IJABER. International Journal of Arts-based Educational Research
Vol. 1, núm. 1, 2021, 23 - 47
ISSN 2697-2018
DOI: https://doi.org/10.17979/ijaber.2021.1.1.7599

NEW POSSIBILITIES OF TECHNICAL DRAWING THROUGH EDUCATIONAL RESEARCH BASED ON THE ARTS

APPROACH TO SURREALIST FASHION THROUGH THE IMPOSSIBLE PERSPECTIVES OF M.C. ESCHER

Dr. Manuel Pérez-Valero
Granada University https://orcid.org/0000-0001-7410-6375
Ángela Gómez-Martín
Escuela Superior de Arte y Diseño de Andalucía https://orcid.org/0000-0002-0821-6688

Abstract

This article presents educational research based on arts in teacher's training (2017-2020) carried out for the subject "Learning and Teaching of Technical Drawing" of the Master's Degree in Teaching of Compulsory Secondary Education and High School, Vocational Training and Language Teaching, in the specialty of Drawing, Image and Plastic Arts (University of Almería). The profiles of the students are diverse: architects, technical engineers, graphic designers, graduates in Fine Arts, graduates in History of Art, graduates in Advertising, Fashion and Public Relations. The processes are therefore, at the same time, very complex, although very enriching, bringing new perspectives to the approaches of teaching-learning of Technical Drawing.

We have developed a methodology of participative, collaborative, creative and experimental artistic research in a laboratory format with the idea of designing programs, or – to be more precise – experiences that stimulate the interest of the students and their autonomous research.

The aim is to address the study of graphic representation and space through new channels that accompany technical drawing and are reflected in students' concerns, such as, in this particular case, the world of fashion. However, it is also important to know and understand that this subject can lead us to the world of Theatre, Constructivism and even Video Mapping.

Keywords

Arts-based Educational Research; technical drawing; teacher training; experimental laboratory; fashion.

Resumen

Este artículo muestra una investigación educativa basada en las artes en la formación del profesorado (2017-2020) realizada para la asignatura "Aprendizaje y Enseñanza del Dibujo Técnico" del Máster en Profesorado de Educación Secundaria Obligatoria y Bachillerato, Formación Profesional y Enseñanza de Idiomas, en la especialidad de Dibujo, Imagen y Artes Plásticas (Universidad de Almería). Los perfiles del alumnado son dispares: arquitectos, ingenieros técnicos, diseñadores gráficos, licenciados en Bellas Artes, licenciados en Historia del Arte, en Publicidad, Moda y Relaciones Públicas, por lo que los procesos son, al mismo tiempo, muy complejos, pero muy enriquecedores, aportando nuevas perspectivas a los enfoques de la enseñanza-aprendizaje del Dibujo Técnico.

Se ha desarrollado una metodología de investigación artística participativa, colaborativa, creativa y experimental en formato de laboratorio con la idea de diseñar programas o, mejor dicho, experiencias, que estimulen el interés del alumnado y la investigación autónoma del mismo.

Se pretende abordar el estudio de la representación gráfica y del espacio mediante nuevas vías que acompañen al dibujo técnico y se vean reflejadas en las inquietudes de los discentes, como puede ser, en este caso en particular, el mundo de la Moda. Pero también es importante saber y entender que esta materia puede conducirnos al mundo del Teatro, el Constructivismo o el Video Mapping.

Palabras clave

Investigación educativa basada en las artes; dibujo técnico; formación docente; laboratorio experimental; moda.

1. INTRODUCTION

The educational model for the teaching-learning of Technical Drawing is too generalised and its strong traditional character has a negative impact on the students, when they receive or attend master classes that can disturb the normal development of didactic processes with no motivation other than information or knowledge. Therefore, it is currently an important factor to favour work groups, experimental environments and the exchange of information, not only for the intellectual development of the student, but also to promote intrapersonal aspects in teaching that increase the expansion of their self-esteem and therefore their expectations, as students and as future teachers of the subject.

This research is based on the analysis and aesthetic experimentation of artistic processes directly linked to technical drawing. There is a need to overcome this current dormant state that has affected our innate capacity to understand with our eyes. We must re-awaken it and, to do so, we will be instructed in visual evidence that corrects bad habits and shows weaknesses, presenting good examples in the act of drawing (Arnheim, 2005), stopping thinking so much about the act of drawing so we can put an end to artistic insecurity.

It is well known that the subject of Technical Drawing often leads to a lack of motivation in the students, surely due to the absence of connection with their own restlessness and the contemporary world they know and have to inhabit. For this reason, technical drawing should be understood as a tool for research and speculation that will open up new fields of knowledge, which are more representative of the contemporary society; and, above all, how this affects the secondary school teenager with the desire to discover –the verb to discover is used, and not to learn, as the surprise effect will always be a fundamental tool in the field of education.

As a fundamental part of this research, the students (future teachers) have been introduced to basic knowledge of the methods and tools of representation used in Art, as well as fundamental principles of the representation of space. During the learning process of Technical Drawing, as indicated by Lino Cabezas (2003, p. 303), two types of perspectives must be complemented: mathematics, which is argued from geometry; and intuitive perspective, which is done by eye, without the aid of a geometric methodology. We have studied those designs that already exist in nature and that have lead us directly to geometric drawing, repetitive designs and optical illusions. To this end, students will be shown the graphic style of New Age, Op-Art and Art Deco, and artists such as Victor

Vasarely, Andy Warhol and Bridgent Riley, as they have a clear relationship with the natural world and human production.

Through the visual image, contemporary art and the most important characteristics of spatiality, the main generalities and classifications of the types of representation in technical drawing were studied (e.g. dimensional drawings, dihedral system, axonometric system, conical perspective). Thus, this methodology will allow teachers in training to use new approaches to teaching and learning in addition to opening up new research paths that will influence their teaching methodology. It will broaden and refine their spatial perception with creative and attractive exercises that will promote technical drawing as a research tool that will serve as a starting point to enter other disciplines. The aim is to stimulate desire as a motivating strategy and, therefore, a trigger for new ways of learning, where emotion and cognitive skills lead to new pedagogical-creative projects (Caeiro, 2018).

It should not be forgotten that, although perspective is essential to faithfully represent space and it is one of the methods that comes closest to reality, it is also an adaptation, an invention, since the mathematical accuracy that the technical drawing possesses does not correspond to the manifestations of the real model. Therefore, it is essential that students understand the engine of the research that concerns us; to know where the technical drawing can take them, to understand the relationship of space with the elements that surround it and to promote strategies of experimentation that strengthen the connection of Technical Drawing - Education - Contemporary Art - Fashion.

2. TECHNICAL DRAWING AND NEW POSSIBILITIES FOR ARTISTIC RESEARCH IN INITIAL TEACHER TRAINING

Technical Drawing is a discipline within the artistic world that allows us to know the space, inhabit it, un-inhabit it and relate it to other elements. It is a process similar to the volume that we occupy or leave free when we put on a suit or a hat. The garment is then transformed into an architectural environment that invites us to reflect and to put into practice and relate the art of architecture with the rest of our senses (Pallasmaa, 2014), just like the creations of Leon Battista Alberti or Filippo Brunelleschi, who play with the same instructions that technical drawing has. However, once these instructions are known, as they were for 'avant-garde' artists, it is time to break from them using our sense and reflection, leaving aside the natural perspective and finding new possibilities in imagination and fantasy. To do so, a good example is to explore the universes of M.C. Escher, after having studied the different forms of spatial representation.

