Memories of the Future: a design technology by scenarios

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ABSTRACT

Scenario Planning allows the investigation of alternative futures being useful in contexts characterized by high volatility and uncertainty. Particularly within the boundaries of Design discipline, the way of thinking through scenarios has been incorporated into design methods to explore future contexts at certain points in the design process. However, we question whether scenario thinking could be an integral approach during the project's lifetime structuring a design technology through comprehensive and systemic mechanisms. Therefore, the present work aimed to share the research of a Design Technology by Scenarios and its application in a design workshop entitled Memories of the Future. The design network was formed by the "Protagonists of the Future," a group movement orchestrated by the Santa Maria Development Agency and supported by UN-Habitat to promote urban development in a sustainable and collaborative way. The results indicate that the co-creation of scenarios as a design technology reframed the actions of the protagonists in the local ecosystem encompassing multiple dimensions: the history and purpose of the project (story); the path necessary to achieve the goals of sustainable development in the city (path); the roles to be performed by the different protagonists involved (actors); and tangible results in the participating communities (evidence).

Keywords: scenarios, design methods, design-driven innovation, participatory design.

INTRODUCTION

Scenarios contain stories in forms that are analytically coherent and imaginatively engaging to explore possible futures (HEIJDEN, 2005). Due to this, Scenario Planning was incorporated into design methods to improve the development of alternatives product-service systems (PSS). However, it is not just about thinking of plausible futures, but how to design such futures using the theoretical and methodological potential that this line of research has achieved in recent years.

The objective of this paper is to share the study of a Design Technology by Scenarios, which is part of a Doctoral Thesis in progress in the Graduate Program in Design & Technology of the Federal University of Rio Grande do Sul. The proposal was applicated in a design workshop entitled Memories of the Future for the "Protagonists of the Future" - a group movement of ideas and actions for sustainable and collaborative urban development managed by the Santa Maria Development Agency (ADESM) with support from the UN-Habitat office in Brazil.

The authors opted to conduct research through action to investigate whether scenario thinking could be an integral and pragmatic approach (TONETTO et al., 2019) during the

project's lifetime. The work is committed to the context of local organizations and aims to provide systemic mechanisms to co-create strategies during practice, instead of inserting traditional scenario methods in design process. Hence, we sought to achieve procedural clarity in the discussions that involve the complexity of the project by scenarios.

1. THEORETICAL SCENES: SCENARIOS, DESIGN, AND INNOVATION

The theoretical basis of this study included creating panoramas/scenes in three thematic axes (Design, Scenarios, and Innovation) in order to propose a design technology. Due to the extensive bibliographic research carried out, we chose to cite only a few studies of each theme, including previously works performed by the authors.

The first panorama of Design considered the designerly ways of knowing (CROSS, 2011) and the development of Design Research from three points of view: 1) Design Methods (ZURLO, 2010; CROSS, 2011; KUMAR, 2012; CELI, 2015); 2) Triggers - Problems and Possibilities (DORST, 2006; DESMET and HASSENZAHL, 2012; HINDRICHSON et al., 2018); 3) Actors - everyone involved in participatory design networks (SANDERS, 2013). This research also distinguishes actors between diffuse designers (everybody immersed in the daily life) and expert designers (those who have been trained as designers to trigger and support meaningful social changes, focusing on emerging forms of collaboration) according to Manzini (2015).

The second panorama was specifically based on Scenarios and sought to detail the concepts and approaches of this word by reviewing the main authors in the Visual Arts, Military Intelligence, Strategic Planning (GODET, 2000; SCHWARTZ, 2003; HEIJDEN, 2005; SARPONG e MACLEAN, 2011) and more recently in the scope of Design (MANZINI, 2003; MORALES, 2004; CELASCHI; DESERTI, 2007; CELI, 2015; JÉGOU et. al, 2012; HINDRICHSON, 2013; ZINDATO, 2016). Due to the procedural emphasis of the present study, this panorama looked at the scenario building processes and established a classification based on the contextualization procedures (Table 1).

