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New Vision On Knitwear Design. How the traditional craft methodologies are evolving into fashion international scenarios.

Laura Affinito\textsuperscript{a*}, Giovanni Maria Conti\textsuperscript{b*}, Martina Motta\textsuperscript{b*}
\textsuperscript{a}Laura Affinito Studio
\textsuperscript{b}Politecnico di Milano
\textsuperscript{*Corresponding author e-mail: info@lauraaffinito.com, giovanni.conti@polimi.it, martina.motta@polimi.it}

Abstract: If for traditional fashion design as clothes making or as basics for the creation of fashion products the concept of good design is now acquired, knitwear is now facing its decisive change from hobby into project; the enhancement of craft (Micelli S. 2011) does not refer to any nostalgia for the past times, and even better in Italy it is a very fertile area to be innovated and experimented. The ability to innovate and promote new points of view in design processes does not arise only from a thorough understanding of specific areas, but also from a lifestyle open to diversity, that society has to accept and recognize (Micelli S. 2011).

Today, the ability of designers to explore contexts in an original way, proposing ideas and results that are not just technical solutions of established problems, sees in creativity and in fashion design education the ability to solve problems through materials and their constant innovation for clothes, to experiment or to look at old problems in a different way with the aim of going beyond the usual "fashion" idea. This paper is written at the end of an educational experience in the Knit Design Lab at the School of Design of Politecnico di Milano, where Missoni, the most important Italian knitwear brand, together with Woolmark, the most influencing certification body at an international level for the promotion and enhancement of Merino wool, in collaboration with Knitlab, a digital platform for the learning of the traditional knitting techniques active in the School of Design at Politecnico di Milano, realized a project in which the knitting techniques have been the first tool for the creation, design and prototyping of a clothes collection for the spring-summer 2017, coherent with the brand identity of Missoni and with at least the 70% of merino wool as a condition dictated by Woolmark.

The aim of the paper is to highlight the moments of convergence and differentiation regarding the methodologies and the design process into the different areas of design.

In this way today we can talk about knitwear design: a specific field of Made in Italy completely changing: to become project, knitwear must produce garments and collections enhancing traditional techniques while expressing the spirit of time and
in which the manual technique becomes a research tool and method to deal with all the aspects in their influence on the industrial production chain.

**Keywords:** Design Education, Methodology, Crafts, Knitwear, Traditional Knowledge, Innovation in Fashion Design.

1. **Introduction**

The following paper has the aim to show how knitwear design is today an integral part of the culture of the project and how it places itself inside the Italian design scenario, by incorporating the methodologies that have characterized the profession of contemporary design.

Moreover, another purpose of the paper is to give a picture of the current state of relations that exist between design methodology and industrial application within a sector which by its nature comes from a manual, simple and repeated gesture, and where the hands are the primary processing tool of the project itself and, consequently, of the construction of the finished product.

To show this, we take as reference a case of applied teaching which has involved the research team of the Final Synthesis Lab in Knitwear Design (fsLKD), at the School of Design of the Politecnico di Milano, for the elaboration of a spring/summer collection of clothing for Missoni brand, through the use of 100% merino wool promoted by Woolmark and sponsored by Zegna Baruffa Lane Borgosesia.

This project allowed us to investigate a series of experiments that the Zegna Baruffa, along with Woolmark, had elaborated on the use of wool, especially in different contexts from the usual applications; the students of fsLKD have created the collection by applying the typical design methods; Missoni has accepted the design challenge using this yarn for the garment construction.

2. **Basic Design practice applied to Knitwear Design.**

When we talk about knitwear, one of the first memories recalls to anyone an ancient manual work, barely homemade. As this imaginary is real, it’s also true that knitwear covers a wide industrial sector of made in Italy that is growing in these recent years.

In an industrial scenario that is continuously renewing itself, it is bound to born the concrete need to train new professionals, able not only to innovate the processes of the whole production chain of knitwear, but also to keep the eye on the craftsmanship and on the traditional work from where this industry originated.

In this context, the production of knitted garments is the most visible aspect of a chain set in some specific areas of Italy, especially the ones around Biella and Carpi.

The recognized industrial vocation of knitwear therefore represents for Politecnico di Milano a new didactic challenge: to structure a series of ad-hoc courses to train new professionals who know how to design using a yarn.

