

## **Estrategias para la innovación educativa en la educación superior hacia el 2030**

***Strategies for educational innovation in higher education towards 2030***

***Estratégias para inovação educacional no ensino superior até 2030***

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### **Resumen**

La presente investigación se originó por la inquietud de un grupo de estudiantes de la generación 2019-2021 de un curso de posgrado en Innovación Educativa. Ellos buscaban a través de la experiencia académica conocer, aprender, generar, desarrollar y aplicar estrategias didácticas para implementar en la maestría en Innovación Educativa. La problemática se identificó como la carencia o ausencia de infraestructura educativa y material didáctico en las instituciones de educación superior (IES) para orientar los procesos educativos en función de la estimulación de los canales perceptivos de los estudiantes, mediante el óptimo diseño de los espacios educativos de las IES. Por tanto, el objetivo de este trabajo fue identificar los criterios constructivistas pertinentes a través de un procedimiento sistematizado que promueva la modificación continua y permanente de los espacios educativos en las IES. La metodología seleccionada fue cualitativa, mediante la documentación de la técnica de estudio de caso. Asimismo, se empleó la heurística como herramienta de búsqueda y discriminación de la información hallada en la investigación documental. Durante el desarrollo, los hallazgos se presentaron al docente y a los estudiantes de la clase en equipos disciplinarios, para lo cual se realizaron anotaciones grupales en una tabla de términos y conceptos que permitió determinar elementos comunes y reincidentes.

Posteriormente, se ejecutó un análisis grupal y multidisciplinario de la información recabada en el cuadro comparativo. Los resultados conseguidos aportaron criterios suficientes para recomendar el diseño de espacios educativos en las IES, así como elementos didácticos que predispongan y motiven a los estudiantes hacia el aprendizaje. Por todo lo anterior, se concluye que el presente documento es una propuesta que sistematiza un conjunto de actividades incluyentes (procedimiento) para el diseño de los espacios educativos de las IES desde la perspectiva de los estudios de posgrado en innovación educativa.

**Palabras clave:** estrategia didáctica, infraestructura educativa, procedimiento de investigación.

### **Abstract**

This research was originated by the concern of a group of students from the 2019-2021 generation of a postgraduate course in Educational Innovation. They search through academic experience; know learn, generate, develop and apply didactic strategies to be implemented in the Master of Educational Innovation. The problem was identified as the lack or absence of educational infrastructure and didactic material in Higher Education Institutions (IES), which allow orienting educational processes, based on the stimulation of the perceptual channels of students, through the optimal design of the educational spaces of the IES. The goal is to identify the relevant constructivist criteria through a systematized procedure that promote the continuous and permanent modification of educational spaces in IES. The selected methodology is qualitative, by documenting the case study technique, using heuristics as a search tool and discrimination of the information found in the documentary research. During the development, the findings are presented to the teacher and students of the class in disciplinary teams, making group annotations in a table of terms and concepts that allows determining common and recurring elements. Subsequently, a group, multidisciplinary analysis of the information collected in the comparative table is carried out. The results obtained provide sufficient criteria to recommend the design of educational spaces in IES, which simultaneously provide didactic elements that predispose and motivate students to learning. It is concluded that this document is a proposal that systematizes a set of inclusive activities (procedure) for the design of educational spaces of IES from the perspective of postgraduate studies in educational innovation.

**Keywords:** didactic strategy, educational infrastructure, research portfolio.

## Resumo

Esta pesquisa teve origem na preocupação de um grupo de alunos da geração 2019-2021 de um curso de pós-graduação em Inovação Educacional. Eles buscaram por meio da experiência acadêmica conhecer, aprender, gerar, desenvolver e aplicar estratégias didáticas a serem implementadas no mestrado em Inovação Educacional. O problema foi identificado como a falta ou ausência de infraestrutura educacional e de material didático nas instituições de ensino superior (IES) para orientar os processos educacionais baseados na estimulação dos canais perceptivos dos alunos, por meio da concepção otimizada dos espaços educacionais das IES. Portanto, o objetivo deste trabalho foi identificar os critérios construtivistas pertinentes por meio de um procedimento sistematizado que promova a modificação contínua e permanente dos espaços educacionais nas IES. A metodologia selecionada foi qualitativa, por meio da documentação da técnica do estudo de caso. Da mesma forma, as heurísticas foram utilizadas como ferramenta de busca e discriminação das informações encontradas na pesquisa documental. Durante o desenvolvimento, os resultados foram apresentados ao professor e aos alunos da turma em equipas disciplinares, para as quais foram efectuadas anotações de grupo numa tabela de termos e conceitos que permitiu determinar os elementos comuns e recorrentes. Posteriormente, foi realizada uma análise grupal e multidisciplinar das informações coletadas no quadro comparativo. Os resultados obtidos forneceram critérios suficientes para recomendar a concepção de espaços educacionais nas IES, bem como elementos didáticos que predispõem e motivam os alunos para a aprendizagem. Por tudo isso, conclui-se que este documento é uma proposta que sistematiza um conjunto de atividades inclusivas (procedimento) para a concepção de espaços educacionais de IES na perspectiva da pós-graduação em inovação educacional.

