P/REFERENCES OF DESIGN

ANTHROPOGENIC NARRATIVES: COMMUNICATING AND EXPERIENCING NON-HUMAN PERSPECTIVES.

Francesco E. Guida*[a], Martina Esposito[b]

a Politecnico di Milano, Department of Design, Italy
b Politecnico di Milano, School of Design, Italy
* francesco.guida@polimi.it

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ABSTRACT | The paper explores the implementation of an anti-disciplinary approach within a Communication Design Studio at Politecnico di Milano, focusing on teaching visual identity and experience design through a speculative design framework. Students are encouraged to engage in problem-seeking and problem-finding practices, fostering the development of concepts and scenarios without predetermined functions.

The studio's main outputs are communication design ecosystems manifested through visual identities, experiences, and Communicative Machines prototypes. These artefacts were showcased in an open event/exhibition, inviting external feedback. Anthropogenic Narratives, starting from the assumption of proposing non-human perspectives (e.g., the ones of rocks, sun, moon, or ice), aim to provoke and activate reflections on the relationship between humans and nature. Each subject is treated as a fictional organisation, which communicates through all the necessary elements of a fictional brand and related touchpoints, unfolding futuristic scenarios while involving the human/user in interactive experiences essential to understanding the narratives. The results come from an experimental educational path based on the risk of trying new solutions and techniques and verifying them on a real scale. Design speculations that are not meant to give answers and certainties aim to imagine new questions and reflect on contemporary and future times. A learning path that intends to go beyond the centrality of téchne to encourage the wielding of knowledge.

1. Introduction: Climate Change, the Role of Design and Critical Stances

The relationship between humans and nature needs to be changed, mainly due to the upheavals triggered by human activities within the last three centuries. The topic of climate change causes discussions and debates. However, most public opinion appears to stand still in front of such modifications rather than becoming aware of their role. Discussing these issues, especially in the context of education, is crucial.

Humanity is facing the most complex challenge it has ever experienced. If our Earth has passed through extreme events, such as the Ice Ages, the crisis the world has faced in recent years, although equally severe and urgent, is very different. In this case, it is possible to identify who is at fault, the ones responsible for the dangerous conditions that human beings and all the other ecosystems are experiencing. Earth is over 4,5 billion years old, while humanity has existed for just 200.000 years. Less than 0.04% of Earth's existence was enough to radically change the environment on which all species depend. The Earth has always experienced change, but the peculiarity of this crisis is the increasing rhythm at which these changes are happening. Indeed, climate change is getting worse year after year, and though there is awareness and discussion on the topic, nothing seems enough to provoke serious action.

Though the data related to the possible risks is clear and easily accessible, the changes in people's daily lives are still not enough. According to a report published by the Pew Research Center (Funk & Kennedy, 2016), although most Americans express to care about the environment, only a much smaller percentage declare to "always try to live in a way that helps the environment." Three-quarters declare themselves as particularly concerned with helping the environment in their daily lives. Nevertheless, only two in ten (20%) describe themselves as people who strive to live "sustainably always." These are cases of cognitive dissonance, a psychological phenomenon that occurs when a person holds contradictory values or attitudes and their actions conflict with their beliefs. It often leads to rationalising people's behaviour by minimising the importance of actions or blaming others for the problem (Jonas et al., 2014). Another bias is the so-called diffusion of responsibility, a process underlying the bystander effect that refers to the fact that as the number of people participating in the problem increases, the personal responsibility that an individual feels decreases (Blagg, 2023).

As Mitrović (2018) highlights, "Design, as the driver of modernism, also had its role in the establishment of the so-called 'Anthropocene' (or 'Capitalocene'), which more than ever in human history opens possibilities for extreme catastrophic scenarios that are about to take place shortly." The term 'Anthropocene' refers to the impact of collective human activity on biological, physical, and chemical processes at and around the Earth's surface ("Anthropocene", 2023). Design has always been a driver for innovation. However, the kind of solutions that have been developed were, most of the time, new tools and products, a race to go beyond the old and substitute with something brand new. When humans understood the consequences of this massive production, they started to shift the design processes to the methodology. Mitrović adds:

> "The idea that design thinking as a method could be used for resolving problems in business or everyday life has conquered the neo-liberal world. Through concepts and business models offering methods and tools for 'designing one's own life' [...], this business philosophy tends to transform into a worldview." (Mitrović, 2018)

It is clear indeed that design has played an uncritical supporting role to industry (Auger, 2023, pp. 65–76), determining the situation we are living in nowadays. "Most of the time, without reflecting on the implications of […] [his] actions" (Mitrović, 2023, p. 31).