Table 1. Scenario Building Process within the boundaries of Design discipline.

How is the context embedded in the design process by those involved?	Authors
The context is built considering the predetermined elements or critical uncertainties and driving forces that may have an impact on the project.	MORALES, 2004
The context is interpreted from the variable elements that tension contemporary society (macrotrends) and from the fixed elements that condition human behavior throughout history (constants).	CELASCHI, DESERTI, 2007 SCALETSKY, BORBA, 2010
The context is given by the results of a contextual research carried out by the stakeholders in the initial phases of the design process.	MANZINI, 2003; JÉGOU et al., 2012
The context is co-created through the collective intelligence of the actors involved in a design network during the design process (The SOW Network[1]).	HINDRICHSON, 2013; HINDRICHSON, FRANZATO, 2014.

This panorama also explored the architecture, characteristics, and visual expression of scenarios (MANZINI, 2003). It was possible to observe that different types of scenarios (exploratory, strategic, conceptual, and evaluation scenarios) can be used at different moments of the design process (ZINDATO, 2016), though no comprehensive approaches were

found till the date of the workshop presented here. However, the use of scenarios in a broader perspective was later found in research that investigates networks and systems as structuring elements of design scenarios (CHIAPINOTTO, 2020). We also highlight the special project FUEL4Design - Future Education and Literacy for Designers - focused on the pedagogies of Design Futures Literacies aiming to transpose, transcend and transform design futures education (MORRISON, CELI, CLERIÈS, 2020).

The third panorama of Innovation aimed to discuss the types of innovation relevant to the development of this work: continuous, dynamically continuous or discontinuous (GATIGNON & ROBERTSON, 1991); radical or incremental (SCHUMPETER, 1961); disruptive or supportive (CHRISTENSEN, 1997), and design-driven innovation (KUMAR, 2009; VERGANTI, 2011). The design-driven Innovation aims an intrinsic relationship with design processes through meanings, leading to the adoption of a more critical attitude towards the design complexity (MANZINI, 2014; VERGANTI, 2016).

The literature review to weave relationships between design, scenarios, and innovation was fundamental to identify any gaps and theoretical conflicts to structure the proposed design technology based on the following question: how can we design for possibilities (future) and shift the procedural emphasis from the problem (past/present) while aiming to anticipate innovation through new meanings?

2. A DESIGN TECNHOLOGY BY SCENARIOS

Creating scenes that aim to establish critical relationships between design (processes, triggers and actors), scenario thinking, and design-driven innovation made it possible to formulate the conceptual bases of a design technology (Figure 1). If we think about designing by scenarios, it is possible to consider aspects of systems thinking, specifically the recognition that many factors may combine in complex ways (MORIN, 2011) to create sometime surprising futures (due to non-linear concept of time in feedback loops). It is about experiencing a state of continuous and iterative flow between different types of previously identified scenarios creating constantly evolving looping interactions between the present and the future.
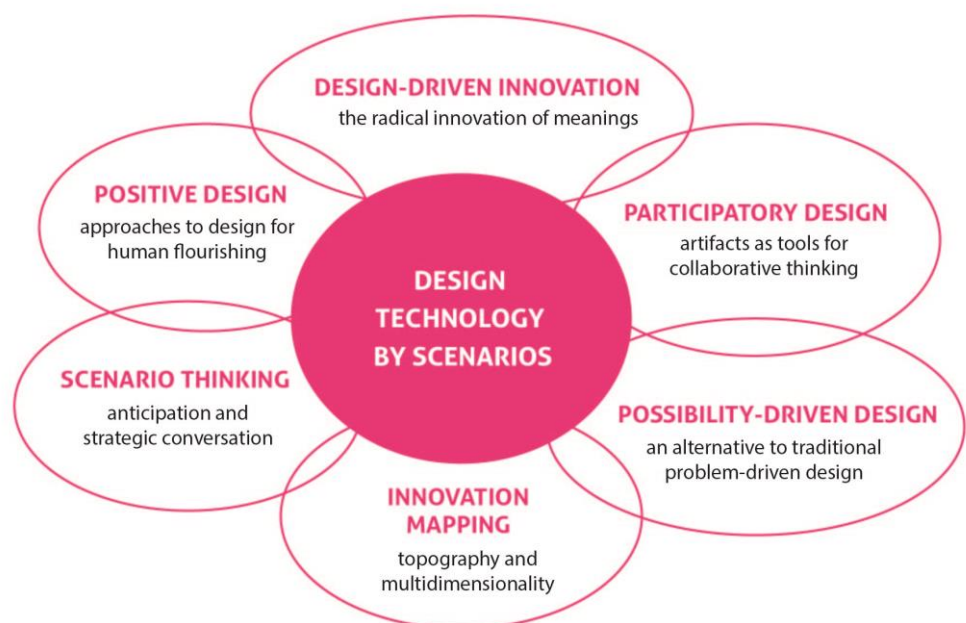
Figure 1. Theoretical guidelines of the Design Technology by Scenarios.

