Prototyping as a resource to investigate future states of the system

Working Paper

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Introduction

Even though design as a human action could be defined as one of the oldest natural practices (Muratovski, 2015), we can argue that what really defines it is not the ability to transform the tangible reality, but, as established by Simon (1996), our capacity to envision an improved version of our reality in the future and plan what would be necessary to achieve it. This notion of an achievable preferred future state of the system might be one of the main advances in design theory, because it centers the notion of design around the idea of a not-yet-existing reality that is possible to be produced.

While still subsists a widely-disseminated idea that design disciplines should be defined and differentiated based on the technical means of production that they rely on to solve the problems they faced (graphic, industrial, fashion) (Buchanan, 2001), we could also recognize that in recent years, common design practices have also recognized the value of design of being ‘solution oriented’. We could argue that one of the main benefits of this proposition is that it focuses on the existence of a diffuse problematic node that is produced by a tension or displacement between what exists and what we really need or want (Ryan, 2014), and the existence of a possible, but not-yet-existing reality that resolves that problem (Bødker, 1998). Being able to recognize the importance of the design process have led to produce complex models, like the ones presented by the Design Thinking\(^1\) community and to advance into more complex scenarios.

\[^1\] Design thinking research community have open the spectrum for design to recognize its own definition and for other disciplines to recognize the possible impact of design in society.
Nevertheless, despite the significant advances of design oriented disciplines and the methods used in the design process, most design models still understand the actualization\(^2\) of tangible solutions into the real world to address current problems as their main goal. This shortened view of the role of design somehow disregards the main ideas presented by Simon (1969) and Banathy (1996), that those models should not be centered on the constructed reality but on the future transformations of the system that they could produce.

The main purpose of this paper is to support the previous ideas presented by the de la Rosa (2016, 2017) regarding the understanding at the ways that design can create new knowledge and what would that type of knowledge be. This paper is intended as both, a conceptual addition to complement the model presented before, introducing to the discussion system related notions like resolution, scale, complexity and uncertainty, and the use of practical cases of design research as case studies to explain and support the ideas presented; all with the expectation that those could help determine the issues presented by current design models and the possibility to use some experimental techniques based on prototyping to reconcile the view of a preferred future in the design process. We seek to provide a more systemic view of the model and a better understanding of how the model can be used on real case scenarios; from initial cases of innovation on the industry to ill-defined social problems that we haven’t been able to solve as a society.

**Literature review**

Design has always been a progressive discipline, looking at the borders of what could be, challenging previous conceptions or ideas and looking for new ways to understand its own role. This might be in part because of his specific process of thinking, that is based on the iterative search for uncertainty as a way to reframe the initial ideas of what the problem might be. In this process of self-redefinition, there are several main concepts that have arisen from design theory during that last century, that have really changed our notion of what design is or could be. Modern theories of design have led design from the idea of a craft oriented discipline that focuses on the talent of the professionals to produce aesthetical formal definitions of commonly used objects, to an inquisitive discipline that is reaching to touch and transform complex areas of human’s life and society. Those concepts have also helped us redefine conceptually our role (as designers) inside the society and the possible challenges that design could face.

With these new ideas of what design is or could be, comes the necessity to search for new ways to represent and understand the role of design, models that can provide us with better tools to assess and resolve the complex problems that could be part of designers’ future professional description. Therefore, it is important to determine what are the elements of design that have produced a significant transformation in our perception of its role and the implications that applying those concepts on a more profound way on the current design models can produce.

The first important concept to determine about design, is related to its systemic nature (Sevaldson, 2017). Every design process recognizes the existence of interconnected hidden factors outside (or inside) the main problem, and sees them as part of the problematic node where the solution should be proposed. From the technical requirements of production, to the nature of the artifact that is intended to resolve the problem, or the complex interactions or affordances that could arise from

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\(^2\) Actualization as defined by Pier Levy (), as tangible coming to reality of something otherwise living in the real of potentiality.
the process or the result, design always seeks to understand outside the pre-established or given problem and recognize it as part of a complex dynamic system.