As affirmed by Auger (2016), “contemporary design is a fundamental part of a postmodern socioeconomic system, inextricably linked to entrenched notions of progress, the manipulation of desire and conspicuous consumption.” Following and contributing to the dogma of progress as a way to achieve a better life, design has paradoxically been left behind by its modernist promises and principles (Colomina & Wigley, 2016), showing the limits of its deterministic spirit. In this condition, it becomes necessary to re-think new roles for design itself (Dunne & Raby, 2013, p. 12).

The rise of user-centred or human-centred approaches testifies to how the anthropocentric perspective has dominated all the aspects of research and production in the design fields (Sznel, 2020; Borthwick et al., 2022).

Norman (2023), the father of user experience design, in his recent book, “Design for a Better World”, states that designers should embrace the need to transition from human-centred design to an eco-systemic approach to humanity. This diverse mindset could help them to have a more comprehensive understanding of their responsibility to the people they design for.
The underlying belief to all these problems, as we already affirmed above, is anthropocentrism, the conviction that a particular species, Homo Sapiens, has some kind of privileged relationship with objects in the world (Caffo, 2017). It is a metaphysical system that considers all other beings as tools to serve humans’ interests (Rao, 2021).

These premises were the starting point from which the 2022/2023 edition of the Final Synthesis Communication Design Studio (Section C1), third year, Bachelor in Communication Design at Politecnico di Milano, took place. The belief is that sustainability-related changes and our connection with the planet require profound critical reflections and a significant shift in perspective, moving away from a purely human-centred view. It is a shift that entails expanding our outlook to consider the perspectives of all creatures involved in our ecosystems, even those typically overlooked, and granting them a voice in the discussion. As a field of practice, design disciplines have “the potential to detect, mediate and generate new relations and to encourage radical imagination” (Mitrović, 2023, p. 35).

Speculative design revealed itself as the perfect framework to do so. It offers the opportunity for an anti-disciplinary approach, using traditional and established design tools and methods to face “wicked problems” (Dunne & Raby, 2013, p. 2): challenges regarding the existence of no immediate or easy resolution, opening discussion in a disruptive way.

2. The Design Studio: Designing Speculations

Through imagination and a radical approach, speculative practice inspires thinking, raises awareness, examines, provokes actions, opens discussions, and provides alternatives needed in today’s world (Mitrović, 2019). With critical thinking, the design of objects generating a story or through the stories embodied in artefacts, speculative design attempts to anticipate the future and, at the same time, helps us re-think the world of today. In that sense, the practices related to Speculative Design reveal this potential and how successful it is as “an experimental environment to test different hypotheses about our lives in the future” (Mitrović, 2023, p. 35).

The statements mentioned above consistently convey the idea that design, specifically communication design, far from being a mere problem-solving framework and a commercial-oriented practice, can also be a tool for exploration and questioning to investigate and face the uncertainty of our contemporaneity. These insights form a fitting foundation for undergraduate teaching, which we will describe and discuss in the following paragraphs. This level of education seeks to equip students with technical skills and a spectrum of soft skills essential for professional practice. But with a robust critical consciousness.
The education path’s main goal, integrating research into and through learning, was to imagine and design possible, if not probable (excluding the preferable) futures, conducting and stimulating intentionally critical reflections on the present.

The main outputs to develop were communication design ecosystems within an anti-disciplinary approach, adopting a speculative design framework. Some developed main elements are visual identities, experiences, and prototypes (called Communicative Machines and at a 1:1 scale) to verify with an external audience.

Another goal of the Communication Design Studio, in terms of critical stances, was to make designers question their ethical role. To link the needs of a world in crisis, asking for action, awareness, and responsibility, to the one of education, the perfect place to stimulate these processes, experimenting with traditional methods and approaches to face severe and unresolvable problems.

In an educational context, adopting such an approach (e.g. Speculative Design, Critical Design, or Design Fiction) offers educators a means to help students develop practical design skills and critical thinking abilities (Helgason, 2020). As an educational tool, it broadens students' perspectives, encouraging them to "think more creatively and critically about the role of design in our shared futures" (Auger, Hanna & Mitrović, 2021, p. 21) and apply design principles across diverse contexts and project types. Most design education programs still adhere to "the modernist rational and functional understanding of design as a problem-solving discipline" (Grakalić, 2020). However, it is increasingly essential for designers to cultivate a capacity for "reflective practice" and learn to function as "researchers within the practice context" (Schön, 1983, p. 68), moving beyond mere problem-solving. It wasn't just a technique or a methodology taught to the students, but the development of a different attitude, the desire for more awareness, that gave birth to projects that demonstrated understanding and judgmental criticism towards something so delicate yet fundamental as the subject of climate change is.