In this way, the Design Technology by Scenarios proposed herein considers a dynamic, social, and iterative practice that flows through the design process. The use of the word "technology" in the context of this work was the systemic set of techniques, processes, methods, and tools for designing through scenarios. Therefore, a set of systems was developed according to the Figure 2: a Navigation System between the dimensions of the context (compass), a Creation System (set of techniques and tools), and a Sharing System (scenario showcase).
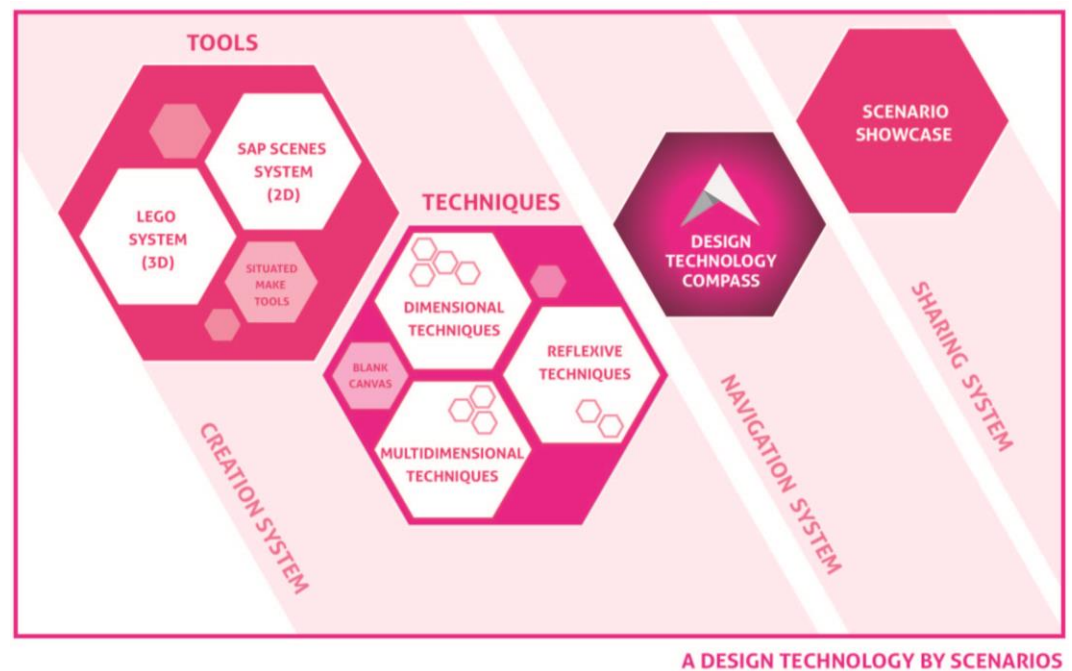

Figure 2. Systemic approach for the Design Technology by Scenarios.

