THE CHALLENGE OF TEACHING DESIGN FOR SUSTAINABILITY IN A PANDEMIC CONTEXT: A DIDACTICAL-PEDAGOGICAL EXPERIENCE

O DESAFIO DO ENSINO DO DESIGN PARA A SUSTENTABILIDADE NUM CONTEXTO PANDÊMICO: UMA EXPERIÊNCIA DIDÁTICO-PEDAGÓGICA

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ABSTRACT

This paper aims to report and discuss a didactic-pedagogical experience in teaching design for sustainability (DfS) in which two subjects - Packaging Design and Sustainability - of an undergraduate course in Graphic Design in a Brazilian public university were worked together. The activity was carried out entirely remotely due to the Covid-19 pandemic. The methodology used is the experience report, complemented with literature review, graphic-visual records of the work process and testimonies of participating students. This report describes and discusses the teaching-learning strategies used, the results obtained, and points out some paths that have shown to be promising from that experience, in particular the use of online platforms for planning and project management combined with the use of videoconferencing applications and textbook produced in an open and collaborative way by the LeNS Brazil research network.

KEYWORDS: Design for Sustainability; Design Pedagogy; Packaging Design; Pandemics; Collaboration.

RESUMO

Este artigo busca relatar e discutir uma experiência didático-pedagógica no ensino do Design para a Sustentabilidade no qual duas disciplinas – Design de Embalagem e Sustentabilidade – de um curso de graduação em uma universidade pública brasileira foram trabalhadas de forma conjunta. A atividade foi realizada inteiramente de forma remota devido à pandemia de Covid-19. A metodologia utilizada é o relato de experiência, complementado com revisão de literatura, registros gráfico-visuais do processo de trabalho e testemunhos dos estudantes participantes. Este relato descreve e discute as estratégias de ensino-aprendizagem utilizadas, os resultados obtidos, e aponta alguns caminhos que se mostraram promissores a partir desta experiência, em particular o uso de plataformas online para o planejamento e gestão do projeto, combinadas com o uso de aplicativos de videoconferência e livro-texto produzido de forma aberta e colaborativa pela rede de pesquisa LeNS Brazil.

PALAVRAS CHAVE: Design para a Sustentabilidade; Pedagogia do Design; Design de Embalagem; Pandemia; Colaboração.

1. INTRODUCTION

1.1. The teaching of Design for Sustainability

In 2006 the 7th national design research congress (7th R&D Design) took place in Curitiba/PR, in which for the first time the theme "sustainability" appeared among the three with the highest number of entries, along with traditional topics of study in design such as Ergonomics and Graphic Design (VAN AMSTEL, 2006). Many of the works presented in that event resulted from experiences in DfS in the classroom. Since then, the presence of sustainability in the curricula of design courses has been increasing, either through the inclusion of specific disciplines or in a transversal way. Some institutions have been pioneers in this sense, and in Paraná the Federal University of Paraná (UFPR) was the first to put this theme in its undergraduate courses in a systematic way, about two decades ago. At the State University of Londrina (UEL) this insertion took place in the Design department, in the Graphic Design and Fashion Design courses, only from 2014 onwards. In that year, Graphic Design course carried out an integral reform of the curriculum, which started to offer in the 3rd year of the course two sustainability disciplines, one focused on environmental aspects of design and the other one dedicated to sociocultural issues in design (SAMPAIO, LOPES and ZERBETTO, 2014).

In 2016, due to an initiative of some Design department members, UEL became part of the first integrated action initiative of Brazilian universities for the production and sharing of knowledge in design for sustainability, the Lens-Brazil network, derived from the international network LeNS – Learning Network on Sustainability (http://www.lens-international.org). The LeNS network is currently made up of more than 150 universities from five continents, and the LeNS-Brazil network (www.lens-brazil.org) is a very active regional network in Latin America with open and collaborative spaces for learning in Dfs (LeNS Labs) in some of the Brazilian institutions which formed LeNS-Brazil, including LeNSLab UEL at UEL Design Department (https://sites.google.com/view/desin/lens-lab).

The Brazilian initiative has even promoted actions in neighboring countries, such as the translation and complementation of publications produced in Portuguese into Spanish. The ethos that guides these networks is the same: openness and collaboration, through the joint production of content that can be used and adapted by lecturers and researchers in design and related areas in different countries. One of these results

is the textbook on the environmental dimension of sustainability, which will be described later in this article.

Based on this rapid evolution, the design department at UEL, through its two courses, currently has a very active role in teaching and research on the DfS, with about ¼ of the professors developing research projects related to this theme, as well as participating in interdisciplinary sustainability research centers with professors from other knowledge fields of the university, such as Ninter (https://sites.google.com/view/ninter). This performance makes it possible for new knowledge about DfS to be constantly brought to the classroom, enriching the pedagogical practice. However, the Design department also faces difficulties in expanding the scope of the topic internally, since sustainability is not yet addressed transversally in the curriculum of the two courses, but only as isolated subjects. This means that there is still no comprehensive and integrated strategy for introducing the subject in the two courses that make up the department, Graphic Design and Fashion Design.

