

ADVANCEMENTS IN DESIGN RESEARCH

11 PhD theses on Design as we do in POLIMI



edited by Lucia Rampino and Ilaria Mariani



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DESIGN INTERNATIONAL

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Designing Knit Designers. Teaching tools and methods to train professionals for the knitwear industry

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Abstract

This study focuses on Italian knitwear both as an industrial excellence, placed halfway between tradition and technological innovation, and as a design discipline taught in design universities, with the aim to experiment with new ways to support SMEs and to answer their concrete needs in terms of young professionals.

On the academic side, the growing correspondence of the disciplines of fashion design with their respective specialized production areas creates an opportunity for knitwear to be addressed in this study from a designer-researcher perspective, and thus to be recognized as a discipline that deserves specific teaching tools and methods and focused scientific research. From an industrial standpoint, knitwear is one of the most complex realities of Made in Italy, with a long and fragmented production chain made up of many different stakeholders that leads to significant waste in terms of time, resources and materials leaving a low budget for the training of new designers.

In this scenario, it is increasingly urgent for higher education to understand how to train knit designers as professionals able to act in between tradition and innovation, owning creative and technical skills along with with specific competencies, other than those of a more generic fashion designer.

The study works towards this objective, keeping knitwear inside the boundaries of the Italian industrial design culture and acting with experimental activities towards the definition of tools and methods to train professionals to be able to respond to the needs of the industrial context, with the proper technical and cultural knowledge and the project-oriented mindset that is typical of industrial design disciplines.

A Complexity to be Addressed

This study takes its place within the research carried out by the fashion design scientific community at the Politecnico di Milano over the past ten years, treating it as a branch of industrial design (Bertola, 2007). As part of the industrial design culture, the fashion system has developed in its areas a high degree of specialization of the creative and productive chain (Dell'Acqua Belavitis, 2007). If with the first doctoral thesis in fashion design (Conti, 2007; Colombi, 2007; Vacca, 2009) the scientific research in this area has structured and developed the methodological groundworks for the construction of the Fashion Design degree at Politecnico di Milano, the academic discourse is now moving towards these specific realities, focusing on jewellery design, artisanal techniques, technology and interaction. This thesis has therefore set itself the aim of focusing on a specific area of knitwear design (KD), that is often left as a simple variation on the theme of fashion but which is a peculiar source of innovative industrial and technological experimentation while being at the same time one of the most traditional sectors in Italy (Conti, 2016).

Focusing on the Italian scenario in particular, the present study intends to represent an effective response to the needs of the industrial sector: from this point of view, indeed, knitwear is a very interesting field to be addressed, as it is one of the most complex realities between the excellences of the Made in Italy brand, with a long and fragmented production chain made up of many different stakeholders. This complexity leads to significant waste in terms of time, resources and materials and leaving a low budget for the training of new designers and for knowledge transfer inside companies. Nonetheless, in an industrial scenario that is continuously renewing itself, a concrete need to train new professionals is becoming increasingly urgent, able not only to innovate the processes of the whole production chain of knitwear, while also keeping an eye on the craftsmanship and on the traditional work this industry originated from (Affinito *et al.*, 2017), in order to act, therefore, in between tradition and innovation, creativity and technique. It is in light of these premises that this work has moved from the hypothesis, addressed in the reviewed literature, that KD requires a cultural background and specific competencies that are different from those of a more generic clothing designer (Traini, 2004) and, therefore, a specific set of teaching tools and methods and a peculiar area of university research.

From a designer-researcher perspective, whoever deals with the training of knit designers inside higher education institutions (HEIs) has the duty to understand how the methodological and educational boundaries of this design discipline are expanding and what tools and design methodologies are at

designers' disposal for them to be successfully embedded within contemporary production and consumption scenarios, which means to conceive a form of design that "is not industrial design in the sense of designing products, but industry-related design, design as thought and action for solving problems and imagining new futures" (Friedman and Stolterman, 2014, p. X)

This study intends to address the complexity of the knitwear industry from this educational perspective, investigating what kind of competencies should be possessed by a well-prepared professional figure in order to respond to the needs of the industrial context, whether or not KD education needs specific design tools and methods and how these tools can deliver proper technical and cultural knowledge, along with the project-oriented mind-set that is typical of industrial design disciplines.

