INTED 2023

17th International Technology, Education and Development Conference

6-8 March, 2023
Valencia (Spain)

CONFERENCE PROCEEDINGS

Sharing the Passion for Learning

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INTED2023 Proceedings
17th International Technology, Education and Development Conference
March 6th-8th, 2023
Valencia, Spain

Edited by
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Preface

The INTED2023 Conference Proceedings contain selected and revised papers from the 17th International Conference of Technology, Education and Development. INTED2023 was held in Valencia, Spain from the 6th to the 8th of March 2023. INTED is an event that takes place annually and provides a platform for lecturers and researchers from more than 75 different countries to meet and share important research and information about education, pedagogical technologies, and development.

The scope of INTED covers the fields of Education and Educational research. INTED2023 provided different keynote speeches, parallel thematic sessions, networking activities, workshops and interactive sessions. Since many international educational experts attended the conference, participants were provided an opportunity to network and collaborate with other experts from around the world. The keynote speeches are available at IATED Talks (iated.org/talks/).

The INTED2023 Proceedings, which are exclusively in English, include the accepted contributions presented at the INTED Conference, which will be included in the IATED Digital Library (library.iated.org). The INTED2023 International Program Committee is composed of lecturers and researchers from many different countries. A blind peer review process was followed in order to guarantee the quality of the final publication, and during this process the following points were evaluated: information content, relevance to the educational field, general structure, clarity of contents, originality, and relation to the conference topics and disciplines.

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Finally, we wish to wholeheartedly thank all members and delegates who have contributed to these INTED2023 Proceedings. We also wish to express our gratitude to all participants and attendees for their engagement, dedication and passion for education.

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INTED2023 Keynote Speakers

Keynote Speakers

José Antonio Bowen – *Association of American Colleges and Universities, United States*
Michael Wesch – *Kansas State University, United States*
Tracey Tokuhama-Espinosa – *Harvard University Extension School, United States*

José Antonio Bowen – Association of American Colleges and Universities (USA)

Keynote speech:
Blended and Included

Blended learning provides us with more options and modalities for what we do and when we do it. This creates opportunities, but also challenges, to ensure that everyone is learning. All good teaching is inclusive teaching and blended environments have the potential to create both better and more inclusive learning. Realizing this potential, however, requires a deeper consideration of transparency, belonging, engagement and scaffolding: good blended learning can maximize all of these, but only if we design it intentionally. This presentation will provide both a framework for thinking about inclusive teaching in blended learning and specific suggestions for designing assignments, activities, and structures that will support the success of all of your students.

Biography:
José Antonio Bowen, Senior Fellow at Association of American Colleges and Universities (AAC&U), has won teaching awards at Stanford and Georgetown, was Dean at Miami and Southern Methodist University and President of Goucher College. Bowen has worked as a musician with Stan Getz, Dave Brubeck, and many others and his symphony was nominated for the Pulitzer Prize in Music (1985). Bowen holds four degrees from Stanford University and has written over 100 scholarly articles and books, including the Cambridge Companion to Conducting (2003), Teaching Naked (2012 and the winner of the Ness Award for Best Book on Higher Education), Teaching Naked Techniques with G. Edward Watson (2017) and Teaching Change: How to Develop Independent Thinkers using Relationships, Resilience and Reflection (Johns Hopkins University Press, 2021). Stanford honored him as a Distinguished Alumni Scholar (2010) and he was awarded the Ernest L. Boyer Award (for significant contributions to American higher education) in 2018. He is now a senior fellow for the American Association of Colleges and Universities.

Michael Wesch – Kansas State University (USA)

Keynote speech:
Teaching is really hard right now, and it's a "Great Thing"

For many of us, these past two years have presented us with the most difficult challenges we have ever faced as teachers. The pandemic has forced us to adopt new and unfamiliar technologies, adapt to ever-changing student needs, chipped away at our physical and mental health, and exacerbated political and ideological divides that now find their way into virtually every subject matter. Teaching has always been hard. Properly understood for all that it is - the instilling of knowledge, curiosity, discernment, character, wisdom, and skill in the next generation - the art of teaching is what the poet Rilke would call "a Great Thing." It is impossible to get exactly right, unconscionable not to try. But as Rilke notes, "growth is in being profoundly conquered again and again by greater and greater things." In this talk, we will explore how this mindset of seeing teaching as the impossible task that it truly is can actually energize us, center us, humble us, and most importantly, help us feel connected to our students and fellow teachers as we confront this mysterious great thing together.