1.2. The experience during pandemics

The curriculum reform that took place in 2014 made it possible for the Graphic Design course at UEL to correct old didactic-pedagogical deficiencies, especially the fragmentation of disciplines and the excess of often disconnected activities, two common complaints from students in previous years. The curricula organization by integrated projects allowed for a more efficient and effective planning and use of the internal resources of the course and created operating conditions that later proved to be valuable with the outbreak of the Covid19 pandemic in 2020. As soon as the pandemic started, all courses from UEL had to readjust quickly to be able to work completely remotely, since the campus was closed for public health reasons in the middle of March 2020. This adaptation, carried out in a period of about 120 days, required adaptations in the class calendars, content revisions to adapt them for remote teaching, and the rapid learning of new information and communication technologies (ICTs) by lecturers and students, in addition to actions such as equipment loan and assignment of internet access packages by the state government for students with greater financial difficulties. In this way, in July 2020, classes were carried out completely remotely, using mainly Google platform resources (Classroom, Meet, Drive).

Considering that the curriculum of the Graphic Design course was already restructured based on the biannual integrated projects, one of the

biggest challenges was precisely to plan and execute them entirely remotely, for several reasons: the projects involved the articulation of different disciplines that should work synergically with the project; the projects demanded team meetings to monitor and guide the design process; the projects included practical activities of design research, prototyping and use of graphic software whose monitoring had always been done in person, and due to pandemics should be done at distance. When analyzing these needs, it became evident that the main challenges for lecturers consisted in planning and managing the projects, which should be done even more carefully, and that new tools would have to be sought to make these tasks viable.

Students would need a simplified, intuitive, easy-to-use virtual environment that offers resources for handling different types of files (pdf, doc, jpg, png, mp4, etc.) in the same virtual environment. After some research and tests, the Miro platform (www.miro.com) was chosen, a choice that proved to be the right one throughout the project. Another aspect that facilitated the planning of the project was the fact that the two subjects that composed it (Packaging Design and Design for Sustainability) were both under the responsibility of the same professor, author of this article. Another similar experience occurred later in 2021, together with four other lecturers in an integrated project of Visual Identity and Signage, that also proved to be equally viable and productive. The success of these two experiences highlighted the importance of careful planning and execution, combined with the commitment of professors and students, when developing integrated projects remotely.

The 2020 experience, presented here, had as its project theme a complex problem that emerged significantly in the Covid19 pandemic: the selective collection and recycling of urban solid waste, and specifically waste from food delivery packaging whose consumption increased during the pandemic in Brazil. Specifically in the city of Londrina, Paraná, where this project took place, several socioenvironmental aspects can be highlighted. With the beginning of the pandemic and the closing of restaurants, bars and the like, there was an increase in the consumption of food ordered for delivery, especially among social classes with medium and high purchasing power. As a result, there was, at first, a significant increase in the amount of waste in the collectors' cooperatives, leading to an initial overload of the system, as many collectors were away from work due to the pandemic.

However, a few months later, when the cooperatives had already normalized their activities, it started to occur a lack of material for sorting, a fact that intensified in the year 2021 due to the large number of informal collectors who began to collect material in the neighborhoods before the cooperatives. It is a complex social phenomenon, in which the pandemic ends up causing unemployment and people must look for other ways to survive. Another important aspect highlighted by the pandemic concerns to delivery packaging, that didn´t adequately meet the new needs brought about by the pandemic, according to studies carried out later by the students. They identified the need for a higher level of protection and safety, for workers and users regarding the risks of contamination, as well as environmental issues such as recyclability, biodegradability, or ease of reuse. All these aspects made up the context that justified the choice of this theme for the integrated packaging and sustainability project, whose experience will be reported below.

2.   METHODOLOGY

The methodology used in this article is the experience report, supported by a bibliographic review, graphic-visual records of the work process and testimonies of participating students. The experience report was organized based on the following steps: 1) Definition of the experience to be reported, 2) description of the experiment structure and 3) discussion of the results. The integration structure between the two disciplines covered the following steps:

•   Integrated planning of the two disciplines (Packaging Design and Design for Sustainability).

•   Definition of skills to be developed and other objectives.

•   Prior preparation of the schedule, stages, activities, and resources.

•   Prior training of students to use the resources.

•   Development, monitoring and guidance of activities.

•   Presentation and evaluation of results.

3.   RESULTS AND ANALYSIS

3.1.   Experience report: competences to be developed and other objectives

The experience reported here refers to the integration of two disciplines that are part of the 4th year of the Graphic Design course at UEL. The first one, Packaging Design, involves historical, sociocultural, environmental, technical, and economic aspects of packaging design, and seeks

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to train the student to develop a packaging project to apply knowledge in a design practice. The second, Design for Sustainability, focuses on environmental issues associated with the production and consumption of goods and services, relationship between sustainability and economic development, possibilities for action through design to reduce environmental impacts, and application of this knowledge to make better

design decisions. In this sense, and being responsible for the two disciplines, the author planned a unified project between them (Figure 1), thus optimizing time and efforts and enhancing the construction of knowledge in a pandemic context marked by several limitations and which required a rapid adaptation by lecturers and students to remote teaching