A Multifaceted Approach to Knitwear Design

To support the validity of KD as an area of inquiry and to give it structure from an academic point of view, the theoretical background of the present study addresses the topic from four different perspectives.

First, KD is addressed as an area of inquiry for scientific research within the relatively new academic discourse ongoing in fashion design (Bertola, 2006; Simonelli and Colombi, 2005; Ruppert-Stroescu and Hawley, 2014; Kawamura, 2005; Dell'Acqua Bellavitis, 2007; Conti, 2007). **Second**, knitwear is framed as an industrial sector among the excellences of the made in Italy brand (Fortis, 2015; Pieraccini, 2017), in order to understand how knitwear is integrated into the Italian fashion system, what it has in common with the more general field of fashion (Bertola and Colombi, 2014; Micelli, 2011; Corò and Micelli, 2007) and what are the specific traits of the sector (Annicchiarico, 2009; Traini, 2004). The **third** perspective analyses the educational system of industrial design in which this study is inserted. Starting with a first focus on the pillars that uphold industrial design disciplines (Buchanan, 2001; Friedman, 2003; Cross, 1982; Schön, 1983), the attention then focuses on the teaching tools and methods in use to train designers when they operate in a specific industrial context as the Italian one, to then understand how these methods have been transferred from design to fashion design education (Bertola, 2009; Giusti 2009; Volonté, 2012; Penati and Seassaro, 2000), to train actual designers and not artists (Kawamura, 2005). This framework represents the starting point for the study to work on KD education with a set of methods which belong to the industrial design culture rather than to the still common artistic perspective in the fashion world. The **fourth** gives

an overview on what is known and established about the KD process, its stakeholders and the role of designers inside it (Eckert, 1997; Eckert *et al.*, 2002; Traini, 2004; Petre *et al.*, 2006; Sissons, 2010; Conti *et al.*, 2016). KD emerges as a poorly explored research field but also as a complex creative and productive process with its own specific issues.

The four areas define and explain the background of the entire study, its framework in the Italian context and the reasons for taking this approach to analysing the topic.

The literature review led to the questions that guided the whole study:

RQ1: *Does KD education need to be specifically structured with dedicated tools and methods?*

RQ2: *What kind of competencies should this specific education transfer to young knitwear designers to make them able to answer the needs of such a unique industrial context?*

RQ3: *In light of the competencies required, which features should KD teaching tools and methods have, in the to-be-pursued balance between technical and cultural knowledge, industrial mind-set and creativity?*

Given the research questions, the main objective of this study is to experiment, build and define the exchange of knowledge between universities and companies, to address the specific needs of the industry and fill the existing gap of practical knowledge inside universities, with benefits on the one side for students, researchers, and professors, and the other for professionals, managers, and the business environment as a whole. Educational activities are the tool used to work towards this result, with the final aim to develop a teaching strategy with new tools and methods for KD education at a university level, and to create a synergic system between the academic-didactic realities and the industrial territory.

To reach the set objectives the study is structured through qualitative methods and divided, after an initial literature analysis, into two main stages: a preliminary research phase with a parallel investigation into knitwear as an industry and as a design discipline, and a following experimental phase based on practical experience conducted with the applied research approach.

Preliminary Research: a Twofold Investigation

Due to the presence of very little literature and scientific research about the topic, the first phase of the present study intends to broaden the view on

the state-of-the-art and to build new knowledge which can be useful to then intervene with impacting experimental actions.

To do this, the preliminary investigation has been conducted on two parallel tracks, to acquire knowledge on the **two macro areas of research interest**: KD as a part of the industrial Italian fabric and as a discipline taught in design universities. The aims were to explore the problems, honour the voices of participants, map the complexity of the system, and convey multiple perspectives of participants: circumstances that Creswell and Plano Clarke (2011) place as the most suitable to qualitative methods of inquiry.

For the **first macro-area of research**, knitwear as an industry, the investigation had multiple aims: to obtain a clearer picture of the sector, identifying the best practices between the stakeholders and framing the productive process in all its steps, also understanding the tasks and the relations between stakeholders and the role that a designer could undertake along the supply chain. The attention is also focused on understanding the needs of expert professionals in terms of young designers and of relationship with universities.