The type of knowledge that designers seek is not just based on a conceptual understanding of the problem, therefore, any initial given description of the problem would be a reduction of reality. Like in the Analysis & Synthesis model of Alexander (1964), the first part of the design process is an analytical approach to understand the problem beyond the possible initial inquiry of a client or user. Designers look for a holistic knowledge derived from the complexity of interactions of actors around the problem (Latour, 1990) and how the tensions produced by those actors and the displaced nature of every designed solution (Simondon, 1958; Latour,1990; Ackrich, 1992) can produce a favorable space for innovation (Ryan, 2014; de la Rosa, 2016). And even though on most cases of design practice those patterns are only observed superficially in order to produce tangible bases to support and validate claims of a future success of the design process, design ability to observe the past and present structures of the system and how the interactions between actor or elements inside these systems produce specific tensions or gaps that can be populated by not-yet-existing solutions, allows design to successfully approach to ill problems (Rittel & Webber, 1973) and find possible solutions on a ‘creative’ way (Verganti, 2009).

This notion of a more systemic and organic type of knowledge that is produced in the actions and interactions of the elements of a system between themselves is similar to what Maturana and Varela (1987) defined as ‘autopoietic’, a type of knowledge that we gain by our actual experience of the system itself (Polanyi, 1967; Merlau-Ponty & Smith, 1996). Therefore, no action or process of design should be considered outside a systemic perspective, and the simplification of the model of the system should only happen in order to reduce uncertainty and produce a resolution to the process.

But we should consider that the idea of a systemic view of design does not just work backwards, as a tool to understand the context for design, it also should extend into the future. We have widely accepted the principle proposed by Simon (1969), that design is about the planning process to achieve a preferable future, and the ability to recognize pre-existing patterns on the system and synthesize them to produce a view of a possible future state of the system is, as Cross (1982) points out, one of the main characteristics of the design process and the design knowledge. Paradoxically, many professional designers and practitioners still see in this notion of futuristic view of design an explanation for how design faces the ideation of a not-yet-existing object or interaction, and delivers a solution on a tangible way. But other views of the design process see the result not on the object produced but on the system to be transformed. As Banathy (1996) points out, the first part of every process of design requires the ability to imagine a preferred future system, and then, design practice seeks for the tangible elements that can promote, lead or facilitate the development of that future system.

This systemic view of the future modifies the traditional view of the ‘designed object’ as the final goal and action of design, to a search for a systemic transformation as a goal and the objects as steps produce to facilitate that transformation, centering design on the future wanted and unwanted repercussions of a planned design plan. Or as in the famous ‘Knowledge Navigator’3 presented by Apple in 1987, where their view of the future is presented, and later used to determine a series of objects, platforms and systems produced by the company to make that view of the system viable.

3 Reference to the video presented by apple: https://www.youtube.com/watch?v=JIE8xk6RI1w
We can argue that they do not succeed on predicting the future, but on how the future system would eventually accept and embrace the vision they presented.

The notion of transforming systems based on interactions lead us to a final concept: complexity, the idea that real systems are by nature complex structures that are constantly redefining themselves based on the interactions between their elements. The notion of complexity is, in first instance, what makes design problems ill defined, since if design’s definition of a problem is not based on the complexity of the system where it is contained, then, most design problems could be defined as merely instrumental. We could argue that even though new design practices seem to be working better with complexity at a systemic level, traditional design practices, like graphic or industrial, have historically center many of their efforts on the understanding of the complexity of the objects as they are being produced, from production to the way in which those characteristics represent the user requirements and produce new affordances or interactions.

But complexity presents a significant problem that is not always address (Edmonds, 1999); complexity is and is not inherent to the system, meaning that, every real system is complex by nature on its constitution but it is not complex by definition. Every real system is constituted by infinite amount of elements and interactions, therefore its complexity is also infinite. Complexity on the definition level depends on the observer and on the modeling process of the system (Edmonds, 1999; Funes & Pollack, 2001). As the system is mapped and modeled, complexities arise based on the resolution applied to the model. Therefore, a design problem that do not appear to be complex is always related to the low resolution or small scope of the model of the system. This process of modeling is vital in design, since it help us deal with the uncertainty of a complex system and its possible future transformations (Banathy, 1996).