Biography:
Michael Wesch is Professor of Anthropology and University Distinguished Teaching Scholar at Kansas State University. He is the creator of the Teaching Without Walls video series which includes the top-ranked YouTube video for college online teaching. The New York Times listed him as one of 10 professors in the nation whose courses "mess with old models" and added that "they give students an experience that might change how they think, what they care about or even how they live their lives." His videos have been viewed over 25 million times, translated in over 20 languages, and are frequently featured at international film festivals and major academic conferences worldwide. Wesch has won several major awards for his work, including the US Professor of the Year Award from the Carnegie Foundation, the Wired Magazine Rave Award, and he was named an Emerging Explorer by National Geographic. He is also co-creator of anth101.com and author of The Art of Being Human, a free and open textbook alternative for Introduction to Cultural Anthropology.

Tracey Tokuhama-Espinosa – Harvard University Extension School (USA)

Interactive Workshop:
Pedagogical Knowledge and the Changing Nature of the Teaching Profession - How Neuroscience is Changing Education

Despite great advances, there are still a great number of myths around the brain and how it learns. Misconceptions, overgeneralizations and a lack of information can do harm in the classroom, slow student learning, and reduce the likelihood of successful learning in our schools. The main objective of this workshop is to dispel these myths and replace them with high quality, evidence-based practice.

Do people really have learning styles? Is it impossible for an adult to learn a foreign language as fast as a child? Are there critical periods when a child should learn specific skills in school? Are some subjects harder to learn than others? Are girls' and boys' brains suited for different types of learning? Can a person really multi-task? The teaching-learning dynamic is surrounded by many myths, which will be discussed in a lively interactive session.

Biography:
Tracey Tokuhama-Espinosa, Ph.D. is from Berkeley, California, is an alumna of the Harvard Graduate School of Education, and currently teaches a course at the Harvard University Extension School entitled The Neuroscience of Learning: An Introduction to Mind, Brain, Health, and Education Science. She is currently an educational researcher and serves as an Associate Editor of Nature Partner Journal Science of Learning and co-founder of Connections: The Learning Sciences Platform.

Tracey researches indicators to measure educational quality; learning in the digital age; transdisciplinary thinking; bilingualism and multilingualism; and the general improvement of teacher practices. Her most recent books are the Bringing the Neuroscience of Learning to Online Teaching: An Educator's Handbook (2021); Neuromyths: Debunking False Ideas About the Brain (2019); and The Five Pillars of the Mind: Redesigning Education to Fit the Brain (2019). She has authored articles for UNESCO and was a member of the Organisation for Economic Co-Operation and Development (OECD) expert panel to redefine teachers' new pedagogical knowledge in modern times.

Tracey's current focus is on understanding What Kids Want to Know About Their Own Brains, a book coming out with Columbia University's Teachers College Press next year. She is also writing a book called ThinkWrite: The Neuroscience of Writing, which explains why writing is the highest form of thinking. Finally, she is co-editing a new Handbook on Brain, Neuroscience and Education, which is a collection of work looking at the future of educational practice.
Tracey has lived and worked professionally in Tokyo, Geneva, Lima, and Boston, and is currently in New York and works with teachers, schools, governments, and NGOs in 40 different countries.

Conference Tracks & Sessions

The INTED2023 conference program is available online at https://iated.org/inted2023

ORAL SESSIONS MONDAY

MOOCs & Open Educational Resources
AI for Learning
Flipped Learning
Soft & 21st Century Skills
New Experiences in Health Sciences Education
Challenges in Curriculum Design
Emotions and Anxiety in Math Education
Early Childhood Education
Personalized Learning Environments
Chatbots & Robots in Education
Teacher Support during the Pandemic
Creativity & Critical Thinking
New Experiences in Engineering Education
Cultural Redesign of Curricula
From ESP to CLIL
Keeping Students Engaged during COVID-19
Challenge-Based Learning
Pedagogical Innovations
Challenges & Practices during COVID-19
Learning Assessment
Teaching STEM
Social Entrepreneurship and Service Learning
Language Learning Experiences and Research
Digital Literacy
Gamification & Game-Based Learning
Collaborative & Team-Based Learning
Blended Learning
Online Learning Assessment
Data Science & AI in Education
Entrepreneurship Education
Technology-Enhanced Language Learning
Information & Media Literacy