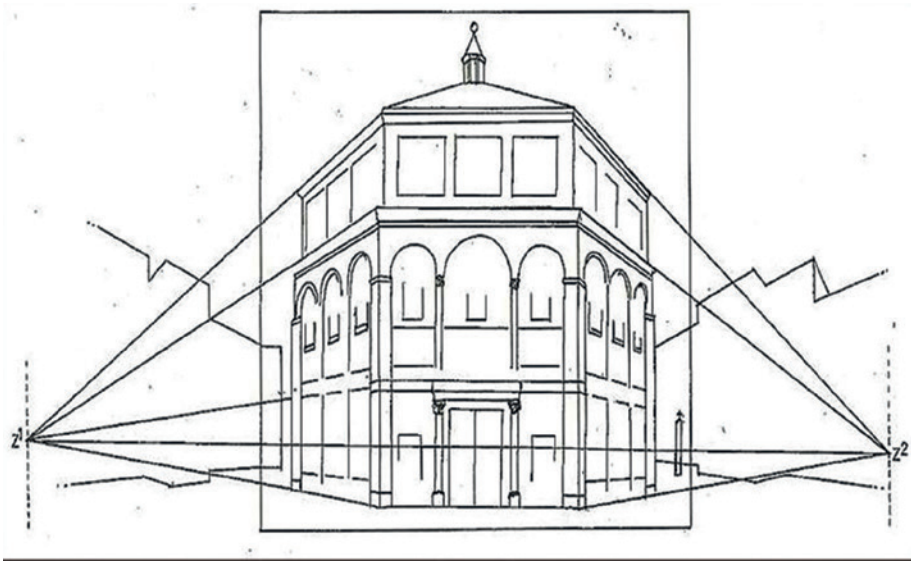


Image 1.Brunelleschi's perspective study, extracted on 18.05.2020 from: https://alexchessani.wordpress.com/renacimiento/

The emphasis will now be on the obvious relationship between Technical Drawing and Fashion when referring to pattern-making processes or compositions. It is also important to know fashion through technical drawing because this means knowing the contemporary society. Fashion is a collective consciousness capable of excluding the individual who feels rejected by it (Squicciarino, 2012). Can only artistic drawing be endowed with sensitivity, reflection or commitment?

Fashion or the garment, just like the words in a sentence or the lines on a page, can have several meanings, use several languages of plastic knowledge to communicate, very similar in this sense to the pedagogical act. In fashion, as with speech or education, the meanings depend on the context and circumstances that can be altered (Lurie, 2002). One does not speak, educate or design in a vacuum, but rather by attending to a specific space and time. The teacher must always take into account what is happening outside the classroom, so that the contents of the curriculum can be adapted not only to the academic needs of the students, but also to their concerns as members of the community.

Just as sketching and illustrating are methods undoubtedly used in fashion design processes, technical drawing helps us to express the idea of a specific design from different views; to represent its silhouette or to suggest its proportions. Even more attractive, it makes it easier for us to understand the space occupied to then manipulate it. When we play and experiment with technical drawing, we also play with geometry, with repetition, with optical illusion. We experiment with the different dimensions to verify that space and its representation go beyond the line, the outline, the figure and the background. We learn and then un-learn.

In this act of un-learning one could take the role of a jazz musician (I always like to recommend this methodology). A musician who, despite having a very studied score in front of their eyes, plays with improvisation and this takes them through different paths and new possibilities of creation and research. Thus, a heuristic learning methodology is promoted to encourage the students to acquire the knowledge by themselves, in an inductive way. Jerome Bruner (2001) believed in a type of education that would develop the intellectual part of the students that would help them favour their abilities and, therefore, solve problems in their research through discovery. Consequently, the student uses their intuition, imagination and creativity to face and overcome problematic learning situations (Camargo & Hederich, 2010).

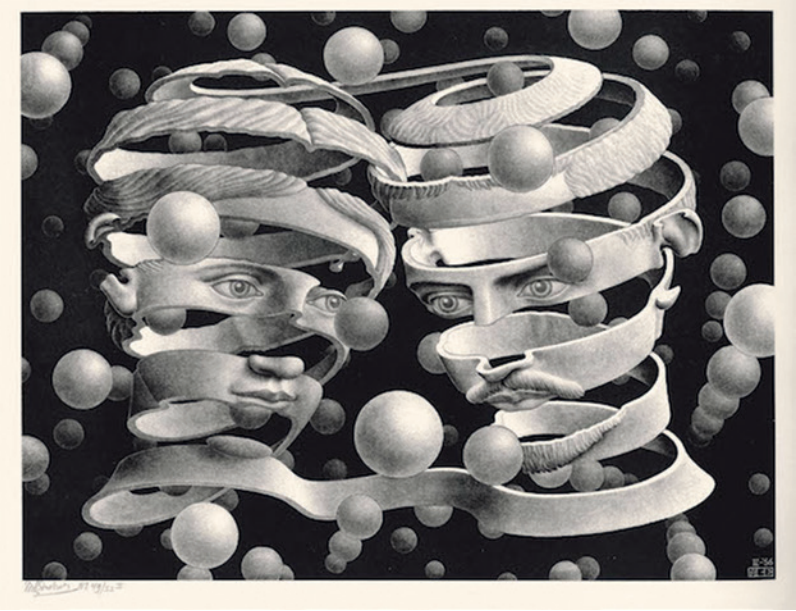


Image 2. Bonding, 1956. Lithography. Retrieved from the M.C. Escher art catalogue.) *Infinite Universes* (2011)

2.1. From M. C. Escher's surrealistic universe to a metamorphosed perspective on the hat

Below, briefly but in some detail we show the elements of this research that encourage experimentation with Technical Drawing, which we think should be fundamental in order to elaborate the presented proposal and the didactic future of the subject.

