience, as well as the intense interaction in the room.

At the moment, the author is conducting testing with higher and middle management of an international health company in Berlin to gather more feedback on the tool.

Conclusion

The structure of the iceberg model was used as the guiding method for the play. The iceberg model shows that events and patterns are caused by systemic structures and mental models that are often hidden under the "water level". Behaviours in an organisation or system derive from these underlying structures that are established over time due to mental models (Hemmelgarn et al., 2018). Leaders have to understand the systemic structures and underlying mental models to make sustainable decisions. SDOL might recognise the ethical dimensions of managers' decisions and actions. This type of leadership is particularly relevant in today's world, where many challenges, such as climate change, inequality, and social issues, require holistic and innovative approaches to drive meaningful change (Garrity, 2018).

The Haptical Recording Experience play shall encourage SDOL to a holistic perspective and promote the exploration of the deeper layers that shape the visible outcomes. It might consider the social, environmental and ethical implications of the choices and strive to act responsibly and with integrity.

The three-dimensional representation and interaction in space, as well as touching and discussing connections and communication, might be an opportunity for SDOL to capture complexity haptically and visually and identify leverage points for interventions. It is important to note that the use of a physical model of the iceberg can only be complementary to other methods and tools in systems thinking. It can be a valuable addition to enhance understanding and application of concepts.

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