**Palavras-chave:** estratégia didática, infraestrutura educacional, procedimento de pesquisa.

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## Introduction

The collective opinions used in the media (e.g., the capacity of teachers in Mexico is one of the limitations to develop learning objectives, Mexico has a highly fragmented higher education system with insufficient coverage or there is insufficient coverage). null link between educational objectives and connection with the labor market) are antecedents that allow determining the problems of this work, that is, the non-existent or lacking infrastructure in HEIs to improve the didactics of teaching processes through stimulation of perceptual media (National Institute of Educational Evaluation [INEE], 2019).

For this reason, the objective of this research was focused on identifying the pertinent constructivist criteria through a systematized procedure that promote the continuous and permanent modification of educational spaces in HEIs. To achieve this purpose, the approach of a research procedure was established with the support of a qualitative methodology, using the case study technique and the role simulation method in face-to-face classes. With this, the analysis of the proposals for the design and integration of educational spaces by teachers in Educational Innovation in an IES has been documented.

In summary, this document summarizes the systematized development of a postgraduate course (Teaching-Learning Processes with Technological Applications) that uses active participation to follow up on a research procedure as a didactic and data collection strategy, and to favor decision-making on the design and integration of educational spaces in HEIs.

The process implemented in an IES that allows students to develop a relevant criterion to recommend the design of educational spaces has been defined from the objective of the course Teaching-Learning Processes with Technological Applications, by means of which an attempt is made to evaluate the teaching process -learning at different levels of education, as well as applying technological resources, techniques and strategies to improve the educational fact, considering the needs and characteristics of each student.

This determination of improvement of the educational fact is the factor that motivates the systematization of a research procedure as a didactic strategy that invites course participants to recommend in the administrations of the HEIs the execution of improvements or design inclusions in educational spaces.

Implementing a set of criteria to make recommendations on the improvement of educational spaces as a didactic resource was derived from the concern of the course participants to establish knowledge of immediate and direct application to teaching tasks. In fact, it was considered that systematizing a research procedure can be innovative because the acquired competence strengthens the metacognitive ability that plans and prospects learning scenarios based on the stimulation of the students' perceptual means.

The design of educational spaces in HEIs also supports new teachers or those in training who do not have knowledge and skills in the implementation of study plans (especially, when they are newly hired staff). An unconsolidated teaching staff constitutes a relevant weakness, especially when they lack knowledge about didactics and pedagogy, since most are professionals from various areas of knowledge who, in many cases, do not have a vocation for teaching (Velasco, Guillen and Galindo, 2018).

Now, as the research procedure to generate criteria that allow recommending the design of educational spaces requires didactic planning, it is necessary to clarify the understanding of the term didactic strategy, which is defined, according to the Dictionary of the Royal Spanish Academy, as follows:

Strategy, adjustable process, set of rules that ensure an optimal decision at all times and didactics, whose main purpose is to systematically teach or communicate ideas, knowledge or doctrines (instruct).

Consequently, in this proposal of the research procedure as a didactic strategy it is interpreted as the reference by which the teacher establishes in a pertinent way the infrastructure resources, methods and educational materials for teaching through perceptual means (Galindo and Murrieta, 2014).

In addition, the research procedure as a didactic strategy is complemented by the role simulation method, which invites students to present in person, as evidence of learning, the findings of their research before the class (Negri et al., 2016 ).

The simulation is a role play where the participants behave as consultants or consultants specializing in the design of educational spaces according to their disciplinary field. The decision-making made by the students is the evidence that shows that the systematization of the procedure fosters academic competitiveness, by recommending configurations of educational spaces according to the specialty of the team on duty.

The analysis of the information presented in the face-to-face sessions was carried out through direct questioning (Freire and Faundez, 2018), a pedagogy that has made it possible to deepen and specify the knowledge about educational spaces as technological applications that motivate to directly exalt and stimulate the sensations about the visual, auditory and kinesthetic learning styles of the participants (Romero, 2016).

