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Everyday interactions with the Tecnosphere: a critical educational path

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Abstract: Contemporary design risks becoming irrelevant or complicit in a technocratic agenda that prioritizes evidence over values unless future designers are trained to critically understand technology and its impacts on social, economic, political, environmental, and psychological structures. What role does design play in this process? What stance will tomorrow's designer embrace? These questions form the backbone of the Theories and History of Design course at Università Iuav di Venezia, which focused on the transformation of everyday actions mediated by technology. At the sociological level, two perspectives collide: a critical approach that acknowledges risks to individual freedoms and a techno-optimist view that prioritizes opportunities over consequences. Designers, positioned between humanistic and scientific, artistic and technical domains, are increasingly mediators of these transformations. This dual role demands a critical sensibility, a focus of the course's teaching activities. Avoiding reductive rhetoric on technology's detrimental or salvific properties, the course framed technological mediation through social structures and explored how it reshapes daily life. The pedagogical model adopted a four-phase structure: establishing a theoretical foundation, engaging in participatory activities, analyzing technological mediation with a cross-eyed perspective, and synthesizing insights through creative outputs. Students investigated actions such as waking up or chatting, analyzing their historical evolution, social implications, and systemic impacts. Deliverables included timelines, experience maps, impact ripple canvases, and speculative audiovisual projects, fostering a deeper understanding of technology's pervasive role. This article presents the course's methodology and discusses its potential to train designers as critical and mindful mediators, equipped to reimagine a Tecnosphere that values inclusivity and sustainability over efficiency and control.

Keywords: *hacker approach; human technology interaction; design theory; interaction design; systemic thinking*

Introduction

Human nature is technological by definition (Gehlen, 1988). Such a peculiar evolutionary trait brought humanity to a profound artificialization of its environment (Caronia, 1996), which is nowadays fully intertwined with physical and digital systems that mediate every daily action and micro-action that we perform. Technologies organize human existence in what Coeckelbergh (2022) calls *technoperformances of time*, shaping how we act and exist in time and space.

The theory and practice of design disciplines is inextricably linked to the relentless progress of technology. Design was born within the need to protect the form of products at the beginning of the industrial revolution (Maldonado, 2005). On the other hand, complex forms of technological innovation – such as Artificial Intelligence – make it increasingly



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difficult to design balanced relationships with it; as effectively claimed by Artur C. Clarke (1962), a technology that is sufficiently advanced is indistinguishable from magic.

The belief (or presumption) that design is the discipline of the future (Fry, 2009) requires developing critical learning paths for tomorrow's practitioners and researchers. Design must keep being an indicator of the environmental challenges we face in a world full of technological products (Thackara, 2005) and unveil at least some of the magic that undoubtedly lurks within technologies. Design and arts are a crucial way of applying technology and making it socially accepted (Fornari, 2019) as they are responsible for designing the interfaces and cognitive devices consequently activated.

Building on these theoretical premises, the article describes the educational structure and methodological approach that oriented the course of *Theories and History of Design* held by the authors at Università Iuav di Venezia (master's degree in Product, Communication, and Interior Design). A selection of results from the students' research within the course is also presented.

Traditionally, courses that delve in design theory and history tend to focus on the historical evolution of material artifacts, and dwell on the design avant-gardes of the 20th century. That is, they are concerned with the *degré zéro du design* (Zinna, 2020), a stage in which design is primarily seen as a discipline concerned with compensating for the body's limitations by inventing and adding external prostheses to extend human capabilities (Eco, 1997). Today, design as a discipline acts with different postures and horizons: as a response to collective and social problems and the prospect of an alternative model of society, imagining and designing new relationships between humans and non-humans (Giaccardi & Redström, 2020). The concepts covered in the course have been particularly concerned with this thematic strand, with a contemporary horizon agitated by a renewed question: how can design contribute to a new – benevolent and humane – relationship with technology?

If design is a way of understanding, giving meaning, and making things familiar (Krippendorff, 2006), technological artifacts are, among all, the things on which it is worth acting more promptly and open-mindedly today. Reflecting on technological mediation in the context of everyday actions, the educational approach has been stripped as much as possible from the rhetoric of the already charged discourse around technologies and their nefarious or salvific properties in macrostructural terms, favoring an approach that deals with social structures and not with the social in general sense (Manzini, 2014). The students have been presented with critical research questions that guided their effort in producing the deliverables requested during the course: when and with what technological tools did we begin to equip ourselves to carry out our daily actions? How did we come to be unaware of such mediation to the point of becoming dependent on technology? What present and future scenarios do these reflections open up?

Framing of the theoretical context: social studies of technology

According to a neoliberal, techno-optimist view of society, technology would be an independent force that inevitably determines social, economic, and cultural changes. In this determinist framework, human agency is often minimized, as the logic of the machine itself dictates the course of our civilization (Davis, 2015), and it is from this dangerous assumption that the growing tendency to delegate to technologies tasks and responsibilities that were previously human has emerged (Huyskes, 2024), resulting in growing technological alienation. Technology from a means becomes an end, not because it has goals for itself, but because all the objectives that humans set for themselves cannot be achieved except through technical mediation (Galimberti, 2023).

Technology is no longer a means, it is an environment. In 2023 we had an average of 3.6 digital devices per human user (Cisco, 2023). These numbers support the famous statement by Papanek (1971), declaring that we live in the environment of machines as much as they live in our human spaces. Technology changes the world we live in, detaching humanity from nature (Heidegger, 1977) and, at the same time, becoming a second nature, co-evolving with us and determining our future characteristics (Papanek, 1971; Van Mensvoort, 2020). From the moment man first lifted a stone to use it as a tool, the evolution of our species has been intertwined with the evolution of technical tools. It is essential for the training of future designers to become aware of the complex implications of designing artifacts that affect people's gestures, and even physical and cognitive abilities.

