ESSAY

.91

Anticipatory Thinking as a Critical Design Skill: About the Design of Tomorrow One-Year Program

Karla Paniagua CENTRO Advanced Design Institute Mexico

Abstract

This paper presents a report of the research and design process of the graduate program Design of Tomorrow, a study program created by CENTRO Advanced Design Institute in 2016. It provides details of the course curriculum, faculty, as well as the learning outcomes. Based on this review, we reflect on the importance of anticipatory thinking as a critical design skill and, to conclude, we examine some challenges and further areas of study.

Keywords: Designing Futures, Second-Order Change, Social Innovation, Strategic Foresight Design, Speculative Design.

Introduction

In this paper we describe the process of creating and developing the graduate specialization course, Tomorrow's Design, a study program offered by CENTRO Advanced Design Institute (CENTRO) since 2016 to train design professionals and implement possible, probable or preferable futures.

CENTRO is a private university in Mexico City focused in training professionals from the creative economy, a sector defined by inventiveness—for example in activities such as design, publishing, museum design, digital media, and others ". . . those activities which have their origin in individual creativity, skill, and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property . . ." (Rossello & Wright, 2010, p.16).

For John Howkins, "... a creative economy is a system for the production, exchange and use of creative products. Economics deals with the problem of how individuals and societies manage to satisfy their wants, which are infinite, and is primarily about the allocation of scarce resources." (2001, p.5-6) Therefore, the creative economy implies a continual use of social intelligence to understand needs and conceive the best means of satisfying them by using the resources available.

About Designing Futures

Future studies emerged as a field of study in the postwar years, a context that left its mark on its identity and subsequent direction. This area of study has since driven the design and implementation of possible,

Journal of Futures Studies, September 2019, 24(1): 91–100

.....

probable or preferable futures, based on the understanding of change; systemic vision as a focus for analysis; the concept of alternative futures; and the interest in increasing the probability of desirable futures (Groff, 2017). For this presentation, we consider tomorrow's design as being synonymous with futures or foresight studies.

Foresight is based on three essential strategies: long-term vision, holistic range, and consensusbuilding. These are blended harmoniously to offer alternative strategies ("Where are we heading?"), strategic assessment ("Where should we be heading") and tactical planning ("How?", "When?", "With what?", and "With whom?") (Miklos & Arroyo, 2008).

This field of knowledge's raison d'être lies in the implementation of solutions for people's welfare and survival, which are aligned with crucial and far-reaching social issues, as shown by challenges such as The Millennium Project (2017), summed up by the following key questions:

- 1. How can sustainable development be achieved for all while addressing global climate change?
- 2. How can everyone have sufficient clean water without conflict?
- 3. How can population growth and resources be brought into balance?
- 4. How can genuine democracy emerge from authoritarian regimes?
- 5. How can decision-making be enhanced by integrating improved global foresight during unp recedented accelerating change?
- 6. How can the global convergence of information and communications technologies work for everyone?
- 7. *How can ethical market economies be encouraged to help reduce the gap between rich and poor?*
- 8. How can the threat of new and reemerging diseases and immune microorganisms be reduced?
- 9. How can education make humanity more intelligent, knowledgeable, and wise enough to address its global challenges?
- 10. How can shared values and new security strategies reduce ethnic conflicts, terrorism, and the use of weapons of mass destruction?
- 11. How can the changing status of women help improve the human condition?
- 12. How can transnational organized crime networks be stopped from becoming more powerful and sophisticated global enterprises?
- 13. How can growing energy demands be met safely and efficiently?
- 14. How can scientific and technological breakthroughs be accelerated to improve the human condition?
- 15. How can ethical considerations become more routinely incorporated into global decisions?

These questions do not fully express the scope of foresight, which can basically be applied to many professional and productive fields, but they do express the humanist vision, ahead of its time, which guides those who use its methods and techniques to find solutions.

Designing the future begins with selecting and researching an area of specialization so that analysts can use this information to identify, document and decipher signals that they read as change markers that can point in various directions, with a type of lamp that indicates to us what is probable, possible or preferable (Conway, 2016, p.34) (Figure 1).

The analysis can be made using different methods and techniques such as the Delphi rounds, structural analysis, and the futures polygon (Glenn & Gordon, 2009). The outcome is a narrative about the events that might happen within 20, 30, 40, or more years. Once this narrative has been written down, specialists return to the present moment and, based on the current context, design tactics that together form strategies to bring about desirable future scenarios or avoid undesirable ones (Conway, 2016, p.56).