The aim of education at Politecnico di Milano has always been the transfer of a project methodology that can transversely go across different product categories: keeping in mind the motto "Design is one" inherited by Massimo Vignelli, (in Vignelli M., (2010) *Vignelli Canon*, Lars Muller Publishers, Zurich) the same principles have been applied when, seven years ago, a Knitwear Design Lab has been introduced into Graduation Course in Fashion Design.
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If therefore the traditional design teaching decomposes into smaller issues and analyses in a practical way all the various parts of the project, knowledge transfer for Knitwear Design proceeds in the same way.

The fundamental topics addressed by the different design disciplines (product, furniture, interior and fashion) such as shape, colour, technique, rhythm, culture, society, ergonomics, production technologies, need to be addressed and adapted to knit design.

Students are, in this way, facing an almost boundless scenario to explore and to address with new eyes: knowledge of the raw material; knowledge of traditional and contemporary production techniques, manual and mechanical; manual practice for research purposes; design exercises on a given topic; acquisition of industry-specific rendering techniques (Japanese notation; notation for knitting; use of software).

The analytic approach of this design process cannot leave aside the knowledge about the raw material. The variety of yarns for knitted clothes is continuously growing and evolving. Each of these yarns -natural, derivatives, synthetic, in mixture, derived from other production chains- carries with it historical, technical, environmental, physical, social, cultural and expressive contents.

In knitwear, the design becomes a basic step into a long industrial chain that starts from the development of new fibres, from the recover of the past ones and comes to the innovation on machines that are now allowing new manufactures more and more often.

These novelties, offered by the textile industry and presented to the insiders through important trade fairs – Pitti Filati in Florence, Milano Unica, Filo, Premiere Vision in Paris, etc.- become the starting point for the project to understand what can be done and what are the edges for innovation.

The aim of the designer is always to go further, putting together and produce meaning, to know the elements that may seem trivial and rework them with a new perspective innovation does not come only through the development of the “new” but also through the understanding of what happens if you produce and process the traditional yarns in a different way.

3. Learning by doing...and knitting.

“The Knitwear Design aims to create clothes that exploit and enhance the typical features of knitwear, integrating traditional knowledge with technological innovation and experimentation throughout the supply chain. This modus operandi that condenses design, know-how and craftsmanship and is at the basis of the excellence areas of made in Italy, has its perfect soil in knitwear, expression of an ancient local tradition with a strong distinctive style and production quality.” in Conti G.M., Poletti F., Rinaldi C., (2016) Maglieria Made in Italy Knitwear. Stories and Talks, Silvana Editoriale, Milano

To provide solid foundations and generate interest in the manual know-how means to clear any theoretical approach: inside the Politecnico students are always required to achieve, and thus to verify, the feasibility and the goodness of the results of their design.

In this totally new viewpoint on knitting, it’s essential to understand the features of a knitted fabric. If knitting has to move forward from the traditional meaning, the exercise on small samples of stitches is fundamental to understand what we do can obtain by knitting a single yarn.
This process is then repeated by replacing needles with a knitting machine. Working with the Lab technicians, the students learn how to produce a knitted fabric and finished clothes, and even more they start to master the—almost—endless possibilities of this productive technology.

This kind of approach is the main training to experiment and find new solutions; being able to realize their own project, their knitted clothes, students are able not only to shape the matter but to master the technique. They sharpen their professional character by gaining the ability to ask specific questions on the times, the feasibility and the reproducibility of a given product; by trying, doing samples, studying the small and scaling it they manage to deal with the limits of the project, to find solutions to bypass the production restrictions, to maintain a constant focus on what they’re doing.

In order to deal with students as knitwear designers, during the lab, the collaboration with external professors or technicians becomes essential; indispensable figures as chemists, textile engineers and, above all, representatives of the business realities of the textile industry, work together in order to make the designer’s work never detached from the real world.

To simulate the industrial reality during the education of the designer becomes strategic for creating professionals able to manage the project in all its phases.

The project developed during the Final Synthesis Lab is just the final step of a study programme that began two years earlier. All the basics and design skills learned in time must necessarily be conveyed in a single project that can show all its steps. Finally, the value of a project cannot be separated from the possibility of being told. This means that not only the finished object has to be shown, but all the key points of the development have to be highlighted.