To collect information, observations during visits to companies, shops and trade fairs were combined with desk research and semi-structured interviews with professionals. The relevant companies were selected inside a precise framework of investigation, the Italian context, as Italy is a privileged research scenario with a complete supply chain specialized in knitwear, from the processing of raw material to the production of finished products. As stated earlier, it is a fragmented and complex system grown with the interaction and the exchange of knowledge between a multitude of small and rarely medium manufacturers: spinning mills, that transform the raw material into yarns; fashion brands, that create excellent products in line with typical Made in Italy features; knitwear factories, that are in charge of materially realizing the end products. The entire system is highly rooted in the territory, especially in the areas around Biella, in Piedmont, Carpi, in Emilia Romagna, and Prato, in Tuscany which are the current industrial districts of knitwear, along with the areas of Bergamo, Brescia, Padua e Treviso.

Studying Italian knitwear means also to take into consideration the rich relations between local SMEs and the international context, which represents the major market for the sector: the research therefor looks into international fairs, such as FILO and Pitti Filati; the most important certificatory bodies operating on a global scale and the most important producers of industrial knitting machines. These stakeholders turned out to be very important for this study, being facilitators in creating networks among not only companies, but also between companies and universities, which make up the most

interesting areas of experimental action within this study. Information was collected from a total of 24 stakeholders, listed in fig. 1.

	SPINNING MILLS	KNITWEAR FACTORIES	FASHION BRANDS	MACHINE PRODUCERS	OTHERS
Brunello Cucinelli					
Casa del Filato					
CELC					
Elementi Moda					
Filmar					
Filoscozia					
Filpucci					
Fondazione Ferrè					
Ghioldi					
Hosio					
Imax					
Loro Piana					
Maglificio Ellynore					
Maglificio MF1					
Maglificio Pini					
Missoni					
Pecci Filati					
Sandonini					
Shima Seiki					
Stoll					
Studio Marelli					
The Woolmark Company					
Tollegno 1900					
Zegna Baruffa L.B.					

Fig. 1 – List of the analysed stakeholders with their role on the supply chain.

This analysis led to the definition of two of the main pillars on which the entire study is based.

First, it highlighted the needs of the industry in terms of young designers, the most relevant necessity of specifically trained professionals in the field.

Companies need designers:

- with the ability to communicate effectively using the technical language of knitwear
- with specific technical knowledge
- who are aware of how new technologies work
- who are specialized in research and development on yarns
- who have a clear picture of the whole manufacturing process, with its stakeholders and its production steps
- who own soft skills, teamworking most of all

Second, it allowed the researcher to define and describe all the steps of the productive process, answering the important question ‘*who needs a knitwear designer?*’ with ‘*almost everyone*’: the strong contribution of the competencies of a specialized knitwear designer indeed emerged not just within the style departments of fashion brands but in many steps of the chain and with all the stakeholders.

The **second macro-area of research** delves deeper into the existing training offered for future knitwear designers and the teaching methods used, with the aim to identify the most effective methods and patterns of knowledge transfer.

Here the methodology combined participative observation, carried out during a variety of teaching activities at the Politecnico di Milano (BA curricular courses and workshops, post-graduate courses, BA thesis development) with the mapping of other Italian and international universities that provide KD courses, built up primarily through desk research plus semi-structured interviews to teachers and students.

Participative observation has been key to understanding how, in the same discipline, teaching tools and methods can be so different depending on the students’ background, on their previous skills, on the available time and facilities to develop a given project. Alongside this, the mapping of the educational offer in ten national and international universities – selected among the leading fashion design schools with specialist courses in KD – mainly aimed at investigating the structure of their programme and, useful in equal measure for this study, to understand if they have a connection with the industrial context of the territory.

Given the identified needs and desires of the knitwear industry, this second track of preliminary research led to assume hypotheses of intervention for HEIs to address them properly (fig. 2).