The brief, starting from the assumption of proposing non-human perspectives (e.g., rocks, moon, sun, ice), aimed to provoke and activate reflections on the relationship between humans and nature. As affirmed by Rao (2021), speculative design allows expanding thinking to consider the perspectives and viewpoints of the "other" that lies beyond human experience and perception. All objects, living and non-living entities, have the same degree of being in the world. Through this reversal, the invitation expressed by the brief was precisely to imagine, discuss and speculate how nature could experience climate change.

Each subject was treated as a fictional organisation, which communicates through all the necessary elements of a fictional brand and related touchpoints, unfolding futuristic scenarios while involving the human/user in interactive experiences essential to understanding the narratives. Possible futures, dystopic narratives, and alternative realities are used to change the present (Inayatullah, 2020).

In this educational path, Communication Design is used to validate speculation: the speculative process is correct when design artefacts can effectively convey it, and vice versa. Design should not be considered a mere self-reflective practice but a powerful communication tool to promote speculation, critical if not political positions (Mehl & Höfler, pp. 13–14).

Students are organised into small teams and taught to traverse disciplinary boundaries and embrace a critical stance towards an apparently fixed discipline, such as Communication Design. It is a matter of fact that Communication Design, usually intended as the area concerning the design of communicative artefacts and specifically of visual kind (Bucchetti, 2020, p. 117-118; Lussu, 2010), has nowadays expanded its boundaries, becoming more of an open context with blurred borders (Grimaldi, 2009).

The applied iterative process views experimentation as a pathway to finding solutions, even in domains where teachers, professionals, or students may lack complete mastery (Triggs, 2003, pp. 7-17). During the prototyping phase (from initial development to final stages), students adopt a 'learning by doing' approach, embodying something akin to the concept of "thinkering" (Antonelli, 2011), whereby a conclusive outcome is achieved through successive collective refinements. Berglund & Grimheden (2011, p. 737) affirm that experimentation and prototyping entail iterations of "trial and error", a pivotal aspect across various stages of response development, from design conception to ultimate implementation. The prototyping phase is crucial, and students are introduced to using Arduino and some coding

environments to promote technological fluency (Lukens & DiSalvo, 2012). In this educational setting, the goal is not to specialise but to become literate, as Reas (in Cangiano, 2016) explains. That means understanding which tools best bring concepts to life. Students are not restricted to using specific mediums; they are encouraged to explore different technologies to find the best fit for their project, whether print, three-dimensional space, or code.

The educational design process is grounded in an anti-disciplinary (Ito, 2016) and evolutionary concept, rejecting a rigidly fixed design methodology. Characterising the teaching approach as anti-disciplinary implies transcending mere multidisciplinarity, avoiding narrow specialisation within Communication Design education (Childress, 2016). Embracing an anti-disciplinary stance entails drawing from diverse sources to envision novel possibilities rather than confining oneself to a single domain (Brin, 2016). This pedagogical strategy, underscored by a critical perspective, prioritises unconventional problem-solving paradigms, encompassing problem-seeking initiatives and problem-posing inquiries (Blauvelt & Davis, 1997, p. 80).

The proposed methodology and educational objectives must acknowledge that the Final Synthesis Communication Design Studio in the third year represents the culmination of undergraduate students' academic careers. It serves as a platform for integrating the knowledge and skills acquired in preceding semesters, with coding and prototyping augmenting those associated with communication design and visual systems. Overall, the final project allows students to deal with a hybrid, transversal dimension of Communication Design, not necessarily closed in a specific area. In these terms, as Bernstein (2011) commented, "fluency with technology often draws on knowledge, skills, and approaches that cross traditional disciplinary boundaries."

By embracing a speculative design approach, students gain exposure to diverse media and tools that transcend traditional design domains and methodologies. This approach enables them to experiment with various methods, tools, techniques, and instruments and draw insights from other practices and disciplines. However, another pertinent consideration is the notion, as mentioned above, of technological fluency, which entails navigating between different domains and perceiving the boundaries separating inquiry areas as permeable (Crow, 2008). Lukens & DiSalvo (2012) affirm that speculative design and technological fluency are inherently cross-disciplinary and integrative.

In conclusion, Speculative Design offers a versatile approach that transcends disciplinary boundaries, fostering creativity, critical thinking, and technological fluency essential for questioning contemporary problems and addressing future challenges.

3. Anthropogenic Narratives: Case Studies and Exhibition

The learning process of the Communication Design Studio can be summarised in five main parts, as shown by the Speculative Overlapping Double Diamond model (Fig. 1) (Isidori, 2023): Exploration, Speculation, Communication, Interaction and Making. The overlap of the various phases, defined as Synthesis, is effectively the moment of transformation into key intermediate project outputs.