So knowing how to present, both with their own words and with visual proposal, the motivations for a particular analysis, and the possible answers through mood and concept boards, before the proposal of new products, becomes for students a critical issue to define the area of their work. Verifying the quality of their insights, keeping an open mind on options and variations, as well as in the real world, is an integral part of the design method.

4. Teaching for knitwear designers.

As the word ‘project’, (coming from the Latin projectare ‘throw-forward’, ‘propose’) originally means moving forward, we, as designers, with a project prefigure what we intend to make happen. The design approach to this type of operation is tied to reflecting before acting, counterposing everything to the no-method approach of working led by the case and waiting to have the right idea. The method of traditional knitting, as well as the one of industrial knitwear production, is thus for its features a really integrant part of the Culture of the Project:

“Nothing could be left to chance otherwise the dress that you create could bring disproportions, unsuitable volumes, incorrect fits. Unlike the tailoring, knitting must be planned, thought in advance, calculated stitch by stitch. Today doing knitwear design means investigating how to solve problems through an activity that creates, to those in charge, many constraints.” in Conti G.M., Poletti F., Rinaldi C., (2016) Maglieria Made in Italy Knitwear. Stories and Talks, Silvana Editoriale, Milano, pag 24.

Since its establishment, seven years ago, the Final Synthesis Lab in Knitwear Design (sFLKD) at Politecnico di Milano is subject of research and experimentation whose purpose is to be a simulation of the operative reality of knitwear designers, closer to contaminations and exchanges of knowledge with the industrial reality.
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In the current scenario, the contribution to the formation of new figures in the knitwear sector played by sfLKd is one of the first experiments in Italy, especially in its purpose to get in close relationship with a highly articulated and complex industrial structure, with a high degree of fragmentation of the supply chain and of specialization of skills and strongly rooted in the territory.

If, then, differently specialized figures act on territory and in the industrial reality and with them the designer must deal, the sfLKd intends to do so as a test bed for students, enabling them to be able to relate with the different aspects of design and production of knitwear.

The Lab is now in its seventh edition and the positive feedback responds to the contextual and newfound attention for knitwear in the contemporary fashion scene: more and more brands have it in the foreground, the designers consider it an interesting challenge and its growth is also reflected in sales and production in Italy (With a 6.5% increase in exports in 2015. Source: Il Sole 24 Ore, March 26th, 2016), and in a broader international context, where the demand of specifically formed figures is increasing.

5. Missoni Project Lab.

During the Academic Year 2015-2016, the Final Synthesis Lab in Knitwear Design has involved the cooperation of professors and researchers from Politecnico di Milano with Missoni\(^1\), the Woolmark Company\(^2\), Zegna Baruffa Lane Borgosesia\(^3\), and Knitlab, a digital platform for learning the traditional knitting techniques founded in the Politecnico di Milano School of Design.

The involvement of companies has been for students an opportunity to debate and review their projects, a test that took them out of the simple didactic exercise: the challenge placed by Woolmark is part of a wider project to enhance the merino wool as a yarn suitable for all seasons and as an opportunity to reach design perspectives in line with a new contemporaneity; to design for Missoni has thrown the students in a context in which the brand’s history, its stylistic features and its audience guide the design choices.

Not just artistic creation inspired from this or that theme, but concrete thinking, applied to industrial production and to contemporary revolutions.

It is clear that the proximity to the industrial production constraints makes the knitwear designers real designers and thus makes Knitwear Design integral part of the Culture of the Project.

Knitwear is today a discipline to be considered among the teachings of design, and as design it deserves a coherent approach in all its parts, so that when you draw a garment you do not just think about the aesthetic result but you do a research (previously defined "practical", i.e. not just theorized but made of tests and checks with hands). The aim of this research is the coherence of the shape with the material, with the processing techniques, the wearability and the feasibility, the availability of manufacturing technologies and innovation.