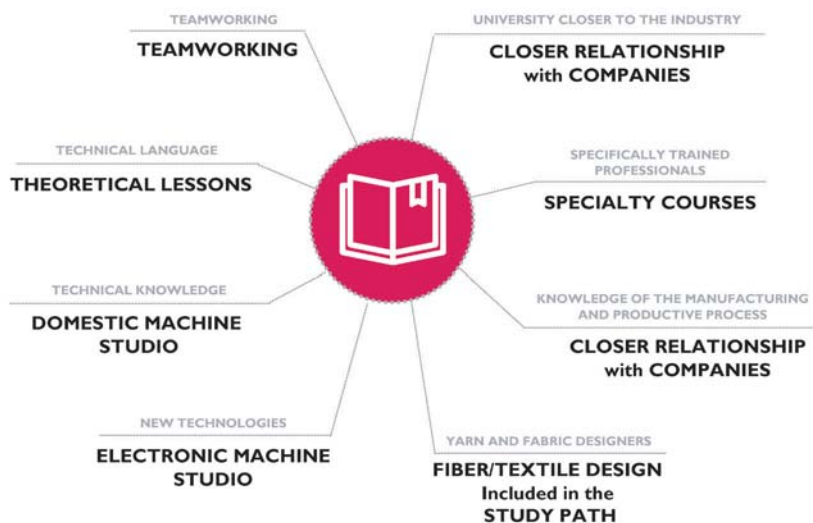


Fig. 2 – Hypotheses of intervention to address each identified need.

This preliminary research phase confirmed what was found in the literature and led to the formulation of two research hypotheses, to be verified later during the experimental research phase.

The importance of a technical, technological and up-to-date knowledge defines **RH1**, that states that **in KD there can be no creation without a technical background**. Throughout the interviews a common theme is that knitwear is not at all just a creative exercise but a technique, a tool for creation that has to be mastered and needs a high level of specialization. The knowledge of designers has to contain both creativity and technical knowledge, in order to make them able to interact in the most effective way with the various actors of such an articulated industrial structure made up of spinners, knitwear factories, brands, certificatory bodies and machine producers.

Since a large portion of the interviewees – professionals and academics alike – reported the belief that industry and university should be more deeply connected, **RH2** assumes **innovative ways of relationship between university and industry to be a facilitating asset to effectively answering the emerging needs of the knitwear industry**.

Experimental Phases

Experimental Phase 1 (EP1)

The preliminary research findings allowed the researcher to start setting up a **methodological framework** for KD teaching to be better defined, applied and evaluated during the consequent phase of experimentation.

The framework, made of tools, methods and directions in which to teach KD, is based on the simplified design model given by Hertzum (in Simonsen *et al.*, 2014, p. 27), that presents four basic elements (fig. 3). First, designers – students, in this case – must understand the **existing situation** through experience and through learning a common language for communication. Second, designers must explore the **technological possibilities** at their disposal. Third, the **design process** must be organized and planned, in order to match the situation and the technological possibilities. Fourth, the **new situation** must be envisioned and concretely experienced with prototypes and simulations.

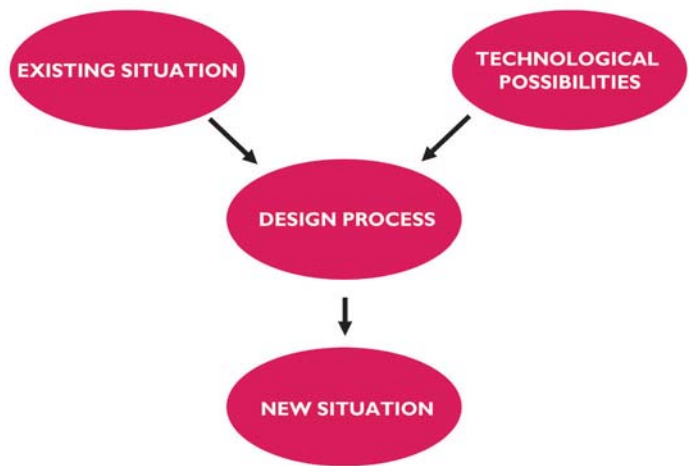


Fig. 3 – The design model by Hertzum (2014).

Taken as a reference, Hertzum’s model has been applied and adapted to the specific features of KD, associating to each element the skills and knowledge that should be provided to KD students through lectures, practical lessons, tutorials and experiential learning, in order to reach the relative objective. As the prior investigation demonstrated that in KD the design process and the making of samples and prototypes are integrated and result

from a series of activities which go back and forth from one to the other, the outline of a KD framework has been structured as composed by three elements instead of four, incorporating the prototyping moment into the design process (fig. 4).

