

**ES Sistema de gerencia para
proyectos integrados**

**EN Management System for
Integrative Projects**

**ITA Sistema di gestione per
progetti integrati**

**FRA Un système de gestion pour
des projets intégrés**

**POR Sistema de gerenciamento
para os projetos integrados**

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Management System for Integrative Projects

Recibido: 06/11/2019; Aceptado: 18/12/2019; Publicado en línea: 21/12/2020.



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ABSTRACT (ENG)

This paper presents the process of 2018's Integrative Project, named: "Family origins and the searching for myself", in the first year of the undergraduate course in Fashion Design at the State University of Londrina. The system has been being improved in theory and practice since 2010. To do so, the authors employ the deductive method, with a qualitative approach of exploratory and descriptive nature, in a case study that emerged from the application of the system – named Management System through Knowledge Process (MSKP). The system is used to design through creative, cognitive, scientific, and projective methods, guided by the Design Thinking (DT) and the application of creativity tools to support the teaching and learning. It is concluded that the cognitive and emotional involvement of students helps them understand the design process, once it relies on their unique repertoire and life experience, and provides them with the identification of needs and possible design solutions at the same time.

KEYWORDS: *fashion design, management through process, design thinking, knowledge construction, teaching and learning.*

RESUMEN (ESP)

Este artículo presenta el proceso del Proyecto de Integración 2018 titulado: «Orígenes familiares y la búsqueda de mí mismo», para el primer año del curso de pregrado en Diseño de Modas en la Universidad Estatal de Londrina. El sistema está siendo mejorado en la teoría y en la práctica desde 2010. Para este efecto, los autores utilizan el método deductivo, con un enfoque cualitativo de naturaleza exploratoria y descriptiva, en un estudio de caso que surgió de la aplicación del sistema, llamado «sistema de gerencia a través del proceso de conocimiento» (SGPC). El sistema se usa para diseñar, a través de métodos creativos, cognitivos, científicos y proyectivos, guiados por *design thinking* (DT) o pensamiento de diseño, y la aplicación de herramientas creativas para apoyar la enseñanza y el aprendizaje. Se concluyó que la participación cognitiva y emocional de los estudiantes les ayuda a comprender el proceso

de diseño, cuando se sustenta en su repertorio único y experiencia de vida, y les ofrece a la vez la identificación de necesidades y posibles soluciones de diseño.

PALABRAS CLAVE: diseño de modas, gerencia a través de procesos, pensamiento de diseño, construcción de conocimiento, enseñanza y aprendizaje.

RIASSUNTI (ITA)

La relazione presenta il processo che ha seguito il progetto d'Integrazione 2018 titolato: "Origini familiari e la ricerca di se stessi" del primo anno del corso di Laura in Fashion Design presso l'Università statale di Londrina (BR). Il sistema di gestione ha decisamente migliorato in teoria e in pratica dal 2010. Gli autori hanno adoperato il metodo deduttivo, da uno sguardo qualitativo di carattere esploratore e descrittivo, su uno studio di caso emerso dall'applicazione del sistema – SGPC sistema di gestione mediante processi di conoscenza. Il sistema viene usato per disegnare per mezzo di metodi creativi, cognitivi, scientifici e progettistici, guidati dal Pensiero di Design (PD) e l'applicazione d'istrumenti creativi con lo scopo di aiutare dei processi d'insegnamento e di apprendistato. Alla fine, si ha inteso che la partecipazione cognitiva ed emozionale degli studenti permette loro la comprensione di design qualora si parta dal proprio repertorio e dall'esperienza di vita, e anche offre loro la possibilità d'identificare le necessità e le possibili soluzioni di design.