As the artificial world grows and becomes more and more autonomous and ubiquitous, we come to the point where technology has an impact at a planetary level. The so-called *Technosphere*, although created and maintained by humans, acts autonomously, constraining human behavior and constituting a new geological paradigm with implications for the ecosystem and climate (Haff, 2014). When we talk about technologies we tend to deprive them of the bodily and physical component that actually composes them: as if there were no bodies behind their configuration, as if the devices themselves did not have their own machine body (Fant & Milani, 2024). The dematerialization of our counterpart (the machine) contributes to distancing us from it and to alienating the everyday procedures we perform: that is, to making them cold automations. The real danger here is to take the *Technosphere* for granted, as a feature of the planet, especially regarding digital services and connectivity. The enormous issue of the digital consumption of energy and resources (Vacanti, 2024) has just recently been acknowledged by the wider

public, although the discourse around digital sustainability has not stopped the wildly fast diffusion of energy demand intensive AI-infused services (Crawford, 2021).

Design, with its iterative dimension (Swann, 2001) devoted to constant practice, can be a discipline in which to experiment with a *hacker* approach to technology: that is, problematizing and curious, with the consequent urge to take apart its pieces to find out how it works, what it is—with the aim of establishing a more convivial relationship with them (Milani, 2022). Particularly, design has a significant responsibility particularly in designing the interfaces of tomorrow's technologies (Kaiser, 2023). It risks, however, being insignificant or even instrumental to the technocratic agenda that neglects values and negotiations in favor of evidence (Schon, 1971; Parsons, 2006; Olsen, 2009) if the future practitioner is not accompanied, during his/her formation years, in a process of critical understanding of technologies and the consequences of their use on social, economic, political, environmental, and psychological structures. What is the role of design and planning in this process? More importantly, what posture does the individual designer have and what attitude will the designer of tomorrow want to have? In simpler terms, what does he or she intend to design?

At the sociological level, two visions clash: on the one hand, a critical approach, aware of the potential risks regarding the possible harm to individual freedoms and social and civil rights; on the other hand, a techno-optimist view, which sees technological opportunities as a priority over possible consequences (Busacca, 2022). The designer, through a growing number of projects and initiatives, is erected as a mediator with a point of view that straddles the humanistic and scientific, the artistic and the technical, thus having a substantial weight and consequent responsibility in guiding innovation.

The concept of technological alienation in everyday actions, as shown above, is the backbone of the course's reflections and a pivot point for the definition of the concept and the realization of the students' projects. The themes discussed during the lectures have a thread that unites them and a shared statement. The statement is that technology is never neutral (Milani, 2022). The *fil-rouge* is a humane point of view with which to look at technologies and their relationship to everyday life. Technology as a technical machine is nothing but a special case of desiring machines (Deleuze & Guattari, 1972). Man is in a *deleuzoguattarian*¹ way as much a machine as the machines with which he interacts, only he is not aware of it. It is around this gap in knowledge – and consequent action – that the overall focus of the course revolves: the only way to reconstruct a benevolent relationship with technology is to know it for what it really is. Indeed, the tools we call *technological* are subject to the same evolutionary mechanisms that govern the co-evolution of living things: adaptation – from function to organ – and exaptation – from organ to function (Milani, 2022). A point of view that is not only technical and not only scientific, which goes beyond the walls of design to flow into areas such as religion, linguistics, philosophy of language and biology. In this perspective, where does the designer stand with his/her action? The educational model that we proposed during the semester focused on articulating the answer to this question.

Describing the educational model: a 4-step structure

The course of Theories and History of Design has an overall duration of 15 weeks, and it is open to master students majoring in product design and communication design. To achieve the overall objective of building a shared critical and historical perspective with reference to human – technology interaction in light of current and ongoing transformations, we developed a novel educational model in 4 macro-phases (Figure 1) that will be described in the following section.

¹ This refers to Deleuze and Guattari's concept of the human as a "desiring-machine" in *Anti-Oedipus* (1972), where individuals are seen not as autonomous subjects but as assemblages within machinic processes, constantly producing and connecting flows of desire alongside non-human machines in a network of production.

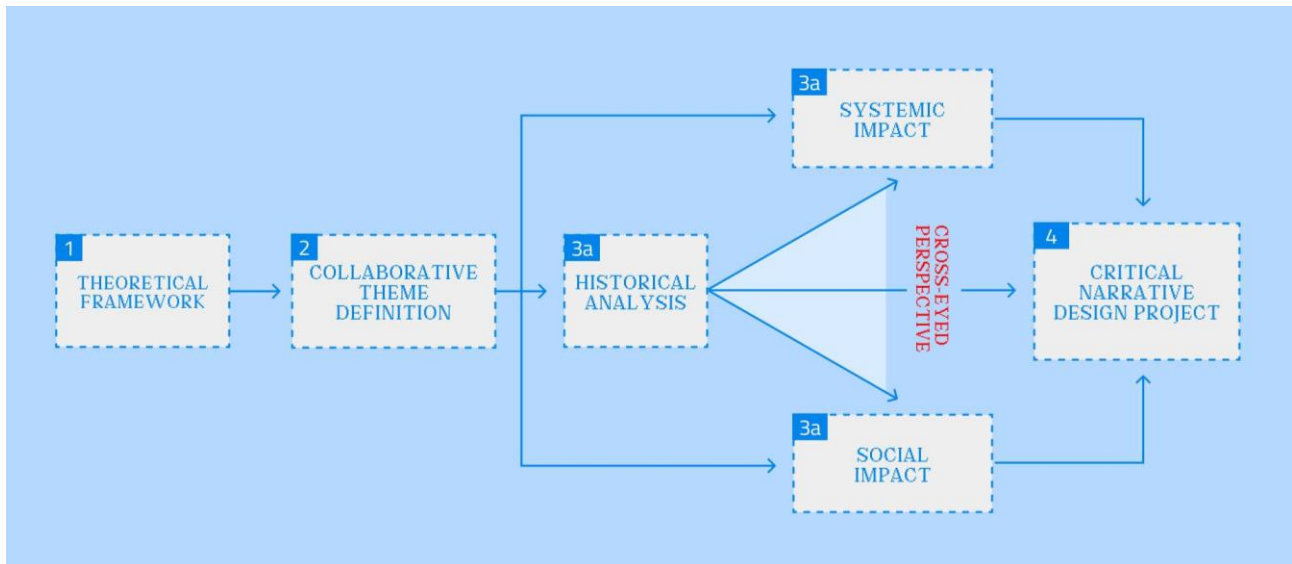


Figure 1. The educational model for the course of Theories and History of Design (the authors, 2025).

