

New spaces for healthcare futures studies: Connecting existing theory to deeper participatory practice

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ABSTRACT

Long term thinking is full of challenges and is also necessary, especially on topics related to systems that take time to change, such as society, cultural values and policies. The further we look into the horizon, the more unknown-unknowns we encounter and the harder it is to rely on existing knowledge, trends and extrapolation for envisioning the future. Expertise is limited when applied to long term futures. An 18-month design research project has been conducted to develop a methodology for participatory future studies with non-experts, given a complex and challenging context. A context of extreme unknowns: healthcare for future space missions. What does it mean to efficiently conduct productive futures studies in the face of unknowns with non-experts? The study does not reject expertise per se, however it does explore how to conduct futures studies with non-experts. Whilst the extreme context takes us out of the Earth, our methodology is discussed and evaluated in relation to existing futures thinking practices in healthcare settings. Our conclusions reflect on the findings from the project and contribute to improving non-expert participation in futures research through a platform embodying the Collective Imagination Framework for imagining new futures for healthcare in 2040 and beyond.

1. Introduction

The importance of futures research in the context of health was recognised by the World Health Assembly in 1990. One of the commonly cited taxonomies of the futures - the highly influential futures cone - can be traced back to a paper in the appendix of a report from an international consultation convened by the World Health Organisation (WHO) in 1993. The 'futures cone' is a taxonomy of futures. Futures studies were identified as an alternative tool to fix the stagnation of progress in 'Health for All' (Taket, 1993). The adoption of futures studies for healthcare development was in its infancy (Nicholson, Hadridge, & Royston, 1995) with a motivation towards global impact. The report described examples from Brazil, Canada, Indonesia, Korea, Malaysia, Mexico, Netherlands, New Zealand, Nicaragua, Pakistan, Peru, Slovakia and the United States. Not only was the interest global, the context was also encompassing. It was deemed necessary by the international community to address the 'profound social, political and economic changes that are occurring in much of the world' (Taket, 1993). The questions asked showed an openness to explore alternative futures: 'will we be more or less healthy in the future?' and 'what role will health play in our decision-making in the future?' (Taket, 1993). Health futures encompasses healthcare futures and is linked to the wider societal futures.

Shortly after the WHO convention, the futures cone was published in Health Forum by (Hancock & Bezold, 1994). It referenced

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futurist Norman Henchey for the four classes of futures modelled by the cone: possible, plausible, probable and preferable. Almost a decade later, this futures cone was adapted and popularised by futurist Joseph Voros (2017, Voros, 2003a) for applications in a more general context. The adapted futures cone was then popularised in the field of speculative and critical design by its pioneers Anthony Dunne and Fiona Raby (Dunne & Raby, 2013) as a way to begin to address preferable futures.

The fact that the futures cone has found its development, after a 10-year-gap, beyond the health setting is intriguing. Six years after the WHO convention, a handbook of public health futures (Garrett, 1999) was published. A detailed reading of the book might provide clues to this curious gap. The book was written for health professionals and much of the content was dedicated to practical information on methods: research design and project management of futures studies, as well as to situate health future research alongside other anticipatory and decision-making processes. The focus was not on understanding and modelling of the alternative futures but on applying futures studies for tangible results. “Health-futures work is wasted if it deals with totally abstract topics that have no relevance to real decisions and actions.” (Garrett, 1999, p.187). The case studies illustrated the problems of such a focus: the participants appear to be unable to imagine into a long-term future. The time horizon of futures studies for long term horizons has been shortened to mid-term when it comes to execution. An exercise by Welsh Health Planning Forum has shortened a futures study of 18 years to 10 years. Another exercise in Nicaragua reduced the 30-year horizon to 10 years (Garrett, 1999). Instead of expanding the available alternative futures to find the desirable futures, the focus on “real decisions and actions” inadvertently drives the participants to look for outcomes we could imagine or deliver based on what we know now which shortens the future horizons.

2. Models

Projected futures are not the primary concerns of futures research. Futures research is founded on the belief that the future (which is plural until one becomes the present) can be influenced. Hence, the emphasis is on constructing alternative futures for the articulation and discourse towards the desirable futures, which is also referred to as preferable futures. There is no lack of tools, methods and frameworks for futures studies but there is a set of vocabulary that is frequently used: scenarios and alternative futures (probable, plausible and possible). The futures cone (Dunne & Raby, 2013; Hancock & Bezold, 1994; Voros, 2003b) is a visual taxonomy of the futures; it positions the said vocabularies in a structure and clearly illustrates the relationships between them. Voros has added additional types of futures, especially projected futures. Dunne and Raby have flattened Voros’s futures cone. For our purpose the 3-dimensionality and the focus on alternative futures (i.e. not projected futures) are important, therefore we will use the model and terminology in Bezold and Hancock’s futures cone (Fig. 1):

The futures cone is a cone of alternative futures that extend and diverge from the present over time. The time horizon is defined as the immediate future (one to three years, note: writing in the paper where the diagram was discussed states 5 years), the medium-term future (5–20 years) and the long-term future (20–50 years). At each point in time, a cross-section of the cone contains the alternative futures. Scenarios occupy an area on a cross-section and are defined as “compilations of trends into differing images of the future” (Taket, 1993, p.76).