POSTER SESSIONS MONDAY

Quality in Education and Distance Learning
Pedagogical Experiences in Teaching and Learning

ORAL SESSIONS TUESDAY

Educational Technologies
Hybrid & Flexible Learning
Barriers to Learning
Student Support
New Technologies in STEM Education
Internships and Workplace Learning
Competences and Skills in Engineering Education
Gender and Equality in Education
Technology-Enhanced Learning
Active & Experiential Learning

Educational Leadership and Management
Learning Analytics
Coding & Computational Thinking
Links between Education & Research
A Lesson in 360 Video Production: Creating Authentic Immersive Education
Inclusion of Learners with Disabilities
LMS & VLEs
Problem & Project-Based Learning
Professional Development of Teachers
Tutoring & Coaching
Towards a New Educational Model of Sustainability (NEMOS)
Workplace & Lifelong Learning
Medical Education
New Technologies in Special Education
Virtual & Augmented Reality
Internationalization in Education
Pre-service Teacher Experiences
e-Portfolios & Competence Assessment
Education for Sustainability
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ICT Skills among Teachers
Student Wellbeing
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Quality in Education
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Student Motivation

POSTER SESSIONS TUESDAY

Emerging Technologies in Education
New Trends and Challenges in Education

VIRTUAL SESSIONS

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MOOCs & Open Educational Resources
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Videos for Learning
Technology Enhanced Learning

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Assessment & Evaluation
Rethinking Assessment in COVID-19 Times
Mentoring & Tutoring
Student Support & Motivation

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Gamification & Game-based Learning
Flipped Learning
Problem & Project-Based Learning
Pedagogical Innovations
Developing Soft and Transversal Skills

TEACHER TRAINING & ED. MANAGEMENT
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Engineering Education
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STEM Experiences

FROM DIGITAL TO PHYSICAL TWIN: AN INNOVATIVE DESIGN METHODOLOGY FOR FUTURE CREATIVES

L. Tenuta, B. Rossato, A. Cappellieri

Politecnico di Milano (ITALY)

Abstract

The paper aims to describe an innovative design methodology for professional training in jewelry design that results from the transition from digital design to physical twins. The methodology focuses on the reversal of the process according to which from the physical product the designer can realize its digital twin and investigates the design implications of considering digital products as the first project output. First of all, the paper analyses the contemporary context of fashion, underlining the urgency of redesigning educational methodologies and students' curricula due to the growing hybridization between the world of fashion and digital landscapes where objects are inserted. Context analysis highlights digital design opportunities, the changing role of creativity, and the importance of 3D visualization technologies to support design practice. Secondly, the paper presents and examines the case study "Utopia. Jewelry beyond the body." held at Politecnico di Milano, Design Department from November to December 2022, a workshop with international learners conducted in academic training to test and validate the innovative design methodology. Finally, the methodology's results, limits, and opportunities will be presented to offer a critical vision of the topic and open future scenarios for research.

Keywords: Jewellery design, Design methodology, Digital technologies, Physical twin, 3D visualization.

