Metamorphing Design Education. A Master Program Based on Soft, Digital and Green Skills for Designers Dealing with Future Scenarios

Abstract
The article describes the definition of a joint Master degree program for designers, focused on integrated skills to address the complexity of the future and to contribute to the green and digital transition of the European industrial context. Based on the application framework of the INTRIDE European project, the article presents an analysis of designers’ skills and the needs of European companies. The reflection then extends to the research methodology adopted, developing a state of the art on the European training offer on soft, digital, green skills, useful for the design of the interdisciplinary joint Master degree program. Based on the research results, authors propose the INTRIDE output as an innovative training course with integrated key competencies for designers, enhancing them as innovation triggers for SMEs in the manufacturing sector. Lastly, authors will discuss the design process carried out and will suggest a sustainable implementation of the training program designed.

Keywords
Design education
Designer skills
Joint Master degree program
Interdisciplinary methodology
European context
Introduction. The Contemporary Framework and a Redirection of the Design Action

The crisis caused by Covid-19 has highlighted the precariousness of our capitalist economic system. A crisis that has shown how governments are not ready to face complex (eco)systemic emergencies, such as those dictated by climate change or Covid-19, because they are interconnected. As Mazzucato points out, the opportunity arises today to take advantage of this crisis and understand how to implement capitalism in a different way, with citizens as the primary beneficiaries of the activated policies (Mazzucato, 2020). We need to create institutions that know how to operate in the interconnectivity of flows and complex systems; this, in order to develop integrated capabilities (Sen, 1988; Nussbaum, 2011) aimed at preventing crises or at dealing with them in the best possible way.

The Covid-19 pandemic has emphasized a series of profound social, environmental and economic imbalances that have negatively characterized our daily life in recent years. The propagation of individualistic practices, the proliferation of ecological disasters, the lack of care for the Other and the Elsewhere, the growing social inequalities and new forms of poverty require us change direction, to redirect the prospect of the future (Fry, 2009).

There is a need therefore for the designer, and the design community in general, to undertake a critical analysis of their skills, including those they have more recently acquired thanks to the always active dialogue with other disciplines. This step is necessary to reflect on what other skills design might need to face present and future challenges, which are increasingly complex and require interdisciplinary knowledge.

As a discipline capable of listening to and observing the dynamics of reality, decoding them and thus anticipating the potential questions of the society of the future (Verganti, 2009), design draws on its interpretative and proactive ability to “see”, “predict” and “show”; but it is thanks to its abductive capacity that the design culture is able to decipher the context in which it operates, understanding in depth both the nature of a problem and the ways to overcome it (Zingale, 2012).

INTRIDE. A Research Project to Generate New Knowledge and Skills for Future Designers

In this constantly changing scenario, even the educational systems aimed at training the academic and professional profile of the designer must be transformed, and renewed to adopt more systemic, sprawling and metamorphic educational approaches.

INTRIDE - Soft, Digital and Green Skills for Smart Designers: Designers as Innovative Triggers for SMEs in the Manufacturing Sector is a 36-month research project funded by the Erasmus+ KA2 Knowledge Alliances call and activated in 2020. It is formed by a partner network that includes universities (University of Florence - Department of Architecture and Elisava Design School), clusters (Distretto Interno Design, Transilvanian Furniture Center, Zamek Cieszyn and AMBIT Living Spaces Cluster) and technological partners (Leitat Technological Center) from four European countries (Italy, Spain, Poland, Romania).
Aimed at design methods and tools capable of generating new knowledge and improving the offer in design education, the project focuses on the concept, structure and realization of a joint Master’s degree program, the goal of which is to implement the soft, digital and green skills of future designers as innovation triggers to address the complexity of reality.

Probing the concept, the focus of the project activities on the identification and enhancement of soft, digital and green skills for future designers derives from a preliminary research study carried out by the partners in the preparation phase of the project proposal. In fact, through a study of the available scientific literature, and referring to the European roadmaps in terms of new educational models, digital transformation and the green transition, the need for a clearer picture unquestionably emerges with regard to the capabilities (Sen, 1988; Nussbaum, 2011) necessary for the professions of the future. This is particularly true for the profession of designer, a smart designer with increasingly integrated, multi- and interdisciplinary skills, interconnected with different production contexts and capable of interacting with the complex challenges of tomorrow.