	AULA	C.H.	DATA	ATIVIDADES (6DGN181 DESIGN PARA A SUSTENTABILIDADE)	MÊS	AULA	C.H.	DATA	ATIVIDADES (6DGN155 DESIGN DE EMBALAGEM)	Livro LeNS - Dimensão Ambiental
AGO	1	2	29/07/2020	Recepção dos alunos/Planejamento/Atividade com lixo doméstico		1	3	30/07/2020	Recepção dos alunos/Apresentação/Planejamento/Miro	1) Compreendendo o problema - bases
	2	2	05/08/2020	Discussão sobre o lixo doméstico / causas dos impactos		2	3	06/08/2020	Apresentação/Conceitos/fundamentos/histórico	1) Compreendendo o problema - bases/causas dos impactos
	3	2	12/08/2020	Compreendendo o problema - causas e consequências	AGO	3	3	13/08/2020	Tipos / Funções / Finalidade / Utilidade / Classes de uso (B2B,B2C,C2C,B2G,G2G)	1) Compreendendo o problema - causas e consequências
	4	2	19/08/2020	Visita virtual à cooperativa/discussão sobre a visita		4	3	20/08/2020	Aspectos de marketing (5ª P), mercado e consumidor / Lançamento Projeto 1	1) Compreendendo o problema - consequências
	5	2	26/08/2020	Seminário		5	3	27/08/2020	Projeto de embalagem: Briefing / definição do tema / Pesquisa e análise do produto e similares	2) Compreendendo o que podemos fazer - conceitos e princípios
SET	6	2	09/09/2020	Ciclo de vida e estratégias		6	3	10/09/2020	Embalagem como serviço/aspectos de PSS	3) Implantação dos princípios - PSS
	7	2	16/09/2020	Diagnóstico ambiental de embalagem - ciclo de vida e checklist	SET	7	3	17/09/2020	Papel e cartão	
	8	2	23/09/2020	Diagnóstico ambiental de embalagem - acompanhamento		8	3	24/09/2020	Plásticos	
	9	2	30/09/2020	Diagnóstico ambiental de embalagem - definição das estratégias prioritárias e geração de ideias		9	3	01/10/2020	Diagnóstico de embalagem - definição do conceito de design (sistema e produto)	definir estratégias e sub-estratégias
OUT	10	2	07/10/2020	Entrega e apresentação: diagnóstico ambiental de embalagem		10	3	08/10/2020	Entrega e apresentação: diagnóstico de design da embalagem	
			14/10/2020		OUT	11	3	15/10/2020	PROJETO - geração de ideias de soluções (sistema)	
	11	2	21/10/2020	PROJETO - Redesign ambiental de embalagem (produto e serviço)				22/10/2020		
			28/10/2020	FERIADO		12	3	29/10/2020	PROJETO - geração de ideias de soluções (estrutura, forma e linguagem do produto)	
NOV	12	2	04/11/2020	PROJETO - Redesign ambiental de embalagem (produto e serviço)				05/11/2020		
			11/11/2020			13	3	12/11/2020	PROJETO - Redesign ambiental de embalagem (produto e serviço)	
	13	2	18/11/2020	PROJETO - Redesign ambiental de embalagem (produto e serviço)	NOV			19/11/2020		
	14	2	25/11/2020	ENTREGA & APRESENTAÇÃO: Redesign ambiental de embalagem (produto e serviço)		14	3	26/11/2020	ENTREGA & APRESENTAÇÃO: Redesign de embalagem (produto e serviço)	
	15	2	02/12/2020	Feedback da disciplina		15	3	03/12/2020	Feedback da disciplina	
	TOTAL	30				TOTAL	45			

Figure 1. Integrated Planning of the disciplines "Packaging Design" and "Design for Sustainability". Source: Elaborated by the author.

3.2. The integrated planning of the disciplines

The disciplines happen on two subsequent days to create continuity between them, thus avoiding dispersion of attention by the students. The two disciplines took place in parallel over four months, using different teaching resources organized in three main moments: 1) Theoretical and methodological foundations; 2) Environmental and market diagnosis of packaging; 3) Environmental, structural, and graphic packaging redesign. In this integration proposal (figure 1), the Packaging Design discipline provided an adequate theoretical-practical contribution, a concrete and specific object of study (delivery packaging) and a process of understanding and solving the problem (design process applied to packaging); on the other hand, the discipline of Design for sustainability brought theoretical and practical subsidies for the

discussion of environmental issues, first in an expanded context (global, national) and then with a focus on the specific object (delivery packaging in the city), and also environmental instruments for application in the project.

3.3. Didactical-pedagogical strategies

In this integration experience, the following didactic-pedagogical strategies were used:

• Lectures and dialogue using the Google Meet platform, to present the main concepts, fundamentals, and principles of the two disciplines; Here, we sought to avoid the use of slides with excess text, favoring instead the use of significant images and concrete examples that illustrate each content presented, which proved to be more attractive to students, stimulating participation and discussion by students. part of them.

• Guided readings of chapters from the textbook "Design for Sustainability: Environmental Dimension", followed by seminars for presentation and discussion in teams (doubles).

• Practical activity of collecting, storing, categorizing, quantifying, and photographing their own household waste for a few days by the students, followed by the presentation and discussion of these results. This activity proved to be valuable in bringing the theory closer to the students' concrete reality, allowing them to see themselves as an integral element of the problem, and not only as external observers.