**Complexity and uncertainty in design**

Based on the notion of complexity and the different ways in which design is practiced, we could argue that there might be different types of complexity on the design field, based on the fact that common design practices, especially on fields like graphic or industrial design, would look at complexity as a self-contained system that is constituted by the formal characteristics of the solution produced. We could define this type as *intrinsic complexity*, as is located on the actual tangible definition of the object. And even though those characteristics are connected to an external system of users and stakeholders, the study of it, is based on the element contained in that object.

Some design schools still use the model proposed by Vitruvius (Polio, 1914) to determine the system surrounding the object, so factors are contained in three major categories: functional, cultural or aesthetic and technical. And based on those three areas the physical characteristics of the object are determined. Those formal characteristics that define the intrinsic complexity of an object are usually based on tacit knowledge of the designers, experience in the field and intuition based on personal experiences, and they might constitute a significant part of what designers struggle to explain or teach in formal education. But when that object is conceived as mediator, an interconnected element of a larger system, then complexity cannot be defined merely inside the object. We could define this type as *extrinsic complexity*, or one that is determined by the external connections and interactions of the object with the macro system.

Both types of complexity extend as much as we want to see, so a designer could investigate for decades the intrinsic complexity of a letter or a chair, and all the elements that define them, as well
as the impact of that technology on the ecosystem in which we live. In other terms, the limits of both intrinsic and extrinsic complexity are determined by two factors: the size of the sample taken out of the macro-system and the amount of definition that we determine when we model the system in order to analyze it. These notions on system modeling are called scope and resolution, and as in digital imaging, the bigger the scope or the higher the resolution we set for our model the more we get to see the details of the system. This idea will be analyzed in more detail later in this paper.

With the idea of design problems being situated inside complex dynamic systems and the fact that we are trying to understand the way to achieve a preferred future state of that system, designers have to face the role of uncertainty as part of their work (Allen, 2014). To be more specific, the work of a designer is situated between the uncertainty of the definition of the problem, the uncertainty of the not-yet-existing solution and the uncertainty of the future system (de la Rosa, 2017).

This final level of uncertainty might be the most important and yet the less analyzed by designers, since it includes the repercussions of the objects we introduce into the system. Consequently, while designers might be measuring the success of their process on level of production or acceptance of users, the actual implications of the decisions we make are still ignored by the design process. We can argue that the farther we try to look at the future (or at the past), the more diffuse if becomes and the more the level of uncertainty rises. Simon (1969) describes this phenomena with the metaphor of a lantern, as the light leaves the lantern it disperses through space, creating a cone effect; an as with a lantern the farther we move from the present the harder it gets to clearly see what is ahead or behind. Voros (2003) complements this idea on his conic model of the future, including not only our ability to understand the future but also a probabilistic definition of what those futures could be, from plausible, to possible, to potential, and with the inclusion of a preferred future that design seeks to achieve.

We can certainly connect this idea with the largely described notion of the ‘cone of uncertainty’ (Bauman, 1958; McConell, 2006), where the level of uncertainty to define, predict or understand a system increases as we move our view farther in time, and as with concept meteorological systems, the prediction of the weather becomes more solid as the moment of prediction becomes closer. But one of the issues with probabilistic models is that they might cause a sense of predictability or determinism of the system, and the role of designer as ‘anticipation’ or ‘foresight’ instead of the active transformation of that system.

**Conceptual models of design**

Producing a model that is capable to include a systemic view of the preferred future, that recognizes the complexity of that system and of the knowledge that is produced on a relational way inside that system, but also the uncertainty of the future and the responsibility of design to go beyond the prediction of the future and into an active role of transformation of it, might be of great significance for design research and for the practice of the future. Therefore, the intention of this paper to present a space of discussion about a possible redefinition of the design process model that focuses on the preferred state of the future system rather than on the solution of problems.

