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The New Paradigm of Teaching Design: A Reflection About Innovations in Materials Teaching in the "Online Season"

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ABSTRACT

In Portugal, it's a National Strategy, the innovation in teaching, the connection between Faculties and Research Center, being a social and academic responsibility, to the good training and qualification of students. This can be an extra motivating factor for the students performance of academic work and better preparation for working life. In March 2005, the Portuguese government launched the strategy plan for the creation of a Digital Portugal, which is based on three pillars, I: digital inclusion of people, II: Digital transformation of the business fabric and III: digitization of the state. According to this plan, Education and its digitization are part of the 1st pillar, which aims above all "The empowerment and digital inclusion of people emerge as imperatives to respond to the impact that digitization can have on the life of each individual, implying an integrated approach that ensures differentiated measures depending on the life cycle of citizens" (Portugal Digital, p. 15), however, in 2020, when the pandemic began, several failures were verified in the digitalization of education, leaving students without conditions / without classes, being urgent for the development and training of students, tools to support the development of their work, however, Little has been done since then. In such a specific area as materials and technologies, the need to find support becomes even more urgent. The new materials and the technological systems, the evaluation of the programmatic contents, increasing the attention to teaching materials in design, offered by the Faculties of Design, is an activity in constant update, forcing a better preparation of the contents taught in 1st cycle studies. This is proved by the actual situation promote by the pandemic of COVID19. Professors and Students are learning news ways to complete the academic year. in this study we intent to known how the students of 1st cycle of design courses, and their teachers, have been approached with materials, research and practical work, when we have been teaching and learning through virtual classes, and how they how they managed to work remotely, in this situation.

Keywords: Teaching, Innovations, Materials, Design teaching

INTRODUCTION

In the last two years, teaching has undergone a change, moving from "face-to-face classrooms" to "virtual classrooms at students' homes". This change happened in all teaching cycles and in higher education, around design it was

no exception. This article presents the experiences achieved by teachers after 2 years of mixed education (online and face-to-face) in design. To carry out the research, interviews were carried out with teachers from National Design schools, thus allowing to assess a series of data on teaching before and after the pandemic.

The interview research method was one of the research methods adopted by the author for the development of her research. The fact that we are in the middle of a pandemic, made it possible for the interviews to be developed in a virtual format (zoom and email meetings, according to the acceptance and possibility of the interviewees). As António Gil mentions, exploratory research is a defining strategy for future work and its main function is to develop and clarify ideas so that it is possible to change and consider new concepts that allow a reformulation of the problem, hypothesis and even the definition of strategies to be adopt in the future of research (Gil, 2008, p. 113).

We can already inform you that the strategy adopted was useful since with these interviews we had access, as Quivy even mentions, "to the procedures they used, the problems they encountered and the pitfalls to avoid" (Quivy & Campenhoudt, 2003, p. 71). For interview analysis, we used the software – MAXQDA, to minimize errors and thus obtain more reliable analysis results.

The interviews that are presented were carried out in Portugal, using video calls, email and only one in person. With the main objective of being able to understand the panorama of teaching materials in design in Portugal, teachers from the main Design courses in Portugal were interviewed, who teach in the Curricular Units of Materials and who have or had a department direction position in the schools where teach.

We cannot forget that teaching in design is carried out on a very theoretical-practical basis, where a close relationship between practice and experimentation preferably prevails, "Design is a practice-based discipline, which is reflected in its education methodology, grounded in project development – notwithstanding the textual components present in design history, theory and critique. As such, making use of dense knowledge might prove challenging because designers think and work in a predominantly visual way, and use visual representation to organize and communicate their thinking (cross, 1982; schon, 1983; lawson, 2005; wastiels, Schifferstein, Wouters, & Heylighen, apud Casais 2020, p. 3 (Casais, 2020, p. 3).

With research and investigation on the subject, we realized how each teacher could have adapted to the scenario and how this influenced and changed the way of teaching in design.