The simulation of the participants in the role of advisers or consultants has contributed to their understanding a formal differentiation of teaching-learning concepts based on lived experience.

The documented results focus on the writing of reflections, experiences and contributions of the participants, a practice that later validates the systematization of the research procedure focused on determining the design of educational spaces as technological innovations.

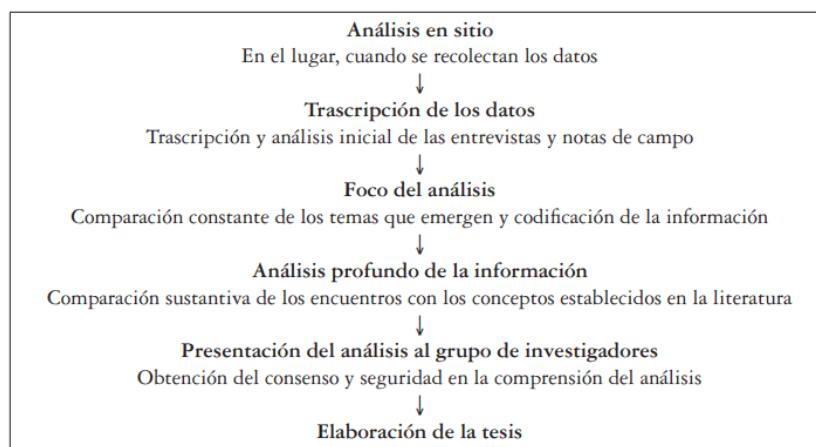
It has been concluded that planning a teaching-learning process (class or course) through the didactic strategy of a research procedure leads and brings students closer to fulfilling the graduate profile of postgraduate courses in Educational Innovation, since the gap in education is reduced. concepts and ambiguous interpretations between technological applications (AT) and information and communication technologies (ICT). This shows that by modifying educational spaces it is possible to motivate student learning in HEIs through perceptual means.

## Methodology

The methodology used was qualitative, since the research was carried out through a study to describe the systematization of a procedure to design educational spaces in HEIs as didactic entities of institutional scope. The analysis was developed using the inductive method (Martínez, 2006), which provides the scientific rigor of this document (figure 1).

The data collection was carried out through tables of concepts and definitions, which in a consensual way document the continuous improvement of the investigations and proposals made on the suggestions of the design of educational spaces, evaluated from the perspective of the criteria of a list of comparison.

**Figura 1.** Pasos del análisis inductivo



Fuente: Shaw (1999) citado por Martínez (2006)

The sample was determined for convenience (Otzen and Manterola, 2017) because the opinions and points of view of the participants were analyzed. As a population, the total of individuals from the 2019-2021 generation group (25 students) of a postgraduate degree in Educational Innovation from a private HEI was considered. All carried out different professional and non-professional economic activities, had completed higher education studies and had obtained a bachelor's degree.

The case study technique was used because it allows the active participation of the participants in each concept added to the recording tables, especially if some element of the presentations was ambiguous or unknown. The development of the face-to-face sessions was carried out using the role simulation method. The duration of the case study was divided into five moments of collaborative participation and inductive analysis. The improvement evaluation instrument were the observation lists that were developed during the implementation of the research procedure (Laorden and Pérez, 2002).

The research procedure to design educational spaces followed the following order and sequence:

- ❖ Step 1. In the first session, introduction to the execution of the investigation procedure.
- ❖ Step 2. In the second session, follow-up of the investigation procedure and the first plenary session to present the results.

- ❖ Step 3. In the third session, follow-up of the investigation procedure and second plenary session to present the results.
- ❖ Step 4. In the fourth session, follow-up of the investigation procedure and third plenary session to present the results.
- ❖ Step 5. In the fifth session, fourth plenary session for the presentation of results, closing and conclusions of the investigation procedure.

In role simulation (dynamic also called role play), the participants in the role of researchers - with the support of heuristics prior to the presentation in plenary session - carry out a documentary research on the positive and favorable experiences of other HEIs, with regarding the design and improvement of educational spaces. Participants in the role of advisers or consultants present in 5 minutes - with the support of the multimedia resource - a synthesis of their findings and coincidences, exposed with the support of hermeneutics as new knowledge. As a basic instruction, it is indicated that participants must make a presentation per week on didactic infrastructure and educational spaces, aligned according to their profession and field of work.