Phase 1: developing a shared theoretical framework through lectures, seminars and readings

The theoretical framework of the course was developed through lectures delving into philosophical and sociological reflections about technology, along with an historical framing of the evolution of computation, and the related development of the theory and practice of Interaction Design (IXD). Lectures held by professors have been alternated with focus seminars held by professionals from diverse expertise areas – namely data visualization, material driven design, digital art, social media, and digital pedagogy – to present students with a variety of perspectives, stimulating them to autonomously develop their own ideas.

At the beginning of the course, the 90 students participating were divided into 18 groups and assigned with a book to read and analyze through the redesign of its cover and the development of a conceptual map. The selected books delve into the theme of human – technology interaction with a range of perspectives that later allowed a constructive dialogue among all the students. Bibliography is shown in Figure 2, along with the newly designed covers.

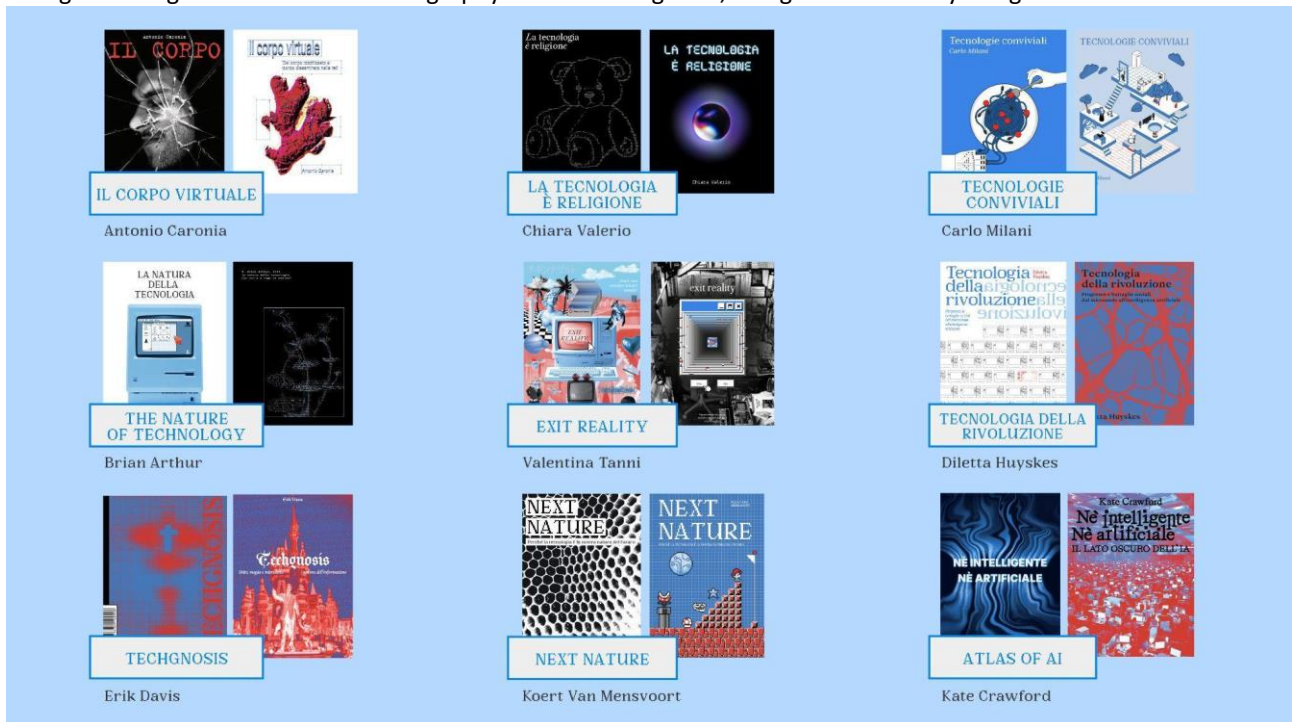


Figure 2. The redesigned covers of 9 selected books on technology (the students of the course in Theories and History of Design, 2025).

Each book was read and analysed by two groups of students, allowing for a 2-day seminar where a lively discussion with multiple and differentiated point of views on the pivotal themes and issues of the different texts took place, supported by posters with the redesigned book covers and conceptual maps (Figure 3). The viewpoints expressed

during the seminar presentations generally reflect a good level of awareness among the students regarding the main issues linked to the lack of care in the use of technologies. However, they also revealed scarce confidence in the potential of design to play a significant role in fostering a different relationship with technology or in the use of alternative appropriate solutions (Vacanti & Leonardi, 2024), that aim to offer practices of emancipation from oppressive conditions (Milani & Fant, 2024).



Figure 3. A moment of discussion in class (Credits: the authors, 2024).

Phase 2: discussing and selecting the research themes in a participatory activity

From the 2nd month, the 18 groups started to focus on a specific theme. We presented them with the goal to investigate *everyday interactions with the Tecnosphere*, thus selecting a daily action that they would study during the rest of the course.

The choice was freely made during a participatory activity, which turned out to be essential not only to create a point of contact between students and teachers, but also to set the research on realistic *co-experiences* of social interaction with technologies (Forlizzi, 2004). Using a digital board to work simultaneously, we built together a map of technological devices owned by the students, then added the applications and programs that run on such devices, and finally listed the daily actions that the latter enable to perform. From the list, each group selected its theme (Figure 4).

1 TO WATCH A MOVIE	2 TO PAY	3 TO TAKE PHOTOS	4 TO CHECK THE CLOCK	5 TO DRAW	6 TO IDENTIFY ONESELF
7 TO COOK	8 TO DO GROCERY SHOPPING	9 TO CHAT	10 TO FIND A MATCH	11 TO PLAN ONE'S SCHEDULE	12 TO CHECK THE WEATHER
13 TO WAKE UP	14 TO WORK TOGETHER	15 TO TRADE	16 TO LISTEN TO MUSIC	17 TO MONITOR ONE'S HEALTH	18 TO ORIENT ONESELF

Figure 4. The list of 18 everyday actions selected by the students (the authors, 2025).

The choice was followed by a brainwriting session, aimed at building a map of the actual physical interactions between users and technologies in the context of each selected theme. The groups were provided with a printed graphical representation of a *cyber* drawing dummy devoid of physical, ethnic, and gender connotations, and a set of post-its (Figure 5). Answering questions about which body parts are involved in the selected action – when performed through analog or digital technology – and how the human body has evolved in relation to technical advancements (and vice versa) helped students to kick-off their research with a deepened understanding of the impact of technology on people.