Many practitioners of futures and foresight are focused on the construction of a set of scenario archetypes. Examples include Herman Kahn, the father of scenario planning (Bradfield, Wright, Burt, Cairns, & Van Der Heijden, 2005) who described the standard world and three canonical variations, more integrated, more inward-looking and greater disarray (Kahn & Wiener, 1967, p.9); Jim Dator’s archetypes of the continued growth, the collapse, the steady state, the transformation; Inayatullah’s archetypes of the preferred future, the disowned future, the integrated and the outlier; Robertson’s archetypes of business as usual, disaster, authoritarian control, hyper-expansionist and humane ecological. (Amer, Daim, & Jetter, 2013; Bradfield et al., 2005) The edges of the images of the futures (e.g. scenarios, archetypal or not) set the outer boundaries of the alternative futures space being considered at the targeted horizon (i.e. on the cross-section area of the futures cone as illustrated in Fig. 2):

Our objective is not to generate another set of scenario archetypes. Instead, our investigation is about exploring the span of the alternative futures space i.e. the shape of the outermost boundary in the futures cone (Fig. 3):

This expansion in alternative futures allows us to enlarge the choices of desirable futures and better embrace future uncertainty to

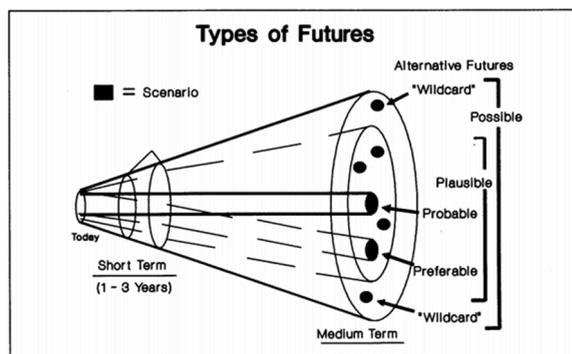


Fig. 1. The futures cone by Bezold and Hancock (Taket, 1993, p.73).

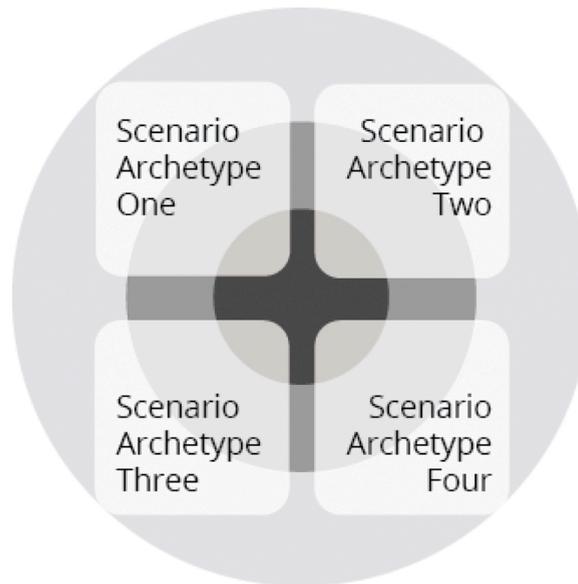


Fig. 2. Illustrating the relationship between scenario archetypes and the boundary of the alternative futures space.

answer exploratory questions. It is often hard to understand where the scenarios were aiming for in the alternative futures space from reviewing the literature, especially due to the confusing use of language. For example, (Kaltenborn, Thomassen, & Linnell, 2012) described using scenarios to look at “alternative and plausible futures” and then referenced definitions such as “a scenario can be defined as a consistent and plausible picture of a possible future reality that informs the main issues of a policy debate” (European Environment Agency, 2009). Although it is generally agreed that the probable, plausible and possible futures are defined as alternative futures in decreasing order of possibilities, the nature of the types of alternative futures has been much debated (Inayatullah, 1990). This is however not our focus, we therefore modified Hancock and Bezold’s futures cone by dropping the rings that divided the alternative futures by possibilities and use a simplified cone and focus on our quest to embrace the unknown-knowns and unknown-unknowns from the Johari Window (Luft & Ingham, 1955) that exist at the peripheral margins (Fig. 4).

For the purpose of illustrating what we mean by using the images of the futures defining the edge of the futures cone, we have chosen two highly contrasting examples: images of the futures in organisational management versus speculative design (Fig. 5).

In organisation management practices, images of the futures are conceptualised at the scale of an organisation (and its environment), its purpose is to ensure organisational success. Therefore, futures are usually described in relation to an organisation and framed by environmental forces for example; Porter’s Five Forces (Porter, 2008), STEEP factors (Mecca & Morrison, 1988) and its variations, opportunities and threats (SWOT) analysis (Gürel, 2017) and scenarios (Buchan & Seccombe, 2011; Department of Health, & Care, S., 2012). More often than not, even for mid-term horizons, where there are increased unknown-unknowns, healthcare organisations are still focused on creating images of futures with known-unknowns sourced from demographics and societal trends data, e.g. the NHS’s long term plan (Alderwick & Dixon, 2019). Arguably, the images of the futures are clearly articulated and lie in the probable space, thus confining the envisioned “desirable future” (e.g. a plan) to be within its narrowly projected delivery alternatives.