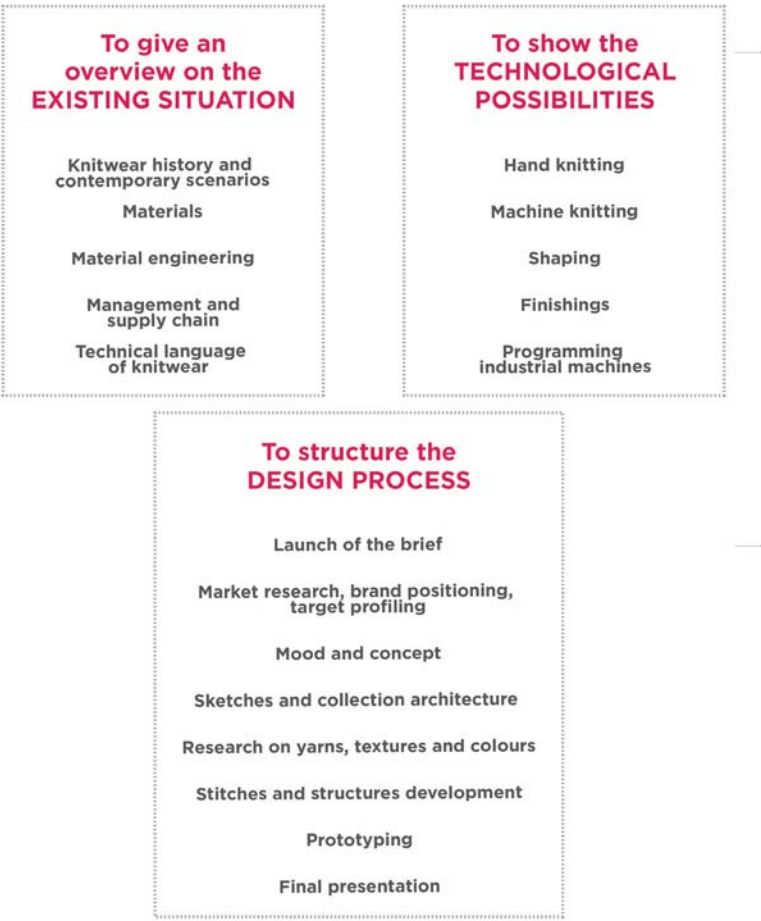


Fig. 4 – First outline of the framework organised with all the useful skills to be taught in order to reach the three objectives of the design model.

The framework has been tested through field experience during eight formative activities, each different in their own timeline, number of students and their background, companies involved and the setting (fig. 5).

	TIME	n° OF PARTICIPANTS	BACKGROUND IN KD	COMPANIES INVOLVED	SETTING
MISSONI PROJECT Final Synthesis Studio A.Y. 2016/17	4 months	48	none	Missoni The Woolmark Company Zegna Baruffa Lane Borgosesia	3rd year curricular BA course at Politecnico di Milano
WORKSHOP Design with Linen A.Y. 2016/17	1 week + 5 months	48	basics	CELC	3rd year curricular workshop at Politecnico di Milano
MAD 2017	5 days	15	none	none	Workshop in Master course at POLI.design
DDM 2017	6 weeks	8	varied	none	Post Graduate course at POLI.design
BCUWS A.Y. 2016/17	5 days	11	none	none	Workshop for Level 4 students at BCU
BA THESIS DEVELOPMENT A.Y. 2016/17	5 months	43	6 months	none	BA Thesis development at Politecnico di Milano
FEEL THE YARN 2017	4 months	2	6 months	Pecchi Filati Filippucci	International contest
KNIT GAME Loro Piana 2017	3 months	2	6 months	Loro Piana	International contest

Fig. 5 – Comparative summary of the experimental activities.

Findings

This part of the investigation impacted on the research process in many ways.

First, it allowed to assess, develop, adjust and refine the designed methodological framework in an iterative process and to define it as the first outcome of this study, structured on three tracks (fig. 6).

THEORETICAL KNOWLEDGE	PRACTICAL ACTIVITIES	DESIGN PROCESS
To make the students understand the current situation	To give an overview on the technical and technological possibilities at students' disposal	To guide students through all the phases of knitwear design
Knitwear history and contemporary scenarios	Hand knitting	Launch of the brief
Materials	Machine knitting	Market research, brand positioning, target profiling
Material engineering	Shaping	Mood and concept
Management and supply chain	Finishings	Sketches and collection architecture
Technical language of knitwear	Programming industrial machines	Research on yarns, textures and colours
	Visits to companies and fairs	Stitches and structures development
		Prototyping
		Final presentation

Fig. 6 – Tracks and modules composing the ideal formative experience for KD.