DESIGN TEACHING IN A PANDEMIC TIME

"Schools of higher artistic education, despite the '1957 Reform', could not go beyond the idea of a "natural gift" and "handcraft training with possible masters" (Sousa, 1996: 2) with which students were confronted before. of the 1974 convulsions. The social framework of these schools pointed to the need for significant changes in the curricula of their courses. The reasons were related to the inadaptation of artistic education to

the technical and technological evolution of some of its areas of interven-
tion, as well as to the absence of adequate infrastructures for the material
conditions of a teaching of this nature" (Almeida, 2009, p. 314).

The realization that Design is an important area for the social and eco-
nomic development of a country has promoted a greater opening of design
schools. It cannot be forgotten that the work of the APD - Associação Portu-
guesa de Design in 1976 in promoting design, as well as the Centro Nacional
de Design, later called CPD - Centro Português de Design, may have been
decisive for the promotion and increase of the competence, integrity, and
visibility of design professionals (Agapito, 2015).

Teaching in Design in Portugal has followed the evolution of techniques,
but no indicator could predict that a pandemic would make us change tea-
ching habits and beyond. As stated by Francisca Simões (Simões, 2020) in
her opinion piece in the P3 newspaper, "the transition to a totally distance
learning should not be part of the future projects of a quality, formative,
democratic and inclusive education", namely because of, In Portugal, despite
the efforts made, there are still difficulties in accessing goods that are consi-
dered essential for virtual education, such as a computer and internet access.
However, it is important to clarify that in March 2005, the Portuguese
government launched the strategy plan for the creation of a "Digital Por-
tugal", which is based on three basic pillars, such as "Digital inclusion of
people, Digital transformation of the business fabric and digitalization of the
state".

According to this strategic plan, the area focused on Education and its
digitization is included in the 1st pillar, which mainly aims at "The empow-
erment and digital inclusion of people emerge as imperatives to respond to
the impact that digitization can have on life of each individual, implying an
integrated approach that ensures differentiated measures depending on the
life cycle of citizens" (Portugal Digital, p. 15), however, in 2020, when the
pandemic started, several failures were verified in the digitalization of educa-
tion, at all levels of education, leaving students without conditions / without
classes, being urgent for the development and training of students, tools to
support the development of Your jobs.

We now realize that there is still a long way to go, to mitigate regional
and economic differences about this issue. The Faculty of Architecture of the
University of Lisbon, on its own initiative, was concerned with having the
greatest number of hours open, always respecting the rules imposed by the
DGS.

According to the president of the Faculty of Architecture of Lisbon, Profes-
sor Carlos Dias Coelho in the order published on January 29, 2021 "Aware
of the importance of access to spaces and infrastructure to support study and
academic work, FA.ULisboa will make available to its students the possibi-
lity of accessing the facilities and services of the Faculty of Architecture, upon
prior registration" (Dias Coelho, 2020), but perhaps not all institutions took
this position.

According to Francisca Simões, the practical classes, even with the effort of
the teachers, during the confinement times to teach practical classes online,

did not have the best results, even though "alternatives were explored, more or less dynamic, more or less more or less interactive, but the conclusion was practically unanimous: this typology of classes works best in person" (Simões, 2020, p. 1).

Cristóvão Pereira, in an interview, also tells us that "digital media will never be successful, because experimentation is essential." He also informs that the confinement time "has exposed the need for students to have access to the workshops. The fact is that the exclusively digital way of teaching materials does not work" (Pereira, 2020), because according to the former director of the Design course at the School of Fine Arts at the University of Lisbon, "the empirical knowledge of the material, and the experience of contact, the need for knowledge and contact with materials, thickness, diameter", (Pereira, 2020) are highly important factors for the training of the designer and this can only be achieved with experimentation *in locco*.

As Alves Pereira says in an interview, experience in materials cannot be only theoretical and only in materials, but in processes "If we stick only to materials, we are only falling into the field of engineering. Which is the mere science of materials. this is not a materials science course. we have to make a small approach to some property that the materials have, to the touch, to the color to the surface finish that we can print on it, even sometimes in the same material the number of pieces can influence the shape of what we choose. We can have a product just like a stamping that requires a tool, or I can just have hammering done in a locksmith shop because there are few pieces" (Alves Pereira, 2019).