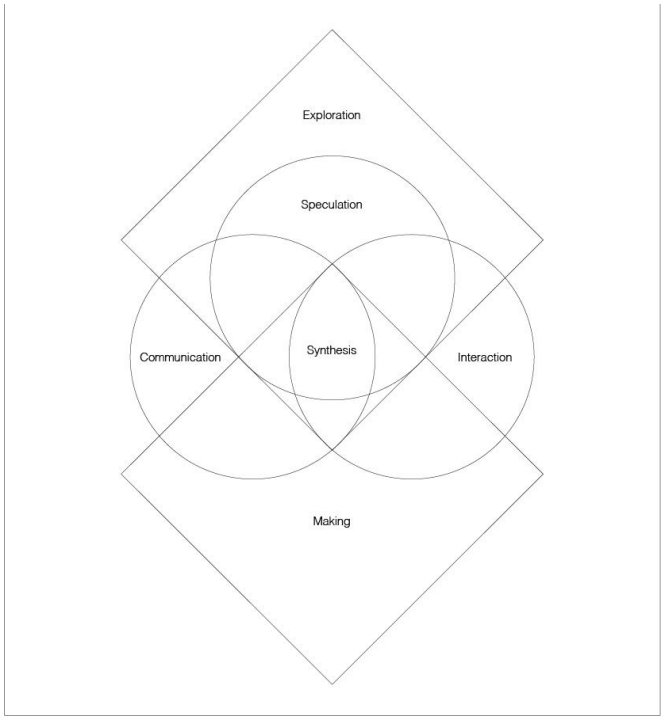

Figure 1. Speculative Overlapping Double Diamond Model (Isidori, 2023).

Students undergo diverse stages of the design process in each phase as they progress towards their final project. However, as emphasised by Frascara & Winkler (2008, p. 7), this process is not merely "reduced to a mechanistic set of steps", as "method without imagination contributes very little to the design profession and the solution of complex design projects." They collaborate in groups of 4 up to 6 individuals. Upon receiving the overarching theme (climate change), each group must delineate a specific perspective on the assigned subject (e.g., rocks, moon, sun or ice) and a corresponding scenario to address. Thus, they are tasked with identifying and dissecting a problem through analysis and research, operating within the realms of Exploration and Speculation. Leveraging human superstructures and organisations as valuable subjects, they employ fictional branding to "represent" their narrative, drawing upon competencies and skills acquired during the Bachelor's initial two years (4 semesters).

Subsequently, the focus shifts towards defining a concept and communication strategy and its multidimensional and multichannel execution (utilising touchpoints and selected media). Additionally, the students delineate the main functions, meanings, and contents of the Communicative Machine. Aligned with their concept and strategy, they devise a visual identity that ensures consistent communication across two- and three-dimensional outputs. They gain confidence in designing complex systems and transitioning into Communication and Interaction, where they begin synthesising the project.

A relevant phase is the prototyping one (Making), which encompasses both digital and analog realms. Students are encouraged to independently acquire any lacking skills, particularly in digital design, coding, and prototyping, while receiving guidance from instructors to refine their projects. Each member assumes a specific role within the group based on their interests and skills. Central to this critical pedagogy is the acknowledgement, rather than dismissal, of students' social experiences and cultural affiliations, which serve as lenses through which they perceive the world and mirror the audiences they aim to engage (Blauvelt & Davis, 1997, p. 80).

The primary outputs, the so-called Communicative Machines, are objects, installations, or interactive devices realised as prototypes for testing and verification. These objects are at the centre of narratives and intended to be like 'deus ex-machina', allowing the users outside the narrative to interpret the provocation and jump into the narrative. Other communication artefacts support this narrative; all the designed touchpoints ultimately enable the user to comprehend the world proposed (the story). All these objects, or

artefacts, produce the story's context appropriately and plausibly (Appadurai, 2013, pp. 355–364). Considering the given main subject (climate change), it was obvious to look for other kinds of stories and new worldviews to establish value and behavioural coordinates suitable for current and future conditions. The communication ecosystems (touchpoints, artefacts, interactive devices) are the narrative systems.

The premises that define each result are real: true data and actual risks humanity faces or will have to face because of climate change, conduct the scenario building and the concept development. This information is filtered through the judgment of an outsider spectator, who could be either victim, cause, or completely excluded from the phenomenon. It is preferable to consider different potential visions of the future as part of a participative journey toward centring a shared vision. When involving multiple stakeholder groups, it is important to acknowledge that each group may be concerned about a different set of issues and hold a different and conflicting set of values that could influence their choice. The intention was to promote an informed debate on a set of visioning scenarios and not to choose one in particular as 'the way forward' (Meadows & Kouw, 2016).