The specific design context in which the research activities were carried out and the methodology applied is that of small and medium-sized enterprises (SMEs) belonging to the manufacturing sectors of the territories involved in the project.
With reference to the traditional logical framework of the design process, the research methodology was structured in three different, albeit interconnected, phases: hypothesis, thesis, synthesis (Zingale, 2012).

The hypothesis consisted in the design concept proposal for the expected output of the joint Master’s degree programme structure. Starting from the results of the research conducted in the field analysis phase with the selected companies, it was essential to interpret the collected data, to be subjected to various critical points of view in order to obtain a more systemic and strategic overview (Zurlo, 2012; Jones & Kijima, 2018).

The methodology adopted for the field analysis was of an immersive and participatory nature and relied on the use of interdisciplinary tools such as surveys, interviews and co-design workshops. A specific questionnaire was developed by all the partners to identify the needs for key skills. It was completed by more than 20 companies for each partner country.

Each INTRIDE partner country then organized co-design workshops with focus groups to identify the challenges and the need for skills, involving both higher education institutions, clusters and business representatives partnered with selected SMEs in the manufacturing sector.

The collected data was structured by laying out the data itself in graphic form, in order to translate its complexity and make it more accessible to users (Barabasi, 2011).

A Final Analysis Report was drafted as the main output for the methodological phase of the hypothesis to summarize and communicate the collected results. The document considered the skills, competencies and knowledge needs emerging from the companies, focusing on specific industrial challenges in which the design profiles could be inserted. The qualitative and quantitative data examined by the research team constituted a crucial resource for the definition of the joint Master’s degree programme and for outlining scenarios for innovation in the manufacturing sector.

In general, the field analysis revealed the varied scenario of skills possessed by the participants and the different degree of importance given to soft, digital and green skills, influenced in part by the complex contemporary scenario. In detail, digital skills were mainly related to communication and marketing. Due to the Covid and post-Covid scenario, the key role of these skills was perceived to
be of increasing importance, particularly with regard to networking and IT. Soft skills were considered crucial for employees, specifically in the areas of communication, innovation, creativity, teamwork and time management. Green skills on the other hand were only partially requested for integration into the manufacturing sector, but their role and importance will grow as a result of market attention. In fact, the future trends perceived by the companies were linked to the circular economy, the sustainable development of products and services, and short supply chains.

The hypothesis phase was followed by the thesis methodological step, in which a general overview was drafted mapping the state of the art of the educational offer of European Master’s degree courses in relation to soft, digital and green skills.

The mapping included 80 Master’s degree courses from 18 European countries (including Great Britain and the INTRIDE partner countries) within which the patterns of soft, digital and green skills were identified. Overall, 71 private and public universities were involved in the mapping of the state of the art, which turned out to be a fundamental method in the systemic research methodology undertaken in the study, in order to understand how to adopt a more strategic perspective in the definition of the joint Master’s degree structure. This methodological step also highlighted how the activation of an interdisciplinary training course is necessary in developing soft, digital and green skills in the key innovation profile of the designer.

Fig. 3
Map of the state of the art of the European training offer in the field of Master’s degree courses.
In the synthesis phase, the qualitative and quantitative data collected was interpreted to give shape to the joint Master program. A hybrid approach was adopted, co-design and design-driven, necessary for a systemic and strategic development of the output. Specifically, the research team drafted a handbook describing the general structure of the Master’s degree course, which can be divided into two postgraduate courses. The researchers then outlined and detailed the training methodology and tools framework, which included a test the purpose of which was to collect feedback regarding the degree of innovation of the didactic proposal that was being designed. In fact, workshops and focus groups were organized and structured by researchers as boundary tools (Meroni, Selloni & Rossi, 2018) to obtain a critical point of view from the participants. The training project has been further advanced through a round of co-design sessions implemented first at the international level, and then at the local levels, with the involvement of stakeholders from the INTRIDE partner countries’ territories.

The study was furthermore aimed at gathering insight into possible innovations in higher education - including curricula, teaching and learning methods - that would lead to better and increased cross-sectoral synergies (Lotti, 2020) in the emerging INTRIDE field (soft, digital and green skills for SMEs of the manufacturing sector) and among HEIs, clusters and technological partners.