From the operational point of view, studies found in the literature consider two starting points for the design process (triggers): problems and possibilities. The problem-solving model has an intentionality because the problems are concentrated in the present and the perception of the future, we have is the problem solved (in the present). While a problem-driven approach takes a problem as a start, a possibility-driven approach (DESMET and HASSENZAHL, 2012) looks out for a possibility (in the future). Thus, the proposed technology considers a disruption between the problem and solution. In this way, the design process is stimulated by the dimension of time, moving the design network to the near future, and looking back in retrospect: what happened during this period?

In addition, to co-create layered scenarios it is necessary to design relationship systems between multiple dimensions (actors, story, path, and evidence) in a topographic way (CELASCHI, DESERTI, 2007). Several prototypes were developed until the Design Technology Compass was created (Figure 3). We use the compass metaphor to build a Navigation System (Table 2) that guides the actors during the project's dimension of time without establishing a procedural route.
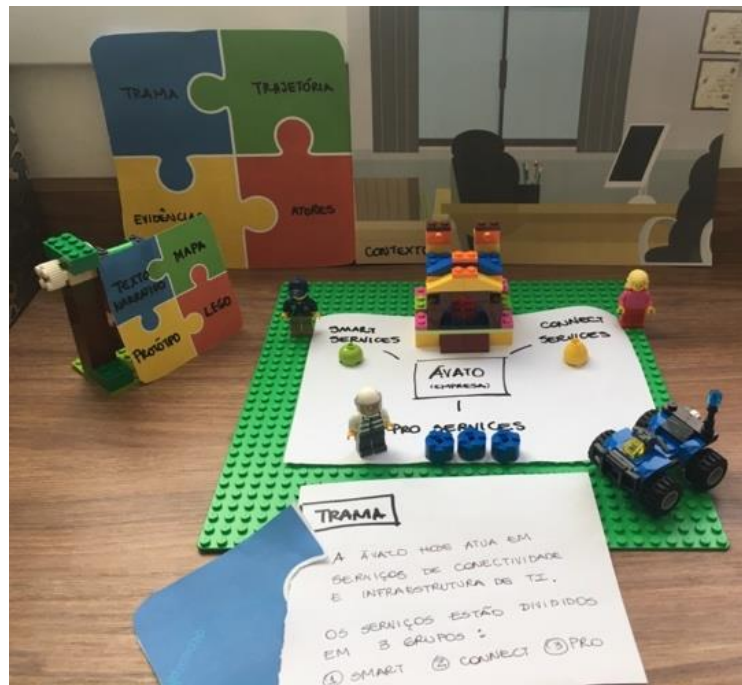
Figure 3. The Design Technology Compass: prototypes.

Figure 4. The Design Technology Compass: prototypes (a) and the final compass (b).

Dimension	Question	Description
Actors	Who is involved in this story?	It explores the characteristics, behaviors, and attitudes that represent the people or groups involved with the organization. It is important to consider that the actors bring their emotions, values, and feelings into the context of the project being created.
Story	What is the organization's history/narrative?	It tells the story and contemplates the narrative, series of events, and interactions between its elements. It is necessary to build, develop, and adapt the living elements (in the present or in the future) of the actors according to a time sequence.
Path	What happens over time?	It consists of the necessary time to move the project into the future. In this dimension, at least two paths are fundamental: the journey of the people involved with the organization and the journey of the organization itself considering all internal processes.
Evidence	What are the impacts of this experience?	It seeks to map all tangible evidence between the organization and the context in which it is inserted to evaluate respective impacts.

Note: the compass has four dimensions to be explored with the project's dimension of time.

To promote an environment of balanced communication in cross-disciplinary workshops (expert designers and diffuse designers), the proposed technology provides the actors with a Creation System that enables the collaborative building of "artifacts of the future" through an immersive experience. This system is formed by a set of techniques and tools already used in this disciplinary field according to the precepts of Participatory Design, which considers communication, interaction, and visualization (SANDERS, 2013).