Figure 5. Students working during the brainwriting session in class (Credits: the authors, 2024).

Phase 3: analysing everyday actions with a cross-eyed approach

The following phase has been dedicated to an in-depth analysis of the 18 actions, considering three inextricable structures that serve as reference points for a critical reflection on technological mediation: historical, social, and systemic. We required students to develop a *cross-eyed perspective* on their action, turning the gaze on the one hand to people, observing the impact that technologies have on the movement of bodies, and on interiority; and on the other, observing the machine, peering into its functionality. The duplicity of the gaze generates meaningful learning (Fant & Milani, 2024). The analysis on each structure was delivered in the form of a visual map, accompanied by a written report.

For the historical review, students were asked to design a timeline of the technological mediation of the action (Figure 6) focusing on the evolution of technologies and their relationship to existing social structures. As a supplement, each group was asked to reference three design artifacts that had fallen into obsolescence and produce an analysis sheet including the biography of the artifact, illustrative images or drawings, an analysis of usability and modes of interaction, and a critical reflection on the reasons for obsolescence.

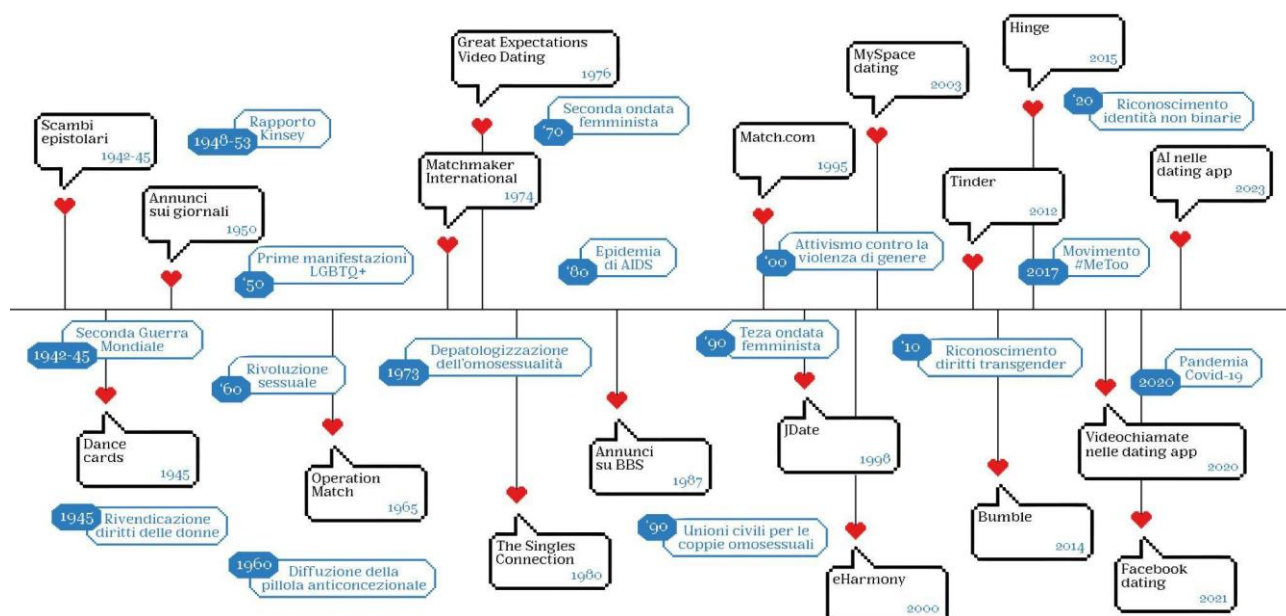


Figure 6. The historical evolution of the action to find a match (credits: Francesco Piccinonna, Jessica Sette, Giulia Righi, Lucrezia Bonaudo, Kangwen Zou, 2025).

Regarding the social level, students were asked to conduct two qualitative interviews and field observations (when applicable) aimed at gathering relevant insights from users doing the selected action in contemporary times, with different approaches and different degree of technical mediation. The results were delivered in the form of experience maps (Figure 7).