..... Anticipatory Thinking as a Critical Design Skill: About the Design of Tomorrow

We must remember that the future is a cultural fact (Appadurai, 2013) and therefore scenarios are created through exercises of collective intelligence, mainly through workshops, discussions, and collaborative prototyping sessions. In short, scenarios are usually created as a result of systematic exercises of conversation and focused analysis.

Some of these narratives are in works such as *El futuro de la Ciudad de México*. *Entre la distopía y las posibilidades creativas* (Arroyo, 2017) and *Sobre el futuro de las escuelas*. *México 2050*, (Paniagua, 2016), texts by students on CENTRO's Tomorrow's Design course and published in the *Nexos* and *Economia Creativa* journals, respectively. These narratives do not seek to predict the future but are designed to be used "as tools to better understand the present and to discuss the kind of future people want, and of course, ones people do not want." (Dunne & Raby, 2013, p.2). In other words, this act of projecting futures aims to inspire and illuminate the present.

With this conceptual framework in mind, in 2014, CENTRO's research department was commissioned to design a graduate specialization course to take the training of designers to a new level. The process is described below and is based on the phases in the design processes as posited by Peter Jones in *Design Research Methods in Systemic Design* (Jones, 2014): strategy, discovery, design, development and deployment.

Strategy

CENTRO's research team conducted an extensive study to identify possible graduate courses that could take design to a new level of complexity. During this phase, the team identified and analyzed 46 national and international study programs; all focused on developing creative skills applied to business, designing public policies and solving complex problems, among other possible solutions. After selecting the most inspiring programs in this area, based on their practical aspects, and their ability to create an intuitive spark, we performed a more detailed analysis of the following shortlist of programs (Table 1), most of which are taught in developed countries.

Program	University	Country
MA in Futures Studies	University of Turku	Finland
MSc. in Foresight	University of Houston	United States
Graduate Certificate in Future Studies	University of the Sunshine Coast	Australia
Postgraduate Diploma in Future Studies	Stellenbosch University	South Africa
MA Arts in Future Studies	Freie Universität Berlin	Germany
MDES Strategic Foresight and Innovation	OCAD University	Canada
MPhil. Programme in Future Studies	University of Kerala	India
MA in Alternative Futures	University of Hawaii	United States
MSc. in Foresight and Innovation	University of Angers	France
MBA in Strategic Foresight	California College of the Arts	United States
MA in Foresight and Futures Studies	Leeds Metropolitan University	United Kingdom

Table 1. Programs

Thanks to Angers, Freie and Turku's programs, we learned the importance of maintaining a permanent dialogue with those think tanks that gather experts around the world, to achieve specific feedback, as well as a network of professionals, mentors, lecturers and invited professors.

.....

The research also allowed us to understand that the programs used different modalities (certifications, postgraduate courses, short and intensive courses, among others). We also observed that the most meaningful curricula were compact (two, three semesters at most), maybe considering the relevance of the students going into the fieldwork as soon as possible.

In the case of the University of Kerala program, we identified a substantial component of quantitative techniques, which constitutes an opportunity area for the case of CENTRO. In the case of the Manoa School of Futures Studies, the program inspired us to include a subject on geopolitics in our program.

Exploring the syllabus and programs, we understood that Futures Studies could nest anywhere on the planet. South Africa, France, the United States, Australia, India, why not in Mexico? Why should the study of the future be confined to developed countries? In this order of ideas, we observed that there was already a Master's in Strategic Foresight in the country, but it wasn't enough.

Finally, the exercise allowed us to understand that the strong affiliation of CENTRO with the field of the Creative Economy should constitute a key feature of our program.

During this stage, we also interviewed Mexican foresight specialists from various think-tanks such as the Club of Rome, the World Future Studies Federation, and the World Future Society. Feedback was also provided from the research team at the Institute for the Future in Palo Alto, California.

From this research it became apparent that futures studies have a proud tradition in Mexico, going back to the 1970s, as exemplified by the work of experts such as Tomás Miklos, Guillermina Baena, Concepción Olavarrieta and Antonio Alonso Concheiro. Today, only a handful of specialists in Mexico work in this field, notably Alethia Montero and Margarita Arroyo, who has worked on fascinating and insightful ideas in collaboration with the experts and organizations mentioned above.

