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Original Research

Social Dreaming in Systemic Design-Oriented Leadership (SDOL): From Mental Models to Futures Thinking

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Abstract: In current leadership development practice, sustainability efforts are hindered by technical rationality, a lack of interest, and inadequate creativity and communication in designing strategies for sustainable futures. This article discusses how social dreaming as a tool in futures thinking can address these challenges by supporting foresight and anticipation, especially in the context of systemic design-oriented leadership (SDOL). This study takes a twofold approach: first, a theoretical overview of social dreaming is provided; second, social dreaming is applied in a future lab designed as a serious game workshop. Managers from two Berlin-based companies took part in this future lab for SDOL development, exploring and formulating complex future scenarios through social dreaming with the use of systems and futures thinking. The results of the future labs show the effect of social dreaming in promoting systemic thinking and improving managers' ability to adapt to sustainability processes. The study concludes that the integration of social dreaming to leadership development in SDOL, especially through its use as a serious game in combination with the systems thinking tool iceberg model/haptic recording play, promotes strategic creativity and eco-social decision-making.

Keywords: *Social Dreaming, Sustainable Leadership, Serious Games, Futures Thinking, Systems Thinking*

Introduction

In today's organizational and societal landscapes, leaders are increasingly confronted with complex and interconnected challenges. Issues such as climate change, economic inequality, and technological disruptions cannot be effectively addressed through linear thinking or traditional leadership models. Current leadership training programs aim to develop individual leadership skills and growth without considering them in a systemic context or promoting systemic and sustainability perspectives.

Organizations have invested considerable effort and resources in recent years to develop and enhance the leadership skills of managers through various forms of design thinking tools and methods (Jalote-Parmar et al. 2017) that have been at the forefront of supporting digital transformation in companies (Magistretti et al. 2021).

The leadership of tomorrow needs new strategies beyond design thinking. Authors such as Beehner (2019) argue that leadership has to enter into new relationships with nature, society, and individuals in order to be able to make a sustainable, trust-based impact on solving problems. Also, Mugadza and Marcus (2019) explain how leadership has changed since the Pre-Industrial Age—from the born leader in industrial times toward innovative leadership with a systemic design perspective.

If organizations seek to develop new forms of leadership, including eco-social leadership, managers might first undergo training in systems thinking and futures thinking. This training would focus an analyzing relationships between stakeholders, identifying behavioral patterns, and changing mental models into new future narratives or shared social dreams. The global poly-crisis demands such a holistic and adaptive approach, which has led to the emergence of systemic design-oriented leadership (SDOL) as a framework (Celik 2023a).

"Systemic design" refers to an evolving and diverse design–driven practice focused on planning and implementing envisioned changes in organizations and leadership (Mugadza and Marcus 2019; Blomkamp 2022; Sevaldson 2019; Lynch et al. 2021). SDOL integrates principles of systems thinking and futures thinking with leadership practices, equipping individuals and organizations with the ability to navigate complexity and drive sustainable change. Moving beyond traditional hierarchical models, it emphasizes a holistic perspective, collaboration, adaptability, and alignment with shared purpose and values.

This approach leverages tools from systems thinking and futures thinking to facilitate meaningful, sustainable transformation. SDOL recognizes organizations as components of broader, complex systems, requiring systemic leaders to connect people and resources across these interdependent networks. As Beehner (2019, 2) notes: "Achieving organizational and systemic change will require leaders who can connect people and resources from multiple system components." Senge et al. (2015) define systemic leaders as facilitators who create the conditions for effective social change, and leadership in this context is not limited to formal authority; any individual within an organization can act as a systemic leader. They argue that systemic leadership capabilities include the ability to view the larger system, encourage reflective and innovative dialogue, and shift the collective focus from reactive problem-solving to proactive co-creation of the future (Senge et al. 2015).

This article explores how social dreaming (SD) can be used as a novel tool to promote futures thinking (FT) and systems thinking (ST) in SDOL development. First, the article examines the theoretical framework of SD in FT and the iceberg model and its adaptation in ST. Second, it describes the practical application and evaluation of these tools in a future lab, conducted as serious games/play workshop with industrial cooperation partners. Third, it reflects on the use of SD in conjunction with the iceberg model/haptic recording experience for leadership training, analyzing both qualitative and quantitative data to evaluate its impact. The article concludes by summarizing the key findings, discussing the transferability of the serious games and suggesting potential future applications.

Theoretical Framework

Systemic Design-Oriented Leadership (SDOL)

SDOL provides a leadership framework (Figure 1) for eco-social management by knowledge generation on ST and FT (Celik 2023b; Celik and Picciani 2024). The framework enables managers to understand dynamics within systems and to consider long-term impacts with critical reflection and critical thinking (Laszlo 2012; Palm et al. 2024; Werner and Bleich 2017). It empowers leaders to develop sustainable solutions with their teams that are holistic, adaptable, and responsive to future challenges (Mugadza and Marcus 2019).

