

Understanding Transformations through Design: Can Resilience Thinking Help?

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ABSTRACT

The interaction design community increasingly addresses how digital technologies may contribute to societal transformations. This paper aims at understanding transformation ignited by a particular constructive design research project. This transformation will be discussed and analysed using resilience thinking, an established approach within sustainability science. By creating a common language between these two disciplines, we start to identify what kind of transformation took place, what factors played a role in the transformation, and which transformative qualities played a role in creating these factors. Our intention is to set out how the notion of resilience might provide a new perspective to understand how constructive design research may produce results that have a sustainable social impact. The findings point towards ways in which these two different perspectives on transformation – the analytical perspective of resilience thinking and the generative perspective of constructive design research – may become complementary in both igniting and understanding transformations.

Author Keywords

transformation; embodied interaction; constructive design research; resilience thinking; transformative qualities

ACM Classification Keywords

Human-centered computing~Interaction design theory, concepts and paradigms

INTRODUCTION

The interaction design research community is concerned, among other matters, with the production of knowledge regarding the use of digital technologies by people. Increasingly, the interaction design community responds to

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its responsibility by directly addressing big challenges that societies face today. Topics addressed in such work range widely, and amongst others, address how digital technologies may support ecological sustainability [4] or civic engagement [3, 6] to name just a few laudable examples.

Proposing visions for the role digital technologies in society, whether through theoretical papers or designed artefacts, inherently proposes new values [20]. This means that to design new ways for people to interact with technologies, is to propose ways in which our world, shaped by such technologies in it, may become better [21]. It follows that a transformation is part of every interaction design research project, may it be addressed either explicitly or implicitly. In this paper, we will start to sketch an approach that we believe can aid the wider research community to better understand how such a transformation may be understood.

Our design and design research work, draws inspiration from the body and its acting in the world, as a key notion to achieve such transformation. We draw upon phenomenology and embodied cognition to support this work, by arguing that we make sense of the world in a way that is fundamentally physical and social [5, 12, 20]. Or, to be more specific: our understanding of the world emerges in dialogue with that world, as we act in it. The dynamic relationships between our brain, body and the social and physical environment around us, together shape how we make sense of the world [9]. These dynamic relationships are complex and ephemeral, yet from the perspective of transformation, they become important dimensions along which to understand the impact of a designed artefact.

Our focus, as design researchers tends to be on the designed artefact: the qualities it possesses and the experience these qualities elicit for people using the design. Such qualities have a transformational power, which means that, through the aesthetics that they express, they may elicit long-term transitions of the ways people using it, relate, use and think about the topic that the design addresses. Designs that embed such transformational qualities, will produce a change in the contexts and the practices that the designs deal with and will therefore have an ethical repercussion on

people's lives [10]. It is however difficult to understand the farther reaching and less direct societal transformations that a designed artefact has. Furthermore, design researchers rarely follow their work to reach a phase in which they are adopted by the public and the market. So how do we assess the transformation and transformative qualities? What other disciplines can support us in this endeavour?

This paper uses a design case, where embodied interaction is key, as a starting point for bridging two disciplines in an attempt to understand the transformation that was ignited by the design. The transformation will be discussed and analysed using resilience thinking, an established approach within sustainability science, as well as constructive design research. Resilience research is a field that focuses on the transformative capacities of social-ecological systems, and might provide a useful, different perspective for providing insights on the transformations elicited by artefacts created through constructive design research. By creating a common language between the two disciplines, we attempt to identify what kind of transformation took place, what factors played a role in the transformation, and which transformative qualities created these factors. Our intention is to set out how the notion of resilience might provide a new perspective to understand how constructive design research may achieve and produce results that have a sustainable social impact.

To set a context for the analysis, we first position our approach based on constructive design research. Second, we introduce the concept of resilience thinking in the context of transformations. Following this, we attempt to bridge the two different disciplines by sculpting a common language. Here, key factors for a transformation identified in resilience literature become a starting point for understanding the landscape of transformations in the context of design. With these key factors, we (1) identify the type of transformation that took place after the design project was implemented (2) describe the landscape that made the transformation happen (3) find the transformative qualities within the design case that allowed the landscape to form. Lastly, we conclude with more general reflections on the opportunities we see for resilience thinking and constructive design research to be mutually informative in terms of transformations.