• Interview via Google Meet with the director of a cooperative of collectors in the city, in which students were able to talk directly with her to learn more about the reality of workers who work in the selective collection of recyclable materials, and about the situation of packaging of delivery discarded by the population that arrived at the cooperative daily.

• Students choose a theme package for the development of a redesign, considering the environmental, social, economic, and technological aspects identified and discussed above.

• Preparation and presentation of a qualitative environmental diagnosis of the chosen packaging, using tools presented by the lecturer, to identify points for improvement, most problematic life cycle stages and life cycle design strategies to be applied in the project.

• Project activity of redesigning the chosen packaging, considering the sustainability issues previously diagnosed, but also technological, marketing, functionality, usability, and safety issues for users, including workers who work in the system (e.g., attendants, couriers).

• Presentation and defense of final projects remotely by the student teams, through Google Meet and the Miro platform.

3.4. Remote management of the process

Due to the pandemic, one of the biggest difficulties faced by lecturers of the Graphic Design course at UEL was to find a way to plan, develop, monitor, guide, monitor and evaluate activities, especially those of project nature, in a totally remote way. The realization of projects remotely in courses such as Design, Architecture and Urbanism still represents a great challenge for these courses, which have in the physical presence of the lecturer in the classroom and in the proximity to the students some of the most important elements of their pedagogies.

Overcoming this challenge to guarantee a minimum level of quality in communication has been one of the biggest challenges faced in the situation here described. On the other hand, there are already several resources for planning and managing projects remotely, especially with the use of Information and Communication Technologies (ICTs) and the internet, and which are used by several organizations for the development of projects that involve multi- and interdisciplinary teams in which members are in different locations, and even in different countries.

Online project management tools (e.g., Trello, Asana) are essential in this regard, but for their effective development there is another type of tool that can make the work of designers and architects viable: the so-called "online whiteboards". In recent years, due to the increase in the development of collaborative projects at distance, a wide variety of tools of this type have emerged, including Ayoa, GoToMeeting, ConceptBoard, Twidla and Miro, just to name a few (VOIPREVIEW, 2021). For the development of this integrated project, we used Miro, a very complete and stable platform that, despite having paid packages, offers to lecturers a free possibility of creating multiple whiteboards for different work teams, limited up to 100 users. A specific space (Project) was created on this platform for the integrated project, and within these projects nine project spaces (boards), one for each pair of students (Figure 2)

The use of the Miro platform made it possible for the lecturer to monitor the activities carried out by the teams in a completely remote way and in real time, making suggestions and additions directly on the boards when necessary, and at the same time dialoguing with students through Google Meet. This combination created conditions for a more dynamic, efficient, and simplified interaction between the lecturer and the class, thus reducing the risk of loss of involvement and motivation inherent to remote work.

One aspect of adopting these digital platforms is to provide at least one class to guide students on the correct way of use, which was done in the first week of class, so that students had time to adapt to the platform, test it calmly, and thus be able to use it when the packaging diagnosis stage was started.
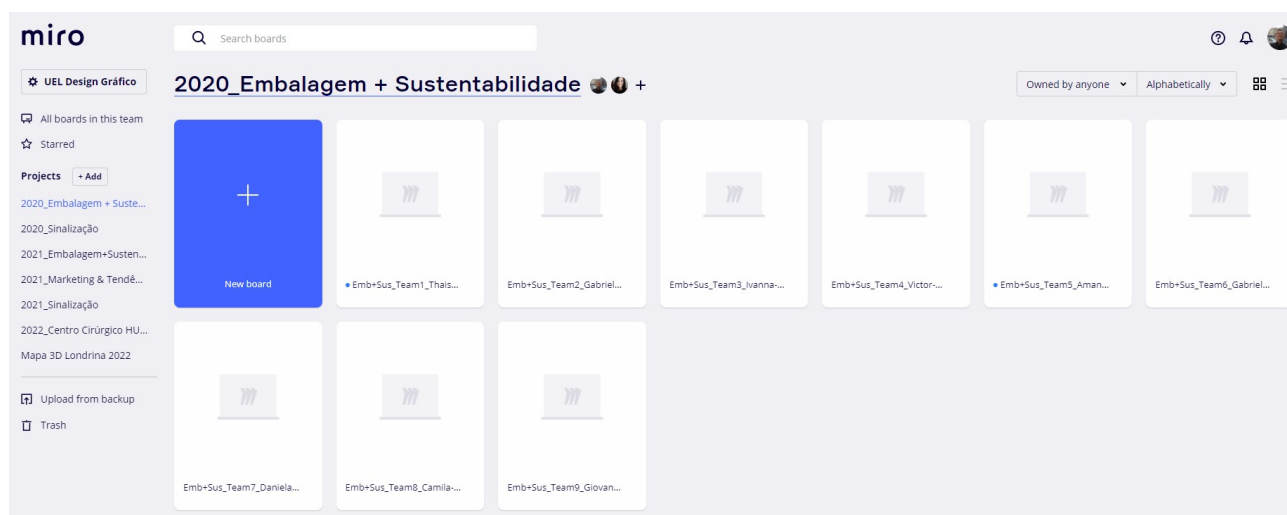
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Figure 2. Workspace of Miro platform, with the project place (Project) "2020_Embalagem+Sustentabilidade" and related boards for each student's team. Source: Elaborated by the author.