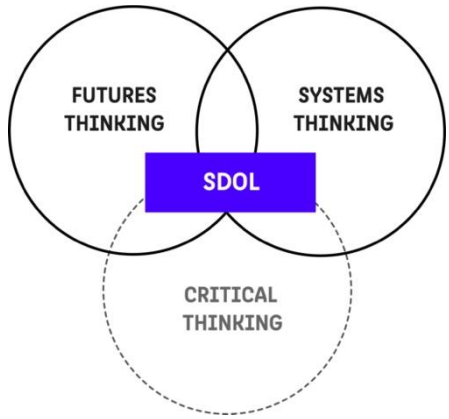

Figure 1: Framework SDOL

In SDOL, ST addresses problem-solving holistically by viewing organizations as interconnected and interdependent systems (Senge 2006; Sevaldson 2022). ST stresses the importance of understanding underlying structures, feedback loops, and relationships within complex systems to identify leverage points for effective interventions (Meadows 2008). It also seeks to anticipate various potential futures (Hodgson and Midgley 2015). Leaders apply ST to understand interdependencies, patterns, and leverage design to make sustainable solutions and decisions.

Building on this systemic perspective, FT aims to predict and influence future scenarios (Buehring and Liedtka 2018). It helps in investigating alternative futures, identifying emerging trends and catalysts for change, and developing strategies to manage uncertainty and complexity. FT creates new narratives by exploring possible, probable, and preferable future scenarios (Dunne and Raby 2013; Voros 2003). It embraces uncertainties, encourages creativity, and helps organizations prepare for change by fostering innovation and flexibility (McGonigal 2022; Schreiber 2024). SDOL combines these two thinking methodologies to address the complex organizational and social challenges.

Social Dreaming as a Tool in Futures Thinking

SD, developed by W. Gordon Lawrence in 1982 at the Tavistock Institute in London, is a unique method in psychodynamic contexts where individuals share and discuss their dreams in a specially created group setting. The process of SD unfolds within a "matrix," a structured group environment designed to facilitate free association and exploration of dreams, aiming to uncover insights through collective thought (Lawrence 2003). Unlike traditional group dynamics, which focus on interpersonal relationships, SD centers on the dreams themselves, integrating them into the organizational reality and making them a part of a shared discourse (Lawrence 2000). SD facilitates a deeper understanding of group dynamics and promotes dialogue and conversations, enabling the emergence of novel perspectives on social, environmental, and organizational issues (Kets de Vries 2014). It emphasizes the tensions between the known and the unknown, encouraging participants to embrace uncertainty and enigma (Lawrence 2005).

As a novel tool in FT, SD aims to uncover shared patterns and concerns within a community, team, or organization, providing insights into collective anxieties, aspirations, and cultural dynamics. In this study, the authors slightly adapt SD by encouraging participants to share aspirational dreams about future visions rather than nocturnal dreams. By encouraging free association around envisioned dreams, SD promotes FT processes and allows participants to explore multiple viewpoints and storytelling on sustainability issues. Unlike brainstorming, it offers an alternative approach to conflict resolution by encouraging participants to view issues from multiple, sometimes contradictory, perspectives. Its core principle is to facilitate the sharing of dreams and their associations, fostering new ideas and connections, thus supporting storytelling and futures narration to create a common vision and eco-social imaginary (Waddock 2024).

Iceberg Model as a Tool in ST

The iceberg model as a metaphor (Figure 2) is used in ST to understand the underlying dynamics and behavior of complex systems (Senge 2006; Morini 2022). In ST, it reveals hidden aspects and patterns in organizational and societal systems, helping leaders recognize deeper layers of complexity and understand that changes in one part of a system can have unintended consequences elsewhere (Al-Homery et al. 2019; Garrity 2018). 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 (Giudici et al. 2024).

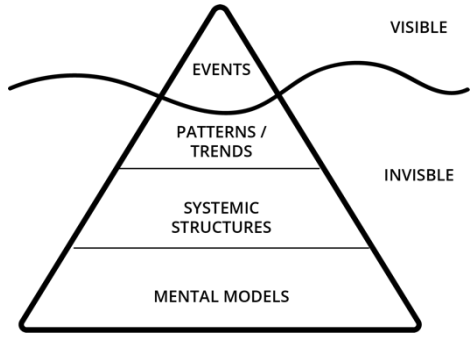

Figure 2: The Iceberg Model Adapted from Senge (2006)
Source: Celik 2023b, 334

The iceberg model distinguishes between visible components (events and outcomes) and invisible components (mental models and systemic structures). The observations on the surface represent only a partial aspect of the system, while the majority of the essential components and influences remain hidden below the surface, similar to the metaphor of an iceberg, where only a modest part is visible above the waterline and the deeper parts remain invisible. Focusing on the invisible components allows for deeper understanding, identification of leverage points, and development of sustainable solutions (Senge 2006; Meadows 2008; Stroh 2015).

The causal layered analysis (CLA) (Figure 3), developed by Sohail Inayatullah (2017), is a method that bears similarities to the iceberg metaphor/model. CLA explores deeper narratives and assumptions within a system, aiming for systemic change and paradigm shifts by examining issues through four layers: litany, social/systemic causes, worldview/discourse and myth/metaphor (Inayatullah 2017).

