Interdisciplinary in design under a collaborative work model mediated by ICT's

Interdisciplinariedad en el diseño bajo un modelo de trabajo colaborativo mediado por las TIC's

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◈ Abstract

This research is carried out in an interdisciplinary model of groups belonging to different specialties: Graphic Design; Design, Art and Interactive Technologies and, Industrial Design of the University Center of Art, Architecture and Design of the University of Guadalajara. Under collaborative work and with the theme *amusement park* from their own disciplinary field, with different times and processes, the members gave rise to the graphic proposal, the name and the theme of the amusement park, which takes up the concept developed by the Graphic Design group with the purpose of generating a proposal for furniture and product from a representation technique. Each group presented their results through an integrative project with different pieces that were created in an interdisciplinary and collaborative work in which the use of ICTS was the backbone. The results of each process and the analysis of the applied study are shown.

◈ Resumen

La presente investigación se realiza en un modelo interdisciplinar de grupos pertenecientes a distintas licenciaturas: Diseño Gráfico; Diseño, Arte y Tecnologías Interactivas y Diseño Industrial del Centro Universitario de Arte, Arquitectura y, Diseño de la Universidad de Guadalajara. Bajo el trabajo colaborativo y con la temática parque de diversiones temático desde su propio campo disciplinar, con tiempos y procesos distintos, los integrantes dieron lugar a la propuesta gráfica, al nombre y a la temática del parque de diversiones, que retoma el concepto que desarrolló el grupo de Diseño Gráfico con la finalidad de generar una propuesta de mobiliario y producto a partir de una técnica de representación. Cada grupo presentó sus resultados por medio de un proyecto integrador con distintas piezas que fueron creadas en un trabajo interdisciplinar y colaborativo en que el uso de las TIC's fue la columna vertebral. Se muestran los resultados de cada proceso y del análisis del estudio aplicado.

Keywords: Interdisciplinarity, design, collaborative, ICTS, learning

Palabras clave: *Interdisciplinariedad, diseño, colaborativo, TIC's, aprendizaje*

Introduction

Collaborative work and mostly interdisciplinary work under a departmental model, as is the case at the University of Guadalajara, lacks support or strategic planning for its execution, hence what favors its realization is the will and organization between academic peers. They are the ones who must coincide on days and schedules to be able to interrelate, which appears as an obstacle to executing this type of work. Hence, the time-place factor was used as essential to carry out the project and the use of Information and Communication Technologies was chosen (ICTS) as a fundamental tool for this.

The application of this research aims to recognize, through a learning-teaching methodology and the support of information technologies, the use of new technologies to act in an interdisciplinary manner in the development of a project. There, teachers and their respective students participated from the educational programs of: Design for Graphic Communication, Industrial Design and Design, Art and Interactive Technologies. And it was based on the hypothesis that: the participation of interdisciplinary projects strengthens the identity of each of the educational program and generates methodological synergies, where the knowledge and use of technologies serves as the axis of academic articulation. This is in line with what is stipulated by Barrientos-Cabezas, Arriagada-Pérez, Navarro-Vera and Troncoso-Pantoja (2020), for whom multidisciplinary work generates a didactic strategy that helps active learning, increases collaborative work and communication between the actors.

Method

One of the main goals of interdisciplinary work is the use of tools and methods that promote this connection in the work of the teams. For Bruna-Jofré, Gutiérrez-Henríquez, Ortiz-Moreira, Inzunza-Melo and Zaror-Zaror (2022), activities that promote collaborative work must be based on five essential points:

- Promote the adhesion of the working group,

- Include active learning,

❖ Present and validate collaborative work,

❖ Promote communication in feedback processes,

❖ Promote reflection on performance and use generic and disciplinary competencies in real contexts.

The use of theTIC's in the teaching and learning process can promote a growth in the interest of the investigative attitude, also associated with processes of inquiry and search for disciplinary knowledge that teachers apply in the methods used in the classrooms (Álvarez-Sampayo, Sarmiento -Guevara and Amaya de Armas, 2021).

For Aparicio-Gómez (2019), interdisciplinarity is favored by the use of TIC's when there is incremental use of these technologies, and awareness in their implementation favors learning and interdisciplinary work.

By having the criteria and methods to critically access information through information and communication technologies, whether through tools such as Google search, image banks, use of communication elements such as WhatsApp groups and tools for design, transcendental information can be filtered with experience and used for the benefit of common work.