The techniques were organized into three categories (Table 3) from the theoretical point of view developed in this research: dimensional, multidimensional, and reflective. The techniques were categorized as to highlight the relationships between the systems of the proposed technology, although no order or mandatory use is established during their practical application. It is advisable that the techniques available in the literature can be combined and/or recombined according to the specific needs of each project and that they should not be understood as exclusive within the proposed technology.

Table 3. Suggestions of existing techniques in Design to co-create layered scenarios.

Category	Descriptions	Techniques
Dimensional Techniques	The emphasis of the technique is concentrated in one dimension.	**Personas (actors):** Create characters with characteristics, behaviors, and attitudes that represent actors or groups involved with the organization.
		Storytelling Map (story): art of telling, developing, and adapting stories using specific elements in events with a beginning, middle, and end, to send a message (VOGLER, 2015).
		Journey Map (path): map the path to evaluate the experience, new business opportunities, improve a product or identify flaws in the relationship.
		Touchpoints Map (evidence): track all the evidence that the service/experience of a given organization can provide people according to their promises.
Multidimensional Techniques	Representation strategies that allow the articulation between multiple dimensions providing the creation of complex contexts.	**Blueprint:** a plan or model that seeks to visualize a person's experience (current or new) through different channels over time.
		Storyboards: derived from the cinematographic tradition that uses the representation of scenes organized in a narrative sequence.
		Role Play/Stop Motion: thinking that the new story really exists and creating a potential journey using its features.

Reflective Techniques	Activate critical thinking and empathy (affective, cognitive, and regulating emotions).	**Empathy Map:** exercises reflections on what people say, do, see, think, feel, and hear to help design an organization's business model.
		Tomorrow's Headlines: fictional articles published in magazines or newspapers in which designers imagine themselves in the future trying to understand what kind of impact the service will have on society.

Note: the selected techniques are already used in design processes and are available in the literature.

Aiming to promote the autonomy of the actors during the practice, the design network received the description of each technique available in cards and application canvas specially customized for this approach (Figure 4). Blank cards and canvases were also available to write down any other techniques that were created and/or used during the project (situated make tools) according to the expertise of the actors. This is because the scenario thinking's essence is conceptually open and systemic, which gives opportunity to the unexpected and, therefore, potentially innovative situations. Here, we highlight that this technology can be customized according to the local culture context and fed back into the near future at each new iteration given its systemic epistemological basis.

Figure 4. Creation System's Techniques: Cards and Application Canvas.

In addition to the techniques, the proposed Creation System considers tools to support the building of the "artifacts of the future." Considering the multi-layer representation of the context, the technology proposes the use of dimensional tools together with the notion of the timeline to weave relationships between the context's elements. Therefore, the design technology by scenarios suggests two well-established platforms (Figure 5) that the actors can opt to use together or individually. The choice of the platforms LEGO® (three-dimensional) and SAP Scenes™ (two-dimensional) aims to supports the co-creation of scenarios enabling the strategic conversation and balancing the skills of people with different backgrounds (diffuse and expert designers).

Figure 5. Creation System's Tools: LEGO pieces (a) and SAP Scenes (b).

Regarding the Sharing System (showcase scenarios), the teams must each present at least one of their works in progress followed by group discussion. To better organize the presentation of the work-in-progress scenarios, inspiration was sought in the form of pitches. Pitches are the most used technique to present innovative businesses or business ideas to any audience in a fast and concise speech. After the presentations, it is suggested that a brief group discussion take place for the actors to take a more critical look at the design path of each team.

The proposal of the technology to design by scenarios consists of independent and interconnected systems with suggestions of existing techniques and tools that can or cannot be used according to the context application. The next section presents the practical application of the technology in the context of an organization for collective urban development in the central region of Rio Grande do Sul State (Brazil).