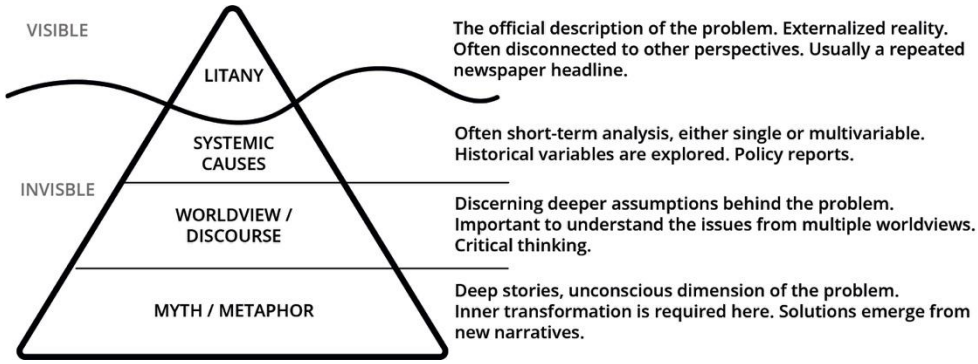

Figure 3: Causal Layered Analysis Adapted from Inayatullah (2017)

Both iceberg metaphors uncover the foundational narratives that shape collective consciousness, facilitating transformative change through deep analysis.

Serious Games

To further enhance SDOL development, serious games can serve as valuable tools for identifying various leadership styles and their effects on organizational dynamics (Almeida and Buzady 2021) by simulating scenarios. Serious games have the potential to promote systemic understanding and future-oriented strategy development in leadership by testing decisions during the game or play scenario (McGonigal 2022; Bontoux et al. 2020; Sajjadi et al. 2022).

The first author developed several serious games for ongoing research on SDOL, including the iceberg model/haptic recording experience (IMHRE) game, which combines the iceberg model in ST with Meadows' definition of systems—elements, interconnections, and purpose—highlighting the need to understand interconnections for system change (Meadows 2008).

The IMHRE serious game (Figure 4) is based on Stroh's (2015) iceberg model, which has three stages: starting with the visible iceberg component "Event," followed by the less visible components "Trends & Patterns" and "Systemic Structures." The model is read top-down. The IMHRE game also uses three layers of systemic analysis but adapts Stroh's (2015) model to:

- "event" as the visible layer or game setup
- "patterns/trends + systemic structures" as the invisible layer or game level 1
- "mental models" as the invisible layer or game level 2

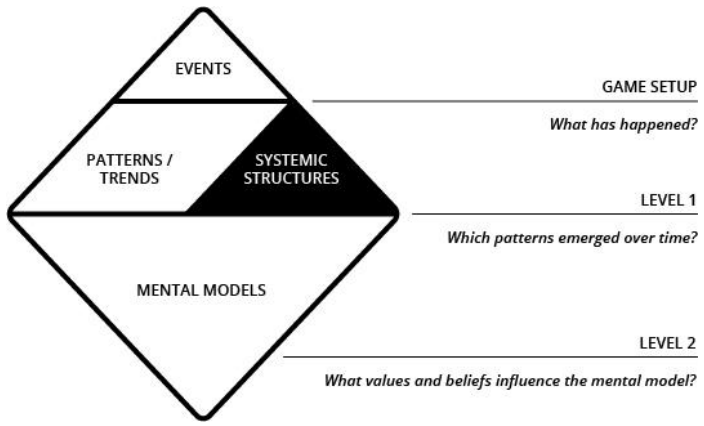

Figure 4: IMHRE Game Layers
Source: Celik 2023b, 335

This playful and haptic serious game is intended to be applied to specific ecological, economic, or social problems within an organization in order to address the complexity of systems playfully through dialogue and interaction. Players are confronted with an event whose deeper causes they must explore in level 1 and level 2.

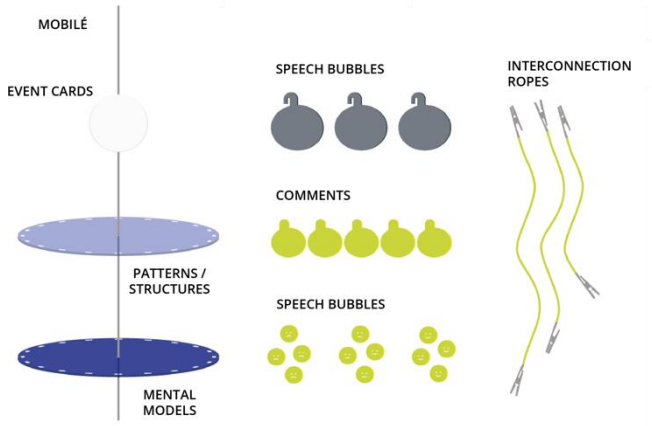

Figure 5: IMHRE Game Elements
Source: Celik 2023b, 336

Participants select an internal conflict/incident within the company. This is an event that typically does not find space for discussion in daily working life because it is too complex, perceived as "uncomfortable," or too difficult to resolve due to conflicting interests. They label the first level of the mobilé (Figure 5) with the event and attach gray acrylic speech bubbles, with handwritten answers on it, to represent patterns or systemic structures. This process is repeated for the second level, representing mental models. After both levels are filled, players step back to reflect on the dynamic construct. They then leave reactions, such as comments and emojis, on the speech bubbles. Next, they connect the commented acrylic speech bubbles across levels using neon-colored ropes. A final reflection follows, where players observe and consider the newly created dynamic before engaging in a discussion.

The three-dimensional representation of the iceberg metaphor as a mobilé and interaction in space, combined with tactile engagement and discussion, make connections and communication tangible and visually documented. It serves as a collective, three-dimensional documentation of thoughts, experiences, reactions, and systemic connections related to a specific event.