An example of active participation, through which the class session is conducted, is shown in the following narrative:

Using the pedagogy of the question during class teaching, the title of the work was established using the following formula:

Main topic + looking for what + a where + and when.

Although the first interventions were forced, the contributions concurred in determining the title Teaching strategies for educational innovation in higher education by 2030. Subsequently, it was possible to propose an objective with the guidance of Bloom's taxonomy, locating the action at the third cognitive level. The objective directs the presentations of the proposals of the teachers through applied examples that attend the perceptual channels by modifying the educational spaces in the IES (Valencia, Ávila, López and García, 2020).

As part of the innovation in the teaching of higher education, the various postures and behaviors that occur, such as uncertainty, confusion, resistance to the use of alternative strategies and acceptance of changes in teaching, are exposed to the plenary session of a class. Participants promptly determine in greater detail and precision the factors that limit creativity and innovation in teaching proposals and improvements.



## Development

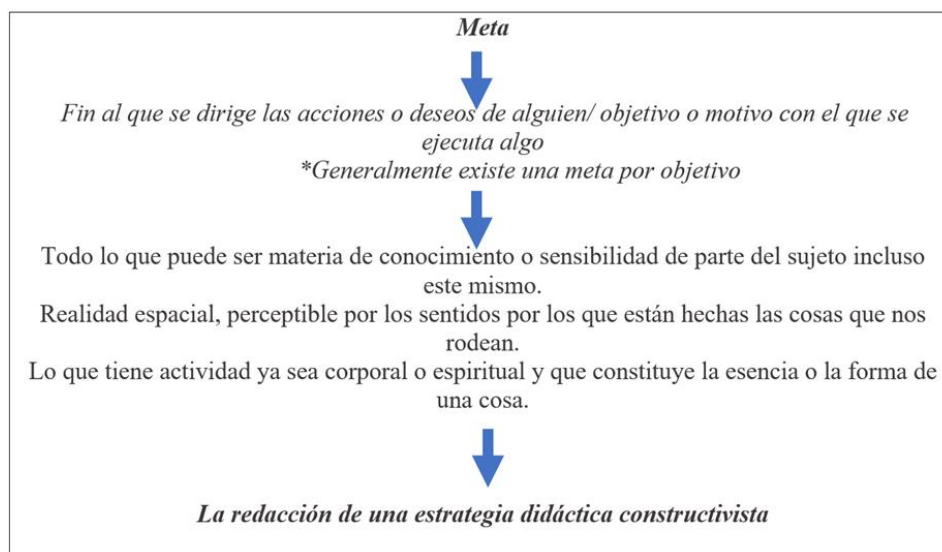
In the systematization of the research procedure of a postgraduate course, to design educational spaces it was established as a priority to define the concept of innovation, which - according to the RAE - is linked to changing or altering something by introducing new features (these elements are perceived by the visual, auditory and kinesthetic media) experienced for the first time.

Now, for the human being to perceive, in the most limited sense, implies being able to capture through the senses (taste, touch, hearing, sight) the images or actions that are capable of generating impressions or external sensations that have an effect on the mood of individuals. As human beings have four receptor sensory organs from the elementary biological point of view (taste, smell, sight and touch), then the possibilities of modifying the behavior of the participants of a course are limited to the stimulation of the four senses that they are also called perceptual channels or media (Romero, 2016). For this reason, learning in a room or closed space with four walls and a single door (via or means of communication) offers a highly complex setting for learning, which does not happen in open spaces with equipment and didactic materials, which they provide diverse scenarios and simple examples for learning.

### First session

To determine the scope, it was necessary in the session to clarify the term goal with the support of the RAE Dictionary (2020) (Figure 2). In this way, it was deduced in a plenary way that the best expression of the learning intentions of the course is the execution of a constructivist didactic strategy, which will be called a research procedure to design educational spaces, focused on investigating the design of educational spaces.

**Figura 2.** Desambiguación del término *meta*



Fuente: Elaboración propia

Both the teacher and the participants agreed that developing a research procedure is consistent with the goal of this course, that is, the writing of a constructivist didactic strategy that coincides with the intentions of the following objective: select the constructivist didactic strategy (research procedure to design educational spaces) that allows, through the stimulation of perceptual channels, to innovate the teaching of higher education by improving educational spaces.

When talking about innovating in the educational infrastructure, the concept defined by the RAE is considered, which is associated with capturing by each of the senses the images, impressions or external sensations that have the effect of causing changes in the mood of the students through stimulation of the senses (taste, sight, touch and smell).