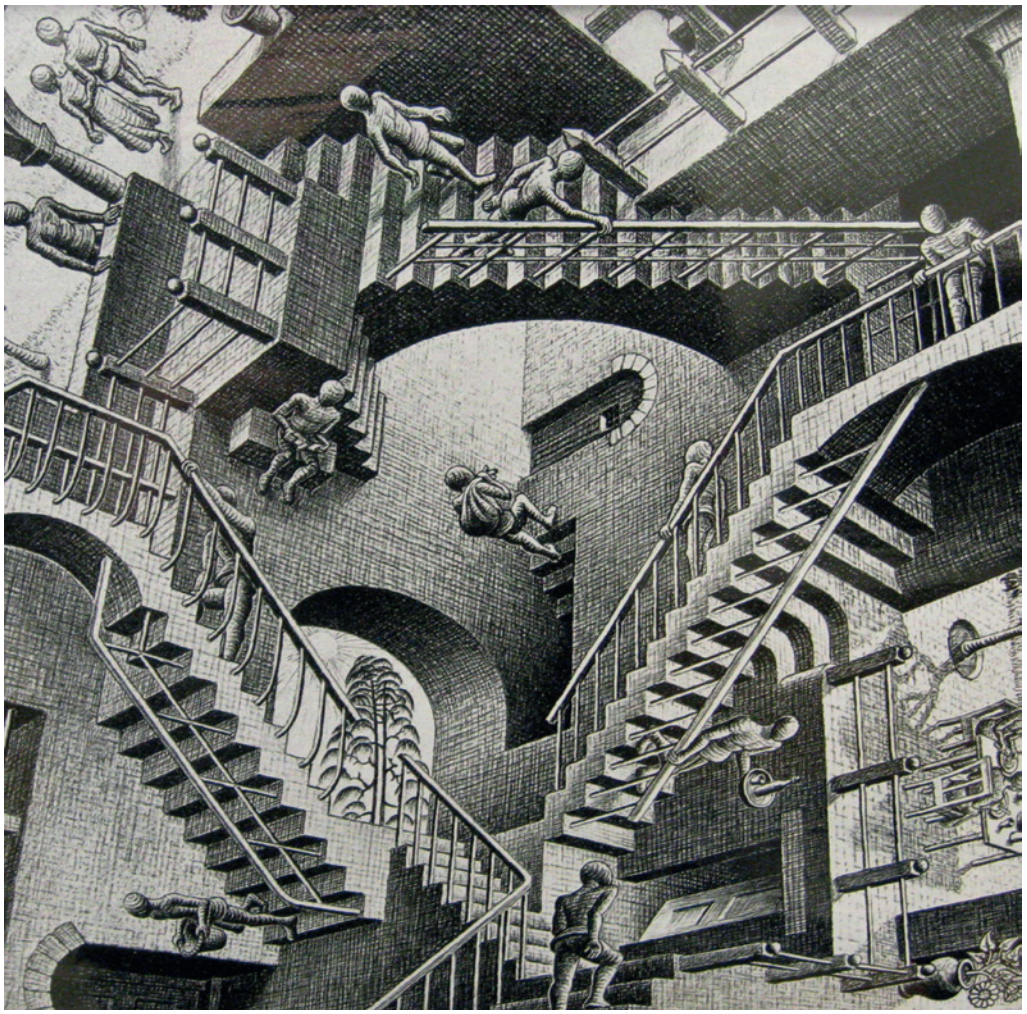


Image 3 and 4. Bonding, 1953. Lithography. Retrieved from the M.C. Escher art catalogue.) *Infinite Universes* (2011)

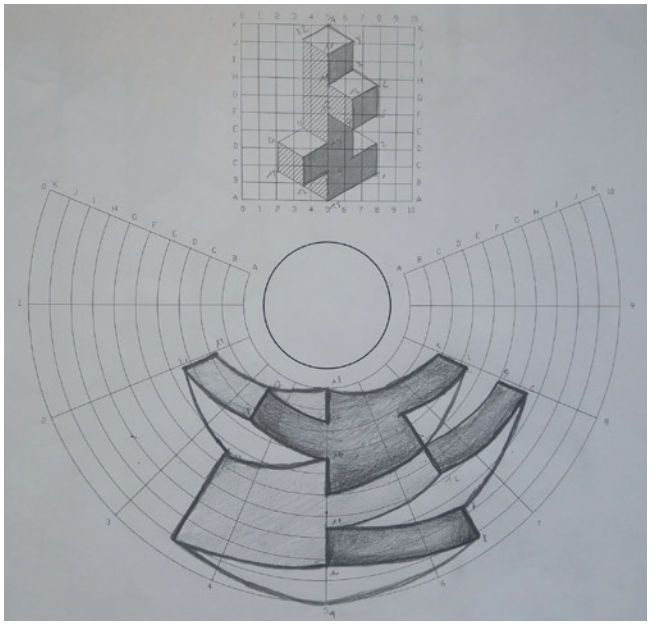
M. C. Escher and the infinite perspective

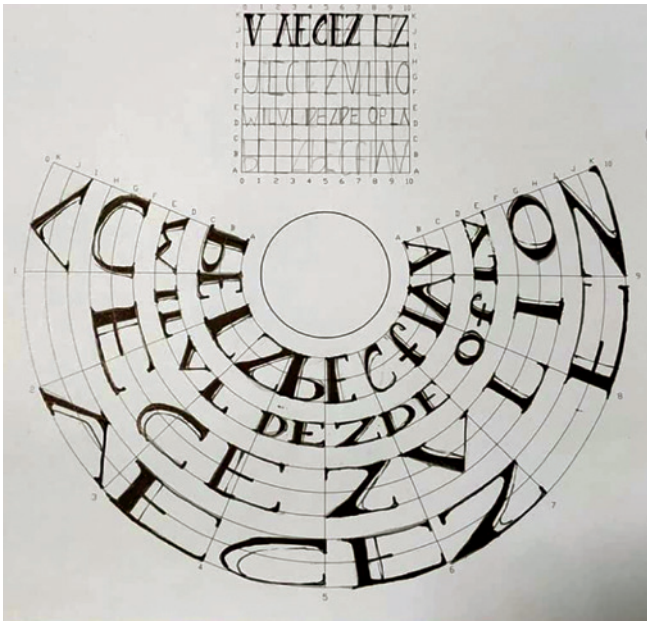
Understanding the work of M.C. Escher and imitating it without copying it is of vital importance for undertaking the research based on the arts that we are concerned with. First, it is essential to know the artist's biography, including his travels around Spain, his love for the Alhambra in Granada, his period of figurative representation, the Mediterranean landscapes that mixed the natural and the artificial, his geometric-natural metamorphoses based on the contiguity of forms with poems fused into plant structures. Having all of this in mind we can then move onto those works that will serve as a study for us; works in which there is a clear visual reconstruction of three-dimensional objects that make clear a representation of impossible and unstable worlds, of pieces that give importance to three-dimensional forms, of mathematics and the geometry of the plane, and of course, architecture and perspective. The Escher exhibition in Granada and the catalogue of this exhibition M. C. Escher. Infinite Universes (2011) have been taken into account for this artistic argument that will mark the pedagogical processes of the classroom.

Anamorphisms. Magic in representation

The incorporation of the concept of anamorphisms in the proposal shows a particular use of the laws of perspective. Through the drawing, the distorted elements represented will help develop our visual perception. Thus, the students will assimilate the transversal relationship between science and art to later incorporate it into an artistic production.

The practice starts with the student creating an image that is unrecognizable at first sight, deforming it geometrically through perspective procedures. The image is configured when we see it from a certain point of view or through a reflective element (e.g. a steel tube, a can or a tube lined with aluminium foil). There are different types of anamorphosis; in this particular case we have worked with conical and cylindrical anamorphosis with the help of templates that facilitate their elaboration and that can be found in the catalogue of the exhibition 'Perspective. Science and magic of representation' (2009).