We can argue that the physical representations of the historic design models include a political or philosophical intention and a specific set of values; that is the reason why it is important to review them on the light of what the might be implying for design epistemology. For example, engineering models for design were problem based, therefore, their vision of uncertainty is located on the
unexpected factors of the system that they must overcome to be able to implement the optimal solution; for this model, the process is a constant fight with the system to impose a unilateral view of the future.

One of the many contributions of the model proposed by Alexander (1964), was the redefinition of uncertainty as we approach to the problem. For him, it is not possible to define the problem or the solution from the beginning, and the observation of the systemic factors shapes the requirements for the design project. His design-engineering model was the first one to use the principles of thinking of design to move from a problem oriented model to a solution oriented model. And yet, this model still focuses on the production of an optimal solution to an undefined problem. This idea has prevailed over the years and even contemporary practices like the ones implemented by IDEO’s ‘Design Thinking’ still look to produce a solution to the current problems without considering the future implications of its possible implementation.

A significant advance on the design model was presented by system theorist Bela H. Banathy, when he included an inflection point into the model, one that defined the double diamond structure. For Banathy (1996), the initial stage of the process of design was not intended to produce knowledge about the requirements or the specifications of the project, but instead as an initial process of research and reflection with the intention to produce an image of the future system. This idea presents a significant modification of the previous models, because it does not focus the design process on the production of a solution but on the definition of an image (that we can all agree with) of the preferred future system.

Nevertheless, despite the effort of Banathy to produce a model that centers its efforts on the complex transformation of the system, the use of this model has been reduced again to a solution oriented model, and commercialized as a tool to produce localized innovation, instead of one that seeks to recognize the possible transformation of the entire system and the positive and negative repercussions of design in society.

This reflection can lead us to the question, how can we contribute to redefine the model of Banathy, to make it more actionable for a process of design research that focusses on the future structure of the system and the path to achieve that preferred state? For the authors, that requires a mechanism to collect data from that possible future, with the intention of increasing the resolution of that image of the future, and find the correct ways to facilitate it. We see an option for that in the model presented by de la Rosa (2016, 2017), where he establishes the use of prototypes to collect embodied knowledge of the future system. In this model, prototypes are deployed as probing mechanism based on the predetermined structure of the preferred future. Each prototyping iteration produces a low-resolution image of that preferred future and a better understanding of it. In order to improve this model we have perform the analysis of two case studies of future systems to later introduce some new notions to the proposed model.

**Case Studies**

One of the main issues for design research, when approaching to the development of new models, is the lack of evidence behind many of the ideas presented by designers. In most cases design models are coming from the analysis of the current practices and the abstraction of the actions and elements involved on those processes. That is the case of most of the models produced by Design Thinking,
that are based on the observation of design practices, and therefore focusing their process on understanding what is already happening, rather than search for new ways to define it and applied. As many progressive practices, Design Thinking led the way to significant transformations of the role of design, but the methods and models proposed by it are based on mechanistic views of the discipline, where complexity is reduced to discrete procedures.

The other approach is based on conceptual advances, where production of models is based on a theoretical decomposition of the process, actions and nature of design. These actions are probably less recognized by practitioners and the common public, since they are hardly ‘marketable’ as a product, but are certainly more impactful on moving the discipline forward. That is the case of the work of Banathy (1996) on producing theoretical models of the process of design, that have not been as mentioned or recognized by practitioners as the market ready versions produced based on his work, like the ‘Double Diamond Model’ from the Design Council. The main value of these advances is their main issue as well, since the conceptual space that allows the advance of ideas also creates a disconnection with current practices.

The model described in this paper was born on a conceptual space, and even though it is based on the experience and observation of design process, some of the ideas might seemed distanced from real practices. Therefore, the intention of the authors to find design research cases that can be analyzed and presented both as an example of the concepts developed through the paper, and as evidence of the possible of significance of the model and of the conceptual areas of research that this paper seeks to address. The search for case studies was based on uncommon design research projects that were seeking to understand blurred views of the future on a systemic level, and that were trying to use more experimental approaches.