DESIGN RESEARCH, EMBODIMENT AND TRANSFORMATION

Our approach is based on Constructive Design Research, a particular form of design research where the design and production of an artefact takes centre stage in the process of knowledge production [13]. The core of this design research approach is thus the artefact created by design. Koskinen et al. go on to present a topology of three different ways in which this artefact can be leveraged to generate knowledge: The *Lab*, the *Showroom* and the *Field* [13]. In this last context, the artefact is deployed in real-life settings and observed in use. We consider the design case presented further on in this paper to fall under the *Field* context, as its explicit aim was to be used by the public in the real world.

Furthermore, the constructive design research project presented in this paper builds on the notion of embodiment as a fundamental component. This stance is rooted in theories of ecological psychology [8], phenomenology [15], post-phenomenology [11], American pragmatism [2] and embodied cognition [1]. This background places the idea of Merleau-Ponty's *body-in-action* as a central part of how design can contribute to attribute specific qualities to the designed (personal) experiences [15]. The body-in-action approach opposes the Cartesian mind-body division, in which the mind is able to fully develop, without interference of the physicality of our existence. The body-in-action implies that we perceive the world with what we can do with it, how we can transform it, and by physically interacting with it, we access and express this meaning [14, 19]. We thus need our body, and the social, physical, cultural environment surrounding it, to give meaning to situations around us. It is relevant to bring this notion of embodiment forward, because it tells us something of the how a meaningful experience unfolds and we, as design researchers, can have an impact on people's behaviour. Embodiment asserts for example, after Klemmer [12], that learning and reasoning are dependent on physical action, and that being present in a space together, using our bodies to interact with artefacts, impacts how we collaborate, cooperate and interact with one another. The artefacts that are produced are therefore means for sense-making and, within the scope of our research practice, we focus on designing what might lead to long-term, short-term, individual or community change, where the change has a transformational nature. The change is considered to be transformational when "the ethics of a person, group or society has long-lastingly changed, and has been embodied in the way the person or people (inter)act, perceive, feel and think" [10].

RESILIENCE THINKING

Resilience thinking focuses on natural resource management, and considers human and natural systems as complex and continually changing. We adopt Walker and Salt's definition of resilience [22], i.e., the capacity of a system to absorb disturbances and still retain its basic function and structure. Resilience thus determines persistence, adaptability and transformability of social-ecological systems (SES). The resilience of SES is seen as a key to sustainability (see [22]). Resilient social-ecological systems are able to change while maintaining their functionality. However, social-ecological systems are also able to transform, causing this system to change its functionality. Transformability in SES means the capacity of a system to cross thresholds or tipping points into new development paths [7]. Further, Walker and Salt [22] define transformability as "the capacity to create a fundamentally new system (including new state variables, excluding one or more existing state variables, and usually operating at different scales) when ecological, economic, and/or social conditions make the existing system untenable". Usually, shifts in perceptions and meaning, values and beliefs, social networks configurations, patterns of interactions among actors as well as in associated organisational and

institutional arrangements are related to a fundamental transformational change [7, 17]. Further, resilience thinking acknowledges different scales as essentially intertwined: transformations at small scales can enable larger scale transformations [7].

ANALYSING TRANSFORMATIONS IN RESILIENCE THINKING

We draw our theoretical base in analysing transformations mainly from Olsson et al. [16]. Through analysing several case studies about transitions toward adaptive governance of natural resource, they identified common factors and phases for successful transformations. Due to its practical approach, the use of real time case studies, and the clear conceptualisation of possible causes of transformations, we chose to work with this analytical framework. Olsson et al., [16] divide a transformation into three phases: (1) preparing the system for transformation, (2) navigating the transition and (3) building resilience after the transformation. In the two former phases (1,2), they describe key factors that are necessary to create the possibility to shift and navigate a system through a transformation. We consider these factors forming a landscape for change. The key factors entail: (i) the emergence of networks, (ii) building knowledge (iii) the emergence of leadership.

Preparation and Navigation

Actions in the preparation phase (1) in relation to natural resource management can be divided into two main groups: “exploring new system configurations and alternative approaches for governance and developing strategies for sorting or annealing alternatives that create conditions for adaptive co-management” [16] Here, named key factors start to play role to push system into the next phase. Learning within social networks and knowledge building is crucial but leadership is needed to i.a. provide vision, connect individuals and trigger collective action (ibid).