The INTRIDE Joint Master’s degree title is Strategic Design for Innovation in the Manufacturing Sector, part of which was pilotsed by the INTRIDE Knowledge Alliance during the second semester of the 2021/2022 academic year in the four respective European partner countries.
second postgraduate course, entitled Design for Digital Transformation in the Manufacturing Sector, was centred more on digital skills, on establishing digital knowledge (EU Digital Education Action Plan 2021-2027) and on the transfer of the skills necessary to interface with the key enabling technologies (KETs) belonging to the 5.0 scenario (Industry 5.0, EU 2021 report). Soft skills were conveyed as a transverse flow of content and skills that horizontally invested the designed structure (Taverner et al., 2021).

Researchers decided that dividing the one-year joint Master’s degree programme into two postgraduate courses - lasting 6 months each - was an innovative solution to propose a more dynamic, systemic and strategic use of the interdisciplinary contents addressed in the Master program. This decision also stemmed from consideration of the complex contemporary European scenario linked to the Education sector, in which the design of training curricula is not focused exclusively on a single professional profile, but is more inclusive in
terms of knowledge, skills and experience (Taverner et al., 2021). The joint Master’s degree was built with a participatory approach, structuring it on an interdisciplinary and modular frame, which features an organisation based on 6 learning modules, each of which is delivered by a project partner according to their disciplinary skills. To represent the interdisciplinary soul of the joint curriculum and to integrate the key competencies addressed by the INTRIDE project, the six learning modules identified by the research group include topics such as Design and Sustainability; Economics, Business Model and Circular Economy; Product and Service Design; Creative Explorations of Traditional and Digital Techniques for Product Design; IoT, Cloud Computing and Cyber Physical Systems; Advanced Fabrication Module. As a transverse and concrete output of the educational path, a final project was inserted as an important step to make the flow of theoretical contents conveyed during the learning modules converge in a tangible result.

Each learning module includes six learning units, most of them theoretical, plus a seventh unit dedicated to workshop activities, with the goal of putting into practice what has been learned during the previous units.

Generally, the learning methodology was based on an alternation between theoretical lessons and short practical workshops. The methodological organisation consists, in fact, of a lecture format mixed with focus groups and teamwork, especially when presenting design case studies. Participants will be actively involved to develop a direct approach with the best practice examples presented during the learning units. They will also be taught how important it is to handle interdisciplinary methods and tools based on the referred design context, acquiring a design methodology which is hybrid and works between academic boundaries (Rampino, 2012).

The strategy of constructing the joint Master’s degree structure organised into learning modules and units was the core of the interdisciplinary co-design approach adopted by the researchers and designers from different partner universities which participated in the development of the learning program. Another strategy they adopted was to focus the learning outcomes and outputs of the joint training framework on specific knowledge, skills and competences, in order to ensure that the INTRIDE Master course adequately matched market and companies’ needs (Lotti, 2020).

The contents of each learning unit have been studied in order to be delivered in a systemic and appropriate way coherent with the horizontal priorities addressed in the INTRIDE project, i.e. the enhancement of soft, digital and green skills for the constitution of the figure of the “smart” designer. The structure of the learning modules was also conceived according to a modular and flexible pattern that allows them to be used as refresher or specialisation courses by the participants. This makes it possible, first, to prepare a post-graduate education plan that meets the different academic and professional needs of possible participant key target groups; and second, to offer a dynamic and relatable framework by providing short specific modules for company employees participating in it. As Manzini stated, “In a connected world, design processes tend to be increasingly distributed among numerous actors who differ in culture, motivation and professional development” (Manzini, 2015,
Therefore, given that the wicked problems that designers will have to face tend to grow in size and complexity (especially those regarding the transition of the European industrial context), it is necessary to establish a new kind of design knowledge and research, capable of innovating design processes and understanding the need for a cooperative approach between all the actors involved.

A Critical Perspective. Discussing the Relevance of Research Results

The research results are significantly characterised by the establishment of a research methodology founded on reflective phases (Schon, 1999) of in-depth analysis of the needs expressed by all INTRIDE key actors (designers, companies in the manufacturing sector, clusters) through surveys, national co-design workshops and benchmarking.