Second, it confirmed RH1¹, since the more effective experiences turned out to be the ones with a higher level of technical knowledge, always in line with that of design culture. The theoretical knowledge acquired through lectures and other traditional methods (T1) and the technical and experiential knowledge gained through hands-on activities (T2) had in all the cases direct impact on the way participants addressed the process of KD (T3) (fig. 7).

Third, it was useful to understand how the teaching activities could be modelled **on times, contexts and participant's target**, following the framework that had been designed as flexible, modular and adaptive to the needs of participants.

¹ RH1: In knitwear design there can be no creation without a technical background.

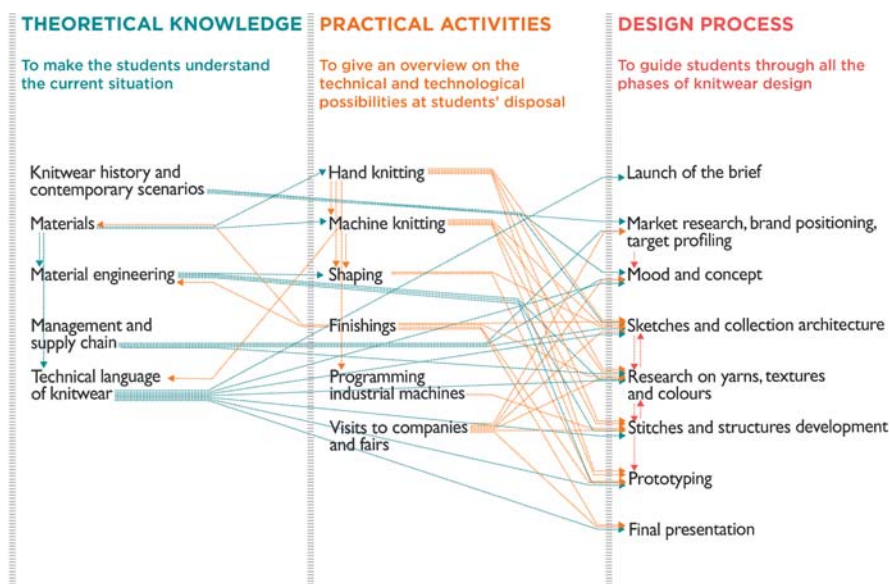


Fig. 7 – Arrows highlight the impact of each teaching module of Track 1 and 2 on the design process in Track 3.



Fig. 8 – Visual synthesis of the benefits for students, HEIs and companies in each experimental activity.

Fourth, it contributed to verifying RH2², since the analysis of the benefits – taken on multiple levels and for all the categories of people involved – showed the activities with more than one type of stakeholder engaged in

² RH2: Innovative ways of relationships between university and industry are a facilitating asset to effectively answer the emerging needs of the knitwear industry.

teaching at one time to be more effective (fig. 8) and highlighted the positive impact of this involvement on several areas of knowledge. Students *learn by doing* (Dewey, 1938) and by experiencing reality, dialoguing with experts, being immersed in real situation.

Experimental Phase 2 (EP2)

Given the first results of the participation of companies in the teaching activities and having outlined the recognised additional value of their contribution to diverse areas of knowledge, EP2 aimed to improve these added values with the experimentation of good practices of collaborative teaching, taking advantage of the variety of stakeholders throughout the chain. This phase consisted of four more pilot training activities diversified by number of participants, participants’ backgrounds, setting, duration and applied solutions (fig. 9).

	TIME	n° OF PARTICIPANTS	BACKGROUND IN KD	COMPANIES INVOLVED	SETTING
WORKSHOP Ghioldi	2 months	46	5 months	Ghioldi	3rd year curricular workshop at Politecnico di Milano
WORKSHOP Filoscozia	3 months	40	5 months	Filoscozia Filmar and others	Extra curricular workshop at Politecnico di Milano
DDM 2018	8 weeks	8	varied	The Woolmark Company CELC MFI	Post Graduate specialization course at POLI.design
BA THESIS DEVELOPMENT with Ghioldi	3 months	8	6 months	Ghioldi	BA Thesis development at Politecnico di Milano

Fig. 9 – Summary of the features of pilot activities conducted during EP2.

The intent was to test good practices and codify new guidelines to be applied together with the didactic modules in the framework, going beyond the most common practices of sponsorships, traineeships, contests, and brief workshops.