Two cases were selected from the design lab of Allianz SE in Munich, Kaiser X, based on their intention to start mapping future spaces and needs in the insurance business for future innovations. These cases were selected based on 4 criteria: Their intention to investigate the future structure of the system; the systemic view implemented by the design team; the use of prototypes as boundary objects as a research tool and their intention to share their process, factor that in a corporate world of fast innovation becomes a hard property to find.

Using prototypes as probing devices
Argumentative prototypes (Galey, A. & Ruecker, S., 2010) and boundary objects have became a significant tool for designers to produce conversations on initial stages of the process of design and unveil otherwise hidden segments of the system. But most of the prototyping processes on common practices and techniques are based on the process of validation, and might present important obstacles to be applied when trying to map complex future systems. This initial observation of the theoretical model was later supported by the analysis of the two case studies of design research selected for this paper, where the design team reported the following insights:

Without providing any stimuli, participants’ ideas often contradict their needs.

- Often, ideas from participants are rather “futuristic” but contradict real needs and concerns for the future: They are citing what they heard somewhere else (e.g. voice activation is the future vs. the trend goes towards working in an open-plan office.), but the requirements and repercussions of this ideas were never considered.
Participants struggle with imagining what could be in the future without having one part of the future made tangible.

A prototype or a tangible object provides the anchor point for the participant, helping them to think on the “right” level.

Prototypes are often intended to validate appeal, but they should help to make a concept relevant in the future.

Acceptance tests help to understand if the idea at hand is good or bad. We’d be able to make a decision if a team should move forward with something or not. Additionally, we’d learn about how a team should improve the idea by fixing its issues.

As helpful as this method is, it’s missing one crucial point: Introducing a new product will necessarily change its surroundings – you simply can’t plug the new product into the “old” context.

Even though a participant “likes” an idea, that doesn’t mean they’re going to use it. This gap needs to be investigated and the authors suggest that the reasons may lie in how the idea will affect its surroundings.

Here, the questions asked are crucial. Traditionally, the prototype is is presented as optional and most of the interview questions are directly about it. The participant is asked “do you like it or not? what do you like? what don’t you like?”

Instead, designers should focus on the context, meaning the prototype is presented as given, and investigate how the things around it would change.

Questions like “will you need to change your behavior? how will others think about you when using this?” will bring an understanding how a future product might change our users’ circumstances and how they would react to them.

This, in turn, will help us shape the concept in order for it to only ask for acceptable changes from the participant, closing the gap between “liking” and “using”.

High-fidelity prototype suggest that the design is already finished, but a prototype should invite users to bring in their own ideas.

It’s already accepted in the design community that using high-fidelity prototypes to early means giving no opportunity to participants to bring in their own ideas (Pernice 2016).

The way the prototype is designed and, for example, what is shown in pictures on the interface – which might be meant to illustrate just one case exemplarily – will influence the participants too much in that direction that they had a hard time imagining additional use cases.

But exactly this could help to understand which “territories” the new service could cover – does it only work for property or can it also include health services?
Case 1 “OPEN storyboard prototypes”
In the summer of 2016, the research and strategy team at Kaiser X Labs was commissioned by Allianz DE to investigate the innovation spaces for car insurance in the future. The ideas developed after qualitative interviewing were initially intended to be validated using basic design and ethnographic techniques. As some ideas challenged the way a traditional insurance works, the design team decided to implement a more experimental approach to testing resulting in data that allowed to map and understand a future space. (See Annex 1)

Description of the test
For the test, a small number of participants (6) were invited to Kaiser X Labs for a 1 hour conversation. Before showing anything, the team spent 15 minutes getting to know the participant and their context. The team learned about their current cars, who’s driving it, how often and, of course, their insurance.

The participants were presented the front pages with the value propositions. They shared what they’d expect behind each of them and picked 4 out of the 6 concepts that most peaked their interest. One after the other, they turned around the cards to read the descriptions while “thinking out loud” so the team could follow their train of thought. Then, the participants were asked to explain the concept in their words to us. After that, the team asked in which situations they could imagine using this product or service, and if they couldn’t, if they know somebody who would use it. Also, the team asked about how this concept would change the way you use their car.

