Design Futures: A New Discipline, Tool and Medium

Andrea Paraboschi
Co-founder of binaryfutur.es
Research Affiliate
Scuola Superiore Sant'Anna
a.paraboschi@sssup.it

Pierluigi Dalla Rosa
Co-founder of binaryfutur.es
pier@binaryfutur.es

Abstract

While digital media are providing a valuable resource to keep the world connected, their intrinsic channel speed has made information extremely transient and present-oriented in its nature, often lacking overall quality in an era of data over-abundance. If rear-view mirrorism has been characterizing our attitude towards the future, nowadays our speed of technological development is making it unfeasible to face what is next while running backwards. At the crossroads of design fiction, interaction design, ethnographic research and future foresights, the design futures discipline aims to create engaging future-projected experiences, with the goal of inspiring people, increasing their awareness on contemporary challenges and their willingness to act, responsibly impacting the future and consciously choosing among possible alternatives. In this paper we trace the origins and the role of the new discipline, we provide a definition, we introduce some examples and we analyze design futures' role as a multidisciplinary platform for discussion and convergent media experimentation and development.

Keywords: design futures, media convergence, design, future foresights

Introduction

The way in which human beings create, transmit and receive information is in constant evolution. Throughout history, different languages have been cyclically colliding and generating new styleme; in the last century, first a physical and then a digital globalization have been accelerating this process, sustaining the birth and the mutation of new stylistic elements and technological tools. These, in turn, are affecting the quality of the contents and of the channels that are used to generate and to distribute information.

In the media realm, the process of digital convergence, defined as the interaction between different media forms and platforms (Jenkins 2006, 2) is making information flows more fluid and capable of being quickly manipulated and transferred to multiple platforms, therefore redefining the spatial and temporal dimensions of communication. This is boosting the way and the scale in which people can be informed and respond to a given informative stimulus, from reacting to political oppression (Howard et al. 2011) to increasing their ability to innovate collectively (Von Hippel 2005 63-78).

On the personal level, while we are getting more connected and synchronized, the to-the-minute informative overexposure is producing contrasting spillover effects. Being connected depends no more on the physical interpersonal distance but on the closest communication technology, often the smartphone in which old and new media coexist. At the individual level, this aspect is among the causes of a growing informative anxiety that is now part of the media's side effects (Turkle 2012, 241-264). Moreover, technological platforms create global, linked open worlds in which individuals can easily get lost and feel "disconnected", incapable of choosing a given communication path/narrative: the only possible home for the "digital" flaneur is while he/she is constantly and anxiously moving through the network/crowd, in a psychological space rather than in a physical one (Manovich 2001, 268-273).

In parallel, at a global level, the ongoing socio-technological-economic changes that started with the industrial revolution and led to the rise of capitalism are creating multifaceted externalities. While the digital technologies undoubtedly helped to boost the modern economies' momentum at a global scale, several open-questions, *wicked problems*, are being raised over the sustainability of a turbulent capitalistic system, making the present scenarios far from any previous techno-optimistic view, and urging global leaders to promptly intervene.

For many decades we have relied on the reassurance that technological progress has always been capable of cleaning up after itself at the expense of later generations (Agar 2015, 10-24). But challenges such as climate change, scarcity of resources, the instability of financial markets, and a growing and aging population call us back to the present reality, urging for immediate action and global answers. In this path of global disillusion, while the old dreams of deregulated progress are fading out, regressing to mere hopes, people are now actively calling for their replacement (Linehan et al. 2014).

Rear-view mirrorism is a defining trait of moments of progress and innovation (McLuhan 1964, 92-114), including the digital era. But we are learning at our expense that marching backwards into the future becomes tricky when the speed is too high. Never before like today have we felt the need of shining a light onto the future of our social, technological and physical environment while its systemic entropy is increasing, complicating our capabilities of participatory analysis and informed decision-making.

As the desire to re-discuss the status quo and to face the negative externalities is generating a new wave of interest, new media tools, languages, constructs and platforms are naturally emerging in order to satisfy this unmet need, facilitating an active debate around alternative visions for the future.

In less than a decade, interactive digital media such as social networks, video-games, and web pages, rapidly converged into the smartphone, a device that added a new and powerful dimension to computerization: context awareness. Through the combination of ambient sensors like motion sensors and geo-localization, smartphone-enabled interactive media are assuming mature forms and enabling interactions that would have not been possible before. While the smartphone is being erected as a symbol of the convergence of digital modes (De Sola Pool 1983, 23-54), it becomes the driver of enormous social change too. With a few taps on the screen, contextual real-time information can be accessed and delivered, enabling behavioral change in almost every service, from tourism, to transportation, to commerce.