The navigation phase (2) is unpredictable and cannot be planned. Therefore, navigation through the phase becomes crucial, and to succeed in this requires preparation. The phase is characterised by emergence of new social structures that link “individuals, organisations, agencies, and institutions at multiple organisational levels” [16]. Also, flexibility and the ability to improvise is important to be able to face the change and maintain system in transition. Here, leadership in addition to diversity in e.g. views, ideas and solutions and right timing play crucial roles (ibid).

Key Factors

The emergence of networks (i) facilitates the generation of new knowledge, sense-making, learning and building up social capital, which in turn can weaken the feedbacks of a negative trajectory [16]. This means that a system is more likely to transform because the current feedback system is weakening. Emergence of networks might happen formally or informally. The informal networks have usually willingness to experiment alternative solutions to existing problems as well as capacity to foster new ideas [16]. Building knowledge (ii) is often enabled by emergent networks that “facilitate information flows, identify

knowledge gaps and create nodes of expertise” which can support governance and management of ecosystems in new ways [16]. Furthermore, new knowledge is produced in the networks as they are more experimental, generating new solutions and fostering new ideas (ibid). The emergence of leadership (iii) refers to the role of individual agency in bringing about transformations for sustainability. Leadership facilitates key functions in transformations such as “trust-building, sense-making, managing conflict, linking key individuals and initiating partnerships among actor groups, compiling and generating knowledge, developing and communicating vision, mobilising broad support for change, and gaining and maintaining the momentum needed to navigate the transitions and institutionalise new approaches” [20]. Thus, it plays also a crucial role for the emergence and effectiveness of social networks.

Building Resilience

After the preparation (1) and navigation (2) phase, resilience needs to be built in the new system to stabilise and maintain the new (possibly) more desirable state. This is perceived as the third phase of the transformation. Without, the changes in the system do not necessarily have a long-lasting impact in the system [16]. In other words, as Westley et al. [23] describe, institutionalisation of the change is needed to maintain it. The new system needs to be established and positioned to existing formal and informal institutions such as mental models, management routines, and resource flows.

APPLYING RESILIENCE THINKING TO CONSTRUCTIVE DESIGN RESEARCH

We have outlined the perspective we take on Constructive Design Research, in particular in relation to the role of embodiment as a key notion. We have then introduced the notion of transformation and explained it in the context of resilience thinking. In the following section, we bridge the two perspectives, in in order to create a shared vocabulary.

First, we will use the different phases presented in the previous section: (1) preparation, (2) navigation and (3) building resilience. These three phases have strong commonalities with particular research within Constructive Design. Secondly, key factors, earlier identified in the previous section, are described in relation to constructive design research. These key factors will be used to identify transformative qualities that the design case possesses. In table 1, on the next page, an overview of the relation between the phases, key factors and the corresponding interpretation for both disciplines - design research and resilience thinking - is provided.

Design in relation to phases and key factors

Phases and Design

Preparation phase (1): The preparation phase defined within resilience thinking, finds a parallel in the design activities of a constructive design research approach. This is a stage in which the activities are of three kinds: one is about engaging with the context, experiencing and acquiring data; the second focuses on envisioning, ideating and realising and the third is concerned with analysis of the

Phases	(1) Preparation Phase	(2) Navigation Phase	(3) Building Resilience
Resilience Perspective	Exploring alternative approaches and developing strategies for changes	Characterised by unpredictability. Crucial: flexibility, new social structures, diversity of perspective, timing	Institutionalising the changes in formal and informal domains
Design Research Perspective	Design research & innovation activities	Collaboration and development activities	Phasing in or out
	Key Factors		
	<i>Emergence of Networks</i>	<i>Building Knowledge</i>	<i>Emergence of Leadership</i>
Resilience Perspective	Generation of new knowledge, sense-making, learning and building up social capital, experimenting alternative solutions	Enabled by emergent networks which facilitate information flows, identify knowledge gaps and create nodes of expertise	Supports effectiveness of social networks and knowledge generation and facilitates e.g. trust-building, developing and communicating vision, navigating the transitions and institutionalize new approaches
Design Perspective	Designed artefacts can engage people in actions, practices and discussions	Designed artefacts can engage people in discussions where knowledge is transferred and challenged	Designed artefacts inherently initiate and afford actions from actors that might lead to transformations of any kind.
	Transformative Qualities		

Table 1. Summary of key factors and phases of transformations in relation to resilience thinking and constructive design research. The transformative qualities will be identified throughout this paper and will be presented in Table 2.

data, their assessment. By means of these activities, carried out in an iterative way, opportunities are sought for change and with the aim of triggering the transformative capacity of a system.