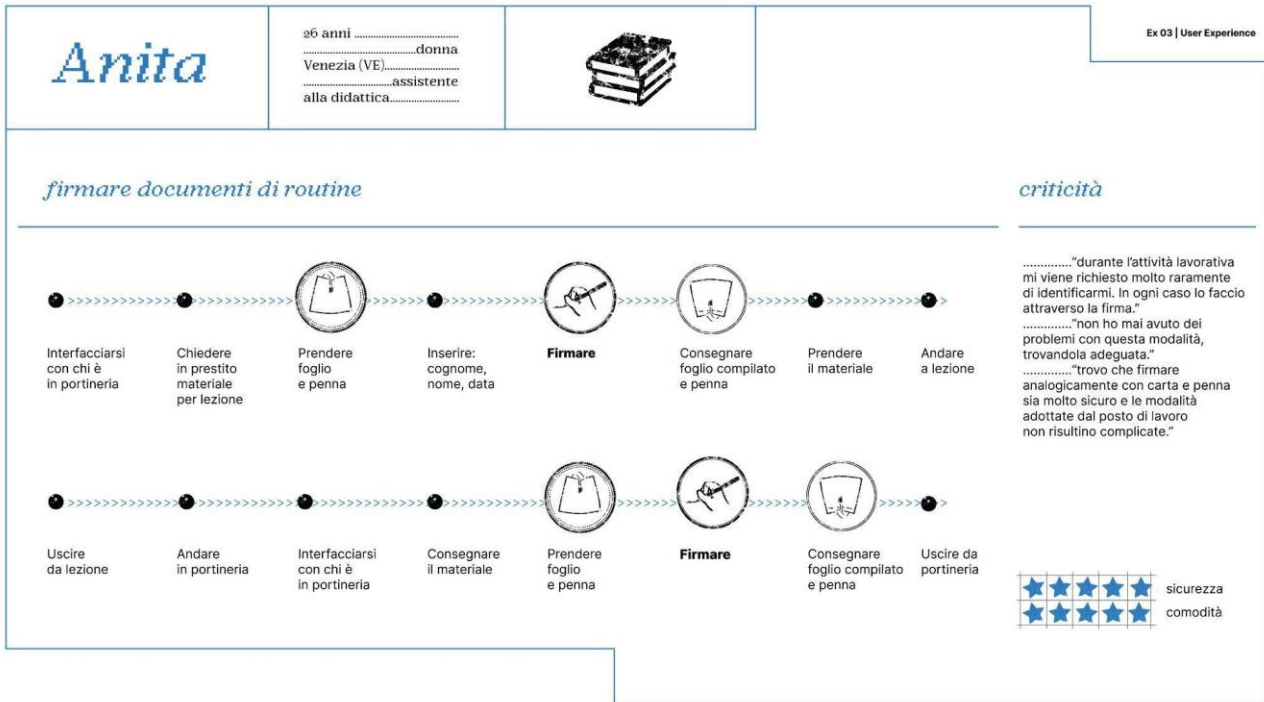


Figure 7. An experience map for the action to identify oneself (credits: Claudia Matasel, Maddalena Musil Rota, Gaia Giraudo, Letizia Monti, Tommaso Antonelli, 2025).

At the systemic level, students were asked to thoroughly investigate the mechanics behind the performance of the action, exploring how a simple gesture acts as a trigger that activates a whole technological system that goes beyond the end user's device, producing unseen social and environmental impacts. This research was delivered as an impact ripple canvas (Figure 8), a particular kind of visualization that depicts direct, indirect, and big picture impacts as ripples generated by a drop falling in a pond.

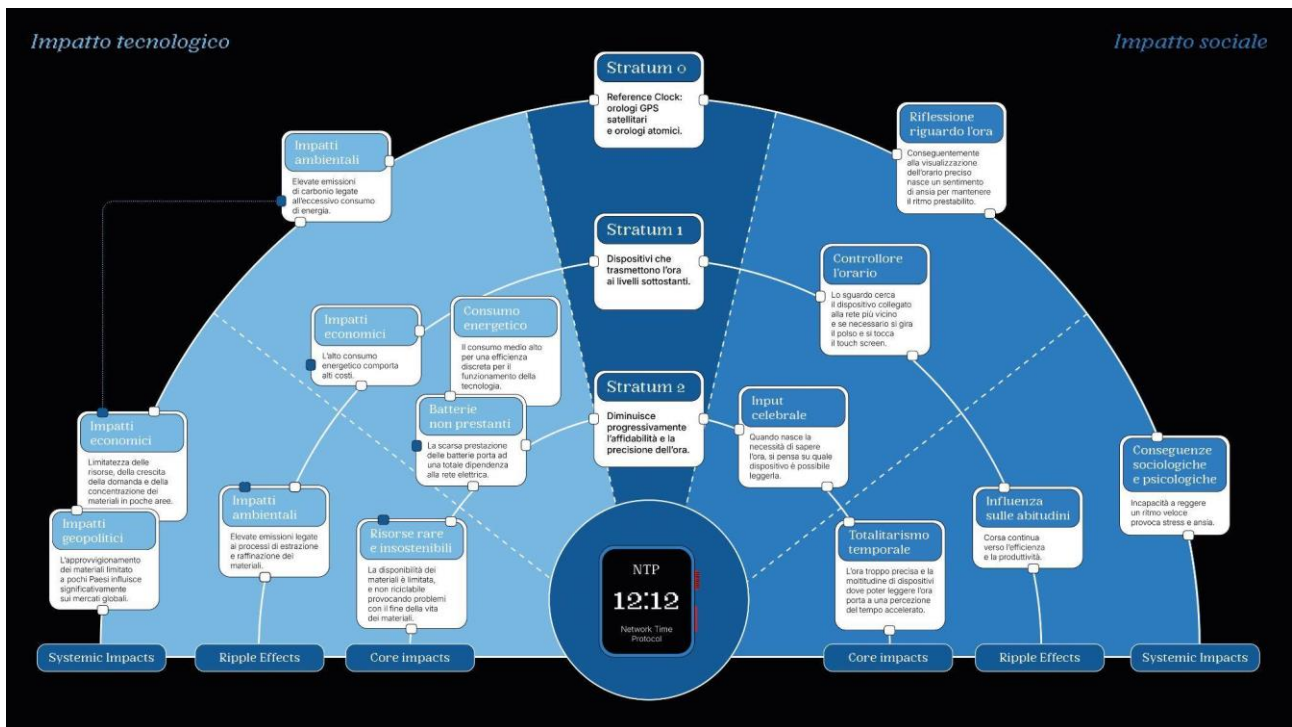


Figure 8. The impact ripple canvas for the action to check the time (Federico Soffiati, Enrica Greco, Angela Trolese, Elena Arnoldi, Jenny Boato, 2025).

The visualisations produced can be considered as intermediate design artefacts, or 'metadesigns', which are created not to be used themselves, but to facilitate further design work. Thus, the research material produced by each group

stands somewhere between interaction and speculative design, attempting to bridge the gap between theoretical knowledge of human–machine relationships and the creative imagination of more desirable, more 'human' technological futures.

Phase 4: disseminating the research through creative synthesis

On completion of the analyses, students were asked to synthesize the research findings and converge them into a critical reflection. At this stage, each group had developed a detached and expert point of view regarding their selected action. The point of contact between the historical, social, and technical analysis thus resulted in the postulation of a research question to be addressed in a speculative narrative way with the goal of disseminating a novel counter-perspective on technological mediation. What is the relationship between history, people and technology in the evolving technological mediation of our daily actions? What dynamics of the present best embody the evolution (or involution) of action?

To support this effort, we asked to outline an *alien character* who personifies all the criticalities generated by technological mediation. The alien served as the recipient of an audiovisual product developed with free technique, with a maximum duration of 120", with the aim to disseminate what Carlo Milani (2022) calls a *hacker attitude*: a perspective that suggests looking at machines without submitting them but without being submitted to them either, trying to understand them and to develop a renewed relationship of conviviality.