Social media undoubtedly represent a relevant "demotic turn" (Turner 2010, 71-97), increasing the visibility of the individuals and their enhanced capacity to break news, voice their opinion, relate to each other and produce/distribute content. They made online participation easier and contributed to the configuration of bottom-up processes among networks of people, companies and institutions (Björgvinsson et al. 2010, 41-50) allowing the Internet to evolve from an indexed repository of multimedia contents to an alive network, capable of reaction and proaction.

While they represent an extremely powerful platform for enriched communication, digital media are not enough to constitute a viable platform for empowering society to create new collective goals that emerge when the common understanding of society is accessible and strong images are used to spark a common creative or collective consciousness (Durkheim 1964, 309-315). Digital media's intrinsic speed has made information extremely transient and present-oriented in its nature, often lacking accuracy and overall quality.

Nonetheless, the collision between traditional and new media onto a common digital platform is enabling a series of combinatorial contaminations (Arthur 2009, 20), contributing to the emergence of a new form of mass-self communication and bottom-up power structures (Castells 2013, 58-70). These contaminations are contributing to a twist the process of media convergence, moving it far beyond the mere technological focus on channels' interconnectivity. New channels are shaping the informative contents, and at the same time new typologies of contents are calling for channels' evolution.

In this continuous and accelerating process, while nowadays many aspects of our lives are growing dependent on portable devices such as smartphones, the technological scenario is starting to explore the opportunities offered by embedded computing. The molecularization of computing power in objects and spaces is giving birth to new, more natural interactions that happen in the physical domain but connect us with a cyber one.

Elements at the crossroads of traditional media, art, design, ethnographic research and future studies are being swallowed up by this twisted convergence process; they are contributing to the creation of new communication opportunities where digital merges into the physical, where an active audience is both psychologically and physically engaged, provoked and "sensitized" and where information can still be fast, immediate, but also accurate, deep and effective.

In these new mediatic frontier, immersive interactive experiences allow the creation of new meanings, with the goal of igniting a global bottom-up discussion over contemporary challenges, while the beneficiaries keep marching onwards, constantly looking into alternative futures.

If it appears increasingly difficult to tackle many of the contemporary "wicked problems" through a traditional disciplinary approach (Ito 2016), this is the time for new disciplines, situated at the crossroads of channel and content evolution to emerge.

The Role of Design

Design has an extremely relevant role in modern society. It can be defined as the thought process comprising the creation of an entity (Miller 2005). Design is a factor of influence, and its applications today span from art, to products, services, platforms, interfaces, organizations, and even cities. Design is everywhere-- it started merely as a way to conciliate aesthetics and functionality in products, enabling mass production and continuously introducing novelty. Then, riding the industrial revolutions' waves, design quickly became an important driver for product innovation in many sectors, including consumer electronics, fashion, housing, and appliance.

Triggered by the economic and social reshuffling of the last decades, design has been deeply and constantly evolving, moving from products' form factor to interfaces and services, to a holistic discourse over the "experience" around physical and digital creations, and it has even become a driving force behind entire corporate strategies (Hertenstein et al. 2005, 3-21).

As the borders between hardware and software become blurred, design is concerned with every aspect of storytelling, creating both tangible and intangible value around things that go beyond the aesthetic perception. Behind every project, from a remote control to a smartphone app to a museum installation, creating a compelling story is crucial for the designer in order to affect people's perception of the ordinary and the extraordinary, actively transmitting values around which the creative process takes place.

Interface design played a dual role in the process of digital convergence: it conciliated the interconnection among different media platforms through the redefinition of interaction patterns, and it allowed the emergence and the diffusion of new media, enhancing the usability of communication platforms.

In this process, digital art acted at the frontier of the interaction design experimentation, crafting inevitable and surprising experiences where the designer acts as a choreographer, reminding the user that every interface can be at the same time a window and a mirror, reflecting the user's identity as he/she is exploring new dimensions (Bolter and Gromala 2003, 1-28).