Navigation phase (2): To translate this into the constructive design research perspective, the navigation phase overlaps with the activities of a design research process that concern collaboration and development. These activities involve reflection and personal growth within the process, include collaboration and communication and it contributes to educational purposes. It is thus a reflective moment allowing for possible steering and navigating the previously mentioned design activities.

Building resilience (3): Building resilience, thus making sure that the implemented design has long lasting power for transformation, corresponds to the moments of a design research process in which the project is set up at the beginning and phased out to those that will carry it further, defining the terms of involvement of designers after the implementation of the design. Within this stage, decisions

have to be made about who is responsible and who will continue with the designed systems, products and services to make it grow into society.

Transformation is hardly linear but an iterative process where different phases can be repeated and reformed in the way towards a fundamental transformation.

Key Factors and Design

Emerging and Mobilising social networks (i): Artefacts can engage people in actions, practices and discussions; this can elicit actions where social networks may be created and mobilised. New ideas can be generated, as well as alternative proposals to tackle current challenges; new partnerships can be formed and informal actions take place. Designed artefacts can, through embodiment, ignite the creation of social networks, or mobilise the already existing structures and networks.

Building knowledge (ii): Designed artefacts can engage people in discussions where knowledge is transferred and challenged. Design can also facilitate the production of new knowledge by bridging values, interests and opinions from

different groups. Artefacts, through embodiment, can facilitate opportunities for people to take new perspectives, creating the potential for new insights and evolving the way people normally understand and relate with the contexts in which the design intervention has taken place.

Emergence of leadership (iii): Through embodiment, designed artefacts inherently initiate and afford actions from actors that might lead to transformations of any kind. This might be able to bring different actors together in order to create a momentum in which change happens. This can literally be interpreted as something that ‘leads’ a transformation from point A to B. However, it might be more interesting to look at the role design researchers have when designing for transformations. The design researcher is operating from a vision, and plays a crucial role in mobilising actors and stakeholders around the created artefact.

Within the following section, the themes and phases will be used to analyse a possible transformation initiated by a design case, *Charged Utopia*. Furthermore, the transformative qualities will be identified and explored in terms of how they are specifically evident in the case.

DESIGN CASE: CHARGED UTOPIA EXHIBITION

Background and Approach

The design case is related to Norrbyö, a small group of islands in Northern Sweden, known for their rich history. In the year 1895, the islands were bought by a timber magnate, Frans Kempe. He created a community around the large saw-mill that was situated there, once the largest of its kind in Europe. This community was a materialisation of his vision of a just society, modelled on his utopian ideals. Frans Kempe provided the workers that had been selected to work for him with modern homes, gardens, schools and healthcare. However, there was a price to pay. For example, workers were required to abstain from alcohol, live a God-fearing life, and were forbidden to form unions. The good for the community was set above individual wishes or needs. Today, the islands are used as recreation areas and as a place for summer houses. The history is still visible around the island, and is presented in the museum on site.

The *Charged Utopia* exhibition was designed and produced as a physical interactive exhibition situated on the islands themselves. The aim of this exhibition was to engage people with the rich history of the islands, while at the same time using this past as a lens for the present. Visitors to the exhibition were triggered to look at the history of the island and reflect on both parallels and differences with other, perhaps more contemporary societal challenges, in particular the ongoing migration crisis in Europe.

This design case pivots on the notion of embodiment as key element for eliciting active (cognitive) engagement of the public. Interactions with designed artefact are the centre of the experience. From these interactions, meaning is created for each individual visitor, aimed at triggering personal

reflections on social coexistence, its paradoxes and challenges [18].

The Exhibition

The exhibition, *Charged Utopia*, was a one-time event in August 2016 on the islands of Norrbyö. The exhibition was set up as a journey, a metaphor for an imagined migration towards a utopia, and dealt with the risks and costs of searching for an utopian ideal (for further background on the *Charged Utopia*, please refer to [18], or [24] for a brief video registration of the exhibition).

The journey consisted out of different parts: the ferry to the island, receiving a passport, exploring the island through an experiential path and answering questions, handing in a part of one’s passport, the exhibition in the museum space and a conclusive discussion. The trip on the ferry towards the islands already prepared the visitors of what they could expect. Poems hanging on the ferry indicated and suggested the notion of identity and the migration towards an unknown land.