PAROLE CHIAVI: *fashion design, gestione di processi, pensiero di design, costruzione di conoscenze, insegnamento e apprendistato.*

RÉSUMÉ (FRA)

Cet article présente le processus du Projet d'intégration 2018 intitulé "Origines familiales et Recherche de moi-même" pour la première année du cours de premier cycle (bachelier) en Design de Mode à l'Universidade Estadual de Londrina (Brésil). On a apporté diverses améliorations au système, dans la théorie et la pratique, depuis 2010. À cette fin, les auteurs utilisent la méthode déductive, avec une approche qualitative de type exploratoire et descriptif, dans une étude de cas concernant

l'application du système appelé Système de gestion à travers le processus de connaissance (SGPC). Le système est utilisé pour concevoir à travers des méthodes créatives, cognitives, scientifiques et projectives, guidées par le *design thinking* ou "pensée design" (PD), et l'application d'outils créatifs pour appuyer l'enseignement et l'apprentissage. La conclusion de l'étude est que la participation cognitive et émotionnelle des étudiants aide ceux-ci à comprendre le processus de design lorsqu'il est fondé sur leur répertoire unique et leur expérience de vie, et leur permet à la fois l'identification des besoins et de possibles solutions de design.

MOTS CLÉS: *design de mode, gestion à travers des processus, design thinking - pensée design, construction de connaissance, enseignement et apprentissage.*

RESUMO (POR)

Esse artigo apresenta o processo do Projeto da Integração 2018 intitulado: "Origens familiares e a busca de mim mesmo", para o primeiro ano universitário no Design de Moda na Universidade Estadual de Londrina. O sistema foi melhorado na teoria e na prática desde 2010. Para este efeito, os autores usam o método dedutivo, com uma aproximação qualitativa da natureza exploratória e descritiva, em um estudo de caso que emergiu da aplicação do sistema — chamado Sistema de Gerenciamento através do Processo de Conhecimento (SGPC). O sistema é usado para fazer o design com métodos creativos, cognitivos, científicos e projetivos, guiados pelo Pensamento do Design (PD) e pela aplicação de ferramentas creativas para suportar o ensino e a aprendizagem. Conclui-se que a participação cognitiva e emocional dos estudantes ajuda eles a entender o processo do design, quando é sustentado no seu repertório único e na sua experiência da vida, e recebem ao mesmo tempo a identificação das necessidades e das possíveis soluções do design.

PALAVRAS-CHAVE: *design de moda, gerenciamento através dos processos, pensamento do design, construção do conhecimento, ensino e aprendizagem.*

INTRODUCTION

This paper describes the actions performed by students and professors of the first year in the Fashion Design degree during the Integrative Project (IP) named “Family origins and the searching for myself” with the aim to disseminate the practical and theoretical system used during the IP, as well as some results and formal/aesthetical examples. However, we do not describe the theoretical formulation of the problem, conceptualization, and the students’ analyses, because that would also expose personal (and, therefore, intimate) aspects of their lives – aspects of the family identity and culture, which are formed and influenced by different ethnicities.

In the Design field, the interdisciplinarity varies according to the relationship between the subjects and the desired projective complexity. The undergraduate course in Fashion Design at the State University of Londrina – object of this study – is mainly focused on the Project Management, the core pedagogical basis, which interacts with other axes of study: Design Fundamentals; Expression and Representation; Garment Construction; and Production System. The Integrative Projects (IP – that take place in the first, second, and third years) promote projective experiences since the beginning of the course, allow the application of real-life situations to support the research, perform continuous assessment, and engage professors with the monitoring of their teaching quality (Daher, *et al.*, 2006).

Table 1 describes the interdisciplinarity of the subject “Research and Creation” by the integration with subjects from other pedagogical axes. The IP takes place in the last two bimesters of the first year and is performed according to the creative process suggested by the Brazilian designer

Gomes (2000). This process is applied because it is part of the first-year syllabus and also because it provides a comprehensive number of steps.

The subject Research and Creation, which “launches” and manages the IP, aims at developing the skills and fundamentals to the management of an organized creative thinking, according to Fornasier, Martins and Demarchi’s study (2008, p. 129) that theoretically systematizes design management through knowledge process. This system provides students with opportunities to practice the systemic view in learning the design process, through applying cognitive, creative, and methodological processes (projective and scientific methods), which are described as “interdependent processes that form a management system through knowledge process”. In the first-year projects, however, the scientific method is not applied (since this subject is not on the yearly syllabus), but students do develop skills to define the design problem, set objectives, and reach innovative solutions for the project.