Another important element of this process concerns the official communications of the two disciplines and the availability of support material for students, which was done through the Google Classroom and Google Drive platforms; thus, all communications made by the lecturer were sent directly to the students' e-mails, reducing the risk of information loss. Therefore, the combined use of these resources – Google Classroom, Google Drive, Google Meet and Miro – was essential for the successful integration of the two disciplines.

3.5.   First stage and the textbook

The textbook "Design for Sustainability: Environmental Dimension" (SAMPAIO et al, 2018) was used as a structuring element of the first stage of the integrated project, with a more theoretical emphasis, but also to guide design choices in the next stage. It is a book produced under in an open and collaborative way by Brazilian researchers who are members of the LeNS Brazil network and is an open license (Creative Commons) publication available for free download (https://editorainsight.com.br/produto/design-para-a-sustentabilidade-dimensao-ambiental/). The book uses the following structure:

• Chapter 01 - Understanding the environmental problem: historical and theoretical bases, causes of environmental impacts and environmental consequences.

• Chapter 02 - Understanding what we can do: concepts and principles.

• Chapter 03 - Implementation of the principles of the environmental dimension of design for

sustainability: Overview, the role of stakeholders and associated strategies.

The theme of chapter 01 was complemented with practical activity with the household waste itself and with an interview with the director of the collectors' cooperative, which brought the students closer to the concrete reality of the problem. From the reading of this book, the students prepared and carried out in the fifth week of class seminars to present and discuss the readings, complementing them with concrete examples of reality, which resulted in a very rich and participatory process.

The incorporation of what the designer can do, through concepts and principles (Chapter 02 of the book) and implementation forms (Chapter 03) was operationalized in two main ways: 1) in the form of life cycle strategies that were chosen by each team in the diagnostic stage of the packaging they chose, and guided the subsequent design stage; 2) in the form of business strategies that each team proposed as a reference for the packages they developed, whether they focused on the product or on the system in a broader way. Teams were free to choose the strategic path they preferred if they justified these choices later.

It can be seen in figure 1 that the contents of Packaging Design were worked simultaneously with the contents of sustainability so that, when the students started the packaging diagnosis stage, they already had a minimum knowledge about typology, function, purpose, utility, classes of use, marketing and briefing that support a packaging project. In addition, together with the environmental diagnosis of the packaging, basic contents were worked on the main types of materials (cardboard, paper, plastics, glass,

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metals) and packaging manufacturing processes, to complement the students' knowledge, since the course focuses mainly on Graphic Design, not Product Design.

3.6. Environmental assessment

For students to be able to environmentally assess the delivery packages chosen and thus make more assertive design decisions, the lecturer provided to the students a simplified document of qualitative tools, derived from two main methodologies, D4S (D4S, 2021) and MEPSS (MEPSS, 2021). These tools are:

• Life cycle diagram of the current packaging, to facilitate the visualization of the life cycle of the packaging under analysis, and identification of any critical steps.

• Business sustainability drivers, to identify the most relevant internal and external social, environmental, and economic drivers for the business under analysis.

• Simplified environmental sustainability checklist for packaging, to identify possible points for environmental improvement.

• Inventory of current packaging materials, to identify quantitative aspects (volume, weight, materials) of the packaging under analysis.

• Life cycle strategies wheel, to define the preferred strategies that will guide the redesign.

• List of enhancements, to identify environmentally poor solutions in the analyzed package and smart solutions in competing packages.

• Sustainability Guidelines, an extensive and detailed list of environmental, social, and economic guidelines and heuristics that can be used to complement chosen life cycle strategies.

3.7. Student's activities development, supervision, and orientation

As soon as the seminars were finished, the teams started using the Miro platform from the 5th week, with the preparation of the briefing, research of points of sale, analysis of similar products and creation of the target audience persona (figure 3). It was possible to note a very fast incorporation by the students, who in a short time were already using the platform easily. From the 7th week onwards, several teams had already inserted and filled in the qualitative environmental diagnosis tools provided by the lecturer in the 6th week (example in figure 4), which once again showed the rapid incorporation of both the content worked in class and the use of the platform.