After having talked through all 4 concepts, participants were asked to rank them based on the likelihood of, if those offerings were available, buying. They were given three medals – bronze, silver, and gold – and asked to walk the team through their decision-making.

Initial results
Rather than just listing what’s good and bad about each prototype, the data was analyzed from three different perspectives: First, the team looked at why this concept might be relevant for the participants. Here, learnings were if the offering fits a niche that is currently not served, additional use case, and if it might inspire a new user behavior: One concept potentially could incentivize participants to take public transport more often, another to keep their old car that they’d planned to get rid of, or one was seen as an insurance for additional users of the car.

Second, the team looked things that need to be given, things without the solution won’t work. Sometimes, this is merely a matter of designing the solution carefully but in some cases, to make an idea work for the user would require that the company might need to change their business model, core competencies, or established processes drastically.

Third, the team sought to understand issues that come from introducing the new concept. These often are inherent tensions of the product, such as offering customized based on user behavior needs to be balanced with data security issues when tracking user behavior. Another type of issue that might arise are shifts that might happen in the entire market. A new solution might contradict existing offerings of one’s own company, or might be much easier or credibly be realized by a startup that takes away customers.
How does the results compare to common methods

Using prototypes this way, prototyping becomes exploratory research, not evaluative. Usually, when building prototypes, one quickly wants to improve and move forward one “hero” idea whereas. This test method is to learn, not to validate. It actually opens up more design questions than it answers which might be disappointing for a team that is looking for quick decisions. But the power of this method is that it helps to make the team iterating of the concept much more conscious of how the solution affects user behavior, additional use cases, the role of the company launching it, tensions in user values and shifts in the market that might happen.

What’s crucial, however, is not necessarily the design of the prototype itself, as this is not a new method, what’s different is the questions asked about it and how the data is being analyzed.

Case 2 “metaphoric prototypes”
June 2017

In the summer of 2017, the research and strategy team at Kaiser X Labs was commissioned by Allianz DE to define the new global UX standard for digital services for Allianz employees. The prototypes were meant to help gaining an understanding of desirable qualities of interactions with the new service. Instead of testing a single idea, the team used three displaced ideas exemplifying different values of the system which created several acentric, overlapping images of the future. (See Annex 2)

Description of the test or workshop

The metaphor exercise were embedded in 1,5 hour remote conversations with Allianz employees from 6 different countries and on all levels. Before showing the prototypes, conversation topics and activities included: a typical day at work, interactions with existing internal services of Allianz, and a demonstration of how they use current internal digital systems.

The participants were presented one illustration after the other. The team asked the participant to name three adjectives that describe the subject of the illustration. After that, they were asked to discuss whether the new digital service should have these qualities or not. Then, participants described how a digital service that was like the metaphor would behave, how they would interact with it and how they would get what they need from it.

After having talked through all 3 metaphors, participants were asked to rank them based on which one applies best for the new digital service. They were given three medals – bronze, silver, and gold – and asked to share their thinking with the team.

Initial results

Even though the team let the participant rank the metaphors, the question the team asked in the analysis phase was not which one of the metaphors was the right one to push forward. Instead, the team looked at what qualities of each metaphor worked, and what desired interactions with the new digital service would look like. This would help the team gain an understanding of the parts of the future service.

The team looked at what role the new service should play considering there is already a plethora of services being offered. The relationship between the new service and all the other offered services for Allianz employees needs to be considered as a system and they will all need to be connected.
The team also learned what kind of intelligence the new service needs to have behind it. The metaphor exercise revealed that digital services simply providing “functions” are perceived as too cold. This is an issue, given that the team was working on a digital tool – it’s all functions. A service that gives the participant exactly what they asked for might not excite them because that may not be what they really need.

**How does the results compare to common methods**

The goal was not to validate one of the prototypes but to use them as exemplifiers of the values of the future system. The metaphoric prototypes helped the participants – after initial struggles with the method – to think about the digital service on a higher level. Doing so, instead of analyzing the current journey and obtaining a list of pain points or a “wishlist” of features, the team got to more abstract service design principles related to the role of the new service in a system of many services and desired interactions that helped us find the features that would really make for a better experience for employees.