Discovery

The programs selected as a primary source of inspiration share an interest in making futures' design a cross-cutting subject in all areas of life, rather than a set of methods and techniques applied sporadically in time and space. Students on these programs are all game-changers. It was also clear that although these programs are not only targeted at design professionals, they do offer designers an advantage over other professions insofar as they familiarize them with the systematic use of the imagination, prototyping, and iteration of solutions, all of which fundamental for designing future scenarios. Finally, most of these postgraduate courses and certificates encourage the production of written narrative scenarios, but they do not necessarily incorporate the possibilities of visual communication, modeling and 3D printing as tools to facilitate the materialization and communication of the narratives.

Interviews with Mexican experts in futures studies helped us define the graduate profile and become acquainted with the current advisory board of the graduate specialization, as well as to discover a wide range of opportunities, because, at the time of the research, Mexico only offered one officially-accredited postgraduate program in futures design.

Development

The following table (Table 2) shows the original structure and current version of the study program.

..... Anticipatory Thinking as a Critical Design Skill: About the Design of Tomorrow

Table 2.	Structure
----------	-----------

Initial structure (2015)	First-generation structure (2016)	Second and third-generation structure (2017-2018)
History of futures studies	History of futures studies	History of futures studies
Foresight methodology	Foresight methods and techniques, with an emphasis on DELPHI	Foresight methods and techniques, with an emphasis on MICMAC structural analysis
Systems thinking	Systems thinking and change theories	Systems thinking and change theories, including analytical tools
Complexity theory	Foresight intelligence	Foresight intelligence in uncertain and complex situations
Big data and data mining	Disruptive innovation scenarios	Speculative design
Economics and geopolitics	Geopolitical context	Geopolitical context and world order
Symbolic anthropology	Symbolic anthropology	Anticipatory anthropology
Narratives	Narratives for introducing scenarios	Multimedia narratives for introducing scenarios
	Constructing scenarios	Future sounds workshop
End-of-course project	Innovative strategic foresight planning processes	Strategic foresight planning processes
	Social innovation laboratory	Social innovation laboratory

The study program was built around a core of three themes that define the direction of course content:

Foresight methods and techniques. It became clear during the research phase that foresight stands out for offering its tools, instruments, and procedures, described in the manual of The Millennium Project (Glenn & Gordon, 2009) and in *Creating Futures*. *Scenario Planning as a Strategic Management Tool* (Godet, 2006), to cite two essential references. On this basis, we selected the resources that are taught and practiced throughout the program.

Design fiction. Bruce Sterling describes design fiction as:

(...) the deliberate use of diegetic prototypes to suspend disbelief about change. That's the best definition we've come up with. The important word there is diegetic. It means you're thinking very seriously about potential objects and services and trying to get people to concentrate on those rather than entire worlds or political trends or geopolitical strategies. It's not a kind of fiction. It's a kind of design. It tells worlds rather than stories (Bosch, 2012).

As such, the program offers students the methodological resources (storytelling, future theater, creative writing workshops, modeling workshops for future souvenirs, analogous information visualization workshops) so that design fiction can lead to prototypes capable of "make-believe" (Dunne & Raby, 2013, p.90). To what end? To inspire interest groups to head in a specific direction,

.....

either to bring about or to avoid a specific scenario. The synthesis and production of these deliverables call for design knowledge and skills.

Social innovation laboratory. The application of foresight methods, and techniques must focus on solving social problems and the beneficiaries must be involved in devising the solution because they play an essential role in its implementation. Therefore, throughout the program, students are encouraged to carry out fieldwork as participative observers and conduct personal and group interviews, as well as workshops in which they apply their acquired knowledge to release and direct collective intelligence processes.

Improvements to the original program respond to the need to improve students' ability to imagine futures, carry out fieldwork to detect signals, prepare narratives that represent them apparently, and communicate these narratives effectively. In short, the idea is to make the strongest possible impact on the development of an anticipatory vision, an effort involving a significant commitment by the faculty members, students, the advisory board, and institutional directors.

The program is taught by a faculty that includes philosophers, political scientists, journalists, anthropologists and designers, all of whom propose and implement improvements to the experience in each new iteration of the postgraduate course. We also have an international mentor from the Institute for the Future, who visits each year to run an intensive workshop with students to equip them with new tools and inspiration for them to design scenarios.