In this research, a method of information search and collaborative interaction was carried out between different work teams from various disciplines in the areas of Graphic Design and Industrial Design, which, through information and communication technologies, worked together to generate an interdisciplinary integrative project. The effectiveness of the use of the ICTS both for communication between disciplines and for the development of the project in each area, and was documented through surveys applied to students from the various participating groups.

Description of the context and participants

To carry out this research, the students of the degree in Design for Graphic Communication (DGC) carrying out a project-based learning exercise, in which a brand design proposal for a theme park was carried out that included the definition of park areas, products and materials, points of sale for external promotion and other points for sale of products within the park.

The group of the thematic unit Graphic Design Projects II, which is mostly fourth semester students, participated with 16 students divided into teams of four people. Over the course of three sessions—with a load of 10 hours per week of the 22A school year—the group developed the amusement park theme under three guiding projects: it began with the definition of the theme, the name and the proposal of brand, later continued with products and services, until reaching the conceptualization of

an ephemeral store and the definition of points of sale and information of the park.

The Industrial Design group that participated through the learning unit Design of Urban Elements, with four hours per week, had a total of 12 students, mostly from intermediate semesters (fourth and seventh). It is important to mention that the participants of this group joined voluntarily once they were exposed to the project, which already had a definition of 40% of the conceptual stage and progress in execution.

On the other hand, the students of the Product Modeling Learning unit of the degree in Design, Art and Interactive Technologies, in the third semester, were the last to be included in the project. 25 people participated.

Procedure

To carry out the project, the students of the DGC In the learning unit Graphic Design Projects II, taught in the fourth semester of the academic route, they made a series of project sheets presented on the platform called Classroom, a tool created by Google for the administration of educational work with the collaboration of students and teachers. To achieve this, we worked in several stages that consisted of:

1.- Research, diagnosis and creation of an amusement park brand project for a specific market segment, recognizing the particularities of the advertising message and the characteristics of printed graphic pieces. At this stage, different ICTS, such as information banks (Google) and websites (Pinterest), among others, were used.

2.- Development of a family of products which started from the design of the sub-brands of an Umbrella Brand until reaching the design of labels and their application in three-dimensional objects for the promotion and sale of the products and/or services of a company, corporation or institution. For this stage and the point described below, design programs were applied, mainly Illustrator, from Adobe, as well as reference sources for inspiration and information on the state of the art, such as Pinterest and Google.

3.- Development of point-of-sale materials for advertising, promotion and sale of products and/or services for the development of the project. At this point it was a requirement that each team develop the following:

a) Box office.

b) Motley / 3D character.

c) Stand to promote the park in a shopping plaza.

d) Information module (Stand).

e) Point of sale material appropriate to the needs of each sub-brand.a) Box office.

It is important to mention that, for each development and intervention, in addition to the learning objective, the linking and use of technology was considered to contribute to the development of the proposals, as well as to serve as a communication instrument between the groups of the different degrees. Thus, the groups of students and teachers established the communication channels that they considered appropriate, whether it was the use of a drive storage unit to share information, WhatsApp instant messaging or, in a very spontaneous way between teachers, phone calls or messages. of voice, as well as the observation of the research and creation process from the point of view of the use of technological tools.
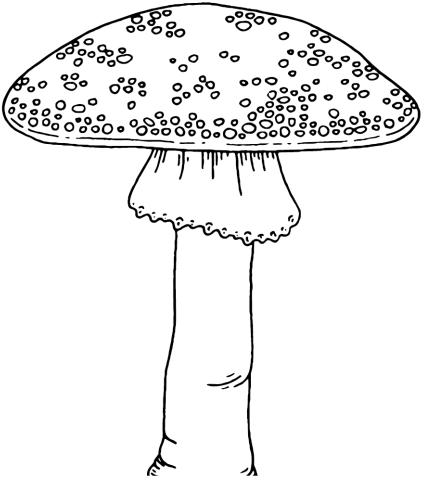
The support tool to provide the teachers of the other degrees with the material to start the project was the shared file platform and Google Drive, which was defined as the communication channel to transfer the information, this due to the weight of the files, the ease with which it has remote access and its storage capacity.

This tool (through the Classroom platform) was used, for example, in the periodic submissions of the theme park proposals made by the Graphic Design Projects II teams, who also shared their ideas in person in class with the groups. of Urban Element Design and Digital Product Modeling so that they, in turn, carried out their intervention and contribution based on the conceptualization or products defined by the graphic designers.