3. RESEARCH THROUGH ACTION: MEMORIES OF THE FUTURE

Practices permeate different instances of social life and refer to what people do in their situated activities, in this case, in the context of design processes (THIOLLENT, 2011). For this reason, research through action was carried out to act in the development of strategies within organizations delivering practical results in the surrounding community (TONETTO et al., 2019). The context chosen to apply the technology was the movement of ideas and actions entitled "Protagonists of the Future." This organization was created by the Santa Maria Development Agency (ADESM) with support from the United Nations Human Settlements Program (UN-Habitat). Following the guidelines of the 2030 Agenda for Sustainable Development (UN, 2015), the organization aims to promote sustainable urban development in a collaborative way in local communities.

The "Memories of the Future" workshop took place on 09/11/2019 to co-create the performance model of this newly formed organization in the city, collaboratively establishing the purpose of this new creative ecosystem. By considering future implications of what is observed we create a contextual framework of action programs or plans as a storyline in our mind. As these programs can be retained and recalled, they might be termed "memories of the future" (INGVAR, 1985; VAN der HEIDJEN, 2005). So, the use of the expression "Memories of the Future" aimed to evoke the anticipation of possibilities to design in retrospect contemplating the dimensions proposed in the design technology. According to this insight, the trigger for the beginning of the activity was given only by the dimension of time: the one-year period.

The actors were thrown into the project without the opportunity of previously observation and instead of responding a "design problem" (DORST, 2006). The Researcher (expert designer) and seventeen Protagonists (diffuse designers) worked in two very heterogeneous project teams that consisted of representatives of ADESM, representatives of Community Associations, Advisers to the City Council Office, Municipal Councilwoman, Architects and Urban Planners, Fashion Designers and Students, and State Teachers and Students. The teams each used a set of three different techniques, although all teams used the storyboard technique and the three-dimensional creation system with LEGO pieces (Figure 6).


Figure 6. Co-creation of multidimensional scenarios: Techniques (a) and Tools (b).

Regarding data collection, at least three sources were considered in order to obtain triangulation: 1) participant observation; 2) the audio-visual records of the design process; 3) the documentary material produced by the teams; 4) and a group discussion using an open and semi-structured script in order to collect information in the most spontaneous way possible. The data were submitted to Content Analysis and the analysis was chosen through thematic categories since the meanings contained in the data are relevant (BARDIN, 2011).

The stories obtained by the actors in this exercise were compiled in a synthesis-narrative built with the two-dimensional system SAP Scenes™ (Figure 7). The results were shared with the network of Protagonists of the Future on 10/03/2020 and, to date, several planned and co-created actions in the workshop have already been effectively carried out by members of the movement in local communities of Santa Maria. In the same week, contingency measures to avoid the progression of the COVID-19 pandemic started in the city and postponed the actions planned by the protagonists for everyone's safety.