We can consider that in such a specific area as the teaching of materials and technologies, the need to find support became even more urgent during the pandemic years, due to covid19, greatly supported by the implementation of a teaching to the distance, an essential resource for students not to be harmed, thus maintaining their right to education, however, due to the imposition of the state of emergency, access to faculties and workshops was denied, penalizing students from practical areas such as the teaching of Architecture and in Design, and for that reason, faculties and institutions with resources and which were able to open to welcome their students (as in the case of Fa.ULisboa), may have mitigated problems related to practice and experimentation.

Still with regard to materials, teaching and access to research through digital educational resources, according to Professor João Ferreira, "easy and regular access to material platforms would help to develop the material culture of students." This could allow students to create research skills and greater autonomy of choice (Ferreira, 2020), thus mitigating the problem of lack of research skills mentioned by Cristóvão Pereira (Pereira, 2020), what happens has to be on platforms that not only present materials, but processes, as Alves Pereira says, so that it is not a teaching in a "mere science of materials" (Alves Pereira, 2019).

It is unanimous that laboratory experimentation promotes better knowledge of materials and technologies. Learning and the acquisition of skills are favored in an environment of experience through know-how, that is, experimenting to learn - Learning by doing. However, according to the REDES

research group, coordinated by Professor Rita Almendra, when it comes to research in Design, regarding PhD works, only 31.6% of the theses presented and analyzed at the time of the investigation are theses of a practical nature. In other words, the opposite of what is defended by the design professors interviewed (Almendra, 2019).

Search for Virtual Material? It Will be Possible?

"Design is the process of translating a new idea or a market need into the detailed information from which a product can be manufactured. Each of its stages requires decisions about the materials from which the product is to be made and the process for making it" (Ashby, 1999, p. 1).

The choice of materials is, and has always been, a concern of designers, since sight and touch are the senses that are first captured when we pass by the object, a piece of furniture, a ceramic, for example.

With regard to the selection of materials, Veiga informs us (et al. 2013) that "the selection of materials is decisive in Design as a technological factor and the designer who does not have this knowledge is out of step, and deprives himself of using new technologies. techniques and resources" (Veiga, et al., 2013, p. 3)

It is not enough to present the materials to students and designers, but it is also necessary to know how to master their characteristics and limits. Veiga reinforces his theory indicating that for academic and professional success in the area of design, designers must have a wide concern and knowledge in relation to the materials to be used, and thus, attention must be paid to characteristics in the materials to be used such as "Quality, productivity, low cost, life cycle and environmental impact are some of the main features in industrial development. Therefore, new technologies for the production of new materials and products are constantly in demand" (Veiga, et al., 2013, p. 4).

In our research work, we understood that we should analyze the virtual tools available on the market, with regard to the selection and organization of materials, future use, application, life cycle and environmental impact. Since the beginning of the research and until now, we have been evaluating the main virtual materials tools, or platforms, such as Granta Ces-Edupack, materialon, Matweb and Material District.

There are, in fact, a series of virtual platforms or libraries that can be starters for a good research on materials and their application, however, they are not designed for design students, as Professor Cristóvão Pereira says "I know the Granta CES-EDUPAck platforms, which is not ideal (A lot of engineering)" and does not allow a close connection between the material and its application, being important, along with the platform, that the school provides conditions for students to experience the material that research, and it is also useful to acquire skills in the area of deduction and experimentation (Pereira, 2020). As mentioned by Abílio Silva, the material platforms that offer the most potential for research are Matweb, Efunda and Ces-edupack "and that comes in (…)" (Silva, 2018) which has quality as it is based on information from Professor and Researcher Michael F. Ashby.

International schools such as the Polytechnic of Hong Kong or Parson in New York have, as teaching support, libraries of materials, which seems to be a good alliance between theoretical research and practice. Still with regard to materials and access to research through digital educational resources, according to João Ferreira, "easy and regular access to material platforms would help to develop the material culture of students" (Ferreira, 2020). This could allow students to create research skills and greater autonomy of choice, seeking to achieve a better design, as "Good designs work; excellent designs also give pleasure" (Ashby, 1999, p. 2).