The files presented consisted of a brand manual (see figure 1) and a brief of the design (see figure 2) that were requested by the degree in Industrial Design and that served as a link and means of information to explain the project prior to any other communication.

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Imagotype

Delirium World.

The image consists of an illustration of a mushroom with sparkles as the main hierarchy, using typography in line with the theme of the amusement park.

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Figure 1. *Partial display of the brand manual: Delirium World park. Source: self-mad, elaboration based on the project of the student Mariano Paolo Trejo Falcón.*

Brief de diseño
Master Brief

Category	- Universe Spark Amusement Park
Product name	-Artemis Restaurant - Andromeda Arcade
Product description and formats	Artemis Restaurant: a family recreational space where you can use the facilities to rest and eat, which meets the theme of the restaurant (a restaurant that is on the surface of the Moon) Andromeda Arcade: it is a retro environment, in which sufficient area is needed for virtual recreational machines, a socialization area and a prize area.
Background	Brief description of the results of rhetorical intellect. (Rhetorical situation, identified problems on which the persuasive strategy will act, etc...)

Guadalajara is a city that could benefit from a youth amusement park with high-adrenaline attractions, thanks to the fact that the public currently decides to leave the city and spend money on trips, hotels and tickets to other amusement parks with similar attractions. By creating an amusement park in the city we give the city the opportunity to grow economically, with a public that does not have the opportunity to enter this type of park on a recurring basis.

Positioning writing

Target: which groups do we want to persuade? It is written from:

Hypotheses about the demographic segment:
- Artemis: family restaurant for all age ranges of a medium-high economic level. Mostly Mexicans.
- Andromeda: young people between 16 and 22 years of age from a medium-high economic level. Mostly Mexicans.

Hypotheses about the psychological characteristics of the user:
- Artemis: they like exotic, fast and fun food, new experiences, and the themes within their restaurants.
- Andromeda: a deep taste and interest in video games, in the retro environment, in modern virtual reality experiences.

Research on motivators of use of the design category:
- Artemis: they seek to have family gatherings in a space themed around the theme, where there are unusual drinks and foods.
- Andromeda: they want to have a community environment where they can play together, earn points, and have fun in a healthy way

Frame of reference: in which category will the design compete?
Definition of the category in which the design will be registered:
- Artemis: restaurants.

	Target motivations.
	- Artemis: familiar, fantastic, cosmic, whimsical. - Andromeda: retro, energetic, fun, cosmic.
Design specifications	**Design objectives:** - Artemis: transmit in a fun way the lunar theme of the restaurant, complying with the concept of family and crave worthy. The Artemis elements must include a food area and a room or waiting area, with white acrylic material, where the seats contain a pleasant backrest for the comfort of the visitors both when eating and when waiting. - Andromeda: the retro theme should be considered and dark spaces will be used to give emphasis and gravity to video games, it is important to create fun and energetic spaces. Have a break room with metal tables and seats (reflective aluminum), with backrests and comfortable seats of different colors for visitors.
Considerations	- Artemis: the mixture of elements of a spatial aesthetic from the 80´s must be taken into account, mixing both benches, tables and armchairs, in which it is considered a family space. Make it a well-lit space that not only uses warm colors in its lighting and that mixes the different colors of neon light around the restaurant. - Andromeda: keep in mind that Andromeda's retro design can take on modern elements and changes to classic colors.
Mandatory	- Artemis: use safety measures for children and people with disabilities at the tables of the establishment, maintain the retro-futuristic aesthetic, make it a large and closed space. - Andromeda: use safety measures for both minors and people with disabilities, maintain sufficient lighting in the place so as not to cause eye strain, and make sure the place is spacious.

- Andromeda: arcades.

Differentiation point
- Artemis: the theme of being on the Moon
- Andromeda: the virtual reality area with free access.

Reasons to believe: what will make it credible that the design can satisfy the motivation of the target?
- Artemis: it will satisfy them because the theme is connected with the dishes and the park, managing to connect everything and adding immersion.
- Andromeda: combine retro and space themes in a single recreational environment and give a unique identity to the game room.