1 FASHION ENTERS DIGITAL

In 2016, speaking on the importance of 3D printing entering the world of design, Francis Bitonti wrote that "products are now digital assets" and that making had become synonymous with the "production of temporal, transformable, editable and self-replicating entities capable of having an equally rich life in the digital environment" [1]. If with the advent of ecommerce, social networks and 3D printing we have witnessed a progressive dematerialization of the fashion product and of the consumer's behaviour from physical to digital context [2], it is in the last two years that dematerialization has undergone exponential growth. Driven by the Covid-19 pandemic, the fashion world has witnessed a radical evolution, embracing digital not only in isolated parts of the creative and production process, but grafting it into the entire product lifecycle [3]. The product becomes virtual and is worn by digital influencers such as NooNoouri, avatar and virtual muse for many fashion brands including Swarovski, Elie Saab and Dior; product communication is dematerialized and decentralized into different channels involving in-game advertising such as Balenciaga's collaborations with Fortnite or advergaming such as the game created by Miu Miu for the launch of the new fragrance 'Miu Miu Twist', engaging a younger target; the retail itself intersects physical experiences with digital ones such as Piaget that uses Augmented Reality technology in order to allow online visits to the boutique and the sale of NFTs. The entry of 3D has given fashion the ability to digitally replicate physical garments, jewelry or accessory as virtual assets [4] views and worn through a screen, up to being able to experience them through social filters, virtual avatars and video games [5] [6]. However, what emerges is that the digital product creation process is based on the mere transposition from what is tangible to what becomes intangible, certainly providing a greater involvement of the final consumer but impoverishing the creative part of digital design. Above all, the advent of Covid-19 has led to a race against time to provide digital solutions as quickly as possible that could reach the public, without however dwelling on long-term strategic planning. Now, having overcome the need for a sudden change, fashion brands can focus on the physical-digital transition by acting on methods and processes. In fact, the literature attests that researchers now need to investigate the design process and design education, introducing digital technologies into design practice and focusing on the potential of design as an enabling creative engine [4][7]. Starting from this consideration, the opportunity to investigate a different design process, overturning the traditional approach was identified. Through the workshop 'Utopia. Jewelry Beyond the body' presented below, an innovative design methodology that starts first designing the digital object and then creating its physical twin was applied.

2   UTOPIA: JEWELLERY BEYOND THE BODY

The "Utopia: Jewelry Beyond the Body" workshop was carried out within the jewelry design module of the Accessory Design Studio course during the master's degree in Design for the Fashion System at the Politecnico di Milano, Design Department. The workshop brief was to subvert the usual processes of the fashion and accessory field and explore the connection between the digital and real world through the design of a jewelry piece inspired by the theme of Utopia. In particular, the request for the students was to first develop the jewelry for virtual spaces and then its physical twin. The physical twin was intended and requested not as a tangible transposition of the digital product but as a synthesis starting from the same concept. Anticipating digital design over a physical design was the result of the analysis of the state of the art of the fashion system mentioned above, where the digital creative design phase is downgraded to only the digital copy of the physical fashion product. Focusing on a digital product for a non-real world, the theme of Utopia was introduced in the brief as inspiration for the project. The definition proposed for Utopia was an imaginary community or society that possesses highly desirable or nearly perfect qualities for its members. In common use, the word or its adjectival form may be used synonymously with "impossible", "far-fetched" or "deluded". Along with this definition, it was suggested to explore some themes expressed in the form of hashtags. The themes were: fantasy, ideal, illusion, dream, boundaries, limitless, surreal, twins, anarchy, priceless, intangible, emotions, disappear, super-precious, transformable, metamorphosis, perfection and error. The goal was to push learners to consider virtual space as a utopian place where jewels live without limits of gravity, weight, movement, size, color, wearability, cost, or production and to think outside the box imposed by physical design.