Once on the islands, visitors were handed a passport, made from wood and with this passport they continued to the experiential path. The experiential path guided the visitors to and through the woods of the island. Throughout the path, visitors were confronted with 7 different, large, wooden interactive installations. Visitors were required to physically engage with the stations and co-operate within their group to reveal questions that represented issues concerned with choices to be made when shaping one’s personal utopia. The questions were ambiguous and open-ended, opening possibilities for discussion and reflection. The path ended in the museum space (the former machinery room of the saw-mill), where interactive installations, this time involving audio and video projections, communicated different stories and perspectives, slowly composing the history of the island. However, before entering the exhibition, visitors were obliged to give away half of their passport. The passports had been used to visualise the answers given at each interactive installation in the woods, each colour indicating a different answer. The visitors were thus required to choose which side they gave away. After visiting the exhibition in the machinery room, the experience was concluded by a debate. The debate was organised to project the event itself within a wider frame of reference: first of all, content wise, i.e., how did participants experience this exhibition and what parallels were found in today’s situations? Furthermore, the discussion also revolved around the role of design in exposing and discussing such situations.

In the following analysis, we will address the three topics introduced in the introduction. We will try to: (1) identify the type of transformation that took place after the design project was implemented, (2) describe the landscape that made the transformation happen and (3) find the transformative qualities within the design case that allowed the landscape to form, using the formulated relationship

between resilience thinking and constructive design research.



Figure 1: Museum Space, Machinery Room

ANALYSIS OF THE DESIGN CASE *CHARGED UTOPIA*

Type of Transformation

The exhibition had impact on two different levels. There was a noticeable short term impact that was observed through the behaviour of the visitors. There were vibrant discussions, the tone of the debate was strong, opinions and personal experiences were shared. Next to this, the experience also triggered doubts and reflections. People were wandering around, silent and thoughtful, carried away by the issues raised by the installations.

The long-term impact are concerned with stakeholders, who, because of *Charged Utopia*, have developed or are now developing several larger projects concerning the islands (Please also see [18]):

- The formation of a consortium between partners in the *Charged Utopia* project, and several partners based in a neighbouring municipality. The aim of this consortium is to develop a project for a two-year design research project with the intention of deploying permanent interactive interventions that support the communication of cultural heritage.
- The formation of a partnership between the museum on the island and the Umeå School of Architecture: an obligatory component of the second-year curriculum is now centred around the island and its social and cultural layers in order to propose ideas for new architectural landscapes to revitalise the place, while dealing responsibly with its industrial heritage.
- Residents of the island, some of whom have lived there in independent communes started during the 60's, have become revitalised in their concern for the island. They have reached out actively to the partners of this project, in order to tell their stories. Moreover, some have become involved in the ongoing development of design and architecture projects on the island, as well as proposing new ones on their own.

In addition, the board of the Museum has seen, through the exhibition *Charged Utopia*, the potential valorisation process that the island and the Museum can be subjects of. Where before the board of the Museum was almost forced to close the museum, due to a financially challenging situation, the exhibition *Charged Utopia* showed the latent potential of the Museum, leading to the decision of keeping the Museum operative.

Charged Utopia was a one-time event. However, the exhibition facilitated and founded a way to bring parties together that are all continuously affecting the island. The compulsory course for second year students within an Architecture School, dealing with the landscape on the islands, is a stable factor that was a direct result of the exhibition. As are the formation of a consortium for a separate design research project, and the revitalised and continuous active engagement of citizens on the island within a series of different, smaller initiatives. Due to the social networks and relations that were established during the exhibition, the one-time event opened up possibilities for more projects on and around the island. Other design opportunities emerged and were realised: a mobile app navigating visitors through the island using GPS locations to discover stories and poems about the island was developed. Just as a Virtual Reality (VR) experience, in which the history of the island could be explored and could connect the present and a possible future with stories from the past.

The long-term effect of the *Charged Utopia* exhibition is thus visible through all these different new projects. Municipalities see more possibilities in developing the islands, and a growing interest in the island's cultural heritage can be observed, insuring the continuity of the museum after the exhibition. Considering these short term, individual, transformations and the long term, systemic transformation, we can say that a transformation happened.