Design Personality
DefinDefine the adjectives that will give personality to the design. They must be congruent with a hypothetical image of "what type of personality would be empathetic withir
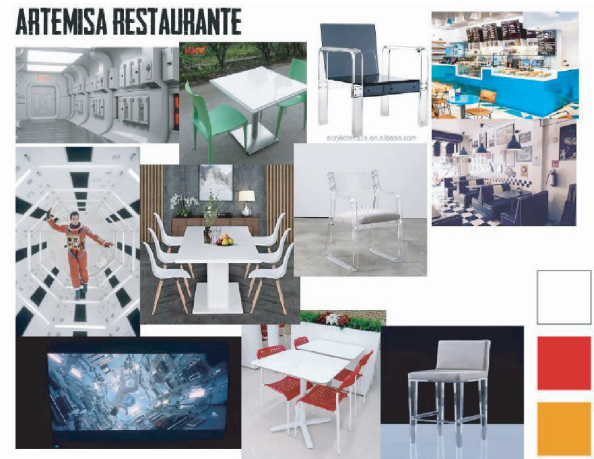

Figura 2. *General display of brief of design.*
Source: self made.

After the presentation and the teacher's instructions to the Industrial Design degree group, there was a first face-to-face communication between some of the members of the Graphic Design teams and the Industrial Design group; However, the difference in availability in the schedules between the members of the groups made it impossible for everyone to be present to resolve the first doubts. Once the first approach was carried out, the students began to communicate through messages via the WhatsApp application, resolving questions about requirements or complementing the brief that had been delivered.

The Urban Elements Design group intervened with the development of furniture proposals for a certain area of the amusement park, based on the concepts and requirements provided by the Graphic Design Projects II group. As a result of the work based on the conceptual process and with the use of a software of industrial design, the group issued various proposals, such as furniture for a rest area in the Universe Spark park; benches for a food area; and umbrellas, lights and trash cans for another park: Delirium World (see figure 3).
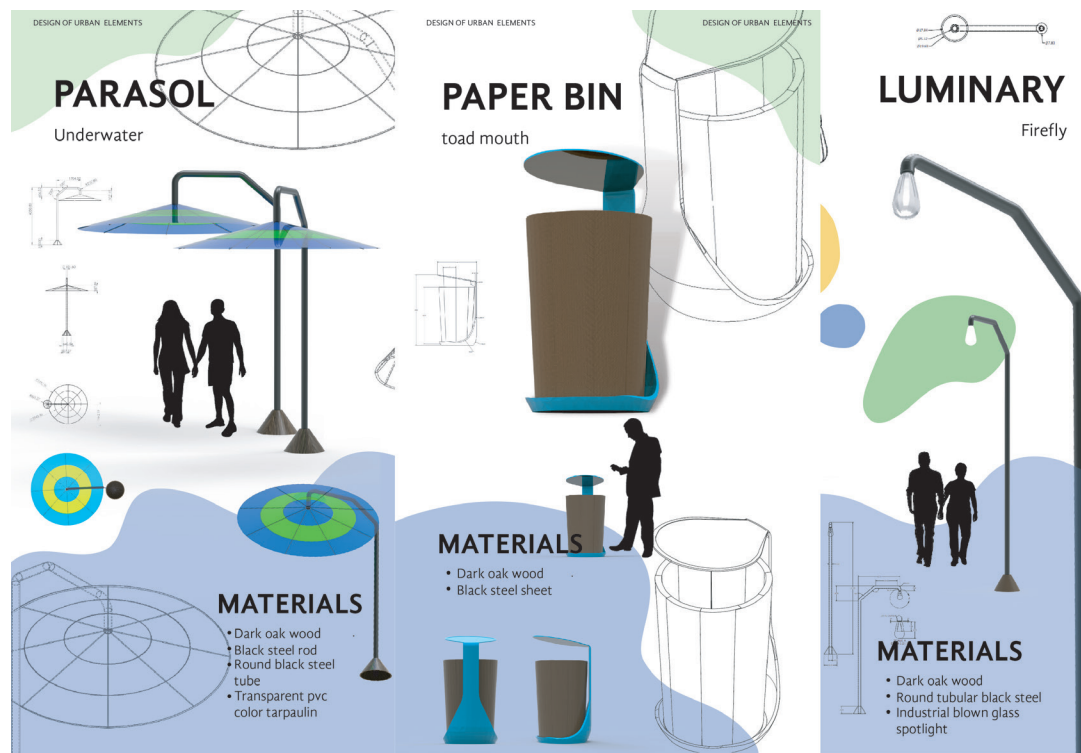

Figure 3. *Design proposal for urban elements for the Delirium World park. Source: Own elaboration based on the project of the students Liliana Mendoza Torres and Reyna Velázquez Dueñaz.*

In the interdisciplinary approach adopted by the Digital Product Modeling Group within the framework of the degree in Design, Art and Interactive Technologies, the group focused on the creation of point-of-sale materials based on the graphic designers' previous projects. The projects, provided by the teacher through an online platform (Google Drive), were assigned to the corresponding teams, marking the beginning of a transdisciplinary collaboration.