2.1   Innovative Design Methodology

To guide the students and to achieve the desired goals, an innovative design methodology has been introduced (Fig. 1). In particular, the methodology is the result of the PhD research of one of the authors and has been tested through the workshop with the students. As anticipated, the methodology reverses the first result of the process, focusing on the digital product. Following the project brief, the methodology is divided into four steps: research, concept development, digital development, and the design of the physical twin. The research phase includes the branding analysis and in particular the search for the designer's stylistic codes rather than those of an existing reference brand and the search for the digital context of use of the object. It also involves the interaction with AI generative creative tools, Midjourney, to stimulate creativity and the association of ideas. In this phase, in fact, the aim is to expand the creative stimuli to break the traditional limits of the design process and to study how emerging digital technologies (AI) can co-design the product. Secondly, the concept development phase involves the generation of the idea and the behavior of the digital product. In the digital environment the product is free to change and transform itself and it is therefore the designer's task to foresee and plan this transformation. It is no longer just necessary to discuss the form and function of the jewel, in the digital environment it becomes an autonomous entity with a specific behavior. It urges the need to define a digital narration through effective storytelling that can justify the value, behavior and appearance of the product. The third part includes the digital production of the product, particularly the transition from the concept to the 3D visualization. Here the technical skills related to 3D modeling and rendering come into play, underling how is increasingly necessary to integrate them into the curricula of future fashion and design creatives [4]. It is important to find the right tool depending on the desired output, considering the digital context of use that the digital product wants to explore. Finally, the fourth part foresees the physical transposition of the digital product by considering the traditional physical production processes. The goal of not setting this limit initially is to understand if the digital design can act as an innovative boost for the physical, challenging existing technologies to make tangible a product that is impossible to create.
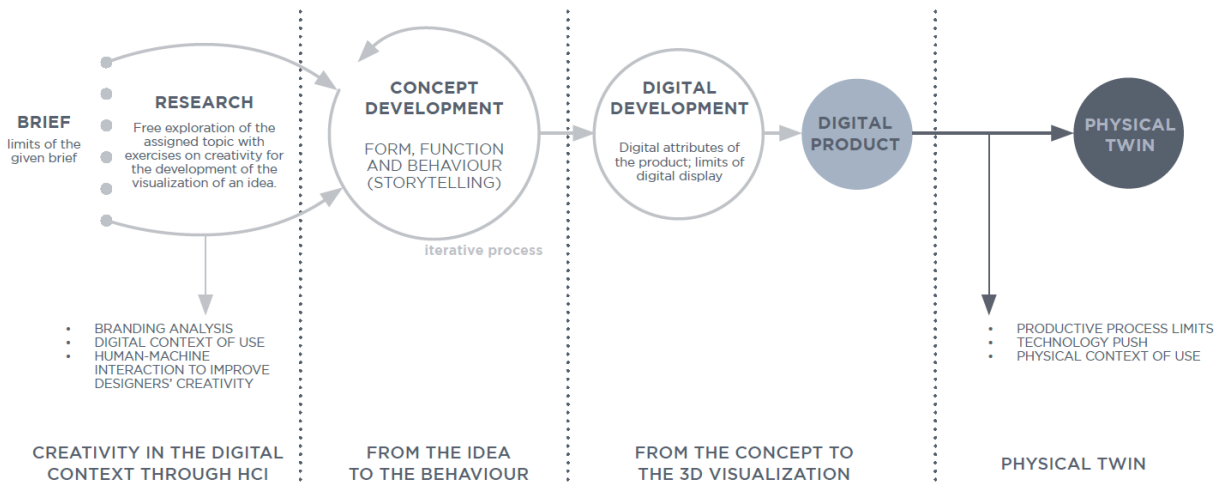
Figure 1. Design methodology presented and used during the design workshop.
Scheme made by the author.

2.1.1 Miro guidelines

To support the methodology and to guide the learners in the implementation of the project, a diagram was also created using the Miro platform which explored all the phases described in the methodology and proposed structured guidelines for the purpose of correct execution of the workshop. The scheme in Fig. 2 shows the structure of the scheme. In particular, the further aim was to graphically build support for the learners so that they were better oriented in the different phases to follow. Each of the learners had a nominative scheme available in a space within a board shared on Miro. The aim was to leave the workspace open so that learners could observe and discuss the work of their colleagues.

Figure 2. Scheme on Miro shared platform made by the author.

2.1.2 Structure, guidelines and expected outputs of the workshop

The workshop took place over 11 days between November and December 2022, including the launch of the brief and the final delivery of the project. The participants in the workshop were: 1 professor, 1 PhD student, 38 learners. The design outputs envisaged an individual work to create the jewel following the brief and adopting the methodology described and teamwork to realize a digital exhibition on the Spatial.io platform showing the designed jewels. The groups were created by the professors halfway through the course based on the thematic affinity of the proposed concept. The structure of the workshop included two theoretical lectures on the theme of utopia, Metaverse and digital transformation in the fashion system to provide learners with the knowledge and stimuli useful for the realization of the project. The following days were then held with programmed and scheduled reviews through a detailed calendar to evaluate and review the progress of the project. Links to tutorials useful for the technical creation of 3D models and 3D animations, Instagram filters and GIFs were also provided on the first day of lessons. Finally, a list of Dos and Donts was provided for the correct continuation of the workshop. To favor a free and encouraging creative exchange, all the useful tools for the learners were provided in advance and integrated with advice, links and inputs useful for the emergence of some questions. To evaluate the workshop and the methodology applied, two questionnaires were submitted to the learners: one before the start of the self-assessment workshop, the second at the end of the workshop for an

evaluation of the overall experience. The objective of the questionnaires was to monitor learning and evaluate the proposed teaching and methodology.