Practical Implementation

Future Lab Design

This study follows a systemic action research (SAR) and research through design (RtD) approach to address the complex nature of leadership development. SAR (Burns 2014) was found suitable for this study, as it lays emphasis on nonlinear learning, stakeholder engagement, and transformative system change. RtD (Godin and Zahedi 2014) was considered appropriate for practical implementation and testing of the serious games in real business contexts.

To assess the practical impact of combining the IMHRE and SD for SDOL, full-day future labs were arranged. These future labs served as serious games workshops on futures and ST with interactive games, where potential futures were explored and challenges were examined from diverse perspectives.

This initiative included future labs with company 1 from the health sector in Berlin and with company 2 from the energy sector in Berlin, as part of the research project "re:play—futures thinking games in leadership development," funded by the Berlin Institute for Applied Research (IFAF). Company 1 and company 2 were collaborative partners in this research endeavor. The research partners (participants) provided their consent to participate in the evaluation of the future labs and agreed to the recording and publication of audio and video for scientific publication purposes. The qualitative and quantitative analysis of the future labs was conducted anonymously.

Due to corporate compliance regulations, the future labs were conducted separately for each company rather than jointly. Ten leaders from higher and middle management of company 1 and twenty-one from company 2 participated in the future labs following internal invitations. These leaders represented various professional backgrounds and departments within the companies, from engineering, security, human resources, medical to accounting. The company 1 future lab consisted of three female and seven male leaders, while the company 2 future lab included four female and seventeen male leaders.

Future Lab Conduction

Each future lab was held at the premises of the respective companies and began with a brief welcome, an introduction, and a fifteen-minute warm-up game. Following the introduction, participants engaged in the Polak game for thirty minutes (Figures 6 and 7). Developed by Hayward and Candy (2017), the Polak game draws its inspiration from the seminal work "The Image of the Future" by Fred Polak (1973), a renowned sociologist and Holocaust survivor. This ice-breaking exercise facilitates discussions on future scenarios, prompting players to express their optimism or pessimism about the future and their beliefs regarding individual agency in shaping it.

Figure 6: Leaders Playing Polak Game at Company 1 During Future Lab 1

Figure 7: Leaders Playing Polak Game at Company 2 During Future Lab 1

After the Polak game, participants played the "Avalanche of Futures" for thirty minutes. In this game, they collaboratively identified a conflict/incident for using the IMHRE game. Each participant wrote an organizational conflict on post-it notes, and through discussions in pairs, groups of four, groups of eight, and then two large groups, they agreed on a common conflict. This game serves as preparation for the IMHRE game, establishing a shared context to apply the IMHRE model.

For the IMHRE game, players were given an overview of the game mechanics and a brief introduction to the iceberg metaphor and the IMHRE game in ST. This model, designed for ecological, economic, or social problems, addresses system complexities through dialogue and interaction. Participants start by exploring the deeper causes of an event from level 1 to level 2.

In the future lab of company 1, leaders explored the conflict of "company & personal interests" (Figure 8), while in company 2 (Figure 9) they focused on "too little (personal) responsibility." Although there was a suggestion to split into two groups to test different models, it was decided on the basis of the small group size and interest in the physical model to keep the group together. Similarly, in company 2, participants also engaged with the physical model of IMHRE.

At both future labs, managers began with the first game level, "patterns and structures" and attached corresponding factors to the iceberg mobilé. This process was repeated at the

second level for "mental models." After labeling all layers, participants reflected on the dynamic construction.

Figure 8: Leaders Playing IMHRE Game at Company 1 During Future Lab 1

Figure 9: Leaders Playing IMHRE Game at Company 2 During Future Lab 1

Following the reflection, participants were encouraged to provide reactions with comments and emojis, attaching them to the speech bubbles. They were then allowed to connect the commented speech bubbles across layers using attachable strings (Figures 8 and 9), facilitating the recognition of connections between the two levels. The leaders of both companies were given a moment for observation and further reflection on the self-constructed artifact (Figures 10 and 11). The haptic phase concluded with a brief statement about the experience and participants' perceptions.

Figure 10: Leaders Reflecting on Results of IMHRE Game at Company 1 During Future Lab 1

Figure 11: Leaders Reflecting on Results of IMHRE Game at Company 2 During Future Lab 1

Subsequently, the leaders at both future labs were introduced to the final sequence of the serious game IMHRE, known as social dreaming (SD). Following a brief explanation of the game, managers were tasked with expressing their own dream. Participants were instructed to address a statement at the level of the mental models in the IMHRE, aiming to contribute to a positive change in the initial event by the year 2050. Each participant had to sit in a circle, facing away from one another, to fully focus on their own dreams and immerse themselves in the experience of SD. Each participant first wrote down their individual dream on a post-it note. In the second phase, they presented it with their backs turned to the group, using the phrase "I have a dream…."

Figure 12: Social Dreaming at Company 1 During Future Lab 1

At the future lab of company 1, individual dreams included ideas like "changing the perspective," "creating commitment," "safe space," and "thinking outside the box." Participants then collaborated to build on these dreams and shape a shared vision (Figure 12). Managers at company 1 created a character, Emilia, for their SD narrative. Emilia uses the company's competence database to form her ideal team. The company is envisioned as a collaborative "campus" space, fostering meaningful work, development opportunities, and a sense of value for all employees. Initial changes proposed included a job rotation model to build trust and prioritize employees' needs.