Speculative design originated from a practical and commercial practice: industrial design. Instead of creating an industrial product solution i.e. a technological object, designers create speculative designs (and its context, in the case of design fiction) as images of the

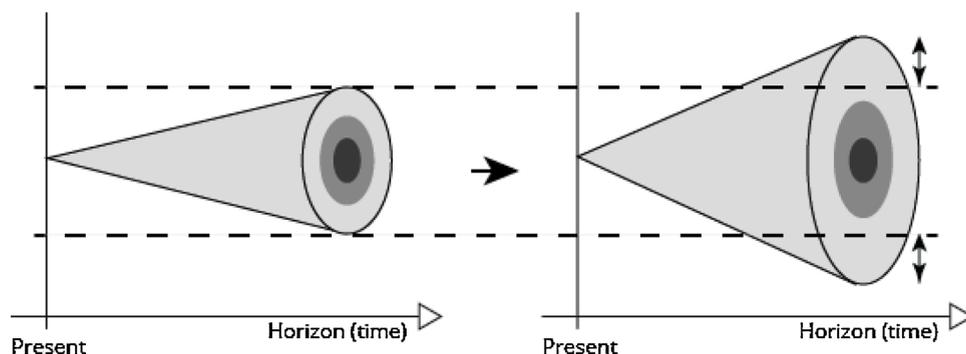


Fig. 3. Expansion of the alternative futures space.

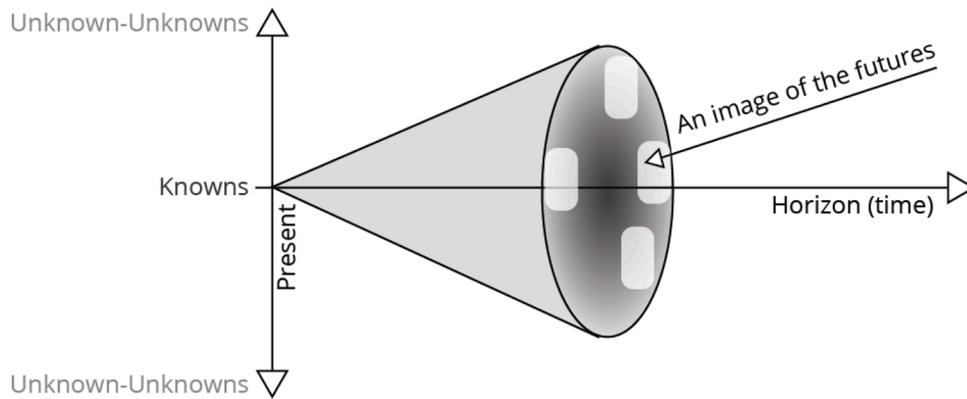


Fig. 4. Simplified futures cone.

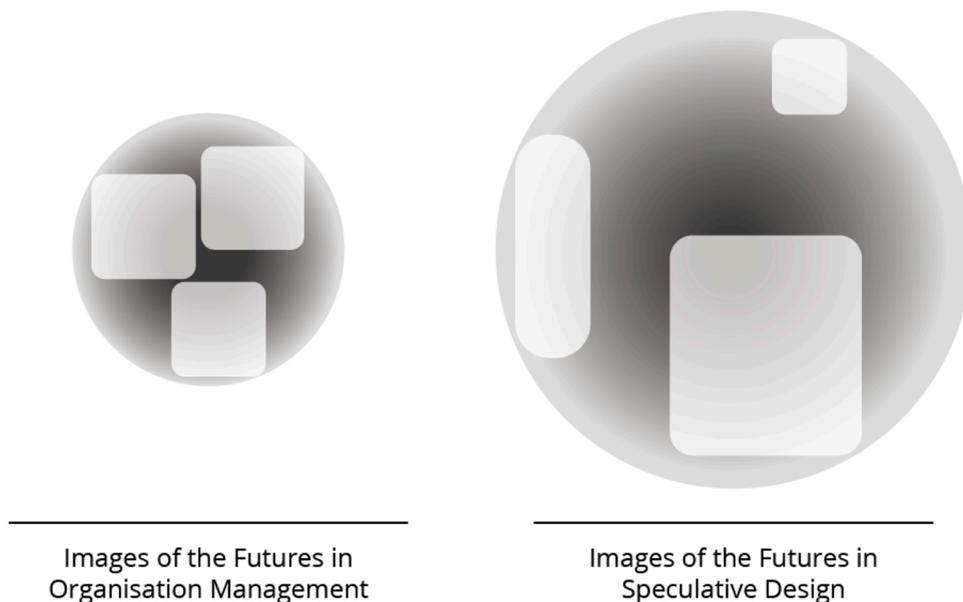


Fig. 5. Contrast the way images of the futures in organisational management and speculative design sets the boundary size of the alternative futures space.

future. In early speculative design practices, utilitarian objects (industrial products) are augmented with strange and ambiguous aesthetics, para-functionality and/or psychosocial narratives (Dunne, 1999). The imaginary use of such speculative designs critiques and invites the viewer to reflect on the culture and behaviour induced by the object, services or narratives. For example, in Lab4-Living's HOSPITable project, speculative objects that integrated medical objects into furniture in everyday life, such as the Infusion Lamp, Google Aid, Coffin Table, are created by the designers to critique the implications of home-based care as an intrusion on the values of home (Chamberlain & Craig, 2019). In Uninvited Guest (Jain, Ardern, Flint, & Fruhstorfer, 2015), speculative remote monitoring objects for elderly care were created and three responses to these objects are illustrated in a short film at the Design Museum's Home Futures exhibition in 2019. In contrast to the approach taken in the NHS long term plan, unknown-unknowns due to demographics changes are embraced by Jaemin Park: in "When we all live to 150" (Paik, 2012) where she speculated the implication of an ageing population through an alternative marriage construct, made tangible through photographs of portraits from the future. Whilst there is a wider alternative space for the desirable futures to be positioned, most responses to the speculative design remained unarticulated in each viewer's mind - a feedback loop issue.