2.2   Results

The workshop carried out produced 38 innovative concepts of digital jewel with its physical twin. Five general themes emerged: Metamorphosis, Illusion, Identity and Culture, Bodies, Two. Metamorphosis includes all jewels that stress the concept of change, from one shape to another, from the presence of color to its absence, from changes in everyday looks to change as the effect of an action. Among the projects, the Vivaldi collection by Irene Attori (Fig. 3) explores the changing of the seasons by creating a digital jewel that, starting from a simple sphere, incessantly blossomed, withered, stripped and then blossomed again. In the physical transposition of the object, the student reasoned on the retail experience to be provided to the consumer, who could decide which configuration to provide to the physical object by blocking the animation of the digital jewel. The second theme, Illusion, includes jewels that exploit the different limits of digital to create optical, material and immaterial illusions, which play with different perspectives and deceive the eye by hiding details or revealing them over time. For example, Twin Rings by Valerio Tommaso (Fig. 4) is inspired by the concept of the Moebius ring to create a digital jewel that, when rotated, goes from a rounded and smooth appearance to an angular and sharp one, without defining where one begins and the other ends. The physical transposition has seen the creation of both versions of the ring that can be worn together or separately. The third theme, Identities and Cultures, is inspired by religion, popular beliefs and the analysis of current society. Francisco Javier Silva's project (Fig. 5) describes society's standardization of beauty by proposing a digital gif in which a machine uniforms the faces of the digital product. The physical object is a ring that becomes a mirror of this concept by hiding the unique beauty of a gem between two halves of a simple face. Bodies category works precisely on the body. It modifies its nature, presents a new version of it, and plays with its parts to make digital jewels. This is the case of Lucrezia Ringressi and her Abnorment project (Fig. 6) where the traditional cameo is digitally reinterpreted with moving body parts that interact with the viewer: they blink, they give you a kiss, they smell the surrounding air. Finally, the Two category thinks about the interaction between two parts, the fusion of different elements to create a single item. Margherita Reolon (Fig. 7) focuses on the analysis of the interaction between two digital avatars and on the trace that the contact between the two can create. The physical jewel will be the physical rendering of that same digital trace, inspired by the gestures we exchange with other people on a daily basis, but transferred from the digital context. The project outputs underlined the centrality of digital and the correct reception of the project brief by the learners. Furthermore, they highlighted the eclectic nature of the digital formats chosen, from Gifs to Instagram filters, from NFTs to videos. The transposition into the physical object remained secondary to the digital processing in most cases and was not configured as a copy of the digital object but as a material transposition of the concept, behavior and generated storytelling.
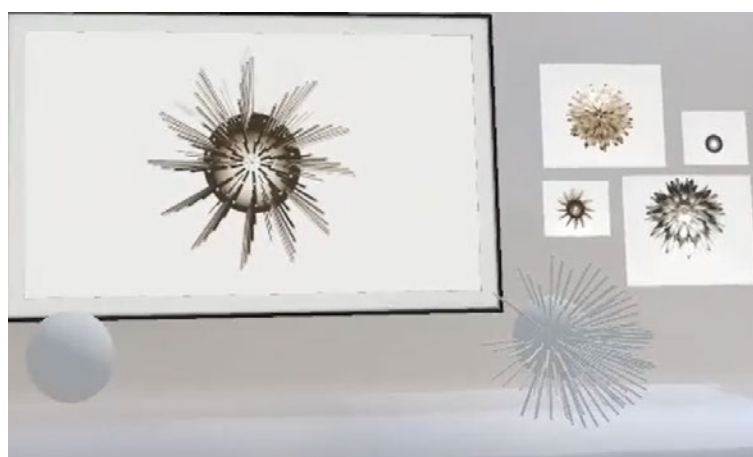

Figure 3. Vivaldi project by Irene Attori, Metamorphosis theme

Figure 4. Twin Ring project by Valerio Tommaso, Illusion theme

Figure 5. Industrial Identity project by Francisco Javier Silva, Identity and culture theme