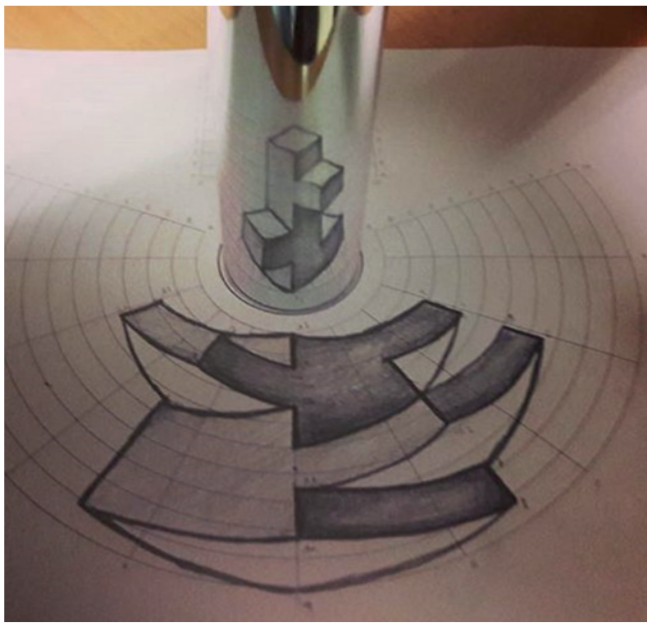


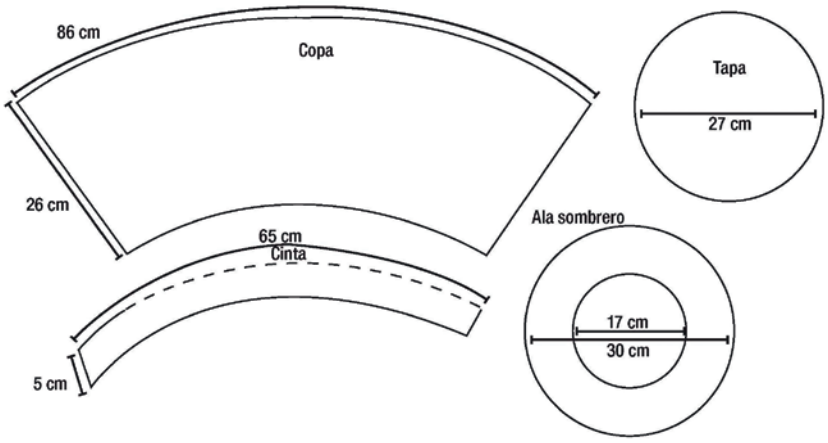
Image 5 and 6. Exercises carried out by the students of the Master's in Teaching of Secondary Education during the 2019/20 academic year.
Image 7 and 8. Exercises carried out by the students of the Master's in Teaching of Secondary Education during the 2019/20 academic year.

Technical drawing in fashion

The most direct relationship between Fashion and Technical Drawing is undoubtedly the pattern making, which will serve to express the design ideas that will later be produced. Students are offered basic knowledge of measurements and patterns, and then carry out exercises to transform the standard pattern, using a learning method of cutting by means of templates. The aim is to forget those that "because of their complicated mechanism and age" make learning difficult, with the resulting loss of time by not being put into practice. A practical and complete teaching is pursued, using a creative process called rapid design. Students will appreciate how they can use a garment template, once drawn, as an inspiration for an infinite number of creations (Szkutnicka. 2010).

In addition to pattern making, it is important to highlight a technique for representing fashion garments and accessories linked to the industrialisation process called technical fashion drawing. Explained by Fernández and Martín (2009), it consists of a representation of the garment as a sketch, drawn as if it were laid out on the flat surface of a table and detailing the front, back and profile, specifying the sizes and positions of the different elements. The technical drawing of a garment is shown as accurately as possible in proportion, without exaggerations, textures or shadows, to avoid misunderstandings during the production process.

Pattern making as a doctrine of technical drawing, works the projection of a three-dimensional figure on a plane, contemplating a series of requirements such as movement, comfort or subjection, although in this activity it is chosen to find and discover new possibilities in geometry through experimentation.



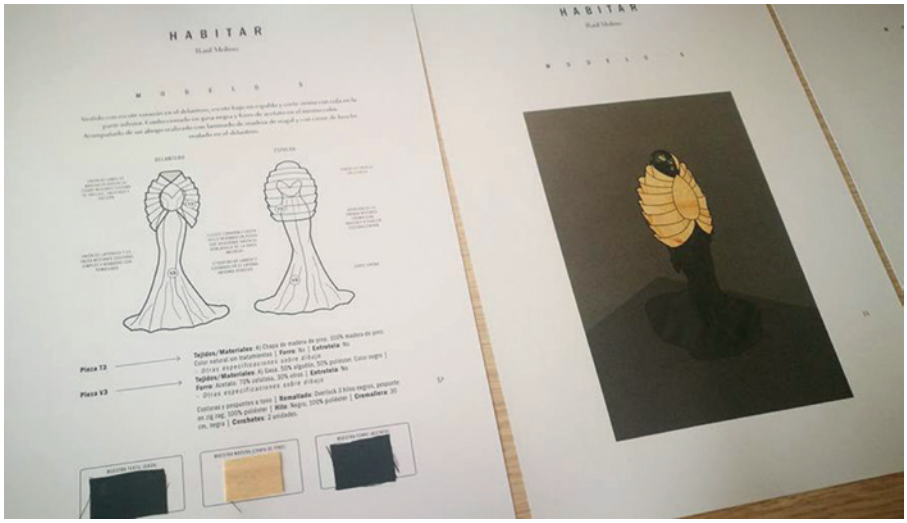


Image 9. Hat pattern. Recovered from: Didactic Unit, *Manuel de Falla* Conservatory.
Image 10.Raúl Molino. 2016. Image of technical file with representation of technical drawing of garment, *Habitar* collection.

Surrealistic Fashion. Unbinding taste through scandal

The students' research now takes a more personal turn and finds its own language of expression. To this end, they are provided with references such as Elsa Schiaparelli, Salvador Dalí, Yohji Yamamoto, Man Ray, Hussein Chalayan and Guda Koster. We should not overlook the fact that Surrealism in its desire to question absolutely everything, had a great influence on art. The idea of Surrealism approaching fashion allowed for a complete metamorphosis that is still used by designers of contemporary haute couture such as Moschino or Palomo Spain.

According to Baudot (2003, p. 17), Surrealism has not stopped intervening in the uniqueness of many fashion-related brands' and advertisements' communication up to the present day. We must bear in mind that fashion turns the wearer of the garment into a trend-setter, in this case taking surrealism from the gallery to the street, from the popular imagination to the classroom.

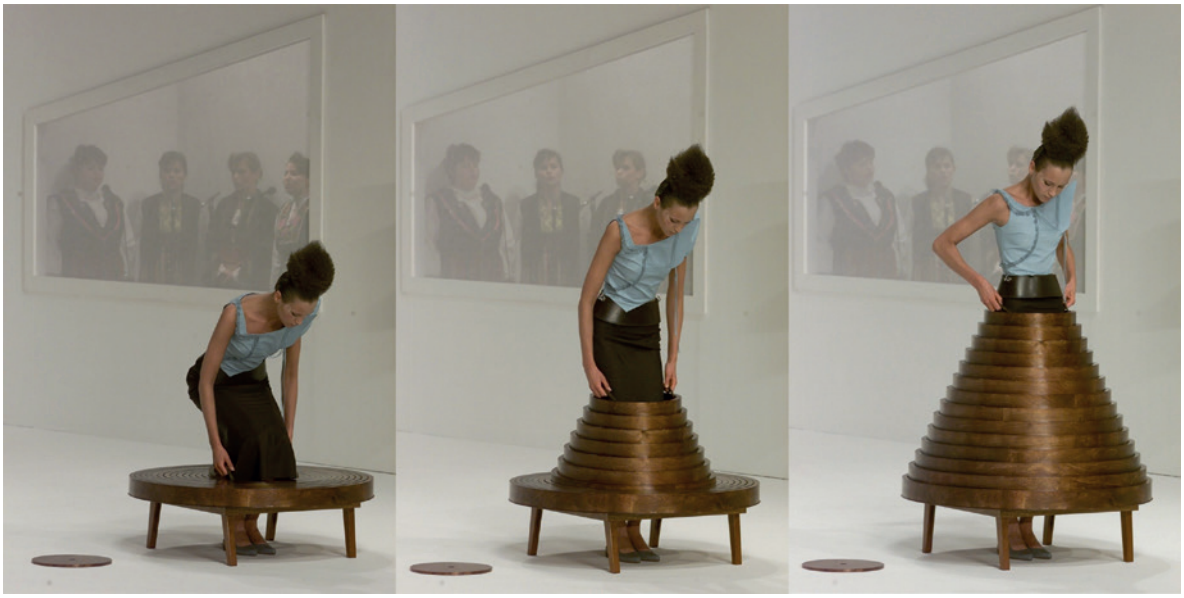


Image 11. Salvador Dalí and Elsa Schiaparelli. Shoe hat, 1937-1938.
Image 12. Hussein Chalayan. Coffee Table Skirt. Colección After words, 2000.