Deployment

At the time of writing, the third generation of students on the graduate specialization is about to complete their second semester of the program, while the fourth generation is preparing to start their studies (figure 2). So far, we have trained a total of 25 students, most of whom are designers. The program has a completion rate of 80%, and a drop-out rate of 20%.

Students' end-of-course projects have included professional training for department stores, Mexico 2031; futures for neighborhoods in Mexico City's historic downtown neighborhoods, Mexico City 2030; the elimination of plastic waste, Cuauhtemoc borough, Mexico City 2027; a mobility master plan for Mexico City, 2050; involving women in decision-making positions in the federal police department, Mexico 2030; designing clothing with a social impact, Mexico City 2037; and a draft bill to regulate the accumulation of wealth, Mexico 2037.

Each one of these projects is the result of applying foresight tools and suggests various alternative futures designs that must be achieved or avoided through specific tactics. As suggested by their titles, these proposals focus on contemporary social problems, mainly in Mexico City; these issues have led to scenarios in the form of written narratives, 2D prototypes and, from the third generation, objects that students will make with the help of Paolo Cardini (Rhode Island School of Design), an industrial designer and expert in speculative design.

Some of the learning outcomes in the first two years of the program's existence are listed below:

Publication of scenarios in scientific journals

As mentioned above, students and faculty of the graduate specialization have written and published articles jointly; two have already been printed and the third is in the process of being published. The first focuses on the future of schools, and the other two on urban planning in Mexico City.

Immersion journeys

At the request of students enrolled in the program, every year, we organize a journey to develop skills at detecting signs of change. We aim to make these experiences in areas near Mexico City where students can think systematically of scenarios. For example, in 2016, we went to the Large Millimeter Telescope in the Sierra Negra (figure 4)—the world's most massive radio telescope

96

(Puebla, Mexico), and in 2017 to the largest hydraulics infrastructure in the world, the TEO East Emission Tunnel (figure 5), a deep drainage tunnel in the State of Mexico. In 2018, students will go to Malinalco and Chalma (State of Mexico) on a journey to explore the future of religious practices. International mentor Jake Dunagan always accompanies students on these visits, raising critical questions, devising exercises to develop ideas, and leading group discussions.

A fascinating aspect of these activities is that gradually the students and professors from other CENTRO graduate specializations have joined in this experience. For example, this has led to students on the MA Design Studies and the MA City programs to incorporate the vision and methods of foresight in their end-of-course projects.

Keynote Speakers

Experts such as Alberto Chimal (writer), Jim Dator (Hawaii Research Center for Futures Studies), Jose Duarte (Visual Thinking School Colombia), David Millán (IE Business School), Sara Skvirsky (Institute for the Future) have all given conferences or master-classes as part of the program and shared their knowledge with students, who are given the opportunity to have these intensive immersions and speak one-to-one with these leading specialists. In 2018, the third and fourth generation students on this specialization will be working with Jose Duarte and Paolo Cardini to synthesize future scenarios and objects in 2D and 3D, respectively.

Regarding the conferences and workshops for this specialization, it is relevant to note that Mexico City has been named 2018 World Design Capital; one of the themes to be developed as part of the program is the design of urban futures. Therefore, graduates, students, faculty members and Centro itself will be a significant player in the inter-university program of activities throughout the year.

Discussion

At the time of writing, 20% of the projects submitted by graduates of the first two generations of students are at the implementation phase; the rest have remained at the prototype stage. More projects need to be implemented, because otherwise the results of the complex and extensive process of designing scenarios remains simply as a narrative or a souvenir of the future (figure 3) which may have value as a creative product but does not become lodged within a value chain and will not inspire the taking of the best decisions now, something that turns the creative product into strategic design.

Another lesson learned is that technological feasibility, which used to be a requirement of the designed scenarios when the specialization first started, reduces the possibility of divergent thinking (Guilford & Hoepfner, 1971). As a result, from the third generation, this is no longer an essential requirement for projects, in the understanding that solutions that are not yet technologically feasible may become so within a few years.

One of the most exciting observations has been that, by focusing on the understanding and anticipation of change, students on the program experience a change themselves. By thinking systematically about alternative futures and applying this skill to every aspect of their life, students realize that their present decisions do not correspond to the futures they consider desirable for themselves; as a result, they undergo significant transformations during the postgraduate course. In this order of ideas, a pending issue for the following generations is the application of a detailed pre and post-test to observe and follow this variable more formally..