Also, because the team talked to Allianz-internals, our participants were highly biased by the status quo and knew a lot about what is not possible. The metaphors helped them to postpone thinking about these biases and allowed them to think about how an ideal digital service system would behave in the future.

**Discussion**

Based on the initial analysis of the literature review and the case studies, we found that the use of prototypes as probing mechanism into the future is a valuable tool that has been used by designers intuitively, to reduce part of the uncertainty of the responses of user to their proposals, but we also found that avoiding the intention of validation, can produce a positive result. Once the element of validation is eliminated, the prototypes becomes a gate into the structure of that possible future system. Participants of the case studies produced systemic reflections of the possible repercussions of alterations to the system, revealing a structure rather than a solution.

One of the main concerns of the initial model, was to produce a better understanding of the system (de la Rosa, 2016), but there was no clear explanation of how this process was determined. As we observe on the cases presented, every iteration of the stage of prototyping with a displaced focus, produced insights about the system, or what we call a low-resolution image of the future system as responses to users to possible scenarios. This subsequent production of low-resolution images can help us identify basic structures of the future system, but when those images of the future are overlapped, we can produce a higher resolution image of that preferred future that it is being investigated (Arenas, Fernandez & Gomez, 2008); as we see on digital imaging theory, “Image resolution can be improved when the relative displacements in image sequences are known accurately, and some knowledge of the imaging process is available.” (Irani, M. & Peleg, S.,)

We believe that this notion of overlapping low-resolution images of the future system (fig.1) can be a significant addition to model suggested by de la Rosa (2016), and support the idea of displaced prototypes as possible mechanisms to produce systemic knowledge about the preferred future and both the repercussions of design actions as well as possible ways to plan and facilitate the structure of the system that has been defined as the preferred one.
While common design methods focus on the production of a tangible solution, we believe that the model presented can facilitate the process of design research on complex scenario and the inclusion of larger view for the design process, where the planning process to produce a systemic transformation really becomes the center of the process.

Conclusions
Design has changed its place in society radically during the last two decades, its role as a facilitator of social transformation has been recognized in many societies, and now shares a place on the table with complex system theorist and policy makers, but for many instances it is still focusing on the patching of failed systems. Many disciplines look for design as a solution producer, asking it to solve the problems that generations of wrong politics and actions have created in the world. And even though we cannot complain on the improvement that the discipline has experienced over the year, we cannot also stop conflicting with this idea, since many of the significant transformation of the system for the future might require us to stop fixing and patching the wholes on defective systems and being able to reframe completely some of the notions that we are taking for granted.

We think that this is not a final model, but it is an advance that at least considers the possibility that the future is not defined yet, and that the role of design can go farther than the deterministic idea of anticipation of a future that we can still change. There is a need to further study this model and other possible ones that could push us to a more active role transforming reality, and establish new objectives for the design research communities around the world.
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Case Study 1: Prototype as an open storyboard

Participants
Kaiser X Labs: 2 UX researcher and strategists (+ managing director)
Allianz: number of contributors depending on activity
Test participants: 6

Initial problem
The central goal of the project was to design the future of car insurance based on user needs.

What happened before prototyping
The team conducted qualitative in-home interviews with 10 participants in Augsburg and Nürnberg, Germany to analyze status quo, derive insights, pain points and opportunity areas. In a workshop with Allianz, ideas were developed. Using the analysis outcomes as a filter, the 6 most promising ideas were elaborated on.

Goal of the study
The goal was to understand which concept has potential from the user perspective and how they could be improved or adapted. As some ideas challenged the way traditional insurance works, the team decided to use a more experimental approach rather than a typical validation test to see whether or not these could be plausible offerings coming from Allianz in the future.

Description of the prototype
The team decided to use a combination of value propositions and mini storyboards to prototype service experiences. The front of the A4 card featured the value proposition of the service – presented as an open idea.

The back of the card repeated the value proposition, combined with the service or product category. Three images plus descriptions illustrated onboarding, main interaction and main benefit of the service or product. Images and descriptions were intentionally vague and incomplete to invite participants to fill the gaps.