## Results

During the presentations made by the participants, it was necessary to evaluate that the proposals on the design of educational spaces or improvement of the educational infrastructure are relevant to the needs of higher education students. For this, during the face-to-face session, with the support of active participation, the review of two evaluation alternatives was required: observation list and check list. This comparison was carried out by

means of the exemplification of an activity of popular domain, such as the elaboration of poblano boats.

Figure 3 shows the comparison between a checklist and a checklist, both used to evaluate the same activity. Likewise, the concepts referring to the evaluation and those responsible were specified, emphasizing that later each team would modify the initial observation or check list, so that they would have to propose their own versions as evidence of mastery of the elaboration of the evaluation instruments.
















**Figura 3.** Comparativa entre una lista de observación y un *check list*

	Lista de cotejo			Check list	SI	NO
Manteca	☹	☹	☹	Manteca	✓	
Tortilla	☹	☹	☹	Tortilla	✓	
Carnita	☹	☹	☹	Carnita	✓	
Salsa	☹	☹	☹	Salsa	✓	
Cebolla	☹	☹	☹	Cebolla	✓	

Fuente: Elaboración propia

Figure 4 illustrates the differences that were identified during the class session, the origin of the observation list and check list, as well as the comparison between both instruments, which was carried out using inductive reasoning and exemplification in simple and simple elements. public domain.

**Figura 4.** Diferencia entre lista de observación y *check list*




LISTA DE OBSERVACIÓN	CHECK LIST
Se debe realizar con apoyo de un experto con mínimo licenciatura en nutrición, turismo, gastronomía o afín.	Lo puede realizar cualquier persona que prepare chalupas. El resultado es pasa o no pasa como chalupa tradicional poblana.
La lista de observación requiere de indicadores y criterios como los siguientes:	
ENFOQUE CUALITATIVO Con indicadores	ENFOQUE CUANTITATIVO Sin indicadores
Chalupa tradicional poblana	Chalupa tradicional poblana
	Si No
Manteca   	Manteca ✓
Tortilla   	Tortilla ✓
Carnita   	Carnita ✓
Salsa   	Salsa ✓
Cebolla   	Cebolla ✓
El resultado es una prosa redactada en función de los indicadores y criterios.	El resultado se obtiene por medio de un conteo de ítems, recibe la insignia de aprobado.

Fuente: Elaboración propia

After the comparison between the evaluation instruments, still in the plenary session, it was determined that the observation list would be the most relevant instrument to evaluate the development of the presentations made from the perspective of role simulation. The initial or base watch list is shown in Figure 5.

Figure 6 represents the final observation list prepared by the course participants, which is more complete and with greater precision in the details than the check list, especially to collect (based on previously established indicators and criteria) the coevaluation of their colleagues after the presentation that each team would make.

**Figura 5.** Lista de observación (versión inicial)

No.	Lista de observación			
1	La duración de la presentación fue en 5 minutos			
2	Numero de diapositivas utilizadas			
3	Apoyo didáctico			
4	Exceso de contenido por diapositiva			
5	Referencias bibliográficas			

Fuente: Elaboración propia

**Figura 6.** Lista de observación base (versión final)

<b>Indicadores y criterios</b>	
La duración de la presentación fue en 5 minutos	Exceso de contenido por diapositiva
☹ +- 2 minutos	☹ Más de 10 diapositivas y 2 imágenes
☹ +- 1 minuto	☹ Menos de 8 renglones y menos de 2 imágenes
☺ 5 minutos exactos	☺ máximos 5 renglones escritos con arial
Número de diapositivas utilizadas	número 26 a una imagen o diagrama alusivo a la información
☹ + 5 diapositivas	
☹ + 3 diapositivas	
☺ 10 diapositivas	
Apoyo didáctico	Referencias bibliográficas
☹ no presente	☹ Menos de 2 referencias o no cuenta
☹ tenía intención	☹ Menos de 5 referencias, más de 2
☺ presento apoyo didáctico	☺ 5 o más referencias
<b>1.- Utiliza material didáctico en su exposición</b>	
☺	Utiliza equipo multimedia (Tecnología educativa)
☹	Utiliza pizarrón y carteles (Tecnología tradicional)
☹	No utiliza apoyos didácticos
<b>2.-Se muestra dominio en el desarrollo del tema</b>	
☺	Cita referencias bibliográficas de artículos de investigación y libros
☹	Cita referencias bibliográficas de libros
☹	No cita artículos de investigación ni libros
<b>3.-Expuso con claridad</b>	
☺	La exposición fue fácil de comprender
☹	La exposición fue confusa
☹	La exposición no fue comprensible
<b>4.-La presentación tiene un uso excesivo de imágenes y texto en cada una de las diapositivas</b>	
☺	Se respetó el formato de la presentación
☹	Se intentó respetar el formato de la presentación
☹	No se respetó el formato de la presentación
<b>5.- El enfoque del tema fue acorde a la especialidad del equipo</b>	
☺	Se menciona la relación de la propuesta y la especialidad
☹	No es específica la relación que existe en la propuesta y la especialidad
☹	No existe la relación de la propuesta y la especialidad