The constant monitoring of these activities by the lecturer also allowed a quick correction in the planning of teams that eventually had some delay in the progress of activities, and, with this, all teams were able to complete the diagnosis stage on the pre-defined date (10th week) in the schedule of the disciplines (Figure 1). As a result, it was possible to dedicate seven weeks exclusively for the development of projects, which, added to the weekly monitoring of the boards, resulted in projects with high quality, both in terms of packaging, service and strategic aspects of business, brand, and positioning.
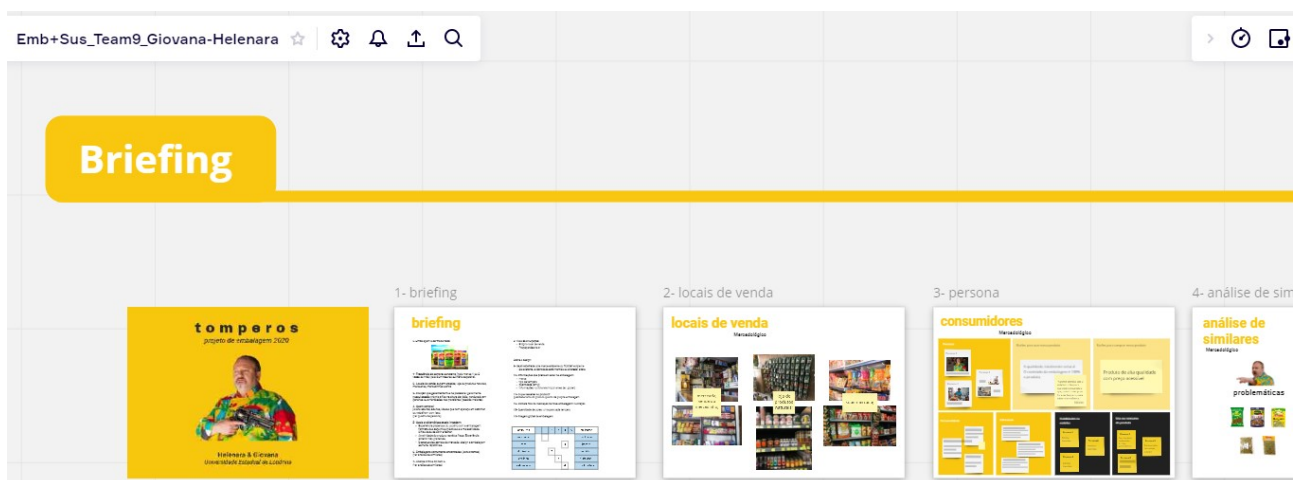
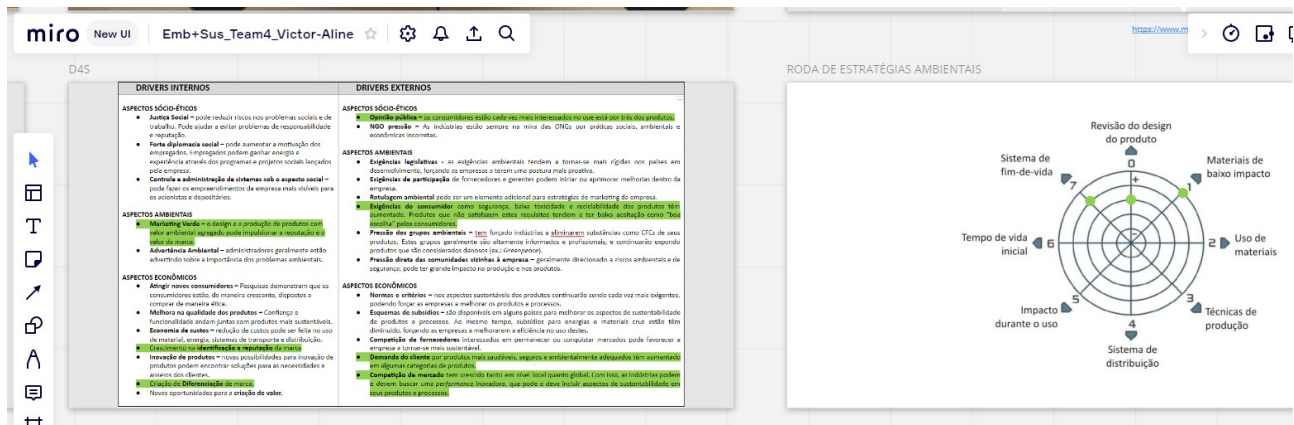**Figure 3. Board of team 9 with briefing content. Source: https://miro.com/app/board/o9J_koJ6-mo=/.**

Figure 4. Board of team 4 with part of environmental assessment (simplified checklist and life cycle strategies wheel). Source: https://miro.com/app/board/o9J_koJ-238=/.