The professor presented each of the projects related to theme parks to the Digital Product Modeling group, outlining the expectations for the development of products in 3D modeling. Autodesk Maya modeling software was selected as the main tool, as it drives the creation of realistic images with the Arnold rendering engine (see figure 4). This rendering engine, recognized for its quality and prevalence in the 3D modeling industry, was used to infuse visual authenticity into the creations.

Figure 4. *Results of Mayan modeling of the Astrodiaco Park project. Source: Project of students Magaly Nohemi Lopez Jacinto and Samantha Yanez Tanaka.*

Each team received specific instructions, adapted to the particularities of the projects assigned to them. Direct contact between students and project representatives was facilitated through communication platforms such as WhatsApp. This open communication turned out to be crucial to resolve uncertainties and clear up doubts that could not be answered by the teacher. Furthermore, the interaction between 3D Modeling and Graphic Design students fostered a mutual understanding of the product development process, generating an effective synergy between both disciplines (see figure 5).

Figure 5. *Results of Mayan modeling of the Radical Land Park project. Source: Project by students Jorge Rojas, Natalia Durán, Miroslava Torres and Miguel Ángel Sagrero.*

It should be noted that, for all the creative processes of the three participating groups, the search for information, documentation on the topic of the project and visualization of its state of the art were essential. For this, it was important to consider the ICTS as a source of consultation and support to be able to generate proposals that are not only current, but also have theoretical support and conceptual background, since, as Belloch (2012) points out, the ICTS present an influence on the mental processes carried out by users to acquire knowledge more than on the acquired knowledge itself.

◈ **Results**

Through the responses in the surveys carried out with the students of the different study plans, results were identified that had a focus on the application of technologies and the objective was met, since it was shown how the use of these tools impacted in the process of constructing the proposals and the communication carried out between the groups and the different disciplines.

One of the most important dimensions of this research project was to know if the use of ICTS favored student learning through collaborative work and project-based learning, and highlighted that 100% of them indicated that the use of ICTS indeed favored their learning (see figure 6)
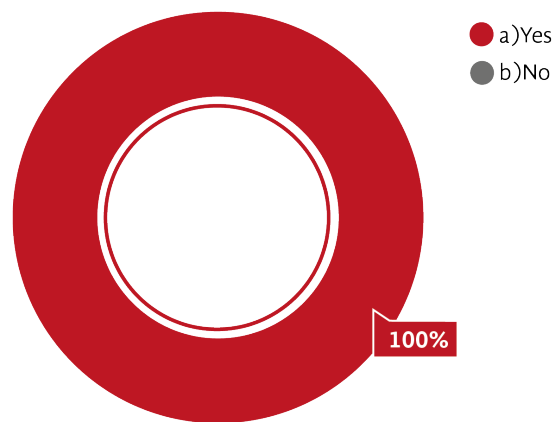

● a)Yes
● b)No

100%

Figure 6. *Use of Information and Communication Technologies (ICTs).*
Source: self made.

In the same question, students were asked to explain the reason for their answer. The information provided was categorized as follows: the use of the TIC. It mainly contributed to communication (see table 1), its use allowed them to investigate, organize and collaborate (see table 2) and, to a lesser extent, it is a tool and a contribution to their learning (see table 3).

Table 1. Comments from students surveyed about ICTS in communication. Source: self made.

Communication		
Since we were able to communicate to **carry out the activities** and separately **to be able to look for examples** to carry out the activities and topics. **I facilitated communication using technology**, and **it was easier to work as a team.** **Communication is easier using technology** and it is easier to work as a team. I had **open communication** with my classmates from the other degrees, which helped us to **resolve doubts** or **to be able to solve** or change things that, perhaps, were not working. The use of **technology facilitated communication** It made it **easier for me to agree.** Yes because we **were able to communicate quickly** and adequately to develop the project.	Different **areas** of knowledge were understood through **communication** with other degrees. It helps us **stay in touch** and clarify doubts. It's **easier to agree**. A project was carried out that could not be completed if the part previously prepared by the other team was not understood. Therefore, there was **communication to obtain the expected results.** In case of encountering any problem or doubt, **ICTs were of great importance**, likewise, **they facilitated communication** between team members. There was **better communication and prompt response to our questions.**	We could quickly contact **the other members to resolve doubts** and make agreements. ICTs were helpful **to solve** any **problems and maintain good communication.** **Communication was easier** through ICT, so we were able t**o organize ourselves and resolve** questions remotely and quickly. Our schedules did not coincide, so **virtual meetings** facilitated and avoided wasted time. To me, it seemed that all the material and information that he gave us **benefited my learning** because it was essential to understand that we always have communication.