In the next paragraphs, we will briefly describe four case studies of the eleven projects produced in the 2022/2023 Communication Design Studio. The description considers the elements (moon, ice, rocks, sun) and their perspective on climate change. At the end of each case study, there is a link to a full description, images, and videos useful for complete comprehension.

If we consider, for example, the rising sea level, two completely different approaches and scenarios have been developed depending on the different positions and the involvement of the natural elements in consideration.

3.1 Moondo

The moon is an outsider participant in the climate change crisis. However, it contributes to the damages provoked by its effects. Its perspective is neither worried nor angry; on the contrary, with great irony, it takes advantage of the situation to make some profit, extending its influence and power.

The narration begins in 2030, and sea levels, triggered by global warming and moon activity, caused the flooding of several coasts and the abandonment of many cities. Moondo (Fig. 2) is a travel agency that takes advantage of the new environmental conditions and turns the submerged cities into perfect tourist destinations. The company offers numerous activities in each city, such as kayaking, paddle surfing, snorkelling on the surface, and scuba diving in the deep. Moondo transforms what would have been abandoned cities into the most fascinating places to visit. An interactive device, through the selection of geographical area, moon phase, and year of interest, allows the users to have a complete forecast of the floods that will occur within the next 120 years and find out the next available destinations and activities. The prototype has the shape of a computer, with a sloping top for the screen and a horizontal bottom for the controls. The structure was made of wood, then sanded, treated, and enamelled, with some elements in plastic and plexiglass. Arduino UNO Base connects the hardware with JavaScript, HTML, CSS software, and certain libraries and APIs. The libraries used were P5js, Jquery, and OpenLayers, which allowed the generation and interaction with the maps displayed during the interaction and made them available through a real-time data request service to Maptiler.

The final part of the Moondo experience consists of a video that, based on the user's choices, shows what activities they can do in a particular year, on a specific coast and in a certain phase of the moon.

Figure 2. Moondo: advertisement, website landing page, the Communicative Machine, a screenshot of the selection process. Authors: Guglielmo Basile, Matteo Dell'Agostino, Arianna Marenghi, Marta Piatti, Chiara Provana, Ilaria Urgesi, Davide Vitrano. Source: https://anthropogenicnarratives.labsintesi-c1.info/projects/10_MOONDO.html.

3.2 I.C.E.

Ice's perspective is very different from the previous one though the project also reflects on the problem of the rising sea level. This element is indeed greatly affected by climate change. Humanity, blinded by its hunger for power, has made it weaker and weaker, dangerously close to extinction. Ice melting is probably one of the oldest and most known consequences of global warming. The persecution of actions that provoked such a problem has continued for years and years, fomenting a rage and a resentment that is now ready to come out.

I.C.E. (Insurge, Commit, Extinguish) (Fig. 3) is a terrorist organisation whose goal is to put to an end the harmful being that humiliates and destroys nature: humans. I.C.E. bombs are everywhere. Their timer lasts a few minutes and accelerates if anyone tries to get close. The only way to stop them is to stay still: place a hand on the icy surface of the device and stop doing anything that would make the crisis worse. As soon as contact ends, however, the time runs out again. The bomb explodes, triggering an environmental catastrophe at a specific point on earth, causing terror and destruction.

The bomb body, which hosts all the electronics, was modelled and printed in 3D. Once assembled, the cube was then covered with a black shrink sleeve. The final part, the ice in which the bomb was embedded, was made in epoxy resin. The device's functionality depends on a proximity sensor linked to a timer that triggers the bomb to 'explode'. When touched, a peltier cell makes the device appear cold, evoking the element of ice from which the message comes.

In addition to the bomb, the Communicative Machine consists of an old hackered television set.
The two elements communicate through an Arduino and a Raspberry PI. When the timer expires, the

Arduino contained in the bomb sends a signal to the Raspberry PI in the TV that broadcasts environmental disasters, interrupting the white noise signal displayed till then. The video and audio signals stored in the Raspberry PI were converted from an HDMI output to a SCART input to be displayed on the TV screen. The project is situated in a non-specific moment, taking reference from different periods and contexts to create a surreal world through a rich scenario that could be either in 20 years or tomorrow.

Figure 3. I.C.E.: urban graffiti, a newspaper headline announcing the possibility of stopping the countdown, the website landing page, the bomb and the television set (the Communicative Machine). Authors: Ginevra Bernasconi, Giulia Bonalumi, Jacopo Domenichini, Agostino Sanna, Andrea Vitali. Source: https://anthropogenicnarratives.labsintesi-c1.info/projects/01_ICE.html.