3.8.   Process and results evaluation

About the process, an aspect to be highlighted is the quality and diversity of content produced at the end of the projects, in which it is even possible to perceive different cognitive strategies in the treatment of information. As examples, one of the teams (figure 5) chose to separate the elements of the research stage (left side of the figure) from the design (right side of the figure, with gray background) to expand the design proposal development process, both graphic and structural packaging
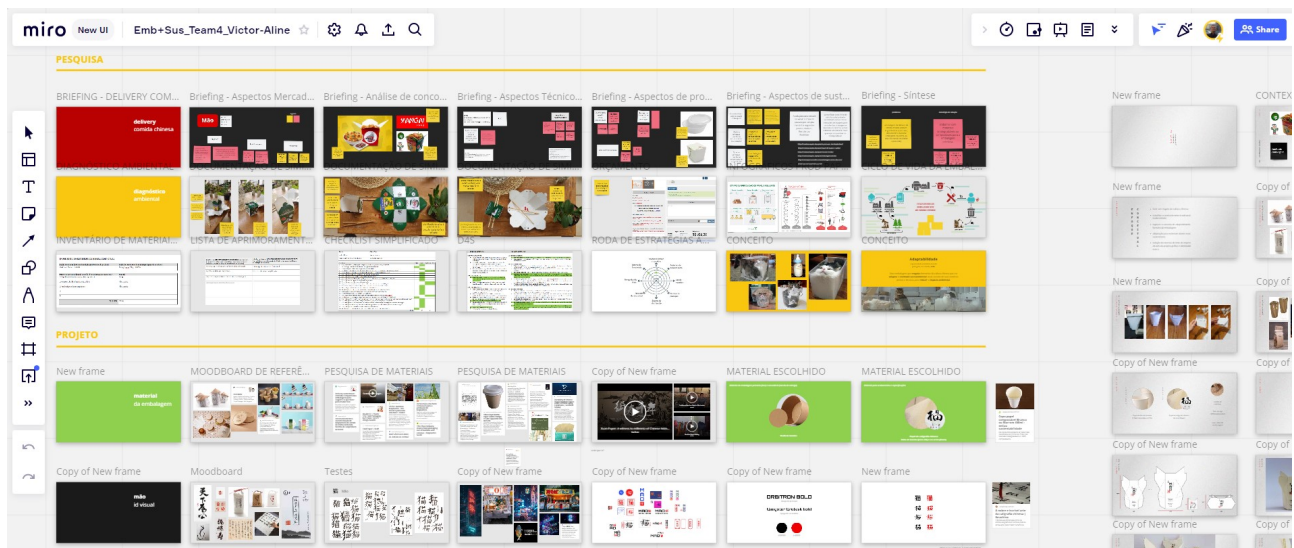
Figure 5. Board of team 4 with the final set of frames. Source: https://miro.com/app/board/o9J_koJ-238=/.

The team in Figure 6, in turn, chose to create groups of distinct frames for understanding the problem, environmental assessment, development (subdivided into service, packaging and graphic communication) and final presentation. Such differences point to different work processes, evidencing different dynamics for each team, but all equally valid in terms of results.

Regarding the results, two main aspects should be highlighted, each related to one of the disciplines. As for the packaging itself, it was possible to perceive the high quality of the proposals presented, both structurally and graphically, further enriched by strategic marketing proposals that included suggestions for expansion through related services, positioning and visual identity developed especially for the project.
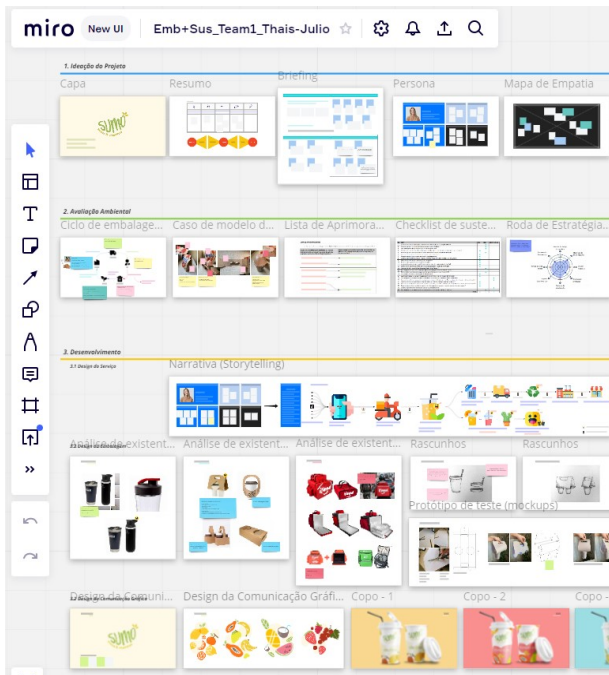
Figure 6. Board of team 1 with final set of frames. Source: https://miro.com/app/board/o9J_kpz6ugo=/.

Among those that stood out the most in this aspect are the packages developed by teams 1, for the delivery of natural juices (figure 7) and team 2, for the delivery of Japanese food (figure 8).

Figure 7. Digital model of team 1 for natural juices delivery packaging. Source: https://miro.com/app/board/o9J_kpz6ugo=/.

Figure 8. Paper prototype of team 4 for japanese food delivery packaging. Source: https://miro.com/app/board/o9J_koJ-238=/.

Figure 9. Digital model of team 6 for artesanal coffee packaging. Source: https://miro.com/app/board/o9J_koJ6BdA=/.

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Figure 10. Digital model of team5 for food (marmitex) delivery reusable packaging. Source: https://miro.com/app/board/o9J_koJ6BTg=/.
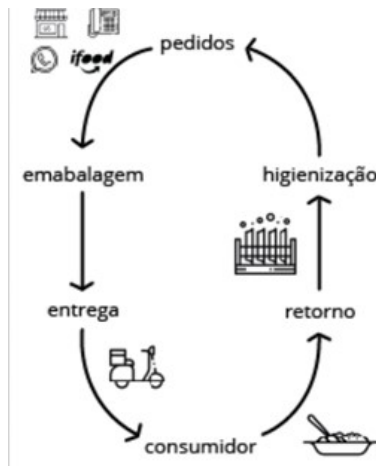
Figure 11. Digital model and service flow of team 5 for food (marmitex) delivery reusable packaging. Source: https://miro.com/app/board/o9J_koJ6BTg=/.

Figure 12. Paper model of team 8 for fast food reusable packaging. Source: https://miro.com/app/board/o9J_koJ6-mQ=/.