As a reminder, it is not the intention of either the teacher or the student in training to be a specialist in Fashion, as there already exist specific studies for this matter. The interesting highlight of this research is to approach lateral and transversal applications of the Technical Drawing in other disciplines and, thus, to awaken the student's interest in it. In the case of Fashion, not only because of the technique, aesthetics or contemporary possibilities of creation, but also because of the intrinsic interest that it has towards the student. Fashion does not only mean glamour. It also means rejection when what society establishes as normal is not achieved. It implies complexities and stereotypes. It is a tool of differentiation and personality, as can be seen in the different urban tribes so popular in adolescence. Fashion has a strong social character that can be attractive and dangerous; and, with the excuse of the technical drawing, the student reflects on the use of the different clothes and their relation with society.

Through this contact with Surrealism, principles so important in creation, but valued so little in Technical Drawing are highlighted, such as the role played by chance, an essential motor of creation (Palmegiani, 2018).

Image 13. Yohi Yamamoto. Wooden vest and skirt. 1991.

3. THE CLASSROOM AS A LABORATORY OF EXPERIMENTATION IN TEACHER TRAINING

The different stages that shape the proposal are broken down into two blocks, supporting the learning of inhabiting the classroom as an experimental laboratory where space, the individual and concepts are transformed (Mesias-Lema, 2017, 2019).

Raúl Molino. Space and its representation inside and outside the creation. Habitar

Under a methodology based on understanding the classroom as a laboratory of creation, we invited the artist and fashion designer Raúl Molino, a graduate of Fashion Design and Interior Design from the Granada School of Art. The collaboration focuses on his collection called *Habitar*, for which he was awarded first prize at Pasarela Fortuny (2016).

The importance of taking advantage of this contribution to the educational research project in Technical Drawing lies in the use of the language of architecture and nature in new habitable structures, linked to the architectural concept of home. All around us, in nature, there are geometric, fractal structures that serve as shelter, for occupying spaces and working on new representations of them, such as butterfly wings, shells or the rings of tree trunks.

Image 14.Image extracted from the seminar-workshop carried out by Raúl Molino in the subject "Learning and teaching of technical drawing" of the Master's in Teaching of Secondary Education."

Image 15. Raúl Molino. 2016. Image of technical file with representation of technical drawing of garment, *Habitar* collection.

Habitar proposes a new form of communication full of movement and harmony, with a style that runs between rigorously geometric architecture and the representation of the space occupied by the body inside and outside the production. With this type of proposal, the students are shown how they can deal with transversal contents through the binomial technical drawing – fashion; and the importance, not only of the student's participation in the artistic world with visits to museums, art galleries or discussion forums, but also of the value of the intervention of artists and creative people in the classroom. Thus, the artist, teacher and students not only occupy or inhabit an educational space, they also gain experience from their own involvement and relationship with others. This act undoubtedly enriches knowledge of the subject (Mesias-Lema, 2019).

Image 16. Raúl Molino. 2016. *Habitar* Collection

Raúl Molino also connects the technical with the artistic so that the clothing he produces serves as a reflection towards our identity, our conscience of reflection that leads us to vital and immediate living spaces. These are artistic productions which, starting from the Technical Drawing, serve as a tool for social, cultural, and ultimately, almost political change.

Method and results

The following proposal is the result of action-research based on the arts that has evolved to adapt to the needs of the educational curriculum and the interests of students between the ages of twenty-three and forty-two. The number of students in both participations was twenty-three (academic year 2017/2018) and nineteen (academic year 2019/2020). A co-participative methodology was followed in which teachers, students and collaborators simultaneously developed active experiences and approaches to the world of fashion through previous photographs they had taken of the Campus of the University of Almeria, which they had previously manipulated as if they were from the Escher Universities.

The spaces used for the teaching experience were the specific classroom of Drawing of the Campus Lecture Hall and the common corridors, which allowed work in a wider support beyond the classroom tables. The students worked on the floor for part of the process, so they could take in a more complete picture of the work done. When leaving the classroom it was found that the student connected better with the proposal, thus

managing to break with the routine space of the classes and activate their attention and desire to experiment.

The time required to carry out the proposal was:

Basic principles of spatial representation: five hours (two sessions).

Artistic collaboration of Raúl Molino: two hours and thirty minutes (one session).

Theoretical complementation of artistic references and fashion concepts: two hours and thirty minutes (one session).

Students' intervention, development of the proposal: five hours (two sessions).

The total time to develop the proposal was fifteen hours, divided into sessions of two and a half hours each. The experience was carried out in a total of three weeks.

These times could be modified when adapted to Secondary Education, since the Master's Degree students' previous knowledge of Technical Drawing differs from that of the Secondary students, so it may be advisable to use more sessions in the theoretical blocks referring to spatial representation.

Image 17. Image extracted from the proposal carried out on the course.

The different actions of knowledge and production are better detailed below:

1 action: The students take photographs of the different buildings that make up the campus of the University of Almeria, which are later printed in black and white. Photographs of both the exterior and the interior of the buildings are taken into consideration. In these photographs of the campus, the different vanishing points, the horizon line, the centre of vision, the land line and points of view (interior, aerial, bird's eye) must be located and enhanced by hand-drawing. This first approach will serve as a review of what has been learned previously in the field.

Image 18. Exercises carried out by the students of the Master's in Teaching of Secondary Education during the 2019/20 academic year.

2 action: At this stage of the "game" (if we may use this word to refer to the work in progress) the students must tear, break and bend the photographs as they please, but must take into consideration the work of M. C. Escher and his impossible figures, tessellations and imaginary worlds that break with rational perspective. Through a collaborative process, compositions are built using the collage technique and on a flat surface, attending to the first and second dimensions.

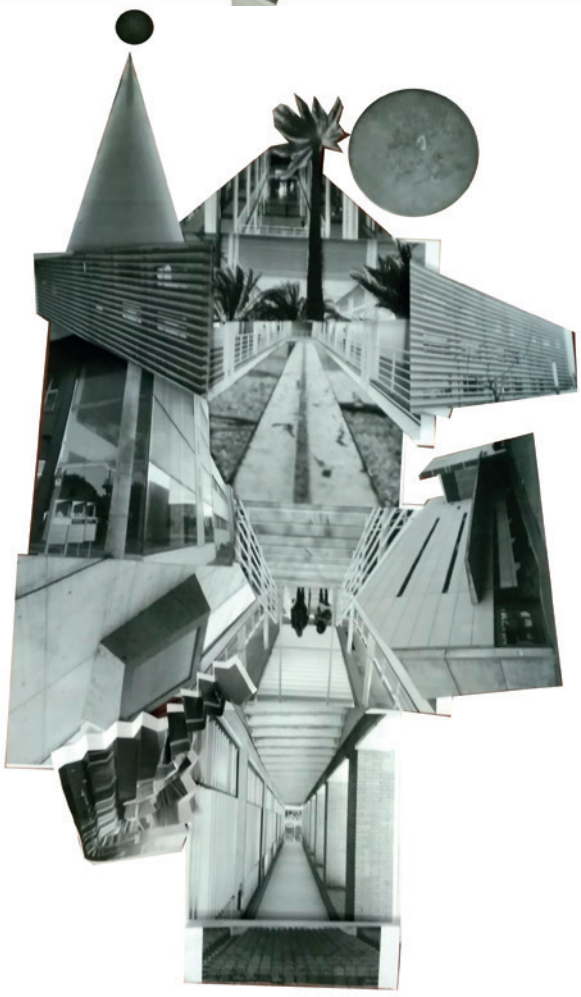


Image 19. Exercises carried out by the students of the Master's in Teaching of Secondary Education during the 2017/18 and 2019/20 academic year.