Discussing the outputs: strengths and issues of the course

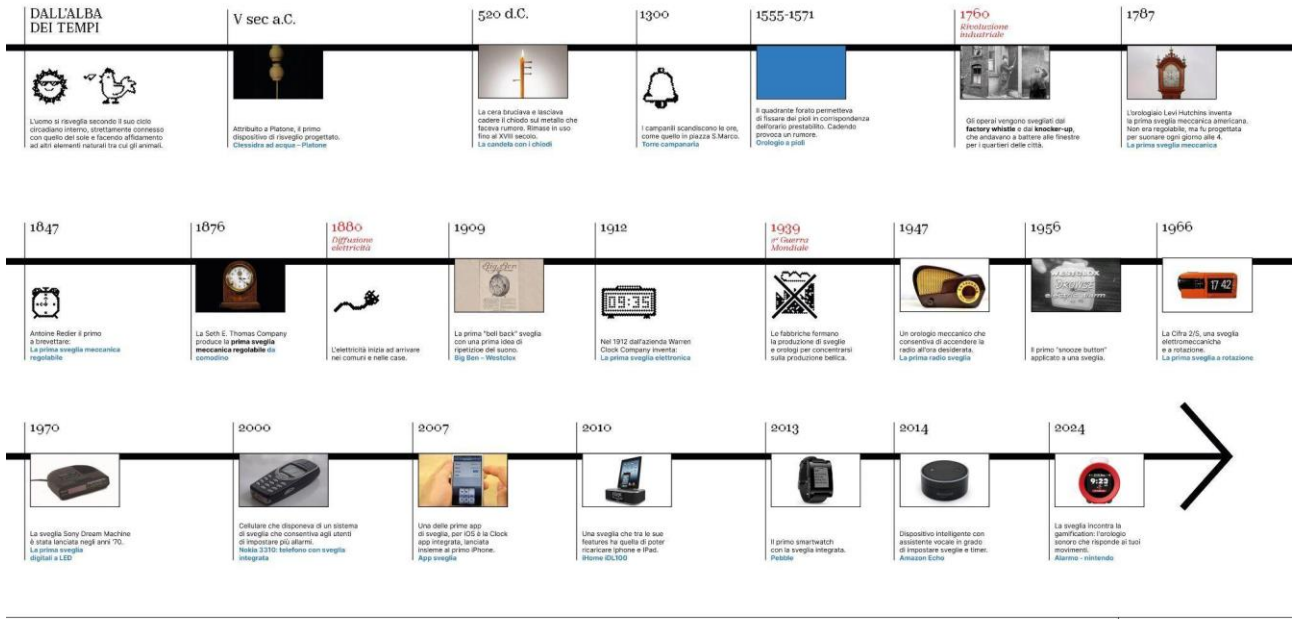
The results of the research should be read in the light of three parameters that reconstruct the approaches and instances envisaged by our working methodology: historiographical depth, narrative ability and skill in technical restitution. As a reference, we describe two case studies that best exemplify the results obtained by the students.

Case study 1: to wake up

The act of waking up (Figures 9, 10, 11) is as old as life and yet the history of its evolution hinges on momentous changes that have accompanied their multi-millennial history. The group's research first focused on understanding the biological, chemical and psychological facts involved in the act of re-emerging from the dream dimension. The objects in the timeline are descriptive of the deepening of each of these factoids and the role they played in the technological evolution of the act.

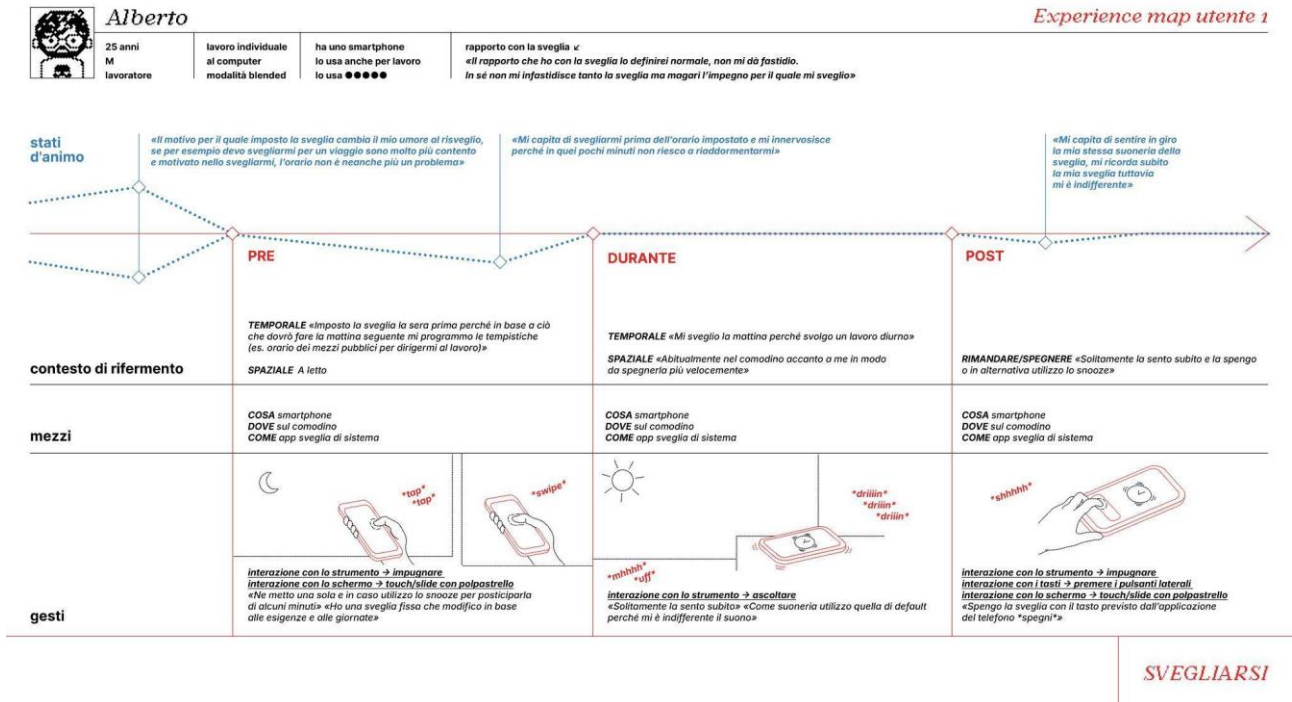
Several artifacts were brought to light such as the water hourglass (or *Plato's alarm clock*), the *BigBen alarm clock*, and the more modern *Digit 2/S* whose operation and reason for obsolescence well describe the technological epoch shift of action. After that, the group took up the task of describing how action is mediated by technology nowadays, emphasizing the new direction being taken by alarm clock applications that aim to monitor sleep by measuring vital parameters to provide information about when it would be most appropriate to set the alarm clock, going to limit these interferences. Reflection on the risks posed by the ability of technocratic power to intervene in our biological (bio-political) lives through technological tools was overlaid with a possibilist reading regarding technology as a tool for potential change and liberation. The research concludes with a question that well describes their views on the topic and what is to be understood as alienation around the act of waking up: is the problem really the ringing of the alarm clock or having to wake up early?