CONCLUSION

In conclusion, we realized with these interviews that Teaching in Design should always have a component of experimentation, which is a differentiating factor in teaching Design and in the training of the Designer, preparing the future designer for the professional world and the acts of his profession. . We also realize that the role of digital tools is increasingly assumed as a resource of greater and better use as preliminary research before experimentation.

We understand that, according to the results obtained with the interviews, the problems related to the acquisition of competences may be related to the decontextualization of teaching and its adaptation to current needs.

The proposal of competences was also noticed by the students that they will be different according to the design school they attended. It is unanimous as highlighted by Professor Abílio Silva, João Ferreira and Cristovão Pereira that in design courses, with regard to research and materials, students must learn to gain research skills.

With this investigation, we found that Design degrees have their own specifications, very characterized by the environment and training of the teaching staff and that the use of existing material platforms on the market can be important for materials research by design students, however, it will be essential that design schools have structures such as workshops that promote material experimentation, because without a link between theory and practice, teaching loses quality.

We also realize that the focus of teaching and teachers should always be the training of students in design professionals. It is understood that being a design teacher is an act of love for others and for future generations that will "dominate" the world of design. At present, a good training will provide students with more tools and resources during their academic training.

Finally, Teaching in Design should always have a component of experimentation, which is a differentiating factor in teaching in Design and in the training of Designers, preparing them for the professional world and the acts of their profession. However, the role of digital tools is increasingly assumed as a resource of greater and better utility, as long as it is designed for design. The present investigation therefore intends to continue working on a virtual solution to support the practice of teaching materials in Design.

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REFERENCES

Agapito, D.E., (2015). Design em Portugal. 1° edição ed. Loulé, portugal: sílabas& desafios.

Almeida, V. D., (2009). O Design em Portugal um Tempo e um Modo. Lisboa: Faculdade de Belas Artes.

Almendra, R., (2019). Redes2019_relatorio-phd. [Online] Available at: https://redesconference.fa.ulisboa.pt/publications/[Acedido em 19 fevereiro 2022].

Alves Pereira, J., (2019). Entrevista a Alves Pereira [Entrevista] (julho 2019).

Ashby, M., (1999). Material Selection in Mechanical Design. 2.ª edição ed. Oxford OX2 8DP: Butterworth-Heinemann .

Casais, M., (2020). facilitating complex Knowledge in design Education throught Design tools. Em: J. B. Rita Almendra, ed. Research & Education in Design. Lisbon: CRC press Taylor and Francis, p. 335.

Dias Coelho, C., (2020). Despacho sobre Utilização dos espaços da FA.ULisboa durante o período de emergência. [Online] Available at: https://www.fa.ulisboa.pt/images/FA/Comunicados/Comunicado_11_Utilizacao _dos_espacos_da_FA.ULisboa_durante_o_periodo_de_emergencia.pdf [Acedido em 27 2 2022].

Ferreira, J., (2020). Entrevista a João Ferreira [Entrevista] (07 2020).

Gil, A. C., (2008). Técnicas de pesquisa Social. 6.ª edição ed. São Paulo : Atlas .

Pereira, C., (2020). Entrevista a Cristova 'Pereira [Entrevista] (07 2020).

Quivy, R. & Campenhoudt, L., (2003). Manual de investigação em Ciências Sociais. 3.ª Edição ed. s.l.:gradiva.

Silva, A., (2018). Entrevista a Abílio Silva [Entrevista] (abril 2018).

Simões, F., (2020). Ensinar e aprender à distânica - o que aprendemos com a covid-19. [Online] Available at: https://ionline.sapo.pt/artigo/718121/-ensinar-e -aprender-a-dist-ncia-o-que-aprendemos-com-a-covid-19?seccao=Opini%C3% A3o_i&fbclid=IwAR2-h7pRQwtUV5dIHeJphV74oMBTVmxswyjVXM6B4pu- qi8gh3OTDKUBb0o [Acedido em 15 12 2020].