Figure 6. Abnorment project by Lucrezia Ringressi, Bodies theme

Figure 7. Skinsaver by Margherita Reolon, Two theme

2.2.1 Strengths and limits

The assessment of the strengths and limits of the analyzed case study was obtained through the qualitative observation of the design process and the application of the methodology and through the questionnaires proposed to the students at the beginning and at the end of the workshop. In particular, the methodology combined with the proposed guidelines proved to be effective for a correct understanding of the brief and accurate execution of the project. Leaving aside the limits of physical design in favor of free and creative exploration of digital possibilities has allowed learners to create innovative digital products that have their own coherence and autonomy in the digital environment. 90% of them positively evaluated the conduct of the workshop and 80% had never carried out a similar project during their previous studies but declare themselves interested in exploring them in the future. The Miro guidelines were mainly useful as a guide for better-structuring ideas (34.6%), for working in a shared platform and discussing with colleagues (23.1%) and for maintaining narrative coherence throughout the process (15.4%). The proposed AI generative tool, Midjourney, was rated as a good experience to explore new project-related tools and useful to find suitable keywords, but its potential has not been fully understood by the learners, who have had difficulty using the platform in practice. The greatest difficulties encountered were in the 3D animation of the object and in overcoming the limits related to the physical world for which they are mainly used to designing. Most of the learners (53.8%) had to integrate their knowledge of other modeling software beyond those already familiar to them, while only 11.5% said they already knew how to use all the programs for the realization of the project (Fig. 8). A second difficulty has been found in overcoming the limits associated with the physical world for which they are mainly used to designing. Although the projects have found a significant degree of creative quality, learners have stated that they find it difficult to understand the creative possibilities of digital and are often held back by knowledge related to physical design.
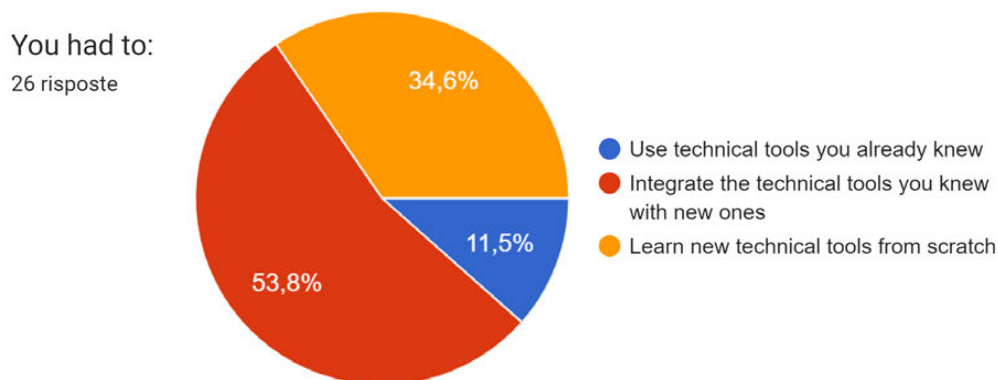

Figure 8. Result of the questionnaire proposed to the learners at the end of the workshop with respect to the question of whether their previous knowledge of software and technical tools had been sufficient to conduct the workshop.

3   CONCLUSIONS

"Utopia. Jewelry beyond the body." was a useful case study to test an innovative design methodology that would enhance the creative design of the digital jewel and subsequently propose its physical twin. The process that often takes place in the creation of physical products is the opposite, to the detriment of the creative possibilities that digital can offer, although it is precisely digital that has a significant impact on contemporary fashion. After analyzing the context, the paper presented the methodology and the proposed guidelines, underlining the structure of the workshop and the methods used. It also described the innovative concepts resulting from the workshop, focusing on the five categories that have been generated. Finally, it analyzed the limits and strengths of the process. Two main considerations emerged from the projects carried out and the results of the questionnaires submitted. First of all, the need to integrate digital competencies within curricula the future creatives, not only for 3D modeling but also for 3D animation so as to allow students to digitally visualize the behavior of the product they design. Secondly, the difficulty of abstraction with respect to the physical world opens opportunities to integrate creative exercises in the research and concept development phase that help the designer to range more in the digital context. Digital has become an essential factor in the fashion industry and there is an opportunity for design to configure itself as a creative engine to create products that have a worthy life even when completely immersed in the digital environment.

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