Wider participation is one of the processes for expanding the alternative space, especially with non-experts. Experts are experts of known facts and facts "are constituted by the older ideologies" (Feyerabend, 2010, p.33). Experts of tomorrow may or may not be the experts of today. The further we look into the futures, the more likely the experts of tomorrow are not the experts of today due to increasing natural and man-made (e.g. technological) complexity induced dynamic changes. Activities in participatory design can be dated back to the Scandinavian methods in the 1970s (Sanders & Stappers, 2008). Several frameworks for supporting the collaboration between the experts and wider participation in a hybrid design/futures practices (Candy & Kornet, 2019) have been created, e.g. the

Futures Design Process Model (Ollenburg, 2019) and Ethnographic Experiential Futures (Candy & Kornet, 2019), which linked future studies to research-through-design and ethnography respectively. Design techniques are merited for their ability to embrace and elicit experiential or tacit knowledge (Niedderer & Reilly, 2010) in a wide range of stakeholders, for example a community of practice i.e. people who presently share a concern.

Imagination and abductive thinking are recognised as the model for non-experts to participate in futures research and often leads to or is aimed at the creation of utopia and dystopia in speculative design and Futures-Design-Process models (Ollenburg, 2019) respectively. This application of imagination effectively relegates the non-experts to a marginal role. A marginal role where non-experts were participating as a data point being collected instead of the “co-construction of knowledge into analysis and co-construction of changes in social practices” (Gregory, 2003). Effectively this maintains the status quo towards an expert-led future. To embrace unknown-unknowns it is important to engage non-experts openly and equally, including those who are beyond the community of practice into the expansion of the alternative futures space and articulation of images of the futures. What follows is a series of exploratory design-led research experiments that seek to reposition the non-expert centrally in the process of expanding the outer boundaries of futures cone projections. In doing so, we develop an understanding of the qualities necessary from what is generated by the non-expert in order to complete a feedback loop with experts. We asked ‘could new participatory methods and frameworks expand the outer edges of futures cones by leveraging the diversity of thinking and alternative ways of knowing with non-experts?’

3. Project

The extreme context of space provides the perfect opportunity to investigate the use of imagination in health futures. Firstly, given the unlikelihood of most people having first-hand spaceflight experience or having been involved in delivering healthcare in space, the context made identification of non-experts straightforward. Secondly, the pool of potential available participants is large (only 600 people have been to space). The experts on healthcare in space are space medics and flight surgeons or professionals from the medicine or health and safety directives mainly in space or associated agencies. Finally, without any direct physical experience of space, imagination is required to generate ideas. The non-experts’ main exposure to space was through fiction/film or mainstream media, dominated by the utopian or dystopian scenarios portrayed in public entertainment. Designing for Healthcare in Space (Pau, 2019) is a practice-led project that explores the process of participation in futures studies, from which the Collective Imagination Framework emerged.

4. Method and approach

Exploratory research “is the probing, playful activity by which we get a feel for things. It succeeds when it leads to the discovery of something there” (Schon, 1984, p.145). By nature, exploratory research asks open-ended questions. The research design evolves with the design research practice. Linear research methods would be very inefficient and ill-suited to exploratory research (Hall, 2011). Instead, research-through-practice is selected as the research approach. The making of artefacts, design, facilitation, gathering feedback and reflection on the experiments are ‘not to be considered as the gathering of reference materials but research proper’ (Frayling, 1993). Observations, learnings and conclusions were made about the methodology of participatory futures research iteratively, through the different processes used to create images of the futures in the experiments.

In this exploratory research, we started with three independent experiments, each based on a classical design technique - respectively: speculative design (design fiction), design games and design thinking. We took inspiration from these practices as a starting point, in search of methods that can articulate and synthesise a wide range of ideas whilst avoiding aggregation into an averaged consensus. Unlike a group of experts, each participant’s ability to generate and express opinions about the future varies greatly - in terms of creativity and knowledge.

As this project explored multiple issues, in this paper, we will focus on presenting and discussing the parts of the project that are significant to the nature and issue of collective imagination in participatory futures. Specifically, to observe and understand (1) the problem with an open invitation to open imagination and (2) how to guide collective imagination. Over 18 months, through a total of eight experiments in eleven activities:

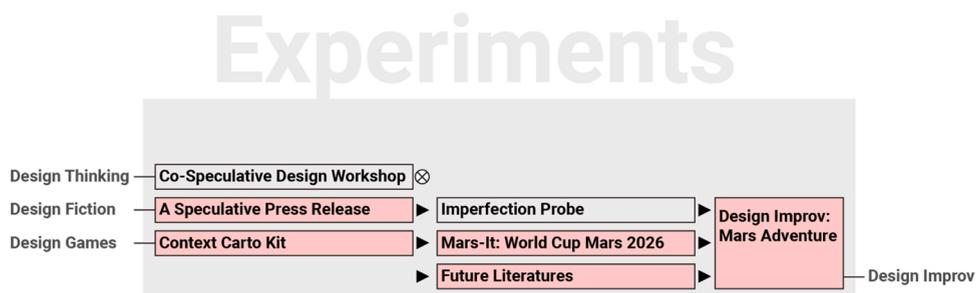


Fig. 6. Structure of the eight experiments.