Of the students and graduates of the specialization, 85% agree that the experience has profoundly changed them. Among other effects, this change has been expressed in the students' appearance (14%), way of thinking (71%), job assignments (28%), and place of residence (14%). For 77% of those taking part in the survey, the change has been positive (CIEC, 2018).

The above situation has strengthened the research team's commitment to the students to guarantee that the change, regardless of the form it may take, is constructive and has the right level of intellectual and emotional content. It has also meant this graduate specialization is seen as a form of education that confronts change through change itself; in other words, by becoming highly flexible in the face of new situations to offer a unique experience in each iteration.

In terms of anticipatory thinking, most students and graduates agree that the program has enabled them to develop their skills to imagine the change formally and systematically, as well as to make them more adaptable to it. In this sense, students and graduates consider that what they have learned over the course is a resource that is changing their way of designing and perceiving events positively (CIEC, 2019).

For designers, practicing anticipatory though is easy, because the profession demands them to create objects that do not exist all the time. Perhaps this is one of the main reasons why the combination between design and foresight is powerful.

What makes a difference for these professionals throughout the program are the mindset and the tools to take this practice to a more precise, thicker dimension with more significant social impact. "How to think of futures as a complex design object?" is the crucial question.

At the end of 2018, CENTRO will run a workshop with students, graduates and faculty members to improve the specialization study program. We expect that significant progress will be made in comparison to the first three years of the course.

CENTRO's Tomorrow's Design graduate specialization is itself the result of design with anticipatory thinking. Over the past years we have observed how our graduates have already developed stronger skills for their personal and professional lives, though it will be in the years ahead when we will be able to make a more proper assessment of this initiative impact.

Correspondence

Karla Paniagua CENTRO Advanced Design Institute Constituyentes Avenue 455, America, Miguel Hidalgo, Mexico City, 11820. Mexico E-mail: kpaniagua@centro.edu.mx

References

CIEC (2018). Encuesta a egresados de Diseño del mañana 2017-2018. Mexico: CENTRO.

CIEC (2019). Encuesta a egresados de Diseño del mañana 2018. Mexico: CENTRO.

- Conway, M. (2016). Foresight Infused Strategy Development. A How-To Guide for Using Foresight in Practice. Melbourne: Thinking Futures.
- Appadurai, A. (2013). *The Future as Cultural Fact: Essays on the Global Condition*. Brooklyn: Verso Books.
- Arroyo, M. (2017). El futuro de la Ciudad de México: entre la distopía y las posibilidades creativas. *Economía Creativa*, 8, 188-214.
- Bosch, T. (2012). *Future Tense*. From Sci-Fi Writer Bruce Sterling Explains the Intriguing New Concept of Design Fiction. Retrieved from http://www.slate.com/blogs/future_ tense/2012/03/02/bruce_sterling_on_design_fictions_.html
- Díaz, R. (1991). Los hacedores de mapas: antropología y epistemología. Una introducción. *Alteri- dades*, 3-12.
- Dunne, A., & Raby, F. (2013). Speculative Everything. Design, Fiction, and Social Dreaming. Cambridge: The MIT Press.

98

..... Anticipatory Thinking as a Critical Design Skill: About the Design of Tomorrow

- Glenn, J., & Gordon, T. (2009). Futures Research Methodology V3.0. Washington: The Millennium Project.
- Godet, M. (2006). Creating Futures. Scenario Planning as a Strategic Management Tool, Paris: Economica.
- Guilford, J. Pl, & Hoepfner, R. (1971). Analysis of Intelligence. Nueva York: McGraw-Hill.
- Jones, P. (2014). "Design Research Methods in Systemic Design", *Proceedings of RSD3, Third Symposium of Relating Systems Thinking to Design*, Oslo: Oslo School of Architecture and Design
- Howkins, J. (2001). The Creative Economy: How People Make Money from Ideas, London: Penguin.
- Miklos, T., & Arroyo, M. (2008) "Prospectiva y escenarios para el cambio social". Retrieved from http://www.congreso.gob.pe/
- Paniagua, K. (2016). *Economía y sociedad, Nexos*. Sobre el futuro de las escuelas. México 2050. Retrieved from https://economia.nexos.com.mx/?p=83
- Rossello, P., & Wright, S. (2010). *Mapping the Creative Industries: A Toolkit*. London: British Council

..... Journal of Futures Studies