Following the emergence of digital media, design expertise evolved from focusing only on the shape of things/industrial products (system hardware level), to deeply affecting the way in which contents are presented (software/interface level), and then to dealing with the systemic integration of physical and digital objects into holistic experiences. Looking at Sir Jonathan ("Jony") Ive's job description on Apple's website we clearly see this aspect: "Jony is responsible for all design at Apple, including the look and feel of Apple hardware, user interface, packaging, major architectural projects such as Apple Campus 2 and Apple's retail stores, as well as new ideas and future initiatives."

Designers are gradually becoming capable of mastering and leveraging on new digital technologies and media to enrich their creative process and to transform their relationship with their end-users and their nature of creators. Their role is rapidly evolving from being "deus ex machina", mainly focused on style (radical design) to "experience orchestrators", leveraging on pluralism of ideology and values that gravitate around products and services.

Today, design can be used as a means of speculation on how things could be, in order to offer new perspectives about the so-called "wicked problems" of modern society. It can allow an individual to open windows on the future in order to better understand the present (Dunne and Raby 2013, 12-20), and to make the user empowered and responsible for his/her present decisions. This is the fundamental evolutionary principle behind the emerging discipline of design futures.

Design Futures

Design futures is a discipline developed at the crossroads of design fiction, interaction design, ethnographic research and future foresights. Starting from a data driven observation of present and past trends, and leveraging on key anchor points (artifacts and/or experiential settings) it aims at creating engaging future-projected experiences, with the goal of inspiring people, increasing their awareness on contemporary challenges and their willingness to act and to responsibly impact on the future.

Design futures does not deal with the future of design, but with the role of design in shaping future alternatives. As we live in a liquid modernity (Bauman 2013, 168-201), characterized by the absence of safe nests, on each individual rests the responsibility and the opportunity to sketch a different vision of the future. Through design futures, the designer provides the platform, the setting that ignites the discussion.

The design futures discipline derives its defining traits from several fields; design fiction is probably the closest one. It shares some aspects with design futures, including the use of diegetic prototypes to suspend disbelief about change, and it derives its scenario-setting techniques and forward-looking approach from it, together with a deep engagement of designers with imaginary objects and future speculations (Sterling 2005, 25-44).

While design futures shares design fiction's aim to engage a broader population in reflecting on the implications of technology and human behavior (Linehan et al. 2014, 45-48), in design futures' projects each proposed scenario is not just possible but often preferable, as a consequence of present actions. Therefore, the utopia or dystopia that characterized many speculative design fiction projects is set apart, and leaves space to a more pronounced positive realism, founded in data-driven research and thoughtfully designed prototypes.

Another cornerstone influence comes from interaction design (often abbreviated as IxD). Interaction design deals with every aspect related to the human interaction with machines, devices and information systems (Saariluoma and Isomaki 2009, IX-XV), with the goal of creating usable and practical products, services and experiences. It represents a shift of focus, from "what a thing does as we use it to what we do in the acts that define use, and from the

visual presentation of spatial form to the act presentation of temporal behaviour." (Hallnas and Redstrom 2006, 15-26).

IxD's role in design futures is prominent and fundamental in order to determine the value of a communication service to its users (Thackara 2006, 97-111); in this case, the quality of the experience brought to fruition. IxD affects the user's perception of both physical and digital artifacts, and his/her interaction with them. In design futures projects, the designer applies interaction design principles to artifacts and spaces, making them believable and accessible.

To support this defining trait, behind every project lays the combination of strong ethnographic research with a future foresights perspective, that is key to establishing a link between consumers and the future (Cooper and Evans 2006, 68-74).

While ethnographic research provides a solid data basis, setting the window perimeter and the rules of the game for the possible futures, the scenario-learning technique condenses the data and transforms them into experiences, enhancing the beneficiaries' decision-making opportunities.

Borrowed from future foresights techniques (heavily used in strategic management), the scenario creation process considers a combination of unfolding events that are quite predictable and others that are not, in order to project a wide assortment of possible futures that are based on the combination of information with imagination (Fahey 1998, 3-38), instead of pure imagination.

Due to its intrinsic trans-disciplinarity, we can find design futures' projects in many different contexts. For example, universities' design degrees promote speculative projects as student outcome, where the focus is no longer in solving a specific user's problem, but in seeking new opportunities for applying design principles to engage a broader discussion.