The group particularly focused on the inescapable inter-subjectivity of the analyzed action: we all accomplish it by following the same steps, yet everyone experiences it in a completely different way. Despite this, with the alarm clock on the cell phone we run the risk of never disconnecting: the phone becomes the last thing we see before we fall asleep and the first thing when we are awake, breaking down the separation between the sleeping and waking states, and triggering a very dangerous overlap between private, social and work time.



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Figure 9. The timeline for the action to wake up (credits: Jolanda Baudino, Giulia Gatta, Claudia Mandara, Elena Trovò, Sunil Barbaro, 2025).



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Figure 10. An experience map for the action to wake up (credits: Jolanda Baudino, Giulia Gatta, Claudia Mandara, Elena Trovò, Sunil Barbaro, 2025).

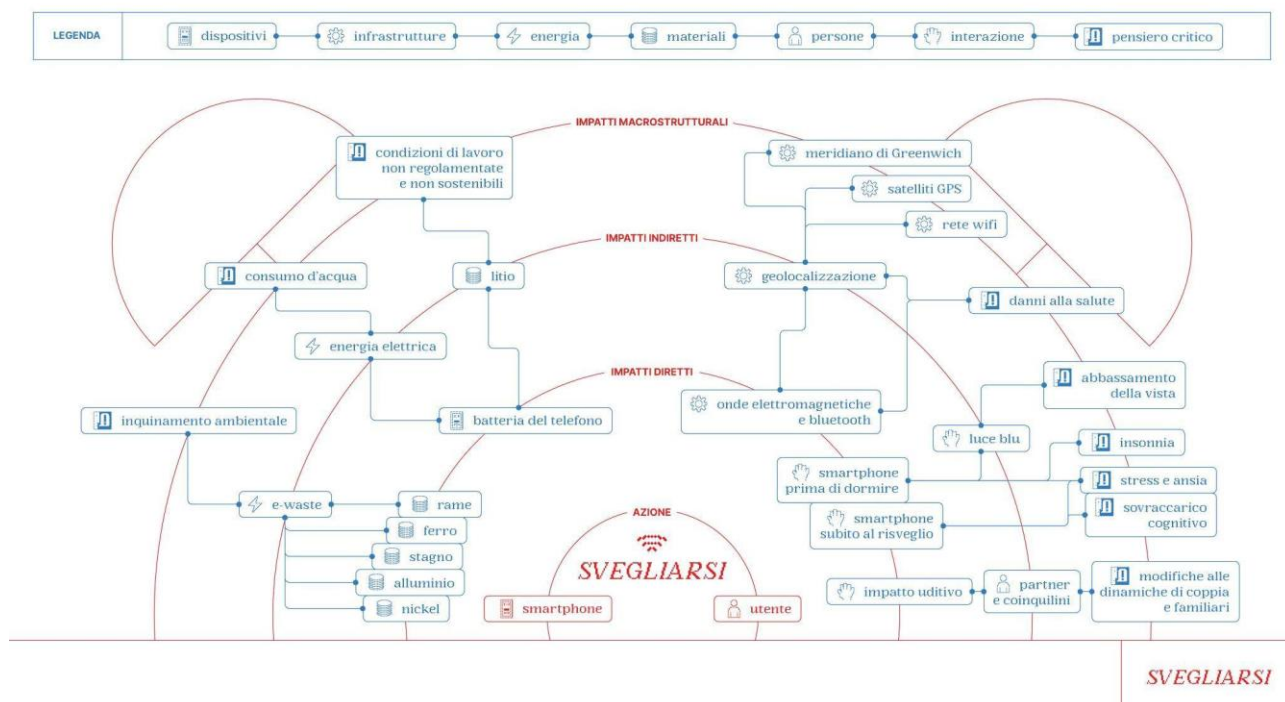


Figure 11. The impact ripple canvas for the action to wake up (credits: Jolanda Baudino, Giulia Gatta, Claudia Mandara, Elena Trovò, Sunil Barbaro, 2025).

Case study 2: to chat

Just as the act of waking up, *the act of writing* (Figures 12, 13, 14), that is, of using technological tools to communicate at a distance, has its origins in very distant periods. In particular, the group highlighted the implications of the transition from analog to digital: not so much and not only from a technical point of view but with respect to the weight we attach to the message we write.

Highlighted as artifacts representative of technological transitions were the *Lettera 22* typewriter, the *Nokia 3310* cellphone, and the *MSN* messaging application. The three design projects describe passages from different eras and testify to an uncritical and almost exclusively positive approach to the democratizing power of technology-mediated communication. Epochs in which the dominant narrative had not yet effectively unveiled the dark side of free access to technology and data ownership with which public debate is now rightly imbued. The research also dwelt on reflection around the implications of the introduction of artificial intelligence not only as a technology mediating messages between sender and receiver but also as the recipient of communication itself.

The group focused on delving into the role attributed to technocracies of aggravating and amplifying generational distances by convulsively updating hardware and software to the point of prophesying forthcoming and ominous consequences about the inability to communicate with each other. It tends to be the case that the digital native alienates himself in the smartphone by losing touch with reality, while the late adopter feels incapable of using the full potential of technology. According to the arguments brought by the group, thus the human being risks losing the authentic and physical dimension of writing, impoverishing the emotional and relational depth, and contributing to a progressive estrangement from communal living.