3.3 Litia

As in the previous case, the project's scenario presenting the rock's perspective is situated in an undefined time context. Rocks are not affected by climate change. They have witnessed countless shifts in the environment, and this crisis is nothing more than one of the many that Earth has and will always experience. Human beings, however, have developed a feeling of anxiety towards this problem. To cure this disease, eco-anxiety, a company for self-care named Litia (Fig. 4), has created Specta, a device that looks at

climate change as the geological phenomenon of rock stratification. Climate change is not a problem if we look at it from a rock's perspective.

Thanks to Specta, eco-anxiogenic events are visualised as relaxing layers that expand the user's perception into a space of dialogue with the rocks. The device consists of a manipulable object that resembles a real rock in shape and size. By lifting and slowly rotating the device, the user can transform the vision of catastrophic events into rock stratifications. The visual effect that deforms the image was created using shaders, a special programming language that allows the same instructions to be executed simultaneously for every pixel on the screen.

The prototype's core is the controller board, specifically the QtPy ESP32-S2 model Adafruit7, which contains the data from the gyroscope and sends it to the base via an Arduino MKR WiFi 10109 board. A light sensor controls the transmission of information so that Specta only sends data when it is actually in use, not when it is on the base.

Specta was modelled and printed in 3D. Its aesthetic resembled that of a rock despite its clean and smooth surfaces, slightly smooth edges, and flat colours, which are very unnatural.

The experience is completed by tracking the amount of content the user has been protected from through an app that provides all the statistics on the device's benefits.

The real problem isn't climate change, an inevitable evolution of life on Earth. It's the way humanity looks at it that must change.

Figure 4. Litia: the device named Specta and a sequence of the eco-anxiety silencer. Authors: Francesco Bonetti, Federico Gajo, Emiliano Garibaldi, Enrico Isidori, Cecilia Pizzagalli, Camilla Tosi. Source: http://anthropogenicnarratives.labsintesi-c1.info/projects/08_LITIA.html.

3.4 Illumia

The project brings a similar message but in a completely different narrative system. Illumia (Fig. 5) is a machine designed to store data on the relationship between atmospheric composition and the colour of sunsets. It embodies the Sun's perspective, generating past and future sunsets from the star's birth to its supposed end. The story is set in a fictional 1984, in the Atmospherical Research Institute of America (ARIA), also a fictitious reality that gives truthfulness to the research at the base of the project. The narrative is set in a context that mixes historical events with imaginative ones, recalling elements from an actual past to build an alternative present and future.

The Communicative Machine consisted of a fictional digital archive whose shape and interface evoked the aesthetics of early computers. It was modelled and printed in 3D, divided into two parts due to its size. Its main components were a Raspberry Pi, serving as a server for a tablet, which also acted as a display, a mechanical keyboard for user inputs, an on/off button, and an LED.

After turning the computer on, the user can select a city from a predefined list and any year in Sun's past and future history. These coordinates are combined with the CO2, temperature, and humidity values identified for each year. These parameters represent the atmospheric components most sensitive to climate change and significantly influential on the colour of the sky. Once the user selects the preferred parameters, the screen displays the generated sunset and three graphs showing the different values of the three parameters over time. At the end of the experience, the user can also obtain a printed output version. The printout includes all the data displayed on the final screen with a message from the Sun itself.

The project aimed to help humanity reconsider the scale and impact of climate change from a broader perspective. The Sun has existed for 4.5 billion years, witnessing seven great extinctions and experiencing temperatures and conditions that humanity can't even imagine. From its point of view, the current climate crisis is an insignificant variation of the ongoing and perpetual change that the climate is constantly undergoing.