The element of innovation in the INTRIDE project is the identification and enhancement of soft, digital and green skills for the designer as an innovation trigger for the European SME manufacturing sector (Taverner et al., 2021). Starting from this main objective, design researchers created a methodological framework that gave meaning and shape to the INTRIDE joint Master’s degree learning path.

Considering the state-of-the-art mapping of European educational proposals based on INTRIDE key skills, very few master courses include the multiple integration of soft, digital and green skills. INTRIDE training and teaching output therefore fits in as an educational proposal with several innovative elements that are in line with our metamorphing contemporary educational processes.

In the INTRIDE research, the profile of the designer is proposed as an innovation trigger for the SME manufacturing sector thanks to the acquisition of integrated and multilevel key competences. This, starting from a strong link with the contemporary context which provides the backdrop for the research project, and examining the nature and importance of the skills that future designers will need to deal with the complex reality (Thackara, 2005) and the transition of the European industrial context, increasingly attentive to sustainable, circular and inclusive production practices.

According to Morin (2017), the designer must deal with complexity and must therefore necessarily opt to move beyond a one-dimensional disciplinary knowledge, promoting the self-crafting of knowledge that can interpret and translate the complexity of reality through the acquisition of integrated interdisciplinary skills. The research results are in line with this thought, with the definition of a joint Master’s degree programme that aims to provide an integrated, systemic and strategic educational plan based on soft, digital, green skills for future designers.

Complex future challenges are specially related to the green transition, to digital transformation and to the promotion of a more inclusive society (horizontal priorities of the 2021-27 European Programme) and, transferring these to the context of the INTRIDE project, the focus is on their impact on the SMEs manufacturing sector.
In order to innovate complex systems such as those of the manufacturing sector, with the additional prospect of activating a cultural sea change for the design discipline and the figure of the designer, the research aims to put into practice training processes capable of involving different actors, operating on different territorial scales (from the European to the regional level) and integrating traditionally excluded or marginal points of view into the design discourse (Verconti, 2009).

This, in the awareness that the limits of the conducted research lie in the examination of a small number of European territories (the four partner countries of the INTRIDE project) and that it would therefore be necessary to implement the analysis by mapping other territories and making the research results even more strategic and systemic, with more concrete consequences.

**A Sustainability Trajectory. Hope for the Future**

The profile of the designer, proposed as a trigger for innovation for the SME manufacturing sector, incorporates the previous roles identified and attributed to the designer, such as that of developer, interpreter and mediator of innovation and transitional processes. Referring to the European industrial context, it seems important to underline the value and the ethical perspective that arises for the figure of the designer, who takes on the social and ecological challenges of the present and the future, using modern technologies and building a critical dialogue with them to support her/his own creative work and design action.

The INTRIDE research shows that designers more than ever need to have access to and develop adequate interdisciplinary skills, tending towards transdisciplinarity (Lotti, 2020). Without adequate skills, in fact, future designers will not be able to fully exploit the potential deriving from integrated knowledge and respond to the needs of the manufacturing sector.

The research study ended in December 2022, receiving a score of 85/100 from the European Commission in terms of the overall workflow, the activities implemented and the quality of the deliverables produced. Therefore, more data will be collected and the role and responsibility of the designer as an innovation trigger will be further analysed as an ongoing outcome of the INTRIDE project. In this perspective, the authors propose two possible directives of action for pursuing a sustainable trajectory of the research.

Firstly, it will be essential to advance the mapping of the skills required for smart designers dealing with complex scenarios. This, in order to build training courses that are in line with the contemporary debate that pervades the discipline and with metamorphing educational needs linked to social, ecological and market dynamics. Second, to extend the interdisciplinary dialogue not only between design experts and non-experts (Manzini, 2015), but also to all other stakeholders interested in acquiring integrated skills and involved in the European industrial context.
In conclusion, the Speranza progettuale (Maldonado, 1992) is for the designer to take on a socio-ecological responsibility (Papanek, 1995) towards everyday complex challenges and to adopt a multilevel systemic approach to the project, conceiving the design practice as an action for change aimed at improving the living conditions of society and cooperating with its members.

It will take a generation of designers capable of dealing with the metamorphosis of the current scenario and willing to acquire new interdisciplinary knowledge to tackle complexity, and design an alternative perspective of hope for the future.
References