In *The Future of Meat*,[1] designer Madelaine Berlis created for her master's thesis (at Coburg University) a video installation showing five potential future scenarios about meat consumption in 2050. Each scenario is located in a specific room, and visitors are free to explore the different possibilities in their preferred order. In a "Lab Meat" room, meat scientists are capable of 3d-printing food, artificially inserting all the nutrients that replicate those in organic meat. In the "Less & Local" scenario, meat is available in small portions from local farms and is more expensive but more environmentally friendly. In a "No Meat" scenario, all the population has become vegan and is taking synthetic vitamin supplements, while in the "Insect Meat" room, insects' consumption completely replaces meat's consumption. Finally, a "Doing nothing" scenario is presented.

Each possible future is accurately described analyzing the impact on carbon footprint, nature, agriculture, and cities, heavily leveraging on scientific data to support the assumptions. A strong data foundation is evident in the team's composition, which includes scientific advice coming from the CE Research Center in Delft and with the collaboration of food scientist Marika Kinshofer.

As Berlis recalls, "the research forms a base for the story of the installation, but the scenarios shown in the five movies are founded on experiences and on questions like: what would a kitchen in the future look like? What can you probably see when you look out of the window?"

Research has been condensed and simplified in order to easily meet a broader audience. In a "No Meat" scenario, for example, it is stated that it would be possible to preserve the current diffusion of rainforests, since there won't be the need to feed animals with grass and soy (95% of cultivated soy is presently used to feed animals). Meat substitutes will need a longer agricultural processing chain than fruits and vegetables, and processing facilities would need to be built in the city.

Visitors are free to pick a preferable setting and encouraged to think about it, stimulated by the physical experience combined with some take-away material: a newspaper that recalls the different options and adds some data evidence. "The aim of the newspaper is that people can have a quick overview of the different scenarios and can see the scientific background without having to read multiple papers on the topics" – says Berlis – "This was the way for us to simplify the data in order to meet a broad audience. Consequently, visitors would in the end choose their favorite scenario based on an emotional experience and scientific research."

The Future of Meat is a platform for conversation, a multimedia physical-psychological experience that encourages discussions from an objective point of view.

---

[1] http://www.thefutureofmeat.com

In another example, design futures is used by the public sector to engage the audience in a policy-making journey.

Designed for the Universal Exposition held in Milan in 2015 by Netwerch architects, the *Swiss pavilion*[2] is centered on a clear message that encourages reflection on individual responsibility, the equitable distribution of food and sustainability. The pavilion consisted of four towers made of glass and metal, each filled with a predefined quantity of Swiss products (water, alpine salt, instant coffee and dried apples) accessible to visitors from the top with elevator assistance.

Once inside each tower, visitors can take as many of the products as they want, but in doing so, they cause the floor to progressively lower, physically expressing the concept of food scarcity and raising awareness on its consumption, through a ludic interactive experience[3]. Each tower is filled with exactly the right quantity of food to satisfy a fair consumption, but since people do not often act cooperatively and have a tendency to overconsume, it is possible to enter into a tower that is already empty.

The towers are therefore conceived as living buildings, and their presence is reflected and amplified in social media, where an extended audience can check their status in real-time, and where the conversation continues.

In another example, on the occasion of the government summit in the United Arab Emirates, the Prime Minister's office of Dubai decided to embrace the multi-sensorial power of an exhibition to show prototypes and stimulate questions regarding new potential government services. Held for the first time during the 2014 Government Summit and repeated for the 2015 and 2016 editions, the Museum of Future Government Services, directed by Tellart, gained enough interest to spark the birth of a permanent Museum of the Future, scheduled to open in 2018.[4,5,6]

The 2015 Museum of Future Government Services included a section dedicated to the future of personal transportation. Questions raised include this one: "in a future where self-driving cars will move people and goods inside and between cities, how should the internal car space be repurposed?"

In the room, three different concepts of self-driving car interior are presented: a government service car could provide on-demand services to citizens while they are on-the-move, while a public gym car can help people to get fit on their daily commute, and a shared office car can conjugate the productivity and mobility needs. Visitors can explore the revised versions of the cars, and consider the role of the new fittings in reshaping the use of this more than a century-old transportation system.

This is just an example of the content that the museum can have, and the declared mission of the institution is to connect designers, technologist and business people to create prototypes for the future of living and the city. The Prime Minister's office of Dubai, HH Sheikh Mohammed bin Rashid Al Maktoum, declared that "the future belongs to those who can imagine it, design it, and execute it. It isn't something you await, but rather create." This way of approaching foresight and innovation is not just the core of the Dubai's museum but a core principle of design futures.