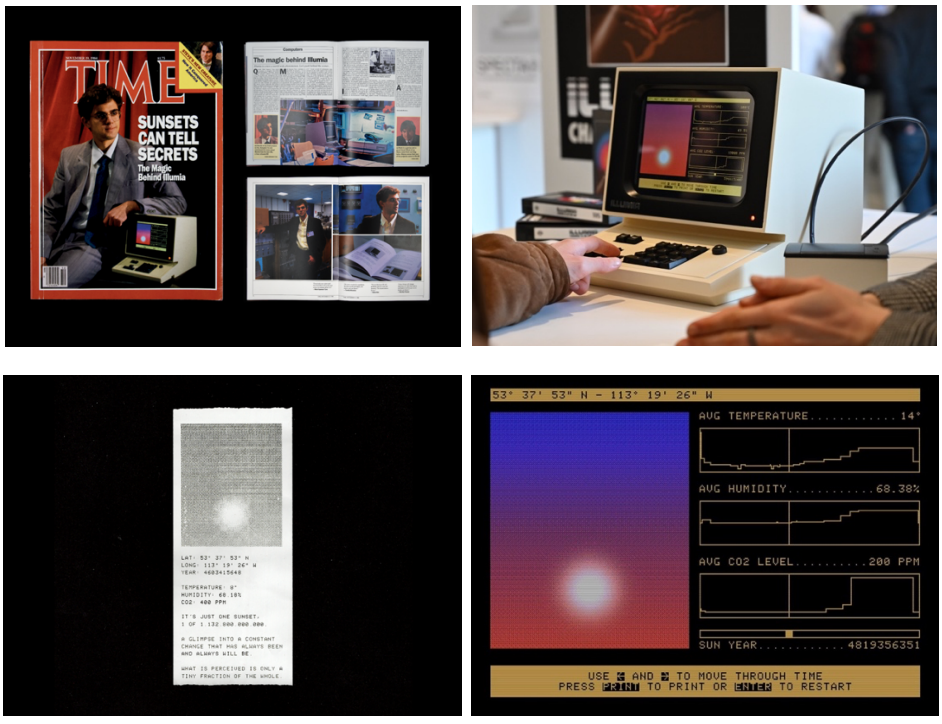

Figure 5. Illumia: cover and inner pages of a magazine setting the scenario, the Communicative Machine Illumia, the receipt with data and the message from the Sun, a screenshot of the interface. Authors: Andrea Borsato, Camilla Brusadin, Martina Esposito, Chiara Mazzeo, Anita Maria Ruggiu, Marco Ernesto Taino. Source: https://anthropogenicnarratives.labsintesi-c1.info/projects/07_ILLUMIA.html.

3.5 The Exhibition and Some Considerations

Even if only as a fiction exercise, the possibilities offered by the projects stimulated a real dialogue toward unheard dimensions. Embodying a non-human perspective, each group showed how the different natural elements send signals and messages worth grasping as they can enrich our vision and awareness and guide us to restorative action.

Among the eleven, these four projects were conceived during the first semester's Communication Design Studio and then showcased in a one-day exhibition at Triennale Milano. The exhibition was emphatically entitled "Anthropogenic Narratives. Communicating and Experiencing Non-Human Perspectives" to summarise both the brief that conducted the learning process and the output. "Anthropogenic" refers to environmental change originating in human activity. The term "Narratives" refers then to the stories behind each project. The word "experiencing" referred not only to the design of experiences. The intention was to invite people to have a direct experience of these perspectives through the communication design ecosystems produced by the groups of students.

The exhibition/event lasted 9 hours and saw the participation of over 700 people who engaged in discussions with the groups about the projects, tested the prototypes, and provided feedback. In some cases, the scenarios were presented so convincingly in terms of communication and narrative that visitors thought they were real products or services.

The four shortly discussed projects developed using the presented pedagogy process generated responses in the meaning of Frascara (Frascara & Winkler, 2008, p. 11): design reduces problems and should always involve research. These designs were conceptualised from diverse perspectives, exploring varied scenarios and employing a range of technologies and media, encompassing both analog and digital formats. Consequently, each design necessitates theoretical discussion and practical validation through prototyping. Students were encouraged to experiment with visual communication, user interface design, and tangible interactions across two and three dimensions, inevitably involving the fourth, the one of time. This approach facilitated the exploration of unconventional methodologies and alternative design paradigms, fostering a critical examination of design values, forms, and representations (Johannessen, 2017; Bardzell & Bardzell, 2013).

Speculation and critical stances were translated actively using Communication Design but approaching design solutions as a hybrid discipline, which means it "allows to break out of traditional typologies, to experiment with hybridisations of formats, structures, and modes of expression" (Quaggiotto & Galasso, 2023, p. 220). By adopting this approach, students are led to assume a critical attitude towards their position as designers, reflecting their practice's social and political implications. Moreover, they also get used to managing their professional field as an open context, not necessarily closed by disciplinary boundaries but evolutionary by nature. Design speculations are not meant to give answers and certainties; they aim to imagine new questions and reflect on contemporary and future times.

The prototyping phase is significant since, beyond the reasons already explained, it generates organisational capabilities such as flexibility and requisite variety, becoming integral to products and processes. It also operates as an antidote against core rigidities through updates of new knowledge and new methods for solving problems (Leonard-Barton, 1995; Berglund & Grimheden, 2011). According to Berglund & Grimheden (2011), the learning model allows students to add benefits to teamwork, utilising each other experiences and perspectives, integration and synthesis, and socialising.

The material and/or digital prototype artefacts are essential in introducing students to a Research through Design (RtD) attitude (Zimmerman, Forlizzi, & Evenson, 2007). According to some of Giaccardi's (2019) statements, they play intriguing and essential roles in demonstrating possibilities, provoking and speculating on alternative presents or futures, evaluating design outcomes, and empirically testing hypotheses. Certainly, reducing the projects' development to a single objective is impossible.