The relevant experiments are described below (highlighted in pink in Fig. 6). None of the participants in these experiments belonged to the expert group. The majority of the participants belong to the following categories: healthcare or related professionals, technologists and designers. Being a member of these professions was not a requirement as widening participation was important. Indeed, participants included artists, lobbyists and many others. It is important to stress that we invited participants to contribute their whole self with no emphasis on their profession or technology capability in the process. Prior to the activities, many participants had no knowledge or interest in exploring space medicine. The method and tools of the relevant experiments are described below:

4.1. *Design Fiction - A Speculative Press Release*

A press release from the future, *New Opportunities for Adventurers* by Naxional Geographix Xpeditions in conjunction with XMed Studio, is printed on a poster and left in two locations (at the corridors of Royal College of Art and at a technology culture festival) - just as most speculative design objects are left in gallery spaces, unsupervised. Viewers are free to add their ideas of news headlines, healthcare products and services that could exist alongside this press release onto the blank spaces of the poster, a marker is provided next to the poster.

4.2. *Co-Speculative Design - Living Off the Earth II Lab Workshop*

This workshop is part of a tech-culture festival in the Hague, Netherlands. The workshop began with the designer declaring: "We are all going to make a journey to Mars today." hence the participants were facilitated by the designer to create two design fictions about healthcare in space in a full-day workshop, facilitated using typical design thinking approaches (e.g. brainstorming, double diamond).

4.3. *Design Game - Context Carto Kit*

Context Carto Kit is a design game created for charting and exploring the context of any topic. The form of the Context Carto Kit resembles a basic board game - it consists of a set of tiles with simple words of association and a set of printed rules. This game has been played 4 times with 1–4 participants with a designer. In our experiment, we asked the participants to bring a health-tech related topic, e.g. brain in space.

4.4. *Design Game - Mars-It: World Cup Mars 2026*

Mars-It is a turn-based storytelling (non-competitive) game where participants take their choice of Space Object to perform an Earthly activity on Mars and encounter Martian issues. Mars-It: World Cup Mars 2026 specifically looked at exploring the implication of a healthcare-related object (e.g. a spacesuit - a mobile life support system) in the scenario of a World Cup event. Mars-It game kit consists of a game mat, two stacks of cards and a dice. Mars Hazards Deck is a stack of cards illustrating the healthcare and environmental problems one might encounter on Mars. Earthly Scenes Deck is a stack of cards containing photographic snapshots of the Earthly task: football. The game mat is where the drawn cards are placed. Once an Earthly Scene is placed on the mat, the dice is rolled to decide on the number of Mars Hazards that should "happen" in each Earthly Scene. The storytelling completes when all of the scenes placed on the mat is described and noted by a nominated scribe.

4.5. *Design Game - Futures Literature*

Futures literature is a non-competitive game where all participants always participate simultaneously, like musical chairs. In pairs, the participants initialise the game by defacing a set of book covers to feature their own ideas they have read in the present day - the defaced book cover is called their Claim-To-Fame Literature. The Claim-To-Fame Literature is evolved by other participants multiple times with a pause to present in between. With each evolution, the Claim-To-Fame Literature is stretched deeper into the horizon and further into the unknowns. Finally, a Speculative Award for each Claim-To-Fame Literature and its associated evolution is created by other participants. Futures Literatures game kit consists of a set of photocopies of the covers of written materials (books - fiction, non-fiction, textbooks, magazines, leaflets) related to the topic of healthcare in space, some paper frames for framing the Speculative Award, a collection of example awards (from satirical to prestigious) from our present world and additional stationery.

4.6. *Design Improv - Mars Adventure*

Design Improv: Mars Adventure took inspiration from improvisation theatre performance (Johnstone 2017). Improv games, such as constructing a story with one word from a participant at a time, are used to warm-up. After the initial warm-up, the participants play the playwright. This playwright phase consists of individual thinking time before group work to construct the props. Finally, each group performs a short 2–3-minute improv sketch about health and wellbeing in the future on the land of Mars. The materials of this activity consist of a basic prop: paper helmets, made by the designer, and a variety of materials for participants to make props.

5. Findings

In the research-through-design process, six qualities to stage collective imagination were generated (Fig. 7):

The six qualities formed the basis of the Collective Imagination Framework (Fig. 8):

In addition to organising the qualities emerged directly from experiment results, the Collective Imagination Framework also (1) elaborates on proposed systems for assessing the qualities of efficacy using the simplified futures cone and the I-See futures shape, and (2) proposed an additional evaluation element – generated through further reflection and is discussed in Discussion session. The level of efficacy, efficiency, elegance and evaluation altogether forms the minimal elements for the successful collective imagination.

In the rest of this section, we recount the steps to arrive at the first three elements (Efficacy, Efficiency and Elegance) of the Collective Imagination Framework via the experiments.

5.1. Issues with an open invitation to open imagination

The three starting experiments highlighted several problems with open imagination.

In Design Fiction: A Speculative Press Release, we observed two problems with an open invitation to open imagination. Firstly, the participants' contributions were very hard to interpret without the context and their own narratives - for example, how should the designer now interpret a sketch of a cat in a flying car? Secondly, none of the participants suggested anything for the headlines. This could have been because headlines are less tangible than products. Is this a problem with abstract thinking, and if so, is it hard to perform or hard to articulate?

In Co-Speculative Design: Living Off the Earth II Lab Workshop, the two groups of participants created two images of the futures (Fig. 9): (1) a non-dying species travelling endlessly in space where many meanings in health and wellbeing have significantly shifted and (2) a group of explorers in the terraformed Mars where they were rescued by a newly invented emergency transportation/habitation 'vehicle'. Whilst eclectic and syncretic imaginations can be expected from diversified participation, the two images of the futures could have come from entirely different workshops. How would the sponsors and stakeholders of futures studies benefit from these wildly different images of the futures? This brings us to reflect on the process of imagination: how should the design process relate to these images of the futures?