As for sustainability issues, the teams' work is highlighted by the judicious choice and application of environmental strategies (and in some also social proposals, although not mandatory) that guided the project. For example, in the case of foods where material recycling was a problem, as in the case of BOPP film in coffee packaging, a team proposed replacing this material with kraft paper with a minimum of printed area (team 1, figure 9); in the case of foods in which fat contamination makes recycling impossible, another team proposed the use of a returnable food packaging (also known as "marmitex") system (team 5, figures 10 and 11). A third team proposed the reuse of fast-food packaging to encourage the cultivation of plants, in a strategy combined with the use of an application to increase user participation in the use and disposal experience (Figure 12 and 13).

Figure 13. Instructions for use of team 8 for fast food reusable packaging. Source: https://miro.com/app/board/o9J_koJ6-mQ=/.

Finally, it can be considered that the didactic-pedagogical approach adopted in this interdisciplinary experience was adequate, efficient, and effective, not only due to the results obtained that were previously presented, but above all from the feedback obtained from the students themselves during and at the end of the process. The following comments done by some of them corroborate this perception:

"Even being a design discipline, the theoretical treatment was very rich, and I was very happy with that" (Student of team 8).

"My perception of environmental and health issues has expanded a lot with this project, and I saw that we can help to promote some changes, but I also understood that not everything depends on us as a designer" (Student of team 4).

"I really enjoyed the whole process, it was very pleasant despite being tiring, and Miro was essential for us to be able to work well as a team" (Student of Team 2).

"Currently I am already using this platform (Miro) in my job as well, because it makes the work a lot easier (Student of Team 8).

"Knowing the reality of the collectors cooperative and the risks they run in the pandemic was one of the most important things for me, it changed my way of looking at my own the garbage" (Student of team 5).

"I just think these two subjects should have come earlier, instead of being in the fourth year. Maybe my Final Graduation Project would have been another topic if it had come earlier, because I really enjoyed designing packaging with this

environmental concern together, I saw that you can make a good product without neglecting environmental and health issues with the pandemic" (Student of the team 6).

4. CONCLUSION

We conclude this article by emphasizing the importance of seeking more adequate solutions for the issue of packaging, and especially those aimed at delivery, a topic that became even more relevant with the outbreak of the Covid19 pandemic last year, and which still affects the world and specifically Brazil. We also conclude with the perception that it is possible, even in an exceptional context such as this pandemic, to carry out an efficient, effective, and satisfactory didactic-pedagogical process for students, if some aspects are carefully considered. Among these aspects, it is worth mentioning:

• careful planning, with a clear definition of the objectives to be achieved and the skills to be developed in students.

• the careful preparation of classes and support materials, including the selection of the most appropriate readings and their distribution among the teams.

• the emphasis on collective, collaborative, open and shared learning, while also considering individual assessments, even when students work in teams, to correct asymmetries.

• articulation with external actors to bring significant contributions to the process, as in the case of interviews with the collectors' cooperative.

• using personal experiences to complement theory and make sense of it.

• the use of didactic resources built in an open and collaborative way, as in the case of textbooks.

• adequate time allocation for the research and diagnosis stage (four weeks) to give more depth to the collection and analysis of information that fed the project.

• the provision of a structured environmental assessment tool that facilitated students' understanding and application.

• encouraging volumetric experimentation with materials (mainly paper) in the making of mockups and models, even if they are made in the students' own homes, and the photographic record of this process.

• carrying out project follow-ups every week, through the Miro platform, which ensured more frequent contact with students, avoiding dispersion.

• the freedom in the way of organizing information by each team, which resulted in a greater variety and richness of ways of using the boards by each one of them.

Thus, we hope that sharing this experience can help other design lecturers to improve their own didactic-pedagogical experiences in teaching design, and specifically DfS and packaging design with environmental concerns, especially through collaboration and openness of content and experiences. The more we share our experiences, especially in critical moments like these, the faster we will learn from each other and the faster we will find answers to the challenges that have arisen, and to which design is called to contribute, more than ever.

REFERENCES

D4S. Available at <https://www.d4s-sbs.org/d4s_sbs_manual_site.pdf> Accessed on 20 jun. 2021.

DE SAMPAIO, Cláudio P. **Design para a sustentabilidade:** dimensão ambiental / Cláudio P. de Sampaio [et al.] - Curitiba, PR: Insight, 2018.

MEPSS. Available at <https://www.mepss.nl/handbook_part2/THE%20MEPSS%20METHODOLOGY/index.html> Accessed on 20 jun. 2021.

SAMPAIO, Claudio P.; LOPES, Camila S.D.; ZERBETTO, C.A.A. A experiência de reforma curricular do curso de design gráfico da UEL. **Revista Projética**, v.5 n.1, 2014. Available at <http://www.uel.br/revistas/uel/index.php/projetica/issue/view/970> Accessed on20 jun 2021.

The 12 Best Online White*board* Collaboration Software of 2021. **Voipreview**, 2021. Available at <https://www.voipreview.org/online-*whiteboard*-collaboration> Accessed on20 jun. 2021.

VAN AMSTEL, Frederick M.C. 7° P&D Design: um grande evento. **Blog Usabilidoido**, 2006. Available at <http://www.usabilidoido.com.br/7_pd_design_um_grande_evento.html> Accessed on20 jun. 2021.

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