Image 20 and 21. Exercises carried out by the students of the Master's in Teaching of Secondary Education during the 2017/18 and 2019/20 academic year.

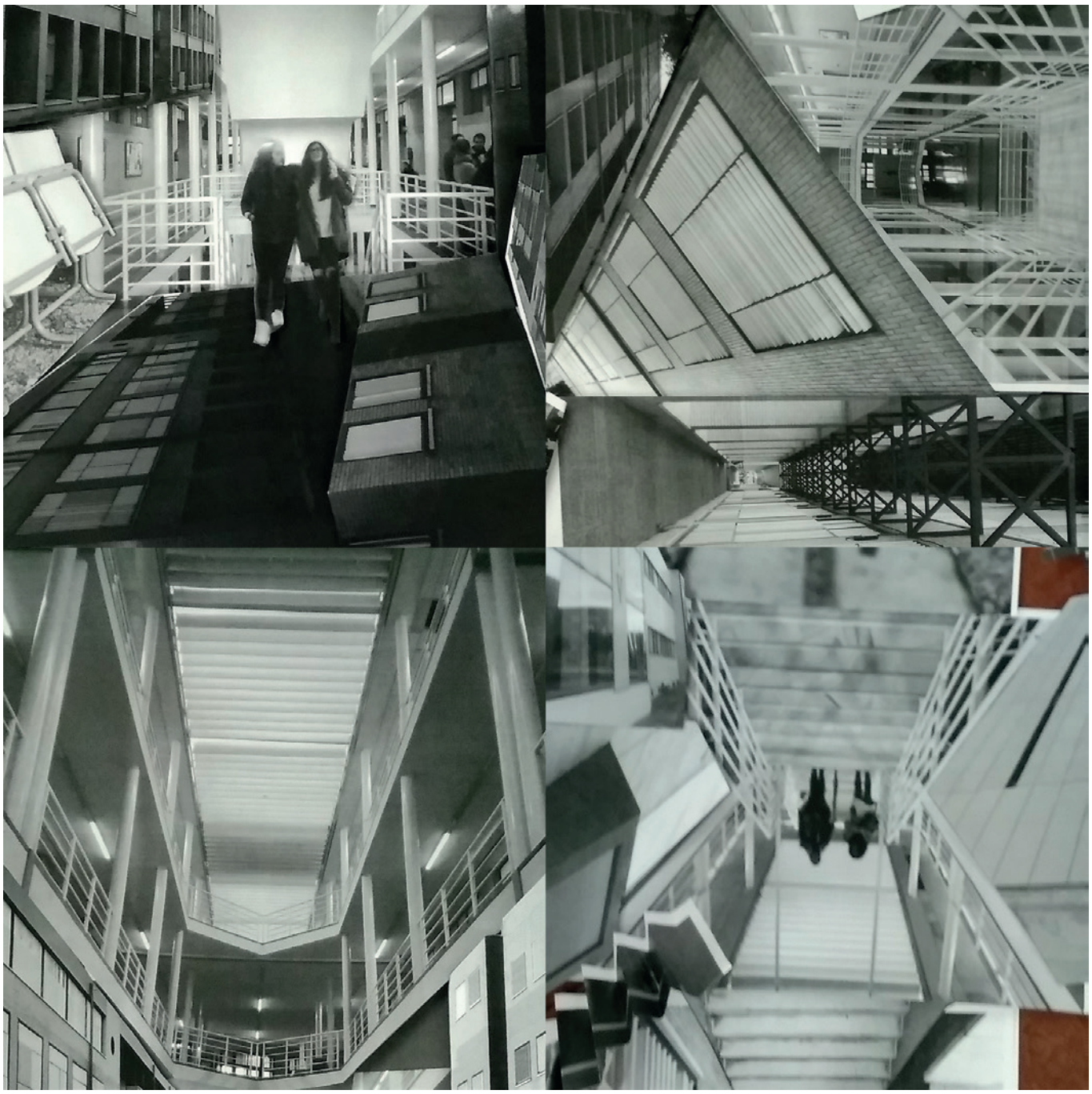


Image 22. xercises carried out by the students of the Master's in Teaching of Secondary Education during the 2017/18 and 2019/20 academic year.

3 action: After completing the two previous actions, it is now time to make a garment or accessory related to the world of fashion, taking as a reference the collaboration of designer Raúl Molino and the artists named in the theoretical framework. In this particular case, we opted for the creation of a single headdress or hat as a collaboration of all the students, giving three-dimensionality to the collages made in the second action.

We have worked on surrealistic creations which could be conceived as a set of creation-expression procedures that use all the forces coming from sleep and the unconscious (Casablanca, 2007). The exercise consists of reusing the "Escherian" creations of the second phase and forming new compositions or almost architectural structures that relate with the occupied space and with the void. Hats and headdresses that have a sculptural character and show utopian, absurd, unachievable and experimental perspectives. Through this spatial representation, capacities as important as imagination and fantasy are enhanced.

Image 23. Final result of the proposal made by the students of the Master's in Teaching of Secondary Education during the 2019/20 academic year. Escher hat headdress. Image 24 and 25. Final result of the proposal made by the students of the Master's in Teaching of Secondary Education during the 2019/20 academic year. Escher hat headdress.

It is well known that teaching art is complex and therefore must be evaluated accordingly. The evaluation method used has been of an objective-subjective character (there are objective elements proposed by the teacher, which serve as a guide for the students, and subjective elements on the part of the student that legitimise the learning). They refer to judgments of the process and product, to flexible and open values that make the meanings concrete. As this is a proposal that focuses its power on experimentation, aspects such as risk, creativity, involvement, and collaborative work are valued over final results that can be measured numerically.

As mentioned above, this proposal is an experimental intervention in the classroom subject to the creativity of students of the Master's program. Priority is given to experience over rigorous and scientific data. As a proposal for future improvement, as a teacher, it would be interesting to anticipate the research needs that may arise and propose a rigorous data collection.

Image 26. Exercises carried out by the students of the Master's in Teaching of Secondary Education during the 2017/18 academic year.

4. THE STUDENTS' ACCOUNT OF THE LEARNING EXPERIENCE

In an educational research based on the arts, the voices of all the people who have been linked to it create a polyphony that will bring different points of view about the experience.

4.1. A look from the inside. From academic learning to experiential learning

In Secondary School, and from my own experience, the study of Technical Drawing focuses on the first and second year of high school courses in the specialties of Science, Technology and Arts, with students mostly between the ages of sixteen and eighteen. This student body has not worked on this subject before, so it faces different difficulties that Rafael Torres (2009) lists:

- Complexity of the subject.
- Difficulties of observation.
- Drawing difficulties.
- Measurement related problems.
- Communication and comprehension problems.

Based on my personal experience it would be appropriate to add one more difficulty which could be crucial to the understanding of the subject, which lies in the decontextualisation and abstraction of the contents. The student, when delving into the subject of Technical Drawing, can easily be immersed in a universe of abstract planes and dimensions, which requires a level of cognitive development sometimes too high for the generality of the classroom.