At the Future Lab of company 2, the SD activity was modified following the action research method. As the group was large, participants were divided into two groups (Group 1 and Group 2). Before sharing and connecting their dreams in a collaborative exercise, they selected "Tarot" cards for inspiration. This adjustment aimed to deepen engagement and collective aspirations (Figure 13).

Figure 13: Social Dreaming at Company 2 During Future Lab 1

At company 2, Group 1 envisioned dreams centered around themes like transitioning managers from "administration" to "change and responsibility," promoting autonomy and accountability, fostering strong leadership cohesion, and creating equal opportunities through education. They emphasized confidence in delegation, self-awareness among leaders, and reducing hierarchical barriers.

Group 2's dreams focused on trust, optimism, agile frameworks, decentralized teams, and a positive leadership culture. They imagined a future with non-traditional hierarchies, fair responsibility distribution, climate-neutral operations, and high employee engagement.

During the Future Lab 1, both companies developed SD narratives using the IMHRE game. Company 1 imagined a society where responsibility is embraced and mutual support and trust prevail. Company 2, with Group 1 and Group 2, described a world of harmonious communities on planet C, where decisions are guided by joy and "humanity" as the new currency.

Participants did not propose specific nudges for change. Each session at the future labs of both companies concluded with final reflections.

Future Lab Evaluation

The evaluation of the future labs was conducted through questionnaires accessible via a QR code, covering demographics and general inquiries about gameplay. The gaming experiences were assessed using the game experience questionnaire (GEQ) (IJsselsteijn et al. 2013), questions for training evaluation (Q4TE) (Grohmann and Kauffeld 2013), and the user experience questionnaire (UEQ-S) (Schrepp et al. 2014). Additionally, the facilitators took observation notes during the future labs, and expert interviews were conducted immediately afterward to gather qualitative data, which was then analyzed using a grounded theory (Glaser et al. 1968) approach.

Questionnaire Results

The results of the questionnaire evaluation ($n = 31$) show a positive assessment of the IMHRE game in combination with SD by both companies with regard to the structure and flow of the game, the simplicity, the teamwork, and the structured approach. Visualization and the illustration of the different levels, as well as the haptic presentation, were also mentioned positively several times. Furthermore, the linking of the levels is positively emphasized, as well as the change of perspective to think through a topic and get to know many problems with the help of the game. On the negative side, company 2 mentioned the group size for the game, the lack of a solution approach, and the confusion caused by the many answers and speech bubbles.

The players' statements while observing the serious game were also markable, as many negative mental models were uncovered during the IMHRE + SD game within the Future Lab at company 1. The group was trying to balance the game when they noticed how it skewed to the sides. There was also a high level of "work energy" during the game, and it seemed that players were already aware of some of the underlying patterns. However, many expressed surprise when they saw the connections between the levels of the IMHRE. Comments during the IMHRE game with company 1 were like "So confusing?," "Where are we compared to other groups?," "It feeds on the thoughts," "I'm getting anxiety right now, when I look on the complexity of the construction." Players at company 2 commented while playing: "strong connections," "more difficult to find points at the bottom," "a bit shocked," "it really hurts down there, but that's also where the power lies" (referencing the mental model level), "honesty and trust are missing."

The comments on improvements indicate that the IMHRE game should not be played in groups larger than ten. Improving participant interactions with the results after play could involve finding a way to present the results in a more easily readable format. Among the most

frequently cited positive aspects, apart from the game's visual and tactile properties, was the ability to change perspectives during gameplay. The visualization of layers and connectors enabled participants to gain new insights into familiar problems.

When asked if they would play the IMHRE game again, fifteen respondents answered "yes," seven said "no," and seven replied "maybe." Nevertheless, the IMHRE game was evaluated as the most impactful at both companies, receiving the highest ranking among the four options. The Q4TE scale shows an overall high satisfaction with the IMHRE game. Regarding utility (applicability to everyday work), parts of the presented content and concepts could be seen to be valuable to the everyday work by the participants (e.g., change of perspectives).

On the GEQ scale, the IMHRE game revealed a high sense of competence, as well as sensory and imaginative immersion from players. Tension and negative affect are relatively low, while the positive effect was high.

For the user experience questionnaire (UEQ)-S scale, the future lab overall and the IMHRE game show a high rating for the hedonic quality, consisting of items for novelty and stimulation. A high hedonic quality would be considered meaningful for a successful IMHRE game experience. The UEQ quality score is high for all aspects of the future lab, which might be a positive indicator for the serious game workshop design.

Focus Group Interviews Results

The Future Lab 1 participants of both companies were asked to share their likes, dislikes, and suggestions for improvement regarding the serious games, as well as their expectations. They also discussed how the games could be applied to their daily work and teams and whether they felt they gained any additional insights from the experience. Depending on the number of people, the groups consisted of five to eight participants.

Both companies were presented with the same structure, games, and context for the Future Lab 1. While there was considerable overlap in the feedback from both groups, there were also significant differences.

During the focus group discussion at company 1, participants expressed a general appreciation for the IMHRE structured approach to problem-solving. One participant commented, "I find almost everything about the iceberg model (IMHRE) good. And this connecting is excellent." This reflects the model's strength in facilitating connections and fostering a deeper understanding of complex issues. The progression from multiple problem statement to a singular focal issue was particularly commended for its conceptual clarity; as another participant observed, "how it was structured and built, especially where you could make connections and see them—aha, okay, many connections lead there."