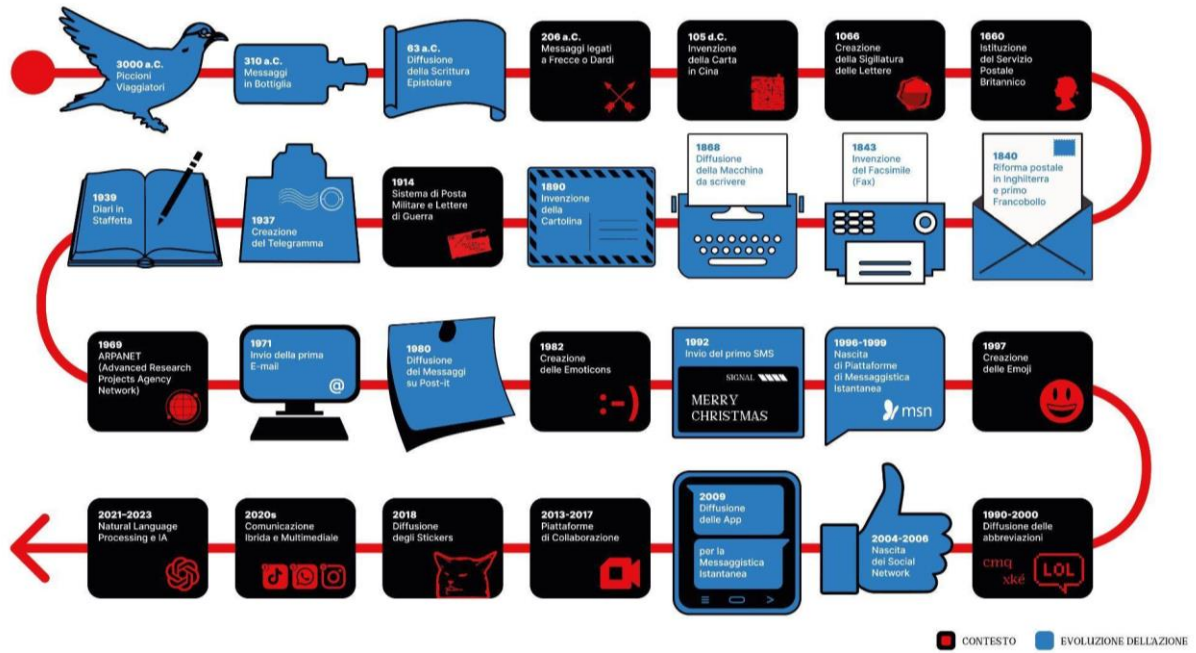


Figure 12. The timeline for the action to chat (credits: Rebecca Handley Silvestri, Fabio Tangorra, Pietro Creanza, Giorgia Marialaura Iurilli, Mayabel Osornio, 2025).

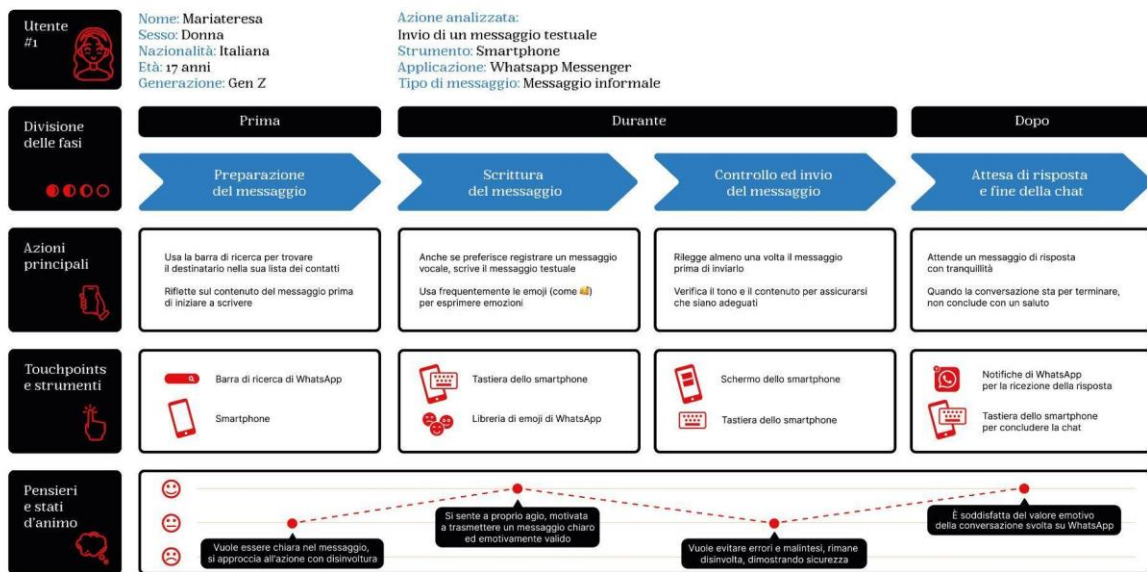


Figure 13. An experience map for the action to chat (credits: Rebecca Handley Silvestri, Fabio Tangorra, Pietro Creanza, Giorgia Marialaura Iurilli, Mayabel Osornio, 2025).

shape their social and personal experiences. The course outcomes showed that while students demonstrated an awareness of the critical issues posed by technological dependence, they also struggled with envisioning design as a tool for resistance or alternative futures. This highlights the need for further pedagogical efforts to empower students with practical strategies to navigate and challenge the complexities of the *Technosphere*.

Future objectives for our course include expanding the participatory and speculative elements of the program to better equip students with actionable skills. Incorporating hands-on design workshops and interdisciplinary collaborations could strengthen their ability to prototype alternative scenarios and reimagine more humane and sustainable interactions with technology. Additionally, exploring the ethical implications of design decisions, particularly in relation to environmental and social impacts, could further enhance the critical capacity of students to engage with contemporary challenges (Thackara, 2005).

Philosophically, we intend to reaffirm the notion that technology is never neutral, echoing the call to *hack* the perceived inevitability of technological dominance by fostering a mindset that is both curious and problematizing (Milani, 2022). Designers must embrace a dual role as creators and critics, bridging the gap between technical functionality and human values (Kaiser, 2023). The educational model proposed here aligns with the idea that design is not merely a tool for solving problems but a lens through which we can interrogate the systems we inhabit. Ultimately, this article argues for the importance of embedding critical education about technology into the foundation of design disciplines. By cultivating an iterative, reflective approach, educators can empower new designers to question the status quo and actively contribute to shaping a Technosphere that prioritizes conviviality and inclusivity over mere efficiency and innovation.

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