Image 27 and 28. Images extracted from the seminar-workshop carried out by Raúl Molino in the subject of learning and teaching of technical drawing of the Master's in Teaching of Secondary Education.

In the book *Manual de Neuropsicología*, it is stated that Piaget considers the cognitive development of the adolescent to end at the age of fifteen. However, the Neopiagetian author Fisher proposes a final stage of development called "The cycle of abstractions", which extends from fourteen to twenty-five years of age (Maestú, Ríos and Tirapu, 2008), thus understanding that the students could be fully developing these capacities during the course of the subject.

Additionally, Technical Drawing in Secondary School focuses obsessively on the resolution of several examples of exercises, becoming a forced training, in order to pass a final test, the EVAU (or Spanish University Access Test). The constant presence of this test on a day to day basis in the students' life and its difficulty can generate high levels of stress and anxiety. This causes a state of Learned Helplessness in the students as well as failure in the development of the proposed activities. On the theory of Learned Helplessness, Polaino-Lorente and Vázquez (1982, p. 174) postulate that "the cause of the low performance of subjects previously subjected to situations of uncontrollability lies in the fact that they have perceived such a situation and subsequently project this way of perceiving to other situations". In this case, by failing in a series of problem solving activities or by perceiving the activity as complex, the students assume that the whole subject is too complicated for them, causing a state of loss of self-esteem, passivity, and consequently the abandonment of the subject.

The profile of the members of the classroom, which require this knowledge for their future university studies, is very broad, from science professions such as engineers or architects, to lines more linked to artistic activity, such as product, interior or fashion designers. Taking this into account, focusing the teaching of the subject through repetitive, excessively technical and abstract exercises, feeds the previously mentioned effect of Learned Defencelessness to a greater extent, since "this type of deficient understanding of reality or feeling of uncontrollability is usually associated with problems such as stress generated by school demands" (Barraza and Silerio, 2011, p. 338).

It should not be overlooked that this abstraction and decontextualisation, so excessively technical, deprives the learning of Technical Drawing of the elements of creativity or collaborative work, among other skills essentially required for the student's future development. This is also contemplated in Royal Decree (1105/2014, of December 26), which establishes the need to strengthen the entrepreneurial spirit with attitudes of creativity, flexibility, initiative, teamwork, self-confidence and critical sense.

To solve these problems, a revision of the teaching model of the subject is considered essential. Therefore, the continuous training of the teacher in innovative methodologies is necessary, such as the one proposed in the Master' subject that we are dealing with. Through collaborative work, experimentation and the use of ICT, so forgotten in most centres, it would help students, who are digital natives, to connect with the contents in their own language. Furthermore, the revision of the subject model must be integral, from its approach to the work of the teacher and especially the evaluation methods. What is evaluated from the Technical Drawing, in tests such as the EVAU, is so limited and complex that it does not allow the teacher or the student to take other paths within the programming.

With this scenario of personal experience, certainly not too gratifying as a student, I am reunited with the subject ten years later, this time studying for the Master's Degree in Secondary Education Teaching, in order to become a teacher. In this Master's, the subject is approached from a transversal and creative point of view, giving room to all kinds of student profiles and focusing the content of the abstract in the tangible, addressing real doctrines and professions that make use of technical drawing in their daily work.

Image 29. Exercises carried out by the students of the Master's in Teaching of Secondary Education during the 2017/18 academic year.

Through technical drawing and fashion design, students learn the projection of three-dimensional figures, working with objectives, problem-solving, modifying a model and working on sketches. Most importantly, at the end of the project, they can see a rewarding result of their work and truly understand that artistic creation is not only an act of expression of a feeling, but also a channel for motivation, a way to work on awareness, a way to acquire new knowledge and attitudes as well as a form of communication (Vanrell, 2007, p. 253).

Trying to give a plastic-artistic form to the reality of that which is affecting us is a creative process that involves developing a capacity for analysis, motivated by observation; and a capacity for synthesis, by expressing what has been transformed after passing through the crucible of the creator's personal experience.

Through the actions described, the student develops a critical outlook on the environment, able to glimpse perspectives, patterns and interesting elements such as composition in the reality of their environment. Through experimentation, they develop teamwork skills and internalise concepts in a dynamic and creative way. In any other case, through the classic representation of perspectives through drawing, the process would have been slower and limited. In addition, the use of ICT in the classroom is encouraged through the use of mobile phones, since, as indicated by Basilotta, García-Valcárcel and López (2014), they allow for improved communication and work among students, highlighting seven advantages: efficiency, moral values, information exchange, innovation, limitation of duplication, viability and unity. It has also been related to an increase in learning by encouraging greater interaction between teachers and students.

In the actions carried out, technical drawing is worked on in a tangible and contextual way, which allows the student to understand and internalise concepts that can later be applied to classic technical drawing. Education, technical drawing and fashion converge in the subject and offer an experience that, as future teachers, it is essential to know and value.

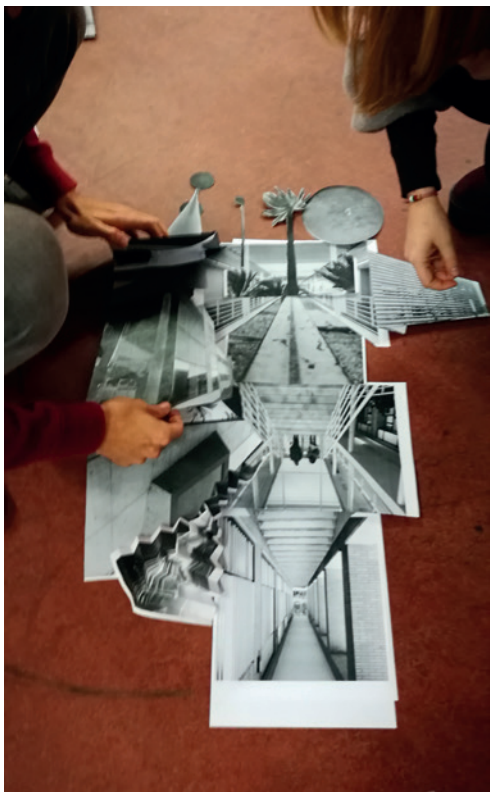


Image 30 and 31. Exercises carried out by the students of the Master's in Teaching of Secondary Education during the 2017/18 academic year.

4.2. Learning acquired during action-research

Additionally, regarding the performance of the activity proposed in the Master's and its methodology, as a student I consider that this type of transversal and creative teaching of the subject is crucial to learn how to explore and exploit the possibilities of Technical Drawing; as well as to provide future Secondary Education teachers with innovative methodological tools that bring the teaching to a standard of quality much higher than at present. The learning, from the teacher training on Technical Drawing influenced by other disciplines, like Fashion and Art, is fundamental for enriching the experience of students in Secondary Education.

Thanks to what I have learned, I have sufficient tools to adapt myself to this teaching model, which I believe should be a future model for all educational centres. In this model of 'teaching by discovery', my task as a teacher is to be a guide to learning and to ensure that each student manages to develop in the subject as much as possible; as opposed to the model of the teacher as a source of information imposed by traditional education. The teacher proposes the development of the activity and facilitates the situations, as in the design of the fashion and technical drawing activity; and the student is the one who experiences, analyses the results and acquires the learning from their own experiences.