There was a shared sentiment that the exercise could benefit from additional steps to translate insights into actionable plans. A participant remarked, "I wished we could have taken

another step with the model, maybe in the form of another game or something to pursue it further…so we could develop more steps and tools to take action immediately." This highlights a desire for more concrete outcomes and tools to implement changes effectively.

The nature of the IMHRE was also discussed, with one participant describing it as "a deconstruction of feelings and reconstruction." This perspective emphasizes the model's role in breaking down and rebuilding perceptions, offering valuable insights into underlying team dynamics.

In the focus group interview from company 2, participants generally expressed a positive perception of the IMHRE. One participant appreciated how they "managed to narrow down from 100 problems to one problem, which was then processed using the Iceberg Model (IMHRE) and storytelling (Social Dreaming)." However, there was a desire to continue the session in the afternoon to explore the topic further. Several participants emphasized that the game provided valuable insights into potential team issues and a better understanding of why certain tasks might not be perceived as intended. As one participant stated, "For me, it was a bit challenging, but the Iceberg game (IMHRE) was actually the most impactful for me; it sparked the most ideas."

Despite this, they felt that the game lacked a concluding component, leaving them uncertain about subsequent steps. Another participant noted, "The door was opened for me, the problems were shown, but I wasn't shown how to walk through the door." This sentiment was echoed by another participant, who appreciated the model for encouraging deeper questioning and understanding of underlying human behaviors that are not immediately apparent. This was seen as important for addressing root causes rather than just symptoms: "We should make the effort to understand what's beneath, so we don't just tackle the symptoms, but what lies underneath." Some participants felt that more time could be spent deriving actionable insights from the exercise, suggesting that a whole day might be needed to develop concrete measures: "I would have liked to work out more substance for ourselves." The IMHRE was recognized for its potential to address themes such as organizational values, behavioral norms, and interpersonal dynamics by subtly guiding participants toward these reflective inquiries: "I believe it opens up a lot through the topic."

Both company 1 and company 2 identified significant areas for improvement in the serious game involving the IMHRE, particularly concerning the lack of conclusive steps and effective follow-up. From company 1, participants expressed a need for more thorough evaluation and actionable outcomes. One participant noted, "What was missing from the Iceberg Model (IMHRE) for me was a brief evaluation. Let's look again at the points and perhaps briefly discuss what we take away from it or what the information is." Additionally, another participant mentioned, "I was momentarily confused about the layers of the Iceberg Model (IMHRE), what comes next, and how the two layers differ. This took a bit of time to reconnect, and I was briefly lost," highlighting confusion about the model's layers and the need for better guidance.

The feedback at company 2 pointed to missing elements that could enhance the game's effectiveness. One participant remarked,

> I felt that there was another step missing afterward, and honestly, I thought something more would come at the end. In retrospect, it surprises me that this was it, and it's exactly what you mentioned as a point: there's a bit of a lack of conclusion, and it's still hard to take something away from it.

This comment underscores the need for a stronger conclusion and clearer takeaways. Furthermore, another participant reflected, "You also said the Iceberg method (IMHRE) was good in terms of its system, but I had some issues with reading it. In other words, the evaluation option wasn't personally good enough for me," pointing out issues with the visibility and interpretation of the results.

Reflecting on the focus group feedback regarding learning, interconnections, and collaborative teamwork in relation to the IMHRE game, participants from company 1 noted the game's potential to reveal underlying issues but also pointed out areas for improvement in facilitating collaborative learning. One participant emphasized the value of the game in highlighting systemic connections, stating, "I found it remarkable how the structured setup allowed us to see multiple connections, leading to interesting insights." Another participant suggested, "What I missed from the Iceberg Model (IMHRE) was a brief evaluation. Let's look at where the points are and discuss what we take away from it," indicating a need for clearer conclusions to reinforce learning. Additionally, feedback about navigating the game's layers revealed challenges in maintaining clarity: "I found it a bit difficult to follow the layers of the Iceberg Model (IMHRE) at times." These comments underscore the importance of enhancing both the clarity of the model and the effectiveness of team-based reflection.

At company 2, participants also valued the IMHRE game's ability to foster reflection and understanding of interconnections but identified opportunities for deeper engagement. One participant noted, "I appreciated how the game prompted us to think about the root causes of issues, which was beneficial for our collaborative problem solving." Another highlighted the value of linking different layers of the model, saying, "The idea of breaking down and connecting the two layers was a great addition, as it helped us see the bigger picture." Some participants felt that further development was needed: "I had the sense that something was missing at the end. It would be useful to have more concrete steps or conclusions." This feedback suggests a need for enhanced synthesis and actionable outcomes to better support team collaboration and reflective learning.

Incorporating physicality, design, visualization of interconnections, and emotional "aha" moments, both company 1 and company 2 provided valuable feedback on the IMHRE game. Participants from company 1 found the 3D representation particularly impactful, noting that it brought a clearer understanding of underlying thought models. As one participant

remarked, "I found the 3D representation brilliant. The Iceberg Model (metaphor) itself isn't new, but the 3D aspect (IMHRE) made it clearer and highlighted the underlying thought models, prompting me to consider whether to address the structures or the thought models first." Another participant appreciated the model's ability to visualize connections: "The Iceberg Model (IMHRE) had a significant 'aha' effect for me methodologically. The way it visualized layers and connections between them was fascinating and led to new insights I hadn't considered before."