On a more systemic and scientific level, MIT Senseable City Laboratory's "DriveWave" project[7] allows users to play with a scenario in which traffic lights are replaced by "intelligent intersections" where flows of self-driving vehicles, pedestrians and bikes are smoothly automated and integrated by a digital traffic controller.

The DriveWave installation allows visitors to interact with a physical cockpit, in which two models of the intersection are built: by simply moving levers, visitors can increase or reduce the flow of cars and include pedestrians in the simulation. A real-time video shows what happens in an automated intersection with respect to a traffic-light regulated one. On another screen, graphs summarize the main benefits on cumulative pollution and average delay per car.

MIT's DriveWave simulation leverages on a scientifically accurate model based on advanced mathematical algorithms, but thanks to a proper fitting, the multidisciplinary team behind the project has been capable of making the installation comprehensible and usable by even a six-year-old child.

---

[2] http://www.padiglionesvizzero.ch/en/swiss-pavillon-2/the-towers-3/

[3] http://www.inexhibit.com/case-studies/milan-expo-2015-swiss-pavilion/

[4] http://motf.ae

[5] http://www.thenational.ae/uae/dubai-museum-of-the-future-exhibit-opens-to-public

[6] http://www.tellart.com/project/mofgs-2015/

[7] http://senseable.mit.edu/wave/

These examples, coming from students' projects, government initiatives and research labs, show the versatility of design futures techniques and are extremely useful to remark on several peculiar and unique aspects.

The ultimate goal of design futures is to promote collective debate: by proposing possible scenarios' alternatives, by letting people interact, playing with future projections/scenarios and consciously determining what kind of actions they need to pursue in order to get there, design futures stimulates participation and collective discussion.

It provides a window on the future, showing what is possible in terms of concrete alternatives that can be actively chosen by people, and demands the beneficiaries perform a self-reflection and later determine what is preferable. Design futures is about both the future, and the present reflection into the future, at the same time.

Design futures projects are extremely transversal and versatile in their nature. Not restrained to be only located in museums, they can become a tool for policy change, research validation, and corporate communication. In each project, the artistic and the scientific approaches collide: the designer is no longer a solo-player in the creation process but a platform orchestrator. The collaboration with other professionals, including data scientists, digital artists, economists, and ethnographers is crucial to differentiate design futures from design fictions' speculative aims. From a back-end perspective, it is therefore possible to read design futures projects as collaborative creative platforms, where different experts give their creative, scientific and artistic contribution under the coordination of the designer, who acts as an orchestra director.

Thanks to design futures, design becomes a communicative platform upon which other media (traditional and new) can coexist, combine, and evolve. It provides the ideal setting for a new typology of communication to take place. If traditional media have always had a central position in shaping societies and digital media are contributing to the evolution of this role (Thompson 1995, 44-80), the premises for the design futures' discipline are therefore positioning its role very close to those media.

As in the 1950s, when the Japanese rise of techno-visions of robots and automation fueled the public imagination and contributed in the following decades to the rise of leading economic and industrial power in the field (pushed by pop-icons like Doraemon and Astroboy), design futures pushes this concept to the next level, taking advantage from the influence of both physical/digital media and from the expressive and dialogic intrinsic power of design.

Design Futures and Media

This last section of the paper is dedicated on the close relationship that occurs between design futures and media. If science fiction uses the novel or the movies as media to "predict" and offer visions and perspectives of the future, the practice of design futures can be considered as a convergent medium by itself. It makes use of experiential/interactive settings, like exhibitions, alternate reality games, immersive virtual reality, and connected objects to engage communities into a co-definition of possible future alternative scenarios based on data facts and simulations. If science fiction, which once celebrated the future, has turned dystopian (Vance 2015, 13), design futures restores an optimistic and participated view on the future, starting from the present.

As we have seen in the previous section through the exploration of different examples, design futures' projects can make use of traditional and new media at different levels. The presence of old and new media in the projects can take place at different levels of depth, and it is possible to highlight a common media stratification/structure in every design futures initiative.

At Level 0, traditional and new media can be combined as tools in order to create the scenarios. In "The Future of Meat", for example, the team heavily insisted on the fictional video-clip as the main vehicle for the description of possible futures, while MIT scientists in "DriveWave" developed a simple physical interface to allow users to interact and play with the scenarios. In the Expo 2015 Swiss pavilion, most of the experience pivoted on traditional media such as printed text, while other interactive media were used at Level 1 to increase the reach of the initiative, allowing both visitors and non-visitor to keep a connection with the physical installation.