4. Conclusions

Speculative Design is one of several disciplines that can help us to take action, anticipate the future, and explore what's possible. The future is not a passive destination but rather a continuous process influenced by our thoughts and actions in the present. Changing the probabilities of future outcomes and shifting towards preferable tomorrows requires connecting past actions to present behaviours. Imagination and the choices in people's everyday lives are the tools that make it happen.

As affirmed by Anagnostou, Karvinen and Vasko (2020), the concrete actions useful to create different futures don't need to be "grandiose intervention, they can also be gentle gestures". Despite its ironic and disruptive methods, the impact of speculative design is subtle and light. It quietly and discreetly touches the hearts of the people who participate in the project and find themselves indelibly changed by the experience. Stories are not vague; they have strong, real implications. As stated by Harari (2015), it is a fact that humans use their language not merely to describe reality but also to create new, fictional realities. Fiction is a powerful tool to create stories to believe in and to redefine the relationships between the elements of the world as it is. It turns out that the world as we perceive it is partly the product of human imagination.

> "We humans control the world because we live in a dual reality. All other animals live in an objective reality. We humans also live in an objective reality, but over the centuries, we have constructed on top of this objective reality a second layer of fictional reality, a reality made of fictional entities, like nations, like gods, like money, like corporations. What is amazing is that as history unfolded, this fictional reality became more and more powerful, so today, these fictional entities are the most powerful forces in the world. Today, the survival of rivers and trees and lions and elephants depends on the decisions and wishes of fictional entities that exist only in our own imagination." (Harari, 2015)

A meaningful event, as the exhibition entitled "Anthropogenic Narratives", enriched the memory with new information and redefined the relationships between already-known patterns so that these concepts can no longer be emptied of this newly attributed meaning. The change of perspective made it impossible to forget the point of view once it had been considered.

Each fiction created during the Communication Design Studio has had a concrete and powerful impact on the lives of those who participated in the project: students, professors, and visitors to the final exhibition held at the Triennale. Storytelling is a powerful tool for understanding the future and motivating the discussion related to a delicate and severe topic, such as climate change. Through participation, they had multiple benefits (Ackoff, 1993). They have a valuable learning opportunity and their commitment to action increases.

Reflecting on the project's impact within the educational context, what is the most interesting is the critical judgement that was stimulated in the students about their profession. These young designers became more than just capable operators: aware of the power their work has on people, they transformed into informed professionals, conscious of the ethical implications of their actions.

The feedback collected over the years from students and the audience in enhancement and presentation occasions (e.g., exhibitions, websites, social networks) confirms the effectiveness of the learning process and educational experimentation to create working prototypes. Students appreciate the anti-disciplinary approach in acquiring new knowledge and skills, directly verifying communication design's hybrid nature. At the same time, they learn to learn, accepting the challenge of a constantly evolving discipline and practice. In the comments to the various editions of the Communication Design Studio, they define the design approach as "extremely innovative" and "useful to learn by doing, work more independently, and deal with technologies never used before." Furthermore, the assignment of issues to develop through a speculative approach is interpreted as "stimulating" and "a challenge", which allows them to "find unconventional design solutions."

Conversely, a recurring comment concerns technical skills. Due to time constraints, many notions and knowledge are not provided during the course through frontal lessons, but their deepening is left to practice and individual initiative. This is particularly true regarding aspects related to coding or prototyping. Specifying that these comments were collected before the exam and the final exhibition is essential. Subsequently, following individual or small group interviews, these comments fade away. The completion of the experience and field verification make the educational model more evident to the students.

The practical verification, made with an external audience, finally allowed the students to verify the design hypotheses through the prototype. Its role is crucial to understanding the narrative through direct and personal experience. For students, this phase can be critical for questioning the design hypothesis. However, it also becomes the moment for self-criticism, for reflection on what has been achieved.

We firmly believe that an anti-disciplinary approach to design applied to a topic such as climate change can be effective in the teaching context. Thanks to a speculative framework, which allows, by definition (Dunne & Raby, 2013, p. VII), to create "Parallel worlds" or to make "The 'unreal' real", students could experience a perspective that traditional design wouldn't consider. By using the proper tools of Communication Design in an unconventional way, they could translate messages sent by natural elements to broaden a discussion that would otherwise be impossible.

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About the Authors:

Francesco E. Guida, MSc in Architecture and PhD in Design and Technology for the Enhancement of Cultural Heritage. He is an associate professor at the Department of Design and teaches Communication Design at the School of Design at Politecnico di Milano.

Martina Esposito is a master's student in Communication Design at Politecnico di Milano. She is interested in communication design as a tool for applying research to the construction of the present and the future through imagination and storytelling.

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