In Design Game - Context Carto Kit, ideas generated were easier to discuss and communicate beyond the activity. Knowledge transfer and balanced group dynamics were consistently acknowledged by the participants. However, a fairly homogenous list of tangible issues and ideas were generated - instead of images of the futures which allude to a broader context. In addition, contributions from different disciplines (linked to the participant's professional career) were evident in the ideas generated. These two seemingly unremarkable observations suggested an issue with permission - permission to speak as non-expert and stray deeper into imagination and other ways of knowing, to be part of a headspace that is giving. We suspected this despite having included printed rules (park judgement and accept contradictions) as part of the kit - where such rules are not far from the common practice employed in facilitating design thinking workshops (announcing ground rules). In addition, the qualities of the output have prompted us to raise the same question from the previous experiment, but from the opposite angle: how should the design process relate to the images of the futures?

The problem with open imagination from these early experiments appear to be:

- Not discursable - i.e. we cannot successfully explain, discuss or evolve the imagined images of the futures beyond the experiments without the participants - because of a lack of context (in Design Game: Context Carto Kit) or articulation process (in Design Fiction: A Speculative Press Release).

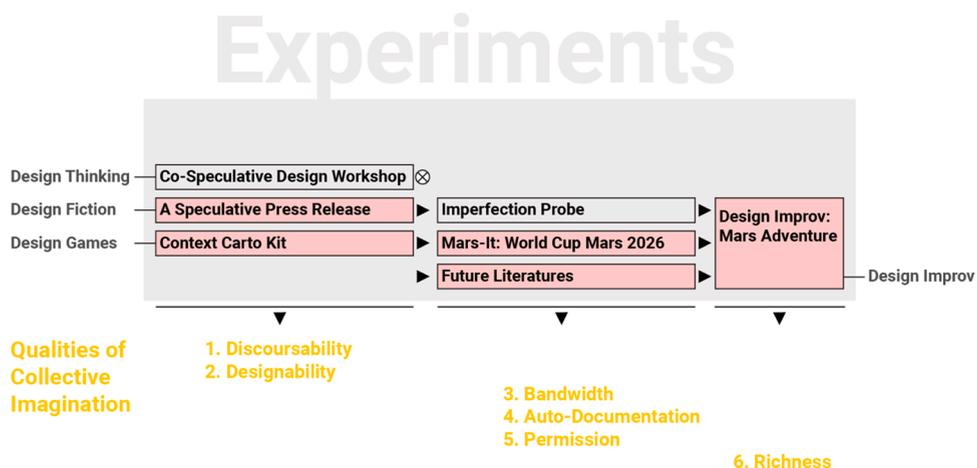


Fig. 7. The emergence of the six qualities to guide collective imaginations.

Collective Imagination Framework

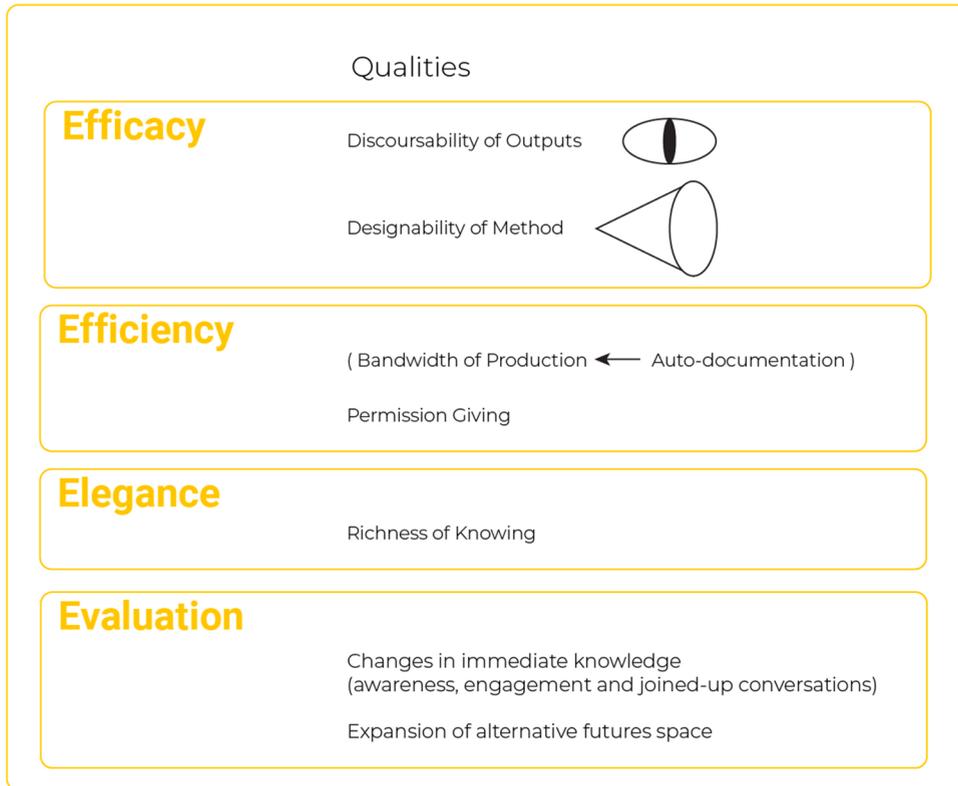


Fig. 8. Collective Imagination Framework (CIF).



Fig. 9. Prototypes produced at a design thinking workshop to study the future of healthcare on Mars.

- Not designable - i.e. the alternative futures generated by different participants facilitated by the same design research methods and tools in the same session varied wildly, as if the design method didn't matter. For our purpose of expanding the size of the alternative futures space, our process needs to be able to facilitate the images of the futures to be generated further out towards the edges of the futures cone.