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1 Founded by Ottavio Missoni and his wife Rosita Jelmini in 1953, Missoni is the most important and known brand of Italian knitwear, representative of Italian fashion excellence around the world. Its style is recognized as a colorfull “put-together” of zigzag motifs, stripes, waves and slub yarns in a patchwork of geometric and floral jacquard. Today, the company is guided by the grown-up Missoni siblings Vittorio, Luca and Angela, the brand’s creative director. (source: www.missoni.com, Sept. 2016)

2 The Woolmark Company is the global authority for promoting the Australian Merino wool. Operating worldwide through an extensive network of relationships spanning the international textile and fashion industries, they highlight Australian wool’s position as the ultimate natural fibre and premier ingredient in luxury apparel. (Source: www.woolmark.com, Sept. 2016)

3 Zegna Baruffa Lane Borgosesia is one of the Italian leaders in the production of industrial yarns for knitwear and the largest producer of 100% made in Italy merino wool yarn. (Source: www.baruffa.com, Sept 2016)
The modus operandi of the brand then meets in all aspects what the professors teach in university classrooms, and it is of fundamental importance for students to find continuous feedback between what they learned at university what it is being suggested by those coming from the business environment in which they will soon enter. Revisions with companies are for the students help and guidance, but also an opportunity to effectively identify the limits of the project and to find the most suitable solutions.

Since the launch of the brief, the projects have been developed with the periodic supervision of both companies in a new perspective, typical of knitwear product, in which is not always the finished product to lead the design choices.

If the final required outcome was a capsule collection of clothes coherent with the brief and with Missoni’s taste, another important issue has been the experimental point of view on the project. “Knitwear was made as it’s made today, with the hands on the knitting machine” says Luca Missoni talking about his parents, Ottavio and Rosita, during their first years of business.

Here below we present as case study two -out of the eight- collections developed during the first semester of last Academic Year 2015-2016, with a focus on the clothes that represent better what we’re defining as Design for Knitwear.

The aesthetic and the brand’s iconic elements are strongly present and in each project we find the typical Missoni’s “put together” technique: the juxtaposition of the colours has been studied firstly on paper and then tested with the yarns, combining them as Missoni still does with patchwork, horizontal lines, zigzag or flamed motifs.

Once investigated and embraced the world of Missoni, students have been able to go further with the experiments on colour and techniques, finding new solutions and interpretations of the brand identity.

The first collection here presented is called “Inn[HER]self”: one of the looks, made by top and skirt, it’s a study on the movement of flat rib stitch, created on the knitting machine with the vanisé technique. Born as a study on colours, this work on flat ribs and their shift has become a structural element of the garments: thanks to the adjustment of the gauge on the machine and to the

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4 Luca Missoni talks during “Knit Talks”, Triennale of Milan, March 24th, 2016
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regularity and density of the ribs both pieces are shaped on the body without increases and decreases.

Figure 2. Capsule collection “Inn[HER]self”, made by Cristina Cervati, Eleonora D’Onofrio, Elena Sophia Di Giacinto, Rebecca Formenti, Erica La Delfa during the Final Synthesis Lab in Knitwear Design at Politecnico di Milano, October 2015-February 2016.

Figure 3. “Inn[HER]self”, top and skirt made with shifted flat ribs on the knitting machine.
Figure 4. "Inn[HER]self", technical sheets for the top and the skirt.

In the second collection, called “Disharmonious ritual”, the most interesting outfit is the result of a project made on the knitting machine by designing a fabric before than a garment. Students have searched for a solution to integrate a particular type of woollen bouclè yarn, hardly knittable, within the collection in the form of fringes. The solution has been to insert, after many tests, the yarn in a lightweight knitted weft, so that the two things together were now a new looking tissue, ready to be cut and used as needed.

“A yarn that emerges in a knitted textile is not a defect to be corrected but it is the soul of that product on which someone has acted, that a machine has built, that a designer has thought.” Giovanni Maria Conti in “The Project of Knitwear” in Conti G.M., Poletti F., Rinaldi C., (2016) Maglieria Made in Italy Knitwear. Stories and Talks, Silvana Editoriale, Milano.

Figure 5. Capsule collection “Disharmonious Ritual”, made by Andrea Baldovino, Maria Giulia Papa, Claudia Pastori, Olga Rapazzini, Alessandra Vaselli, Suu Wang during the Final Synthesis Lab in Knitwear Design at Politecnico di Milano, October 2015-February 2016.
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Knitwear therefore, as in this case, forces the designer to a long, thorough and detailed research; it often means to overturn the usual mental order that builds an outfit to begin to think and to design the soul of knitwear, starting from that single interwoven yarn. You can then design the yarn itself, combine several yarns together, or even use non-traditional materials and then continue with the project of the stitch to be worked by hand or machine, to make a fabric. All these components influence the final garment and determine its features so decisively that it is not uncommon to find fashion sketches made before and completely altered after the experimentations made with yarns.