In order to achieve satisfactory levels of learning, students must be encouraged to act with autonomy and manage their own knowledge. The management of this Integrative Project links the Management System through Knowledge Process (MSKP) – suggested by Fornasier, Demarchi, and Martins (2008) and presented in Figure 1 below – with the Design Thinking (DT) by the application of tools to favor the decision-making, thus leading students to the abductive reasoning. Activities are performed according to a project schedule, but the pace of each student is also taken into consideration – professors apply a weekly, individual assessment of the activities performed so far, which provides a continuous evaluation of the project.

We chose to work with the management through process because its key activities:

- promote meaningful connections between creative, cognitive, scientific, and projective processes;
- are documented, thus resulting in non-randomized decision-making, since they are guided by a consistent train of thought towards innovative solutions;
- use tools in several steps of the process, with defined expected outcomes, favoring effective, non-obvious results and a coherent decision-making;
- favor the learning of theoretical processes through the frequent immersion in the context and the documentation of the practice;

Table 1. Activities of the first-year syllabus within the Integrative Project (IP)

First Year syllabus	Activities	Creative process steps
Research and Creation	<ul style="list-style-type: none"> Theoretical basis and practical application on: knowledge management; design thinking; creativity and creative processes; creativity tools; and the System for Project Development through Knowledge Management; 	Subjects prior to the Integrative Project
	<ul style="list-style-type: none"> Initial research: problem identification; planning; 	Identification
	<ul style="list-style-type: none"> Definition of objectives; substantial research; family tree; conceptualization; 	Preparation Incubation
	<ul style="list-style-type: none"> Data analysis; definition of formal and aesthetical requirements; 	Warming
	<ul style="list-style-type: none"> Design of possible solutions (sketches); experimentation with 2D and 3D shapes and different materials; 	Enlightenment Verification
	<ul style="list-style-type: none"> Selection and analysis of the best solution; prototyping with different materials; Presentation speech; presentation of the real clothing piece worn by a model; 	
Visual Methodology	<ul style="list-style-type: none"> Development of visual panels: persona, concept, and product; 	Incubation
Textile Materials	<ul style="list-style-type: none"> Research and selection of different (textile or non-textile) materials; use of natural resources to dye, and textile experimentation; 	Elaboration
2D and 3D Garment Construction	<ul style="list-style-type: none"> Clothing piece design: 2D garment construction model, fitting and cutting; 	Elaboration
Sewing Technologies	<ul style="list-style-type: none"> Seam: textile experimentation; mounting of the clothing piece without finishes (zipper, buttons, eyelets, etc.) 	Elaboration
Graphical Representation	<ul style="list-style-type: none"> Fashion drawing of the piece (according to the end-user's body). 	Elaboration

- encourage the development of multiple skills (knowledge, abilities and attitudes);
- promote the abductive reasoning, which can lead to innovation.

The inter-relationship between processes and the sequence of steps allow the development of projects in logical, defined stages to design a product. Therefore, the systemic view of the process improves the students' understanding and learning (Figure 1). It is important to mention that some of the stages are essentially conducted

with scientific accuracy, which opposes to the argument of the creative force as simple inspiration. This process was described by Fornasier, Martins and Demarchi (2008, p. 127-152), and is supported by the five types of knowledge (Subjective, Tacit, Cultural, Objective, and Explicit) defined by the same authors (2014, p. 25-44).

This system employs the DT approach so that the professor, which is also a designer, can be a mediator of learning. "The designer is an innovator who goes in-field, observes, questions, and listens to the world around. This means that the first contribution of design is the