5.2. The offer from a group of non-experts

Without designability and discursability, the collective imagination process lacks efficacy. Are designability and discursability

sufficient aims for framing the process of collective imagination? In the next two experiments, further qualities are uncovered.

Unlike a group of experts who would be able to converge and eventually agree, a group of non-experts with their own diverse knowledge and experiences would appear to be a challenge to the process of creating images of futures that are discursable and designable. However, as stretching one's own idea into the unknowns is often difficult for non-divergent thinkers, a group of non-experts offers a simple way to be given permission to stretch their ideas: let other non-like-minded people stretch the idea. Design Game: Mars-It: World Cup Mars 2026 and Design Game: Future Literature were designed to facilitate this. Permission giving is the foundation of all of our experiments and one of the qualities to ensure efficient collective imagination - that is to avoid turning diverse images of the futures into an averaged consensus as averaged images of the futures do not expand the alternative futures space.

In Design Game: Mars-It: World Cup Mars 2026 (Fig. 10), the images of the futures generated have a great resolution in problems (failure modes of the Space Object with respect to Health Hazards) and solutions. Participants remarked that it was great for knowledge exchange between themselves and have learnt from the Mars Hazards cards. However, the game generated a lot of high-resolution problems and solutions, mainly with the knowns, but lacking worldviews for exploring unknown unknowns.

Beyond that, we've also noted that quiet moments were quite frequent and facilitation felt quite intense. This could be a problem inherent in the turn-based, story-telling games. As participants must listen carefully to the other participants and serialise their thinking, respond in turns and wait for the scribe to note down the descriptions. Two more qualities emerged: (1) bandwidth of imagination and (2) auto-documentation of the images of the futures and its discourse. The benefit of having a group is that more can be done at the same time, i.e. high bandwidth of production of the images of the futures. However, the higher the bandwidth of imagination, the harder it would be to capture the images of the future, therefore, it must be balanced by a process of auto-documentation for efficient collective imagination.

In Design Game: Future Literatures, participants are always participating all at once for high bandwidth imagination, except for brief moments of presentations. The process is also auto-documenting as each step generates pieces of self-describing literature, which also serves to improve discursibility. The images of the futures generated have an expansive worldview (i.e. not at the dead ends of utopia and dystopia) and clear problems and solutions in the possible futures. In three hours with eight participants, the meanings of peace, disability and laziness were eventually explored after the initial ideas on healthcare technology advancement were stretched. The designability and discursability qualities were met.

Without consciously intending to, these two design games appeared to have experimented with creating the missing feedback loop when investigating technology implications (the main investigation of speculative design).

5.3. Staging collective imagination

The experiment with the highest bandwidth of auto-documentation, designability and discursability is Design Improv: Mars Adventure. Most notably, the participants were eager to build props. Building props (physical making) was an activity the participants spent half of the playwright time on. The activity of building props can be seen as physical world making in speculative design. It is thinking-through-doing and this is critical to create the richness and resolution of the visions within a short timeframe.

Within 2.5 hours, eleven participants created two design fictions (in two groups, Fig. 11) on the topic of healthcare, with an expansive worldview, a clear problem and solution about possible healthcare issues on Mars - supported by a large number of props created by the participants. It was natural to film the improv performance and keep the props for auto-documentation.

The richness of the imagined futures is indeed a remarkable quality created by design approaches - it captures beyond words and embraces tacit knowledge. The bandwidth of imagination is maximised not only by simultaneous participation of participants and but also simultaneous participation of multiple senses and types of knowledge. This is the final quality of a successful collective imagination.



Fig. 10. Simulation of the gameplay of WorldCup Mars (no photograph was taken at the actual workshop).



Fig. 11. Design Improv: Mars Adventure - participants improvising two sketches of the futures with props created by the designer and by the participants.

6. Discussion

The Collective Imagination Framework (Fig. 8) is proposed as a systematic way to achieve collective imagination with non-experts, with the specific objective to guide the non-experts to create images of the futures that are more ready to be part of a feedback loop with experts in co-creating futures.

To have efficacy in collective imagination, we need designability of the method and discoursability of the output. To articulate the definition of designability, we refer back to the simplified futures cone (Fig. 4). A designable process facilitates the generation of images of the futures that are positioned in a designated area in the futures cone. Specifically, towards the outermost edges in order to expand the alternative futures space. Having images of the futures generated close to the centre of the cone is an act of collective planning, not collective imagination. Instead of having the scope of the futures set by experts as in collective planning, by being able to direct the non-experts to expand the alternative future spaces, it becomes possible to co-design futures. The images of the future generated must be highly discoursable - to allow for the ideas to spread and continue in feedback loops with experts. We observed that participants appear to be more ready to imagine and articulate a solution rather than a problem or a context. However, a solution without the problem or the context, e.g. cats in a flying car, cannot be used very profitably in further discourse. Besides, as pointed out by Bezold and Hancock, healthcare futures do not exist in isolation but within a societal future - a context (Taket, 1993). A discoursable image of the futures is created by including an articulation of an expansive worldview (a context) and at least one clear (healthcare) problem and solution, where expansive means neither utopic nor dystopic. As set out in the Models section, having non-experts generating utopia or dystopia perpetuates the status quo towards an expert-led future. As a visual language, discoursability can be represented in the following simplified glyph (Fig. 12):

The higher the bandwidth of production, auto-documentation and permission giving, the better the efficiency of collective imagination. Where high bandwidth of production is supported/limited by more/less auto-documentation. The efficiency qualities are not just optimisation factors but are critical to the success in adoption of the collective imagination as process to co-create futures. The collective imagination process must avoid being an extended process such that the output is outdated by the time the process has been completed. For synchronous, non-distributed processes (i.e. all participants in one physical location), we have success in processes that last 2–4 hours from end-to-end (from briefing to wrap up). Instead of producing a comprehensive view, the process is created to iteratively and continuously co-create futures.