To answer the question what was transformed and what type of transformation this design case ignited, we can draw from the examples of the effects of *Charged Utopia* above. Firstly, shifts in individual perceptions took place through participation indicating a small-scale transformation on individual level, and on a small community level on the islands itself, towards a revitalised connection with the island and its history. Secondly, the impact of exhibition reached out from just being a one-time event to new institutional collaborations, which indicates a meso-level transitions in the use of the island as well as how it is valued by the larger public. It is important to recognise the relation between this small-scale transformation and the meso-level transformation, since these two can reinforce each other in the long term. The following sections will formulate how these transformations were set in place.

Landscape Allowing the Transformation

The small and meso-scale transformation that took place after the exhibition happened due to a specific landscape that was created, allowing for transformations to happen.

Following, we conceptualise this through the key factors and phases, as described in the section *Applying Resilience Thinking to Constructive Design Research* and in table 1.

The first factor, *Emerging Networks (1)*, stresses the importance of shifts of perspectives, the creation of new social networks and the connection of institutions where new experiments can lead to alternative solutions and new ideas. Looking at the long-term effects of the exhibition, we see a strong connection here: connecting an Architecture School with the museum, the formed consortium between a neighbouring municipality and partners in *Charged Utopia*, and the connection to the residents of the island formed informal and formal networks that actively engaged and are still engaging in the revitalisation of the island. The exhibition formed a physical, shared space in which these partners engaged with one another.

The second factor, *Building knowledge (2)*, articulates the importance of the above described networks in order to “facilitate information flows, identify knowledge gaps and create nodes of expertise” [16], but also the creation of new knowledge, since the described networks are often open for more experimental things to foster new ideas [16]. Within the exhibition, where different people were brought together through the installations and the debate, different perspectives were shared. However, it is important to recognise the artefact within this section as well. Not only the emerged networks were the drivers of this knowledge transfer and production. The exhibition, the artefact, created a platform in which the newly formed networks could communicate, discuss and propose new ideas. The interaction with the artefact, together with the formed networks were the drivers of knowledge transfer and production.

The third factor, *Leadership (3)*, is in this case, strongly connected to the previous theme where we stress the importance of the artefact for the creation of networks and the facilitation of knowledge transfer and knowledge production. The resilience perspective is describing leadership as a form of mediation, able to navigate, steer, compile and manage conflict through a transformation when necessary. Within *Charged Utopia*, the choices of the designers lead the process of a possible transformation. The designed artefacts led the visitors into a direction in which they could explore, reflect and connect with each other and with the content of the exhibition. The artefacts provided the platform for a *possible* change, but was not used to push the visitors in one direction. The artefact was created in such a way that interpretation was key, so that personal experiences and subjectivity became important in discussions and reflections. Leadership in terms of this project thus facilitates, but does not necessarily steer into a specific direction and outcome.

As the relation between the key factors and the phases (see table 1) suggests, the key factors are central in inciting the first and second phase of a transformation. Hence, we can

conclude that a transformation was at least starting to take place relating to the phases 1 and 2 (preparation and navigation). The system was prepared to change through alternative visions for the island and experimental ways to implement these: before the exhibition took place, connections between different institutions were created and different views on the future of island were brought into the table.

The exhibition itself and further connections triggered by the design case, can be considered as a part of the navigation phase. However, here it is important to acknowledge the possibly overlapping and iterative nature of these phases and challenges of making a clear division between them in relation to the design case.

When it comes to the third phase of a transformation, described in design terms as the *phasing in or out* of the design process, the design provided a moment in which participants of the exhibition were able to share thought, make new relations and establish their own view about the content. This last part of the exhibition was intended to create an opportunity for others to ‘take over’ and for the designers to take a step back. A result of this is the continuing relation between the museum on the island and the local architecture school, as well as the growing interest of municipalities in the islands, which can be seen to build resilience for gained changes on the island in the future.

Transformative Qualities within Design; Forming the Transformative Landscape

By taking a close look at the design case, we identify transformative qualities enabling the emergence of the key factors. In the table 2, these qualities are presented and linked to specific parts of the exhibition (see section *The Exhibition*). The presented transformative qualities within the design case are: *storytelling, tangibility, ownership, physical interaction, teamwork, use of local elements and materials, allowing for making choice, open approach and ambiguity*. The way these are implement in the design case, have a strong embodied nature. This points into the direction that embodiment is an important aspect when defining the transformational power of this specific design case.