Figure 7. Workshop Memories of the Future created with SAP Scenes™.
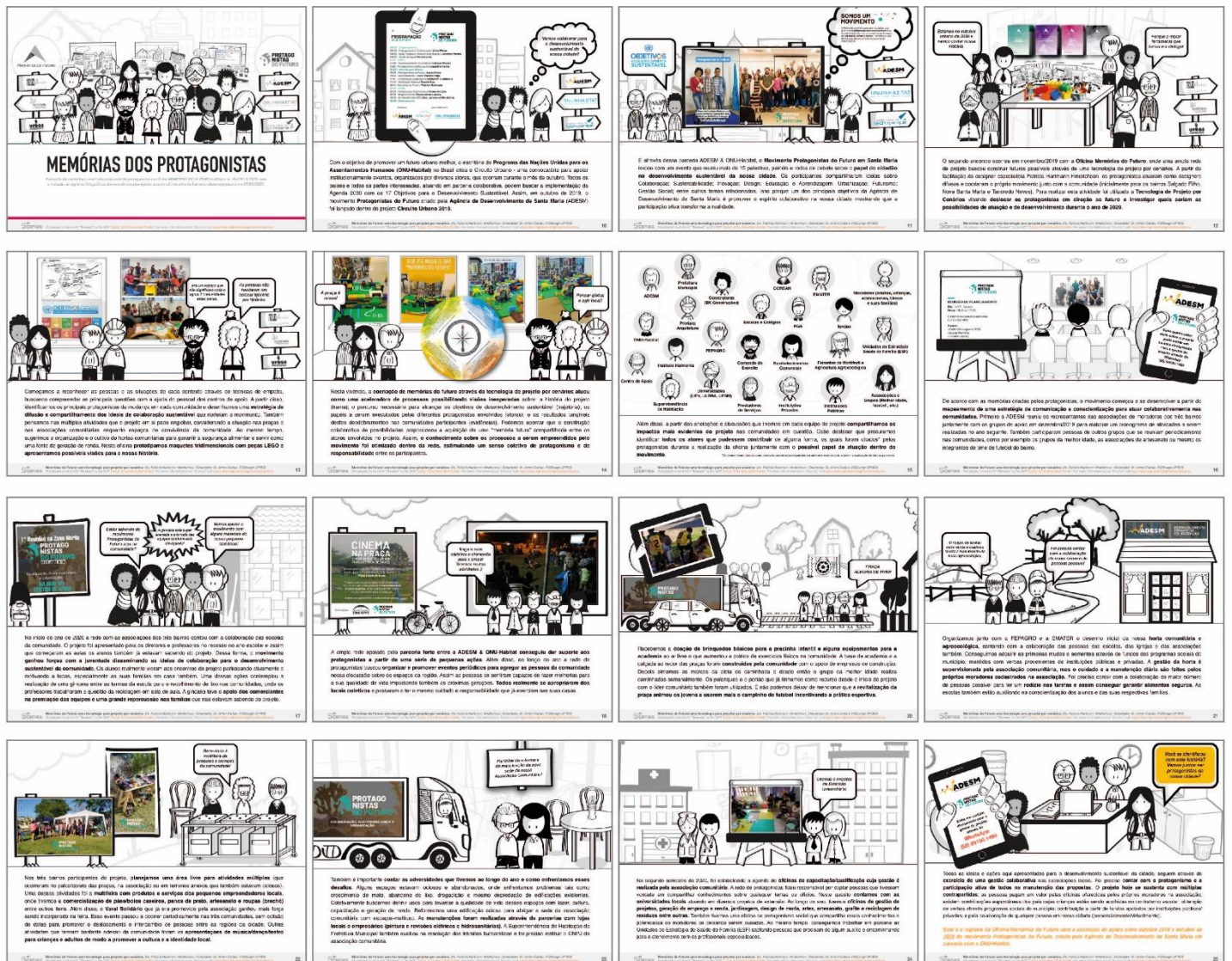
4. DISCUSSION

In this section, we seek to discuss some aspects related to the application of the Design Technology by Scenarios, specifically within the Memories of the Future workshop. In addition to the results obtained by the content analysis, the authors highlight the effectiveness of using direct transcripts from the discussion group (verbal information), whose participants were identified here as "Protagonists."

The set of systems part of the technology was necessary to promote a strategic conversation with actors from different disciplinary perspectives and knowledge being perceived as a game: "look what we built playing with this tools and time went by so fast this afternoon (PROTAGONISTS, 2019)". They also became immersed in the project, and it is interesting to note that the process was perceived with simplicity by the actors despite having a complex epistemological base: "working in simplicity, this project involved all of us in the current situation thinking about the future (PROTAGONISTS, 2019)". In fact, the proposed technology made available a set of manipulatives for "free play" (without setting tasks) which seemed simple to the actors involved.

The technology applied showed that both project teams followed different paths regarding the use of available techniques and tools. The initiatives were designed and shared as robust

memories and arrived at the scenario showcase with comprehensive stories in the four dimensions of the compass. Among the initiatives co-created by the protagonists, we can highlight: Varal Solidário (clothing drive); Multi-feira (an open-air market for products and services by small local businesses); the Community and Agro-ecological Vegetable Garden; a Cinema and Multiple Activities in the City Square; Training Workshops for job and income generation; and the Social Protagonism Workshops with the objective of expanding the network of actors involved.