Source: self made.

Among these responses in relation to the ICTS highlights that these contributed to communication by making it simpler and faster for the participants, in addition to facilitating the exchange of information and the development of collaborative work, necessary to understand all the processes and thus obtain the expected result.

Table 2. Comments from students surveyed about ICTS in communication.
Source: self made.

Research, collaboration and organization		
For the **ease of collaborating remotely.** We were able to collaborate with each other and it was easier for me to understand certain topics thanks to the **participation and argumentation among my classmates.** However, I think we did not make enough use of certain tools that **could have helped our performance in the race more.** Because we had to use ICTs to **investigate** the **different problems** that were presented to us. The use of **technology allowed us to delve into each topic** in a deeper way, it allowed us to learn **different perspectives from well-known designers**, something that at other times would have been easier, and it gave us the tools to maintain assertive communication between students and teachers.	**Greater efficiency** Yes because it was an **indispensable communication and research tool.** Well, I had access to **information** related to the project **at all times.** It was easier for me to **find information.** It was very helpful, since it allowed us to **find a lot of information** that we required to carry out the project. Due to the **ease of obtaining information.** It seemed to me that the material was **information** that was provided to us and was very **suitable** for the projects that we were going to carry out.	Personally, I had to **research** the **materials** to apply them in the project so they looked as realistic as possible. If I had any questions, I could search them **quickly** and repeat as many times as necessary. Yes because it made everything **simpler and more professional.** **The work was successfully completed** in an appropriate manner. Well yes because, despite the stress and **everything, it was achieved.** There was **better management and organization.** Everything **was easier.**

Source: self made.

Regarding the contribution that the ICTS had in the research, organization and collaboration of the project, the aspect of collaborative work stands out, closely linked to the communication that is indicated in the results mentioned above, and the advantage of its use for prior research or in the process as a source of consultation of doubts that allows the good execution of the project.

Table 3. Comments from students surveyed, about the ICTS as learning tools.

Learning tools
Yeah. **Favors and enriches** the possibilities when developing projects.
It will be much easier for me to **understand things through practice** and constant use of the programs.
Well, it also allowed me to have **practice in carrying out the learning obtained.**
Yes, since they are **very useful tools** and, in turn, they make the work easier

Source: self made.

As part of the comments received, less attention was made to the contribution of the ICTS in the preparation of the projects, that is, how this learning tool allowed the knowledge acquired to be put into practice.

On the other hand, it is worth highlighting that the interpersonal relationship between the members of each of the work teams was valued by the students themselves as: friendly (86%), cooperative (79.1%), reliable (53.5%), participatory (51.2%). %), satisfactory (46.5), dialogue (32.6%), autonomous (25.6%), with procrastination (16.3%), individualistic (9.3), absent (7%), competitive (4.7) and frustrating (4.7%) (see figure 10). In this regard, it is evident that this relationship was mostly evaluated as favorable, which can be attributed in part to the effectiveness of the communication medium, that is, to the use of information technologies as support tools that were used during the process of realization, feedback and presentation of the progress of the different groups, since not all members had the opportunity to interact in person during the project process, as can be seen in the students' responses gathered in table 1.
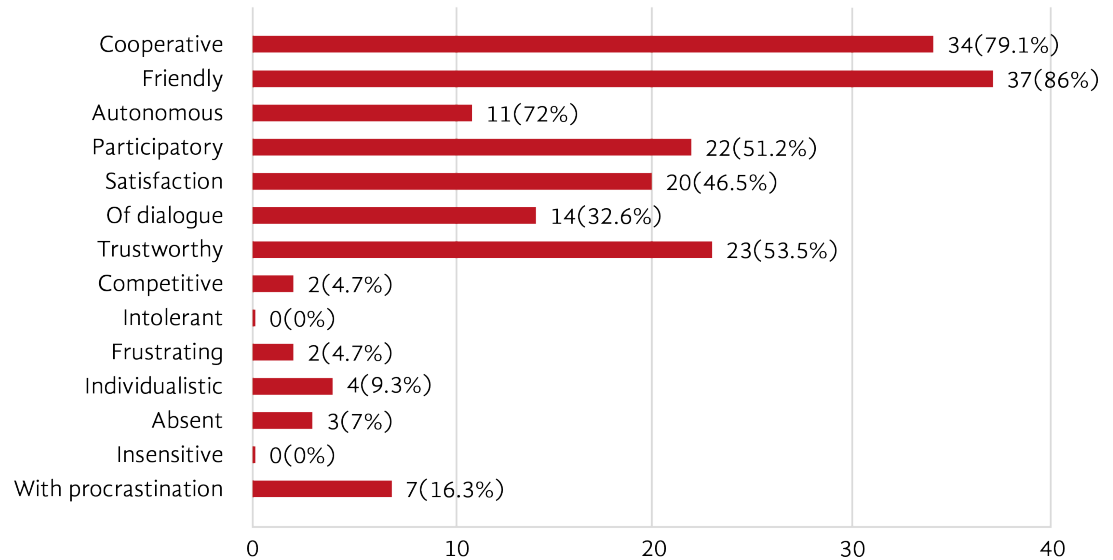
Figure 7. Interpersonal relationship.
Source: self made.