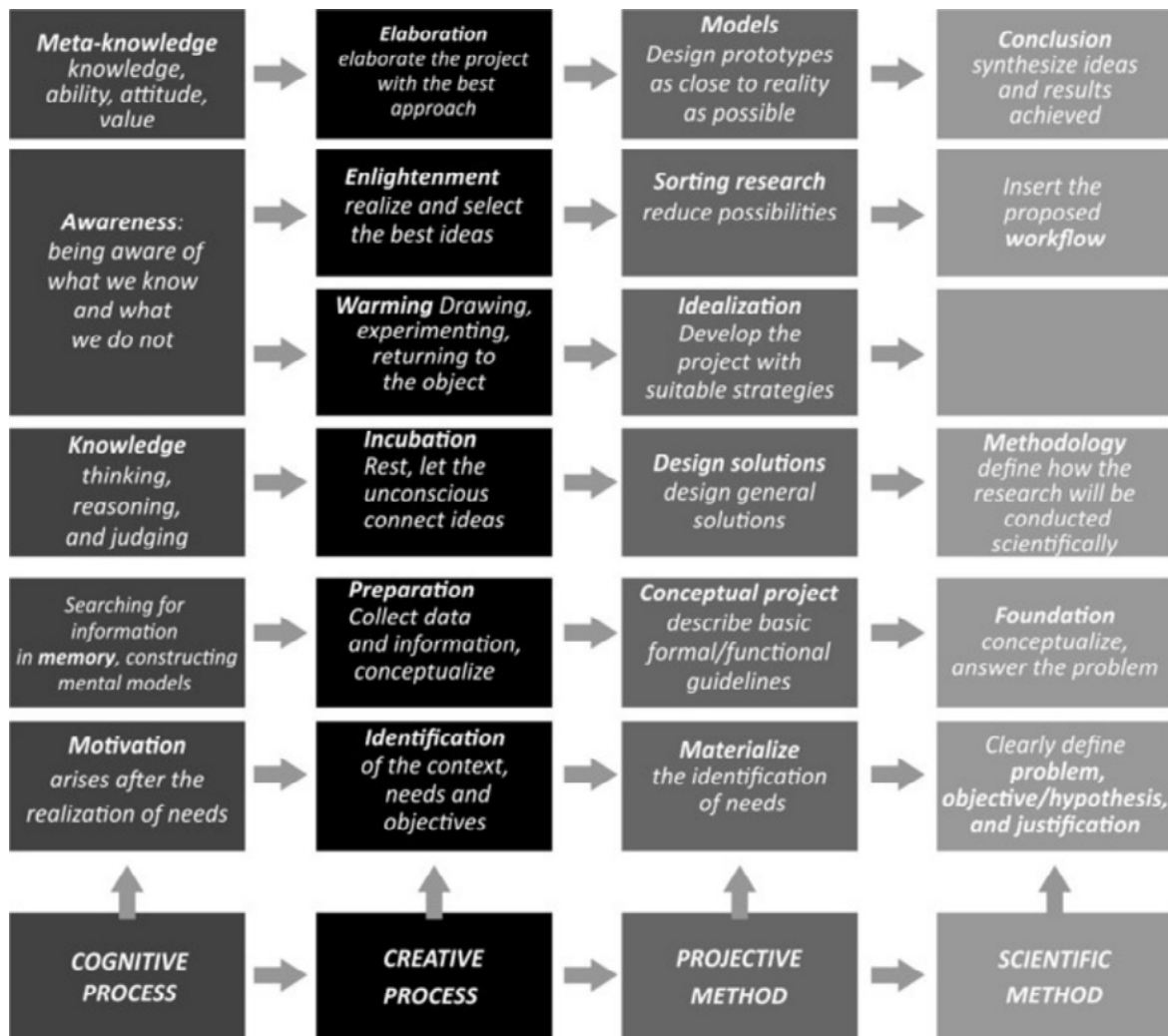


Figure 1. Management System through Knowledge Process applied to project development. Source: Fornasier, Martins and Demarchi (2008, p.147).