This learning methodology acquired during the course of the subject is currently applied during my teaching activity. Fortunately, at the educational centre of the Andalusian School of Art and Design, where I teach Graphic Design, they opt for transversal teaching and projects, where all the subjects work together on the development of the tasks. These projects have a real and contextualised purpose: the students working together with the companies. Every year we also work on a transversal project for all the design disciplines taught at the school.

5. CONCLUSIONS

The teaching proposal has been taken as a starting point for future educational research based on the arts through the application of knowledge linked to technical drawing. The methodology carried out in the classroom has been well received by the students (the future teachers), so it could be confirmed that it is a creative vehicle for learning with an investigative nature. During the teaching processes put into practice, curiosity, critical spirit and outlook have been developed and strengthened.

The method used is based on dialogue, communication and reflection, so that a work of a subject such as Technical Drawing leads students to understand that there are no absolute representations. It is necessary to teach detection of difference, to analyse the different and to deconstruct stereotypes. Using traditional methods of representation, it is understood that technical drawing serves as a bridge for reaching different paths and disciplines, to know, but not to dominate, universes as exciting and stimulating for the student as fashion.

This experience has awakened interest in promoting Technical Drawing as a stimulation in the training of Secondary School teachers, as it inflates the imagination through the previous traditional knowledge. At the same time, it lends itself to the service of the educational needs of our time in Secondary Schools, where the experiences – classes – must entail not only research with a strong practical profile, but also personal growth that overcomes the insubstantiality of everything technical and the limits that academicism imposes upon us. As Arthur D. Efland (2003, p. 17) states, taking into account the modern vision of our society, the ability to comprehend your own emotional states and know how to reveal or represent them through creations that reconsider the value of originality and personal expression should be rewarded.

It was time to give students what I had missed out on during my years of training. From a personal point of view, in our professional career we must not forget that it is not education, but a good teacher, who makes life interesting.

Image 32, 33 and 34. Final result of the proposal made by the students of the Master's in Teaching of Secondary Education during the 2019/20 academic year. Escher hat headdress.

6. REFERENCES

Arheim, R. (2005). Arte y percepción visual. Madrid: Alianza Editorial.

Barraza, A. y Silerio, J. (2012). Indefensión escolar aprendida en alumnos de educación media superior y su relación con dos indicadores del desempeño académico. Psicogente, 15 (28), 337-347. http://revistas.unisimon.edu.co/index.php/psicogente/article/view/1880.

Baudot, F. (2003). Moda y surrealismo. Madrid: H. Kliczkowski.

Berrater, B., Santos, J. D. y Ferrater, C. (comp.) (2011). M.C. Escher. Infinite Universes. (Exposición celebrada en Granada, Parque de las Ciencias, del 29-III-2011 al 08-I-2012). Granada: Gráficas Alhambra.

Bruner, J. (2001). El proceso mental en el aprendizaje. Madrid: Narcea.

Caeiro-Rodríguez, M. (2018). Aprendizaje Basado en la Creación y Educación Artística: proyectos de aula entre la metacognición y la metaemoción. Arte, individuo y sociedad, 30 (1), 159-177.

Camargo, A. y Hederich, C. (2010, diciembre). Jerome Bruner: dos teorías cognitivas, dos formas de significar, dos enfoques para la enseñanza de la ciencia. Psicogente, 13 (24), 329-346.

Casablanca, L. (2007). La moda como disciplina artística en España. Jesús del Pozo y la generación de los nuevos creadores [Tesis Doctoral]. Universidad de Granada.

D. Efland, A., Freedman, K. y Stuhr, P. (2003). La educación en el arte posmoderno. Barcelona: Editorial Paidós.

Fernández, A. y Martín, G. (2009). Dibujo para diseñadores de Moda. Barcelona: Parramón.

García-Valcárcel. A, Basilotta, V. y López, C. (2014). Las TIC en el aprendizaje colaborativo en el aula de Primaria y Secundaria. Comunicar, XXI (42), 65-74. https://www.redalyc.org/articulo.oa?id=158/15830197008.

Gómez Molina, J. J., Cabezas, L. y Bordes, J. (2003). El manual de dibujo. Estrategias de su enseñanza en el siglo XX. Madrid: Cátedra.

López, V (coord.) (2009). Perspectiva. Ciencia y magia de la representación. (Exposición celebrada en Granada, Parque de las Ciencias, diciembre 2008 a septiembre 2099). Granada: Gráficas Alhambra.

Lurie, A. (2002). El lenguaje de la moda. Una interpretación de las formas de vestir. Barcelona: Editorial Paidós.

Maestú, F., Ríos, M. y Tiraou, J. (2008). Manual de Neuropsicología (2ª ed.). Barcelona: Viguera.

Mesías Lema, J. M. (2017). Art Teacher Training: a photo essay. International Journal of Education through Art, 13 (3), 395-404. https://doi.org/10.1386/eta.13.3.395_1.

Mesías Lema, J. M. (2019). ARTISTAS HABITANTES: una metodología contemporánea, participativa y colectiva en Educación Artística. Observar 2019. 13, 74-104. https://www.observar.eu/ojs/index.php/Observar/article/view/104.

Mesías Lema, J. M. (2019). Educación artística sensible. Cartografía contemporánea para arteducadores. Barcelona: Editorial GRAÓ.

Pallasmaa, J. (2014). Los ojos de la piel: la arquitectura y los sentidos (2ª ed.). Barcelona: Gustavo Gili.

Palmegiani, M (2018). Elsa Chiaparelli y su relación con el Surrealismo. Revista anual de Historia del Arte. Liño, 24, 73-84.

Polaino-Lorente, A. y Vázquez, C. (1982). La indefensión aprendida: ¿Un modelo experimental de depresión? Revista del Departamento de Psiquiatría de la Facultad de Medicina de Barcelona, 3, 173-195. http://opendata.dspace.ceu.es/handle/10637/1905.

Real Decreto 1105/2014, de 26 de diciembre, por el que se establece el currículo básico de la Educación Secundaria Obligatoria y del Bachillerato. Boletín Oficial del Estado, núm. 3, del 3 de enero de 2015. https://www.boe.es/buscar/act.php?id=BOE-A-2015-37.

Squicciarino, N. (2012). El vestido habla, consideraciones psico-sociológicas sobre la indumentaria. Madrid: Cátedra, Signo e imagen.

Szkutnicka, B. (2010). El dibujo técnico de moda paso a paso. Barcelona: Gustavo Gili.

Torres, R. (2009) Aplicación de la metodología Interactiva del dibujo técnico en la enseñanza secundaria con el programa Cabri 2D- 3D. [Tesis Doctoral]. Universidad Politécnica de Valencia.

Vanrell, C. R. (2007). Creación artística en la adolescencia: vinculaciones terapéuticas/ Artistic creation in adolescence: therapeutic entailments. Arteterapia, 2, 247-260.

Manuel Pérez-Valero Artista plástico y visual. Doctor en Bellas Artes y profesor de Educación Artística en la Universidad de Granada. Director Artístico-Creativo de Enhorabuena (@enhorabuenaart), donde intenta devolver a la actividad creativa y a la educación esos factores tan importantes como son la intensificación de la sensibilidad y la agitación social.

mpvalero@ugr.es.

Ángeles Gómez-Martin Ilustradora, diseñadora de Moda y diseñadora Gráfica. Profesora del Grado de Diseño Gráfico en la Escuela Superior de Arte y Diseño de Andalucía, en Granada. Cursó el Máster de profesorado en Educación Secundaria Obligatoria y Bachillerato, formación Profesional y Enseñanzas de Idiomas en la Universidad de Almería.

angelagomez@esada.es