Description of the test or workshop
A small number of participants (6) was invited to Kaiser X Labs for a 1 hour conversation. Before showing anything, the team spent 15 minutes getting to know the participant and their car.

The participants were presented the value propositions, shared what they’d expect behind each of them and picked 4 out of the 6 concepts that peaked their interest. One after the other, they turned around the cards to read the descriptions while “thinking out loud” so the team could follow their train of thought. Then, the participants were asked to explain the concept in their words to us.

After that, the team asked in which situations they or someone they know would this product or service, how this concept would change the way they use their car. Whenever participants asked questions about the product, we asked them to fill those “gaps” themselves.

After having talked through all 4 concepts, participants ranked them based on the likelihood of purchase.

Initial results
Rather than just listing what’s good and bad about each prototype, the team looked at why this concept might be relevant for participants. Here, the team learned about unmet needs, additional use cases, and if it might inspire a new user behavior.

Additionally, the team looked things that need to be given, things without the solution won’t work. Here, participants shared their view of the future that the prototype would be part of: Learnings were not specific to the prototype itself but consequences of its introduction, values and about mobility in general – which was highly interesting data that couldn’t be use for immediate needs of the project, however.
### Case Study 2: Prototype as an open metaphor

<table>
<thead>
<tr>
<th>Participants</th>
<th>What happened before prototyping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaiser X Labs: 2 UX researcher and strategists, 1 UX designer (+ managing director)</td>
<td>In order to get an understanding for the market and current trends, the team conducted secondary research to gain insight into expert opinions in the field and a competitive analysis looking at existing offerings that either live in the same market or work in a similar way.</td>
</tr>
<tr>
<td>Allianz: number of contributors depending on activity</td>
<td>Goal of this Allianz-internal project was to define the new global UX standard for digital services for Allianz employees.</td>
</tr>
<tr>
<td>Study participants: 13</td>
<td>Goal of the study</td>
</tr>
<tr>
<td></td>
<td>The goal of was define design principles for a new digital service based on the needs of Allianz employees.</td>
</tr>
</tbody>
</table>

#### Description of the prototype

The team expressed their hypotheses for how the new digital service could behave as three concepts surrounding the system to explore what its parts could be. Those follow roughly the logic of the notion presented by B. J. Fogg’s (1999) of a functional triad on HCI. The first metaphor presented the service as a solution to a problem of infrastructure, the second to a process problem and the third to a service problem. Each one of them was visualized with an illustration. Those illustrations implied already several actions and notions like in the example shown below, input, output and transformation.

![Example Illustration of a metaphor for the digital service](image)

#### Description of the test or workshop

The metaphor exercise were embedded in 1.5 hour remote conversations with Allianz employees from 6 different countries and on all levels. Before showing the prototypes, conversation topics and activities included: a typical day at work, interactions with existing internal services of Allianz, and a demonstration of how they use current internal digital systems.

The participants were presented one illustration after the other. The team asked the participant to name three adjectives that describe the subject of the illustration. After that, they were asked to discuss whether the new digital service should have these qualities or not. Then, participants described how a digital service that was like the metaphor would behave, how they would interact with it and how they would get what they need from it.

After having talked through all 3 metaphors, participants were asked to rank them based on which one applies best for the new digital service. They were given three medals – bronze, silver, and gold – and asked to share their thinking with the team.

#### Initial results

Even though the team let the participant rank the metaphors, the question the team asked in the analysis phase was not which one of the metaphors was the right one to push forward. Instead, the team looked at what qualities of each metaphor worked, and what desired interactions with the new digital service would look like. This would help the team gain an understanding of the parts of the future service.

The team looked at what role the new service should play considering there is already a plethora of services being offered. The relationship between the new service and all the other offered services for Allianz employees needs to be considered as a system and they will all need to be connected.

The team also learned what kind of intelligence the new service needs to have behind it. The metaphor exercise revealed that digital services simply providing "functions" are perceived as too cold. This is an issue, given that the team was working on a digital tool – it’s all functions. A service that gives the participant exactly what they asked for might not excite them because that may not be what they really need.