The actors' enjoyment and experiences were also highlighted in the discussion group: "this dynamic made everyone so involved that we are already dreaming about the things we accomplished" (PROTAGONISTS, 2019). In this regard, we can observe that the proposed set of systems still allowed the actors to include their own emotions, ideals, and values in the design process: "we (can) see that everyone was included in this experience in some way (...) you have no idea the feeling that we have with us joining forces" (PROTAGONISTS, 2019).

We already know that scenarios make sense of future events providing us a set of temporally organized concepts and schemas that allows recognition and judgement of what is going on in real time (HEIDJEN, 2005). So, the codesign of multidimensional stories proposed a new understanding into the network, resignifying the possibilities of the Protagonists of the Future movement in Santa Maria: "this project meant resurgence for me, we are sitting with young people planning a future" (PROTAGONISTS, 2019).

Regarding the results of this practice, we can point out that the technology really provided the acquisition of a "future memory" that was shared among the actors involved in the workshop. "By considering future implications of what is observed we create a contextual framework in our mind in which these observations can be organized" (HEIDJEN, 2005, p.133). Then, it was possible to notice that the workshop provided a simulation of the challenges to be faced by the design network during the next year journey: "In my mind, what we did here today feels like a movie that had already existed. It showed that our capacity has no limits and did not allow me to feel accommodated" (PROTAGONISTS, 2019).

In addition, the protagonism of the actors during the workshop can also stimulate a sense of co-authorship and responsibility to achieve the goals envisaged together, because it organizes a behaviour framework to face the real situation soon. This may occur because the behavioural and cognitive repertoire for future use is based upon experiences of past events, and it is continuously rehearsed and optimized through life (INGVAR, 1985). According to this perspective, the co-creation of memories as a way of designing also aroused similar reactions in the actors involved: "This workshop was innovative because I felt that I was really leading and that I was not alone" (PROTAGONISTS, 2019).

Finally, the co-creation of memories of the future enabled by the technology accelerates processes optimizing knowledge in multiple narrative dimensions: the history and purpose of the project (story); the path necessary to achieve the goals of sustainable development in the city (path); the roles to be filled by the different protagonists involved (actors); and the tangible results of these developments in the participating communities (evidence).

5. CONCLUSION

The results presented here were obtained from a process open to the unexpected by investigating an operational approach with multidimensional scenarios. A significant obstacle

faced in this work was articulating systems and their respective elements proposed in technology seeking theoretical and practical clarity in a complex epistemological basis. The long development time of this study was relevant for the creation of the discussions obtained thus far: complex systems need the dimension of time to feedback from uncertainty, error, and change.

In this sense, one of the limitations of the application described in this paper was the duration of the workshop, which lasted about five hours. If the duration of the workshop were longer, the participants would have possibly been able to try more techniques/tools and still weave potential relationships between them. In addition, the theoretical and technical difficulties of analysing and prospecting future scenarios are different in each new context, thus highlighting the need for more iterations over time.

For this reason, the proposals outlined here contribute to the systematization of knowledge about the co-creation of scenarios as a design technology, however, they are preliminary compared to the possible advances in this line of research. We believe that the way of thinking and, especially, designing through scenarios is essential for discovering new paths in a context that is characterized by high volatility, uncertainty, complexity, and ambiguity. Therefore, a Design Technology by Scenarios is a design-driven approach that may enable strategies to co-create more resilient and sustainable social forms of wellbeing in the most diverse contemporary organizations resignifying procedures and values.

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ENDNOTES

1. SOW Network is the result of a collaborative design experience that involved several designers from UNISINOS, experts from different areas of FACCAT, students, and teachers from the school Theóphilo Sauer de Taquara/RS. The Sow Network received the International Object Design Award: Brazil 2016 in the Design & Education category.

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