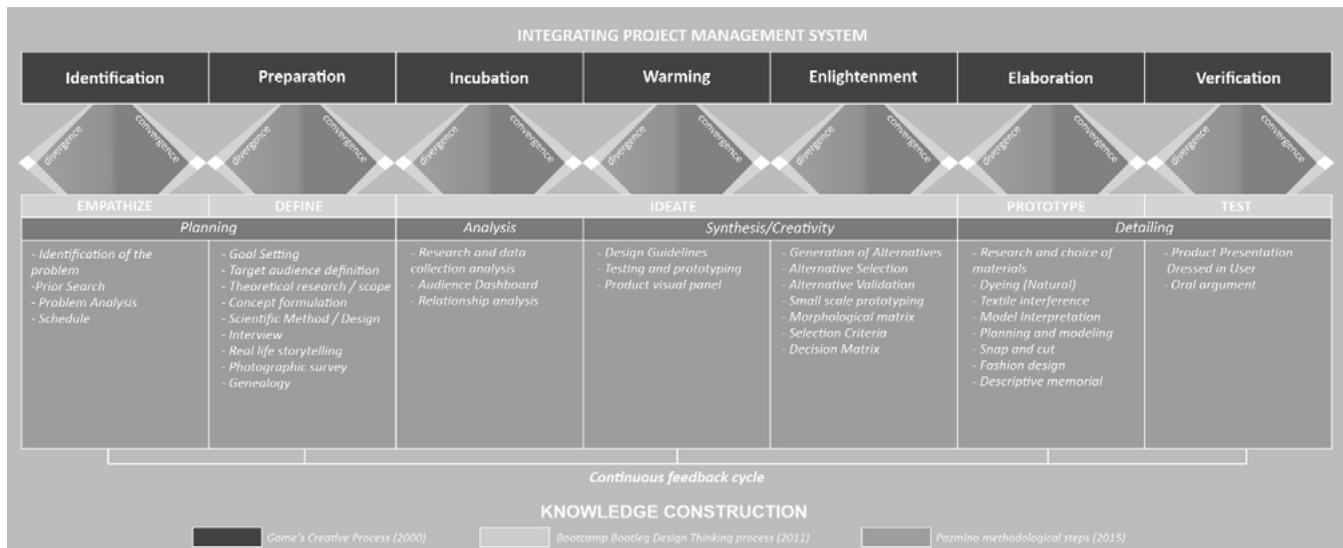


Figure 2. Integrative Project Management System.

development of ideas that later will be transformed into concepts” (Demarchi and Fornasier, 2018, p. 867). The DT process includes two cycles, namely: divergence and convergence (Figure 2, represented by the rhombuses), which navigates between the deductive reasoning (the logic of what it must be) and the inductive reasoning (the operational logic). When combined, they form the abductive reasoning, which encourages students to think in unconventional ways, while challenging the explanations generally accepted as “the undeniable truth”. It also generates some tension that can be reduced by using the creativity tools in searching for patterns from the data available. However, the use of creativity tools must have well-defined objectives and expected outcomes.

Students are more likely to make non-arbitrary decisions when they apply the divergent and convergent thinking, thus moving to the next stage of the process. Some stages can take place concurrently, depending on how close they are to the problem or to the other stages, since the DT (Demarchi and Fornasier, 2018, p. 865) “is a creative process that fosters [peer] collaboration and the experimentation [with drawings, materials and prototypes] in order to mitigate risks in the innovation process”.

Cavalcanti and Filatro (2016, p. 61) explain that the DT is a process suited for education because “it promotes the problem-solving from empathy, placing the people involved in the center of attention and inside the context where the challenging situation is located”. The authors present the DT steps (developed by the Stanford University, 2011), namely: Empathize, Define,

Ideate, Prototype, and Test – which are also included in the IP’s Management System (Figure 2). The third step, Ideate, consists of three full cycles of divergence and convergence.

In the teaching-learning process, design thinking encourages students to: take the starring role of their knowledge (learn to be); design various drawings and prototypes to avoid mistakes (learn to make); be empathetic and become a multidisciplinary professional (learn to live), and manage their own knowledge through research (learn to know).

In developing the creative thinking, students must consider the DT along with the creativity process suggested by Gomes (2000), which is divided in 7 steps: identification, preparation, incubation, warming, enlightenment, and verification (refer to Figure 1 and Figure 2). It is important to mention that each step has only one cycle of convergence-divergence, which favors the students’ understanding to perform the tasks. Students also apply some of the creativity tools described by Pazmino (2015), according to the requirements of each project (Figure 2), and to the stage of the project, that is, planning, analysis, synthesis/creativity or detailing. The planning stage, however, includes two divergence-convergence cycles, as well as the Synthesis/Creativity stage.

The system consists of an inseparable group of active elements, in which meanings can only be fully realized when considered at the same time with their collection of inter-relationships. Such inter-relationships, or

interaction between parts (processes, steps, tools), result in recognizing the very existence of the system – that is, the system of Knowledge Construction.

METHODOLOGY

This study uses the deductive method which intends to validate hypothesis: if all of them are true, then the conclusion must be true as well (Marconi and Lakatos, 2010). It employs a qualitative approach, in order to understand the nature of the social phenomenon studied, reaching a deeper understanding on the unique behavior of individuals and groups (Richardson, 2010). It is also exploratory and descriptive – through a case study – because it explains the phenomena related to the teaching of project process through knowledge production and its variables (which has been being improved since 2010, when it was first launched).