The elegance of collective imagination is a unique leverage design offers, characterised by one quality: the richness of knowing. Design as a discipline embraces tacit knowledge (Polanyi, 1962, 1967) as much as explicit knowledge. With non-experts, it is especially important to embrace the different ways of knowing and expressing provision for participants from a wide range of backgrounds and thinking/knowing patterns. This quality is harder to quantify but it underpins the success of collective imagination based on open invitations.

At the start of the research project, we believed that expanded participation is necessary as the experts for the futures are unlikely to be the experts of today. After observing the remarkable properties of collective imagination in creating engagement in a topic of no concern (but of interest) to any participants, we think it is important to expand participation as the future is not created by concepts, but by people. In a way, we moved from having to speculate on which group of participants might be the next experts to accepting that any of the participants might work towards being the next experts.

Finally, we noted the challenge in developing a new framework and studies of participatory futures. An approach to validate a future study is to apply a framework to a study to generate scenarios and images of the desirable futures for a given time horizon and wait, then validation is claimed if it comes true - an anticipatory approach (Fuller, 1992). This long wait for validation means the development of the field of futures studies for long-term futures is extremely slow, perhaps even slower than developments in space explorations. It also makes learning very difficult as it is limited by the researcher's ability to reflect at the point of validation (potentially 20+ years after a long-term future studies have been conducted). The challenge in validation, in turn, limits the development and adoption of the field in health(care) settings, which tends to require large amounts of evidence at a large scale. This challenge of validation may have even influenced the way future studies have tended towards quantitative studies, which can be more easily recalled and validated than qualitative studies. Therefore, finding a new way to evaluate the effectiveness of futures studies is critical. The action of participating in collective imagination is an outcome itself for the participants. A successful participatory futures study and its methods should generate awareness, engagement and joined-up conversations - which are more measurable. The

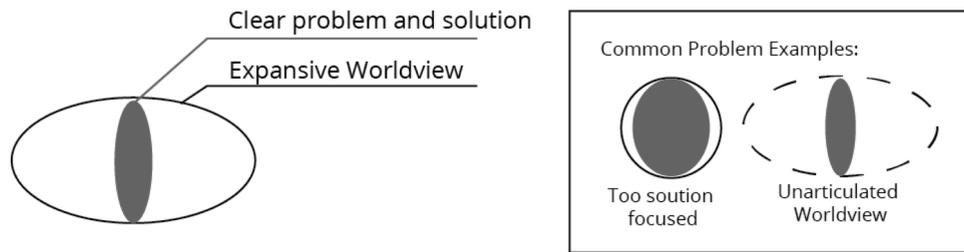


Fig. 12. The I-See futures shape - A visual language to describe discoursability of images of future.

emphasis on futures studies is about creating alternatives from which a discourse is generated towards desirable futures. Another measurement for success is the quality of the alternative futures space created - the expansion of the outermost edge of the simplified futures cone, as defined by the edges of the scenarios generated by the participants. The consideration for evaluation completes our Collective Imagination Framework (Fig. 8).

This study is limited to exploring how practice-based design research in the context of healthcare design can uncover new collaborative practices that open up opportunities for changing futures. The collective imagination framework has drawn on existing futures and futuring theories and proposed a set of methods to address shortcomings in current practices focussed on health and healthcare.

7. Conclusion

Futures thinking is not an alien concept for health and wellbeing professionals and related experts (e.g. health tech developers). In this paper, we re-emphasised a futures researcher's role as facilitators as opposed to opinion leaders or scenario (or scenario archetype) writers, as in organisation studies and speculative design. A scenario written in isolation by a group of people who simply agree with each other is either a plan or a design fiction. Wider participation in future studies is essential to move beyond a plan or a fiction in the face of future health unknown-unknowns. In the project Designing for Healthcare in Space, a framework for systematic collective imagination with non-experts emerged as the Collective Imagination Framework. The framework is designed to facilitate open and accessible contributions to healthcare futures and wider participation beyond experts and the community of interest of the present day - to address unknowns of the futures. Guided by the Collective Imagination Framework, non-experts' images of the futures can shift away from being used as a data source for the experts to filter - towards a more equal voice in a feedback loop with experts. As non-experts are no longer consigned to generate utopias/dystopias and focused on expanding the alternative futures space for a discourse towards our desirable futures. We anticipate that by studying participatory design with multi-disciplinary non-expert groups, we can eventually develop a better understanding of bringing experts and non-experts together with improved balance for the purpose of futures studies.

Acting as facilitators of futures visions as opposed to the futures visionary, we continue to seek to expand our practice to conduct futures studies through even wider participation. XHealth Lab (Fig. 13), an interactive exhibition, was developed to further explore the



Fig. 13. XHealth Lab II - a stage for imagination.

process for collective imagination of healthcare in extreme environments (2019) in an asynchronous way. In order to support wider participation an asynchronous process is our next challenge. XHealth Lab is a live research platform that co-evolves with our methodology of participatory futures. We propose an iterated versions of this lab for the collective imagination of desirable futures for healthcare in 2040 and beyond.

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