As all the previous phases of research highlighted some shortcomings for the already existing collaborations, each one of the detected issues had an assumed answer to be tested during the pilots (fig. 10).

EP2 confirmed, with a verified growth of benefits, the strength of collaborative teaching and outlined it as a unique opportunity for researchers and professors to address state-of-the-art topics and to gather benefits on multiple sides.

Consequently, the assumed experimental answers became a set of guidelines (fig. 11) for collaborative teaching that provide HEIs with the ability to answer the needs of the industry by improving students’ learning, giving them, at the same time, the opportunity to apply the theoretical and technical basis they have learned on a real problem-based context, to gain an industrial mind-set and the ability to entertain a direct dialogue with stakeholders, to frame the industrial reality and to know it in all its steps.

ACTUAL SHORTCOMINGS	EXPERIMENTAL ANSWERS
Short time dedicated by the company to the students	Longer times
Briefs which simulate reality but are not actually real	Reality-based brief addressing the real needs of the company
Lessons held inside classrooms or workshops with inadequate facilities	Students immersed in the industrial environment to develop part of their work
Loose relationship and few meetings with the experts from the company	Constant feedbacks from companies on design and product development
Exclusive dialogue with the design units, with no contact for students with the other stakeholders along the chain	Closeness to manufacture with the involvement of diverse stakeholders
Lack of technical knowledge transferred, due to a preference for the creative side of the project	Collaborative development of student's projects with expert technicians inside companies
Difficulty for companies to understand and reach concrete benefits that they could exploit on everyday work life	Pursuing of concrete benefits for the companies as well as for students

Fig. 10 – Summary of the actual shortcomings of cooperation between the industry and HEIs in the field of KD, with the corresponding answers tested in the pilot activities

Guidelines:

- are designed to be selected and to model cooperation from time to time, depending on the concrete need of the involved company, the background of participants and the expected results.
- consider the reality-based needs of a company in terms of time, spaces, facilities and not just in terms of ideas.
- actively involve all the participants in teaching/learning.
- direct researchers and professors in HEIs on how to know where to intervene from time to time on the collaborative teaching approach and how to model it as required by the current situation.

GUIDELINES		STUDENTS	HEIs staff	COMPANY
PROPOSE	Gain the ability to welcome and give prompt response to reality-based brief which address a need expressed by the involved company			
	Act to reach concrete benefits for students, researchers and professors in HEIs and companies			
FACILITATE	Organize longer teaching experiences to respect the availability of the company's professionals and to allow their real and constructive participation			
	Schedule constant feedbacks from diverse professional figures on design, research, technical choices			
BUILD	Immerse students in the industrial environment through visits and lectures with professionals but also through having them working on their projects inside the company			
	Give a closer overview on the professional opportunities of manufacture, with the involvement of different stakeholders			
	Give students the opportunity to be hands-on on their projects and to realize prototypes under the supervision of teachers at the university, and under the guidance of technical experts inside the company			

LEGEND			
	Main responsible of the action		With active role in the action
	Main beneficiary/ies of the action		

Fig. 11 – Summary of the guidelines.

Outcomes

Complementary Application of the Outcomes in an Integrated Teaching Strategy

The two final outcomes – framework and guidelines – impact on each other and are designed as modular and combinable, intended to be used together in an integrated and mouldable teaching strategy. The two components can be combined depending on variables such as the number of students, their background, the type of companies involved and their needs, the setting and the available time.

This kind of flexibility comes from the modular structure of both the framework and the set of guidelines: the framework is indeed composed of three tracks of knowledge which are not intended to be consecutive in terms of time but could overlap and be pursued in parallel. Similarly, the three groups of guidelines are non-consequent and are not required to all be present in each experience. The integrated strategy can thus be represented as a

composition of smaller modules which can be chosen to model each teaching activity depending on the situation (fig. 12).

The strategy is intended to become the backbone of a discipline that makes HEIs able to understand the practical needs of the knitwear industry and to translate them into educational experiences. It should provide teachers – professors and researchers – with the tools to be able to foresee the expected result of the teaching activity, and to manage it from a methodological point of view and make it as effective as possible. This means that, depending on the request made by stakeholder/s, professors and researchers can undertake an activity of an entrepreneurial nature, using teaching as a tool for assessment and choosing the most suitable methods and their application towards the desired result, while remaining in line with the students’ backgrounds and the available time and facilities.