At Level 1, media are used to extend the fruition of the installation and to allow the discussion to continue. In "The Future of Meat", the newspaper was used to allow visitors to

carry on their thoughts and deepen their knowledge on the scenarios while visiting the installation or once back home. Moreover, as reported by the chief designer Madelaine Berlis, thanks to digital media the experience can be extended to a broader audience; starting from the digital buzz generated by the physical visitors, digital media allow the designer to collect data on a larger scale, igniting a feedback loop with the physical installation. Berlis states, "So far, digital media has not played a substantial role in the installation itself but we are planning to design an Internet platform where people can see the videos online and vote for their favorite scenario."

In line with this approach, the EXPO 2015 Swiss Pavilion offered online visitors the possibility to remotely visit the installation through a "virtual tour" and to track the towers' resource levels directly from the website, where additional information on food scarcity and responsible food consumption is presented. Still at Level 1, traditional monodirectional media such as newspapers and TV contribute to generating resonance around the installations, providing free advertising, and attracting visitors.

At a higher level (Level 2), we can see the design future discipline as a new medium by itself, a bi-directional platform where communication flows can take place between the designer (and his/her team) and the direct beneficiaries (an installation's visitors), a tool that promotes debate between the beneficiaries (Level 0 and Level 1 beneficiaries). From this perspective, design futures leverages both on the synthesis of current media trajectories and on a necessary multi-disciplinary content hybridization. The resulting language is suitable to target the "wicked problems" of the contemporary society by creating mirrors in the present and windows on the future. Design futures, like most of the media, therefore acts as a spark for behavioral change.

According to Neuman's definition on the characteristics of an emerging medium (Neuman 1991, 48-76), we clearly recognize that design futures can alter the influence of distance (in this case spatial and temporal distance, by bringing the future scenarios into the present), can increase the depth of communication (not necessarily its speed), can enable interactive communications, and can permit the merging of different media forms.

Finally, at Level 3, we can see media not as tools but as the protagonists of design futures initiatives. Here designers, media specialists, sociologists, ethnographers, computer scientists, artists can act in two ways. They can embed new mediatic experimentations on a scenario structural level, in order to support a desired storytelling; or they can set up entire projects that are explicitly conceived and dedicated to the future of media, engaging visitors in the discussion. This option, which we can call "media design futures", represents a great chance for us to collectively anticipate the experience of future media and determine the road ahead.

We already know that new emerging technologies like AI, robotics, virtual reality, and smart environments will be the key ingredients of future media, but the lack of sight on the possible scenarios of application is resulting in anxiety and skepticism.

As science fiction played a key role in helping people to dream about the future of media in the past century, setting an often utopic polar star, now is the time for design futures to allow people to actively contribute to the co-definition of the future communicative tools, proposing possible trajectories, uses and evolutions of the way in which humans and machines communicate.

Therefore, it is clear that there is not a single perspective from which to codify design futures initiatives. Each project can open up several different layers of interpretation that are the result of the inherent complexity and multidisciplinarity of the topic.

Conclusion

With this paper, we aimed at shining a light on the emerging discipline of design futures. This preliminary work is conceived to be a foundation upon which many other aspects of design futures need to be explored, and many other research questions will arise and find their answers. Due to the involvement of different disciplines, we hope that the topic will be approached from multiple angles, and we are confident that an in-depth analysis of the different contributions will enlighten new mechanisms and constructs, refining the theory.

How can science be simplified in order to meet the needs of a broad audience? What is the best time frame of a design future project to guarantee a proper level of accuracy? To what extent are private and public companies innovating by leveraging on design futures techniques? How will the evolution of media be influenced by design futures? How should a museum maximize the fruition of these installations? Will the role of museum change from being conceived as "elitarian cultural centers" to the new agora, where public opinion is exchanged

and policy making is promoted? What are the challenging implications behind the rise of artificial intelligence? What impact can virtual reality have on design futures? These are just some of the many open questions that we hope will stimulate a debate among both academics and practitioners.

Acknowledgements

References

Agar, Nicholas. *The Sceptical Optimist: Why technology Isn't the Answer to Everything*. Oxford: OUP, 2015.