CASE STUDY: INTEGRATIVE PROJECT “FAMILY ORIGINS AND THE SEARCHING FOR MYSELF”

In the project “Family origins and the searching for myself”, students are expected to research and uncover their family history and systematize it through a process diary in order to design a clothing piece to represent them. They are also expected to be cognitively and emotionally involved with their unique context, hence favoring the understanding and learning of the design process and of the creativity techniques. We established evaluative, theoretical, and practical criteria so that professors could mediate the learning outcomes and assess the design process performed by the students.

We describe the results of an applied research from the creation of a system that helps students perform all the stages of the process and allows professors to assess and monitor them at the same time. The case study, named “Family origins and the searching for myself”, was applied in 2018 with 30 students. In this project, students were expected to:

- know their origins through family history and identity, including their experiences, life repertoire, and real-life stories (origins, beliefs, rituals, habits, etc.);
- identify the project needs and solutions, by applying methods and creativity tools;
- practice the systemic view and the systemic thinking through the development of skills and basic knowledge on the management of the organized creative thinking; and
- apply the cognitive, creative, and scientific methods (to define the design problem and the objectives). These methods are “interdependent processes that form a management system through knowledge process” (Fornasier, Demarchi and Martins, 2008, p. 129) and are used to design the garment.

In order to evaluate the project, professors considered tangible results, the process diary and the final product. The subjective results, in turn, rely on a systematic individual assessment of the skills developed to perform the process steps along the project schedule, besides to the oral presentation of the garment to an examining board consisting of the professors involved in the Integrative Project. The evaluation criteria change according to each subject; however, the examining board discusses each project collectively, considering the initial proposal, project requirements and limitations (previously defined), and the activities described in the interdisciplinarity board.

RESULTS – DISCUSSION

After the launching of the IP in classroom (in the Research and Creation subject), students began researching their family origin through techniques such as real-life stories and storytelling (collected from the family members), photography, and interviews, which allowed them to create their family tree. This research is contextual, that is, aims at defining the target audience (or end-user), and a design question to be solved. This moment falls under the *problem identification* and the *preparation* stages described in Gomes’s creative process (2000), when the design problem is defined according to the information available and through the use of scientific methods, techniques and tools to collect data.

The *incubation* is the stage when data is analyzed and students reach deeper levels in the research (a bibliographical research, emphasizing topics that are relevant to connect with “myself”), exploring the family history up to the present. This stage brings to surface knowledge and information that will be used in the fourth stage, the *warming*. In this stage, students experiment with and design the product (wearable artifact) according to the initial requirements, with a focus on the conceptual message defined through previous knowledge from the research and the use of creativity tools suggested by Pazmino (2015). Sketches, material experimentation, etc., are supported by the following subjects: Research and Creation, Visual Methodology, and Processes and Textile Materials. Once the experimentation ends and possible solutions are generated, students select the best options, according to the criteria established for each project.



Figure 3. Integrative Project 01. Source: Student: Rodrigo Guimaraes Marques Luz (2018).

The best solution is the one that meets the needs and concepts of the project. Then, students proceed with the drawing of the garment (guided by the Graphical Representation subject). This takes place in the fifth stage, the *enlightenment*.

In the next stage of the creative process – the *elaboration* – students are requested to prototype the wearable artifact, with the support of two more subjects: 2D Garment Construction and Sewing Technologies. Finally, in the *verification* stage, the wearable artifacts are presented to an examining board consisting of all the professors involved in the Integrative Project, aiming to evaluate the project development in accordance with the content of the course.

Figures 3 and 4 present some of the results achieved by students in the presentation of the project, when the student wears the product and orally argument about it. Concepts and meanings cannot be described in this study, because they would expose the students' personal history.

Some of the students explored their creativity with the support of the proposed system, thus reaching very positive results. However, some students did not apply the system completely, which became evident by the gaps between stages and the fragility in the project thinking. Seven out of thirty students in class had a satisfactory performance in the project; five had excellent results with their products.



Figure 4. Integrative Project 02. Source: Students: Ana Beatriz Bianchi Fittipaldi (2018) and Lívia Akari Kuroba (2018).