Finally, to assess the interdisciplinary learning experience as an important part in the integration of this type of projects, based on what was presented by each of the teams from the other subjects (see figure 8), a numerical value scale was used, where 5 corresponds to substantial and 1 to little substantial. The students' response was as follows: 46.5% considered the experience substantial, 39.5% believed it was moderately substantial, and 14% thought that the interdisciplinary learning was good. These results confirm the value not only of learning from the project itself that the students developed, but also, as García-Arano (2020) points out, of the way in which the knowledge from various sources and experts is approached, how relationships are woven. , and tools and concepts are used that allow the possibilities of action and construction of the artificial world to be developed.
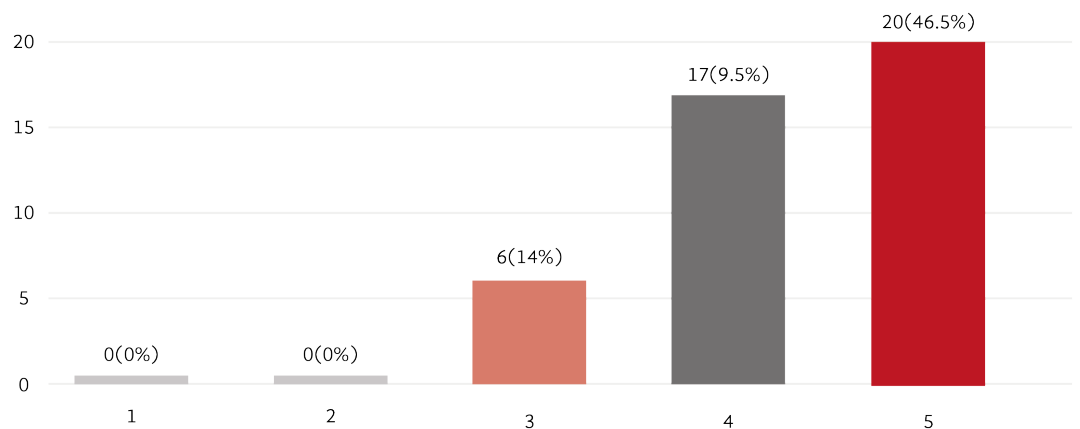

Figure 8. *Interdisciplinary learning.*
Source: self made.

As a conclusion regarding the results of these surveys, with the analysis of the responses and the experience of the students observed by the teachers throughout the development of the project, the advantage of using the ICTS not only as a source of communication between students, with teachers and between teachers, but as a contribution to learning and strengthening projects based on construction from different disciplines. This is because technologies allow entry to a new world full of easily accessible information for students and teachers that opens a door in the learning environment, where new strategies are offered for student participation, allowing improvement of cognitive development (Cruz-Pérez, Pozo-Vinueza, Aushay-Yupangui and Arias-Parra, 2019). In addition to this, as the sociologist Edgar Morín (2010, cited by García-Arano, 2020) points out, he highlights the importance of openness to different disciplines to generate advances and enriched knowledge, since these "interdisciplinary usurpations and migrations", as well as "migrations of ideas" in many cases have been the cause of the formulation of new postulates, theories and theoretical transformations.

On the other hand, based on this analysis and as a complement to the topic addressed in this project, it is possible to state the following points:

◈ Impact on comprehensive training: The interdisciplinary project demonstrated the relevance of the comprehensive training of students by exposing them to approaches and knowledge from various disciplines. This experience can help develop adaptive, problem-solving, and critical thinking skills that are crucial in today's work environment and society in general.