Bauman, Zygmunt. *Liquid Modernity*. Malden: Polity Press, 2000.

Björgvinsson, Erling, and Pelle Ehn, and Per-Anders Hillgren. "Participatory Design and Democratizing Innovation." *Proceedings of the 11th Biennial Participatory Design Conference*. ACM (2010): 41–50.

Bolter, Jay David, and Diane Gromala. *Windows and Mirrors: Interaction Design, Digital Art, and the Myth of Transparency*. Cambridge: MIT press, 2003.

Castells, Manuel. *Communication Power*. Oxford: OUP, 2013.

Cooper, Rachel, and Martyn Evans. "Breaking from Tradition: Market Research, Consumer Needs, and Design Futures." *Design Management Review* 17.1 (2006): 68-74.

De Sola Pool, Ithiel. *Technologies of Freedom*. Cambridge: Harvard University Press, 1983.

Dunne, Anthony, and Fiona Raby. *Speculative Everything: Design, Fiction, and Social Dreaming*. Cambridge: MIT Press, 2013.

Durkheim, Emile. *1893, The Division of Labor in Society*. New York: Free Press, 1964.

Fahey, Liam. *Learning from the Future: Competitive Foresight Scenarios*. New York: John Wiley & Sons, 1998.

Gibney, Bruce. *What Happened to the Future? Founders Fund*. Accessed May 14, 2016. Available at http://foundersfund.com/the-future/

Hertenstein, Julie H., and Marjorie B. Platt, and Robert W. Veryzer. "The Impact of Industrial Design Effectiveness on Corporate Financial Performance." *Journal of Product Innovation Management*, 22.1 (2005): 3-21.

Hallnäs, Lars, and Johan Redström. *Interaction Design: Foundations, Experiments*. Borås: Textile Research Centre, Swedish School of Textiles, Unversity College of Borås and Interactive Institute, 2006.

Howard, Philip N., and Aiden Duffy, and Deen Freelon, and Muzammil Hussain, and Will Mari, and Marwa Mazaid. "Opening closed regimes: what was the role of social media during the Arab Spring?". Project on Information Technology and Political Islam, University of Washington (2011). Accessed May 14, 2016. doi: 10.2139/ssrn.2595096

Ito, Joichi. "Design and Science." *Journal of Design and Science*, 2016. Available at http://jods.mitpress.mit.edu/pub/designandscience

Jenkins, Henry. *Convergence Culture: Where Old and New Media Collide*. New York: NYU press, 2006.

Linehan, Conor, and Ben J. Kirman, and Stuart Reeves, and Mark A. Blythe, and Joshua G. Tanenbeum, and Audrey Desjardins, and Ron Wakkary. "Alternate Endings: Using Fiction to Explore Design Futures." *CHI'14 Extended Abstracts on Human Factors in Computing Systems*. ACM (2014): 45-48.

Manovich, Lev. *The Language of New Media*. Boston: MIT press, 2001.

Mcluhan, Marshall. "The Medium is the Massage." In: *Understanding Media: The Extensions of Man.* New York: The New American Library, 1964.

Miller, William R. "Definition of Design." Trimtab, Buckminster Fuller Institute 2005. Accessed May 14, 2016. Available at http://www.wrmdesign.com/Philosophy/Documents/Definitiondesign.htm

Neuman, W. Russell. *The Future of the Mass Audience*. Cambridge: Cambridge University Press, 1991.

Saariluoma, Pertti, and Hannakaisa Isomäki. *Future Interaction Design II*. London: Springer, 2009.

Sterling, Bruce. *Shaping Things*. Cambridge: Mediaworks Pamphlets. 2005.

Thackara, John. *In the Bubble: Designing in a Complex World*. Cambridge: MIT Press, 2006.

Thompson, John B. *The Media and Modernity: A Social Theory of the Media*. Stanford: Stanford University Press, 1995.

Turkle, Sherry. *Alone Together: Why We Expect More from Technology and Less from Each Other*. New York: Basic books, 2012.

Turner, Graeme. *Ordinary People and the Media: The Demotic Turn*. London: Sage Publications, 2010.

Vance, Ashlee. *Elon Musk: Tesla, SpaceX, and the Quest for a Fantastic Future*. New York: Harper-Collins, 2015.

Von Hippel, Eric. "Democratizing Innovation: The Evolving Phenomenon of User Innovation." *Journal für Betriebswirtschaft*, 55.1 (2005): 63-78.