Participants from company 2 highlighted the value of the IMHRE game's tactile and physical dimensions in facilitating engagement and reflection. Valuing the tangible elements, one of them noted, "The physical nature of the Iceberg Model (IMHRE) made it more engaging. It was not just a theoretical model but something you could handle and interact with." Another participant noted that the structural layout of the model contributed to their understanding of complex interrelations: "The design allowed us to see and understand the connections physically, which was very revealing. It provided a concrete sense of how much is interconnected and where the connections lead." Both companies agreed that the IMHRE effectively facilitated emotional insights and deeper understanding, with participants highlighting how it prompted them to ask fundamental questions and gain a clearer view of complex issues.

The focus group feedback on the SD game level in the IMHRE revealed a blend of positive reflections and constructive critique. Company 1 appreciated the methodology, noting its effectiveness in creating a positive vision: "I find the methodology excellent. It's somewhat akin to systemic coaching, where you create a positive vision and imagine where it could lead. This approach mobilizes tremendous energy and, being playful and team-oriented, presents a great opportunity." Additionally, the cohesive nature of the team's ideas was seen as a strength: "I found it positive that we all seemed to head in the same direction. There wasn't anything completely contrary, just individual focuses, but fundamentally we seem to think alike."

In contrast, company 2 provided nuanced feedback, recognizing the value of SD exercise while also noting some challenges: "I really liked the Future World (Social Dreaming) exercise where we envisioned 2035. It was well-facilitated and encouraged everyone to generate their own ideas before discussing them as a group. However, we struggled a bit to see how we could reach that ideal state." They also appreciated the guidance provided during the exercise: "The additional keywords and guidelines were very well moderated and helpful." Despite some difficulties, one participant valued the exercise's ability to prompt expansive thinking: "The exercise was beneficial, though somewhat challenging, as it pushed us to think big and move beyond small details to envision an ideal world. It's okay to aim high and then realistically adjust from there." This mixed feedback highlights the potential of the SD component to inspire and challenge teams, although its practical application might need further refinement.

A significant wish for the SD part was the need for a clearer road map or follow-up plan from company 1. One participant noted, "We didn't address what we need to achieve our dreams. We only spoke in the realm of imagination without considering what steps we need to take to make these dreams a reality." This indicates a desire for practical strategies and next steps to ensure the transition from conceptualization to actionable plans.

Company 2 expressed frustration with the certain element of using the tarot cards in the SD. One participant commented, "I couldn't manage the card. It actually distracted me rather than guiding me." This feedback suggests that some components of the process, such as the use of tarot cards for creative thinking may have hindered rather than facilitated the experience, highlighting a need for more intuitive imagination and narration.

The integration of the IMHRE game and SD in the future labs demonstrated complementary impacts on leadership development. The IMHRE game allowed participants to deconstruct complex workplace challenges by visualizing systemic layers—event, pattern/systemic structures, and mental models—encouraging reflection on interdependencies and team dynamics. Participants noted "surprising" moments when recognizing hidden causes of recurring problems, indicating an increased capacity for ST. In contrast, SD facilitated a forward-looking, imaginative dialogue, where participants articulated aspirational visions for the future and collaboratively constructed narratives. This combination of tools in a serious games format contributed to both deeper organizational insight and the development of futures-oriented mindsets.

Social Dreaming for Sustainability Reflection in Leadership

This research focused on an action research approach to explore the integration of SD with the IMHRE serious game in SDOL training. The future labs, conducted with two Berlin-based companies—one from the health sector (Company 1) and the other from the energy sector (Company 2)—provided a robust setting to examine both quantitative and qualitative dimensions of the approach.

Quantitative evaluations using the GEQ (IJsselsteijn et al. 2013), Q4TE (Grohmann and Kauffeld 2013), and UEQ-S (Schrepp et al. 2014) revealed that the serious game approach was well received. GEQ results indicated high levels of sensory and imaginative immersion with low negative affect, suggesting that participants experienced the training as engaging and enjoyable. The Q4TE responses confirmed that many leaders found the method applicable to their daily challenges, while the UEQ-S scores highlighted the novelty and stimulating quality of the future lab experience.

Complementing these findings, qualitative data was collected through facilitator observation notes and expert interviews and analyzed using a grounded theory approach. This method allowed core themes to emerge directly from the data, providing rich insights into the participants' learning processes and the challenges they encountered.

Many participants noted that the physical, layered structure of the IMHRE game was instrumental in uncovering hidden systemic issues and in facilitating a comprehensive understanding of team dynamics—a finding that resonates with Stroh's (2015) emphasis on visualizing complex interdependencies and Inayatullah's (2017) CLA model. Several leaders experienced "aha" moments when engaging with the 3D tactile elements; however, some found the 3D design visually chaotic and suggested that a simpler, two-dimensional format might enhance clarity. Compared to the CLA, SD combined with IMHRE is much more open and process-oriented. This combination fosters the creation of new future narratives, whereas CLA (Inayatullah 2017) focuses more on existing future narratives.