DISCUSSION

The above analysis describes the effects of a design case, created through a constructive design research approach, using perspectives on transformation from resilience thinking and constructive design research. What design researchers often imply with their design is the intention of eliciting a change: a transformation on a short-term or long-term base. This was also the case with *Charged Utopia*.

Within this paper, we have addressed the fact that there is a difference in approach in constructive design research and resilience thinking when identifying transformations. Nevertheless, within the analysis of *Charged Utopia*, it becomes very evident that the key factors from the resilience perspective played a role in the transformational aspects of the studied design case. This might indicate the

value of bridging those two disciplines in order to understand transformations and explore how the two modes of inquiry can empower and influence each other. We suggest that resilience thinking might be able to provide a wider frame of reference for addressing and identifying transformative qualities in other design cases. In this particular case, we found that transformative qualities included a strong notion of embodiment, which might be a valuable insight for future research on transformations. We do not imply that the identified transformative qualities within this paper are the only key to design for transformations. However, we do believe that these transformative qualities are valuable for designing for transformations, and see an opportunity for further research.

CONCLUSION

Within this paper, we have looked at the transformative powers of the design case, the exhibition *Charged Utopia*. Our intention was to set out how the notion of resilience might provide a new understanding of how constructive design research may achieve and produce results that have a sustainable social impact. We bridged the disciplines to create a common language on transformation with a focus on key factors and phases in the process. In other words, we have connected the two vocabularies and played with the respective notions. By this, we were able to do the following: (1) identify the type of transformation that took place after the design project was implemented (2) describe of the landscape that made the transformation happen (3) find the transformative qualities within the design case that allowed the landscape to form. Our analysis suggests that transformative changes took place at individual, local and meso levels. These include shifts in individual perceptions, how the island is used as well as its relation to larger institutional domain. The landscape of the transformation that was set in place was formed by the emergence of the necessary key factors (emerging networks, building knowledge and leadership) identified within the resilience perspective. Furthermore, we gained insights on the phases of transformation through which the process took place, understanding that transformation was prepared and navigated throughout the design process. The last phase (building resilience) was also identified in the design case: the design created an opportunity for others to ‘take over’ and where the transformation could thus grow into a stabilised state. Next, we identified the following transformative qualities: *storytelling, tangibility, ownership, physical interaction, teamwork, use of local elements and materials, allowing for making choice, open approach and ambiguity*. The way these were implemented in the design case, suggested a strong embodied nature. This points into the direction that embodiment is an important aspect when defining the transformational power of this specific design case.

By adopting this novel approach to study a transformation through a design case from perspectives of two disciplines, we suggest that resilience thinking might be able to provide a wider frame of reference for addressing and identifying transformative qualities in other design cases. Thus, we see

Exhibition Stage	Elements & Actions	Transformative Qualities
Ferry	<ul style="list-style-type: none"> - Poems - Audio - Evoking the experience of immigrating 	<ul style="list-style-type: none"> - Strong storytelling approach - Immersiveness - Identifying oneself
Passport (1)	<ul style="list-style-type: none"> - Ownership of tangible passport, used for answering questions 	<ul style="list-style-type: none"> - Tangibility - Ownership
Experiential path	<ul style="list-style-type: none"> - Interactive installation - Ambiguous questions - Voyage and travel through island 	<ul style="list-style-type: none"> - Tangible & Physical Interaction - Ambiguity - Teamwork - Use of local elements/ materials
Passport (2)	<ul style="list-style-type: none"> - Choose what part of the passport to be exhibited, making room for choice for participants 	<ul style="list-style-type: none"> - Tangibility - Ownership - Allowing/forcing into making choices
Museum Space	<ul style="list-style-type: none"> - Video & audio about history & stories of the island with an ambiguous way of storytelling - Interactivity with local materials to make own choices about exhibition 	<ul style="list-style-type: none"> - Poetic Storytelling
Debate	<ul style="list-style-type: none"> - Relate to current societal situation - Exchange of perspectives & allow for reflections 	<ul style="list-style-type: none"> - Experiential starting point - Open approach - Space for input - No right or wrong

Table 2. Transformative Qualities of the Design Case

a strong value in bridging the disciplines of constructive design research and resilience thinking. Therefore, we hope to have provided an opening for a dialogue in which both vocabularies can help in the realisation of a transformations tackling current and future societal challenges.

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