Conclusion

“...it’s much easier with textile because you can manage it inside [the company]: you have your atelier and you can work directly with the model makers. There are tailors with whom you can do tests, to see immediately shapes and techniques. With knitwear this is not possible because suppliers are external, so you have to create a relationship [...] and to work with them, with the knitters on the knitting machines. It is a slower process.” Margherita Carrara, in “An Italian Soul in French Knitwear” in Conti G.M., Poletti F., Rinaldi C., (2016) Maglieria Made in Italy Knitwear. Stories and Talks, Silvana Editoriale, Milano

The teaching experience of last year, in collaboration with Missoni, Woolmark and Zegna Baruffa Lane Borgosesia, has shown, in practice and during the course of the Lab, that designing knitwear is an ongoing challenge with research contents for the project that have to be investigated in different areas of knowledge; a challenge that cannot be dismissed with a "it’s just a dress" because that 'dress', will be the result of a series of intersecting "complex knowledge". If it is true that it is our ability to see not usual situations as usual, and take action in the first as we have acted in the past (D. A. Schon, 1993: 159), then in the design of knitwear the handiwork, seen as the act of learning how to create an industrially replicable model, is what it seemed unusual and
far from design, but in this specific case is an indispensable moment of "knowing how to make" the finished product. In a contemporaneity where design is deeply connected with the modern industrial world, fast and multicultural, its communication has to be necessarily built with all the instruments able to visualize accurately the designed garment and to perfect it easily. Students have to know software to design knitwear items that are able to simulate the ideas in times compatible with those of the industry, to perform a further step away from the common imaginary which sees the designer as a figure who communicates only through artistic sketches, not too realistic in proportions and absolutely approximate for production requirements. “Doing things” makes us more aware (Micelli S., 2011: 29). Well sewing a dress or being able to cook a fish are activities that allow us to imagine categories of "elegance" and "goodness" ever more sophisticated. To "make by hand" and then move on to the comparison with the electronic machine that will create our own piece of clothing is the key point of the implementation of a knitting project and to deal with our material world, never take it for granted, allows us to think better. Innovation in this case, in this field, in this industrial sector is simply not, or only, the result of a more or less advanced technology application but is an innovation starting from "practical doing". The yarns used for the construction of the outfits for Missoni, supplied by Zegna Baruffa, are the ideal synthesis of artisanal knowledge and technological research; if wool has indeed all the necessary features, for example, in terms of temperature control, the tests conducted in the laboratories of the Politechnic of Turin, according to the international method Moisture Management Test AA-TCC 195-2009, have shown that the treatment called Re-Active and K-Wool has increased the ability of the wool itself to transfer body moisture on the outer side of the fibre, and then of a garment, increasing de facto the characteristics of the fibres itself.

To conclude, if on one hand there is no coded 'practice' for knit design, on the other we can state, thanks to Missoni Project Lab, that the most appropriate design of the process involves steps such as the design, the construction of experimental tests of the stitches in parallel with the realization of three-dimensional models, then the makeready on the knitting machine to obtain the desired shape. A thread that pervades us, which becomes mythology, like the thread of Ariadne or the fabric of Penelope, to become design, mirror of the contemporary material culture.

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About the Authors:

Laura Affinito, product and surface designer, works at her Studio in Milan and as adjunct professor of Knitwear Design Lab at Politecnico di Milano. Her research focuses on relationships, convergences and contamination between the various project fields, with a focus on textile design for people and public spaces.

Giovanni Maria Conti, Ph.D, is currently the Coordinator of Knitwear design Lab and his fields of interest are focused on contemporary design with a specialization on Knitwear and Fashion Design. Founder and Scientific Coordinator of the website/blog www.knitlab.org, he is executive secretary of Fashion Design Degree at the School of Design of Politecnico di Milano.

Martina Motta, Graduated with a Master’s Degree Thesis in Knitwear Design at Politecnico di Milano, she’s now attending Ph.D. courses, working as a researcher and as a tutor for students at Politecnico di Milano. Her PhD research focuses on Knitwear Design education.