◈ Overcoming physical barriers: The ICTS allowed us to overcome the limitations of time and space by enabling collaboration between groups of students and teachers who may not coincide in schedules or who were in different locations. This ability to collaborate virtually expands the possibilities for future projects and can have a lasting impact on interdisciplinary education.

◈ Disciplinary knowledge transfer: The project revealed how knowledge from one discipline can complement and enhance the work of another. Graphic Design students contributed creative and aesthetic ideas, Industrial Design students contributed functional approaches, and Art and Interactive Technologies students provided perspectives on user experience. This transfer of disciplinary knowledge enriched the quality and diversity of the proposals.

◈ Collaborative learning: The project highlighted how collaborative learning can be fostered by ICTS. Students not only shared information and resources, but also answered questions, debated ideas, and provided feedback, this promoted a more interactive

and participative learning environment, which can improve knowledge retention and student engagement.

⬥ Preparation for the work environment: Interdisciplinary experience and collaboration through ICTS reflect real-world situations in the workplace. Many projects and challenges in professional life require working with people from different specialties and locations. Students who participated in this project may have gained valuable skills for collaboration and communication in diversified teams.

⬥ Challenges and lessons learned: This project was able to open a panorama for teachers to give us the task of including in the planning a section that addresses the challenges encountered during the project, such as the coordination of schedules, effective online communication and the need to adapt to different styles. of work. It would also be valuable to highlight lessons learned and possible improvements for future similar interdisciplinary projects.

⬥ Sustainability and continuity: The project put on the table the possibility of integrating this interdisciplinary approach and the use of ICTS in the academic curriculum in a more sustainable and continuous way. How could this experience lay the foundation for future projects and collaborations between disciplines at the university?

⬥ Development of technological skills: In addition to its applications in the field of communication and collaboration, the project also contributed to the development of technological skills in students, for example, in the use of design software, online communication and management of technological tools, which are valuable in an increasingly digitalized world.

⬥ Future perspectives: Finally, based on the results, it could be explored how this experience could influence the students' perspectives and aspirations in relation to their future careers. How has this experience impacted your approach to design, technology, and interdisciplinary collaboration?

⬥ Discussion and Conclusions

It is necessary for educational processes to generate multidisciplinary projects in which students from different degrees pay in part of themselves to create a high social impact that benefits not only the teaching-learning processes directed by universities in educational spaces, but also generate new areas of knowledge and opportunities in the social context around the life of university communities. As highlighted in the points stated at the end of the analysis of the surveys, these educational processes have a great impact on different aspects of student education.

The application of surveys to the participating students showed that the use of ICTS had a positive impact on collaborative learning and the execution of projects and that students valued the ease of communication, research and collaboration that these technologies provided.

The results of the proposals executed by the groups, as well as what was expressed in the surveys of the participants, show that interdisciplinary processes, design, collaboration and ICTS are essential elements for the success of complex educational projects, since the proper use of the ICTS as communication and creative support tools can enhance collaboration between disciplines and enrich the final results of projects through the search for own answers after searching for information and analysis (Díaz-Barriga, 2013).

It can be observed in the design proposals presented by the students as a conclusion of the project that using technologies as a source of support through specialized design programs to present design proposals should not only be considered for their daily implementation in order to achieve results. of quality and better appearance (or closer to reality), but also to transcend to projects with high social impact. In this regard, it is important to mention the need to update the versions or options of the programs and tools, as they advance constantly and more quickly today. This updating of the programs and the related topics, as well as the relevant training, are part of the teacher's task.

On the other hand, the results on the implementation of this project show that information technologies can be used as a means of communication and link to promote collaborative, multidisciplinary work, which can even be carried out despite the circumstances or difficulties. of groups, spaces and times.

Therefore, it is visible to highlight their contribution as an opportunity and advantage to generate a participation scenario that can be taken into account to generate synergies between educational programs despite the circumstances. The face-to-face must be articulated with the virtual and the digital with the analogue, the ancient notebook and pencil technologies must be combined with the current internet and social networks, as Linne (2021) says. A certain experience, such as the COVID-19 pandemic, has left us with lessons learned from the contribution and advantages that come with the implementation of information technologies in various areas. Despite this, it is clear that the ICTS are still left aside in certain spheres or are little perceptible as areas of opportunity for other improvements, in this case, for interdisciplinary work.

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