Feedback on the SD component was similarly mixed. While many participants appreciated its role in stimulating FT and in fostering collective visioning—as noted by Kets de Vries (2014) and Lawrence (2005)—others struggled to translate visionary ideas into concrete future actions. Also, the preference for a shorter time horizon (10 years instead of 2050) aligns with the findings of Gaub (2023) and McGonigal (2022) that individuals find it challenging to envision distant futures due to a lack of perceived influence and difficulty in episodic FT.

Participants expressed a desire for more practical follow-up steps. This highlights the need for frameworks that can help transform visionary thinking into concrete, actionable strategies. In this context, the "Immunity to Change" model by Kegan and Lahey (2009) was incorporated into Future Lab 2 at company 2 to help leaders overcome mental barriers and convert insights into practical steps.

A structured comparison between the two companies further enriched the evaluation. More in-depth discussions were held at company 1, where the future lab involved a smaller group, of ten participants, and leaders reported a stronger sense of agency regarding their company's future. In contrast, company 2's larger group, of over twenty participants, resulted in more passive engagement during the SD sessions, leading several participants to recommend that an optimal group size should not exceed twelve for more effective interaction. Moreover, the introductory Polak game (Hayward and Candy 2017) revealed that while most leaders were optimistic about the future and saw themselves as having significant influence, a subset expressed feelings of limited control over their organization's long-term trajectory. This finding emphasizes the necessity of leadership training that enhances both strategic foresight and personal agency. The integration of SD within the IMHRE serious game has demonstrated notable strengths and areas for improvement in enhancing sustainability reflection and leadership interaction. These findings also point to the need for transdisciplinary collaboration. Authors such as Keitsch (2020) argue that openness and diversity are essential in this process, stating: "Openness is needed to be logically fascinated by the variety of opinions in a discourse, to ethically admire the willingness to find compromises and to take up the designerly challenge to find feasible solutions" (Keitsch 2020, *69*).

Overall, integrating SD with the IMHRE can enhance systemic design-oriented leaders' understanding of complex systems and promote innovative thinking, but further refinements

are needed to translate insights into actionable strategies effectively. Due to time constraints, SD and the long-term effect could not be extended further, and the concrete implementation of potential nudges remained open. In the expert interviews, leaders expressed a clear desire for solutions to the revealed mental models or further steps. Therefore, a major limitation of this study is the inability to measure the long-term effects of the implemented tools and their impact on SDOL training within the ten-month project time frame. Similar challenges have been highlighted by Gawell (2020), who emphasizes the difficulty of assessing long-term effects within short research project timelines, as participants often feel that the real work has only just begun with the project's conclusion. Likewise, Scholz et al. (2006) point out that the true impact and outcomes of such approaches are difficult to measure within short time frames, as significant learning and transformation tend to unfold later in the process. Therefore, while the immediate results of this study provide valuable insights into leadership development in ST and FT through serious games, further research is needed to understand how these methods can enhance sustainability reflection and leadership interaction.

Conclusion

This study demonstrates that integrating SD with the IMHRE serious game in SDOL training effectively uncovers unconscious patterns and deepens eco-social decision-making. By fostering engagement and multi-perspective dialogue, this combination proves valuable in challenging mental models and advancing systems and FT across various organizational contexts. While SD generates a collective futures narration and training in FT, IMHRE provides a structured approach to ST, helping leaders understand systemic interdependencies and design principles for organizational change. Together, they offer a holistic framework that encourages leaders to engage with stakeholders in shaping transformational strategies.

While SDOL offers notable strengths, it also presents challenges—particularly in navigating complex organizational structures, overcoming resistance to cultural change, and addressing systemic issues that extend beyond the organization. The future labs revealed that participants recognized the value of these tools and expressed a strong interest in applying them internally to address team challenges. This commitment led to the development of "re:PLAY—a playbook for Future Labs," which equips systemic design-oriented leaders with practical guidance to integrate these approaches into their teams. The transition from researcher-led facilitation in Future Lab 1 to participant-led facilitation in Future Lab 2 further underscores the adaptability of the approach and its potential for sustained implementation.

The study also has certain limitations. The sample size of thirty-one participants may restrict the generalizability of the findings. While combining quantitative and qualitative data provides a broader perspective, the depth of qualitative insights and the statistical power of quantitative analysis could be enhanced in future research.

To ensure lasting impact, ongoing methodological support and follow-up interventions remain essential. Methodologically supported follow-up steps such as a modular road map that connects foresight, reflection, and implantation will encourage leaders practically not just to dream the future but to design and live it (Burns 2014; Cornelisse and van Klink 2024).

Future research should explore the long-term effects of SD and IMHRE in SDOL development, particularly how they influence behavioral change and strategic decision-making over time. Additionally, investigating their transferability across different industries and leadership frameworks will provide deeper insights into their broader applicability. By embedding SD into SDOL programs, organizations can better equip leaders to navigate uncertainty, complexity, and sustainability challenges. Future labs, designed as serious game workshops, offer experiential learning opportunities that strengthen leaders' ability to anticipate and respond to emerging challenges.

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Informed Consent

This study was conducted with the informed consent of all participants. Participants were informed of the study's purpose, procedures, potential risks and benefits, and their right to withdraw at any time without penalty. Written consent was obtained from all participants, including permission for the creation and use of photographic material.

Conflict of Interest

The authors declare that there is no conflict of interest.

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