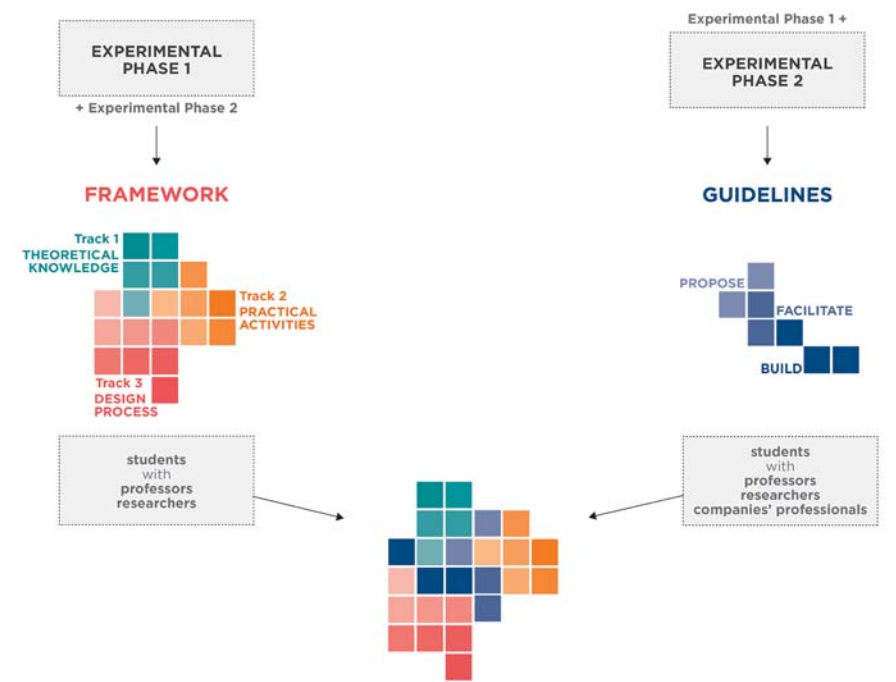


Fig. 12 – Visualization of the integration of the framework and the guidelines in a flexible strategy.

Conclusions

The study provides a framework of the Italian knitwear industry in its entirety, highlighting its specifics and critical issues as a particular branch of the fashion system. It approaches the knitwear industry from the domain of design studies, posing several questions, focusing, on the one hand, on the role that academic research in design and design education should play in such a context and, on the other, on who a specifically trained knitwear designer is, what competencies he/she should have, where his/her intervention is essential on the production chain.

All these issues have been defined in three initial research questions, addressed along the research development.

The undertaken investigation on the knitwear industry fully answered **RQ1**, highlighting the expressed need of a specific teaching approach for KD with dedicated tools and methods. The preliminary parallel investigation led to the framework for KD teaching, that through the tests conducted during Experimental Phase 1 answered **RQ2** with the definition of the competencies to be transferred to knitwear designers as linked to creativity and technique, composed by a multifaceted knowledge. This knowledge includes the learning of theory and practice about materials, material engineering, management, contemporary culture of fashion, production, manufacture, knitting techniques, software, and the ability to apply all this background to the phases of a design-driven creative process.

RQ3, is addressed by both the experimental phases of the research, with the design of the teaching strategy which is structured to deliver the needed competences but allows at the same time to pursue the training of knitwear designers with a very adaptable didactic approach, to be adjusted from time to time to the context.

With the reached answers to the research questions, the final outcomes of the study impact on a variety of areas:

- on the project, with reality-based project briefs, and a design process that becomes more strongly oriented towards the industrial product.
- on academic research, as for the first time, knitwear has been investigated in depth, among the academic areas of fashion design, as a discipline that deserves a specific training and a particular form of university research.
- on design education, where knitwear becomes a structured discipline among the other specialties of fashion design, with a set of specific

tools and methods and the deep connection with the industrial fabric that the relevant research aims to pursue. The knitwear designer will be a professional figure able to answer the specific needs of the industry.

As a starting point for academic research in the field of KD, this study paves the way towards several opportunities for future works. If, on the one side, the territorial boundaries set at the beginning gave the study a fertile ground of experimentation due to the specific features of the Italian context, on the other this represents a challenging issue to be addressed in terms of scalability and opens the door to several opportunities for future research, oriented towards the creation and codification of collaborative teaching experiences between international partners.

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