Students are expected to design their products using the five types of knowledge described by Fornasier, Martins and Demarchi (2014). The *explicit knowledge* results from the synthesis of the knowledge recorded in the diary – that is, the description of all the stages of the process, previous research to define the problem, objectives, and the use and validation of the artifact (objective knowledge). The *tacit knowledge* refers to the manual skills developed during the process, such as dye testing (in the Textile Materials subject), garment construction (Garment Construction subject), sewing (Sewing Technologies), sketches (Research and Creation), fashion drawings (Graphical Representation) and the visual panels (Visual Methodology), which are all attached to the diary through photos or memos.

The *cultural knowledge* is the research on the family origins, traditions, myths, habits, heroes, beliefs, skills, attitudes, professions, etc., that the student will transform into knowledge and record on the diaries, through written stories, photos, family tree, etc. – which then constructs the knowledge needed to create the concept of “myself”.

The learning objectives of the project are to connect theory and practice in the system; practice the empathy and the design thinking; and design the wearable artifact by the application of theoretical and practical strategies, related to the *objective knowledge*. That means the students must convert all their previous knowledge, relate it with new knowledge, and transform it into *new subjective knowledge* – which are not codified or explicit. For this reason, it may be difficult to be assessed by the professors, who must then rely on the physical products (clothing piece and the diary) and on the progression of students throughout the process.

CONCLUSION

Fornasier, Martins and Demarchi (2008) explain that the cognitive, creative, projective, and scientific methods are interdependent. Combined, they form a management system through knowledge process. They contribute to the understanding and the development of projects, hence providing conclusions and expanding the cognitive and creative experience. “The design practice includes the project development, which is an activity performed through a group of projective stages, using different creativity techniques” (Fornasier, Martins and Demarchi, 2008). The design process, however, cannot be shattered; it is organized in a systemic, yet organic, sequence of relationships with natural systems. A system is identified by the inter-relationships or the interactions between its parts (Bertalanffy, 1973). In this sense, we do not intend to promote a standardized projective activity, but rather

to encourage the process thinking *through* stages. In fact, we noticed that the students who understood the process stages and described them in their diaries were also the ones who reached a higher level of innovation. Yet, they were not necessarily the ones with the best wearable results, mainly because of the lack of manual ability to construct it.

It is concluded that the Design Thinking approach guides the development of the creative process, for it takes into consideration the parties involved and the relationships between them, as well as the previous knowledge and the new knowledge emerged from the exploratory bibliographical and in-field researches. Since creativity is the core aspect of the Design Thinking, which comes from the connection of different types of knowledge, the main activity of the designer is to manage their knowledge, represented in this study by the five types of knowledge described by Fornasier, Martins and Demarchi (2014). In this sense, results were assessed from the description of the process and the diaries provided by the students, as well as in the presence of proper words and expressions both in one-on-one conversations and written in the diaries.

Professors are challenged to provide students with means to understand that undergraduate courses are not intended to teach *how to do*, but rather to reflect on *what to do* – and then *do*. Motivating students to learn to think as designers is probably the key factor here. Think as a designer means realize, analyze, and understand the situations and contexts to design products and processes targeted to real needs. Currently, information is easily accessible, but transforming it into knowledge may be a barrier. The three students used as example in this study performed all the activities according to the schedule and reached excellent results. Notwithstanding, we emphasize the fact that all the three are encouraged by their families, have frequent access to social and cultural events, and that their family members are present in their lives, even remotely.

It is also important to mention that, in 2018's Integrative Project, six students did not turn in the process diary, or did it to the bare minimum, which made it difficult for the professors to monitor and evaluate their projective reasoning. Four of them had difficulty in verbalizing and describing their actions, and often used slangs and idiomatic expressions. Those students reached less than expected results, and the professors could not assess the use of the system and the projective reasoning in those cases.

Fashion design undergraduate courses must promote the valorization of positive attitudes among students, encouraging them to share their experiences and socialize. Thus, we can promote the activities that are really relevant to the learning process, since it occurs through hearing, seeing, and doing. This study is an example of the possibilities to move from the simple memorization of abstract concepts to a type of knowledge constructed with awareness, competence, and emotional engagement.

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