Fuente: Elaboración propia

During this first stage, setbacks and unforeseen events appeared (figure 7), which it was necessary to express and clarify, since they are an essential part of any group dynamics. Among the difficulties presented, high significance was given to the attitudes of the participants, since in this document it was considered that if the participants' state of mind

was not recognized during a course, a dynamics of apathy and frustration could be generated, as some participants They stated this in the second session during the analysis of the presentations made.

**Figura 7.** Manifestación de obstáculos referidos por los participantes del estudio de caso



Fuente: Elaboración propia

## Second session

The second class session began with the presentation of the first findings of the research procedure to design educational spaces by the participants, divided at convenience into four teams that maintained the profile of graduation from their degree, their professional training, as a relationship. and your work experience. After the first round of presentations, the following observations stood out in a negative way. On the opening slides all participants:

- a. They changed the title.
- b. They did not mention the objective.
- c. They modified the problem.

Regarding the analysis by means of the tables of concepts, the participations were divided into three observation items that are described below:

- ✓ Contributions of work towards training: New changes, discoveries or findings.
- ✓ What skills we develop: Improvements in techniques and personal practices.
- ✓ Time management: Manifestation of confidence regarding the mastery of new knowledge and documented content.

For a simple and practical review, a three-column table format (table 1) was used, under the premise of expressing its praxis, understood as experience or prolonged practice that provides skills and expertise when carrying out knowledge or ability to do something.

**Tabla 1.** Análisis del primer momento de las presentaciones

Aportaciones del trabajo hacia la formación	Qué habilidades se desarrollaron	Manejo del tiempo
<ul style="list-style-type: none"> <li>• Enseñanza</li> <li>• Análisis</li> <li>• Conocimiento</li> <li>• Comprensión</li> <li>• Experiencia</li> <li>• Vacío</li> <li>• Cambio</li> <li>• Reflexión</li> <li>• Indagación</li> <li>• Incertidumbre</li> <li>• Corrección</li> <li>• Inquietud</li> <li>• Confusión</li> <li>• Inconformidad</li> <li>• Implementación</li> <li>• Funcionalidad</li> <li>• Dudas</li> <li>• Descubrimiento</li> </ul>	<ul style="list-style-type: none"> <li>• Indagación</li> <li>• Capacidad</li> <li>• Exploración</li> <li>• Experiencia</li> <li>• Creación</li> <li>• Motivación</li> <li>• Innovación</li> <li>• Comparación</li> <li>• Oralidad</li> <li>• Creatividad</li> <li>• Pragmático</li> <li>• Descubrimiento</li> <li>• Comprensión</li> <li>• Analizar</li> <li>• Manejo de PC</li> <li>• Manejo de paquetería</li> <li>• Improvisar</li> <li>• Web</li> <li>• Blogs</li> <li>• Wikis</li> <li>• Presentación personal</li> <li>• Integración</li> <li>• Empatía</li> <li>• Implementar</li> </ul>	<ul style="list-style-type: none"> <li>• Limitado</li> <li>• Rápido</li> <li>• Preciso</li> <li>• Escaso</li> <li>• Estresante</li> <li>• Frustración</li> <li>• Ansiedad</li> <li>• Nervios</li> <li>• Gastritis</li> <li>• Sarpullido</li> <li>• Colitis</li> <li>• Pánico</li> <li>• Impotencia</li> <li>• Inseguridad</li> <li>• Miedo</li> <li>• Bloqueo</li> <li>• Administración</li> </ul>
<p>Durante este análisis se observa que existe poca precisión para expresar sus experiencias, y su frustración es alta debido al precario manejo del tiempo. Grave contradicción existió en la defensa de las presentaciones, puesto que los recursos tecnológicos por parte de los participantes se confunden con el uso exclusivo de las TIC, lo que limita en gran medida la recomendación hacia el diseño de espacios educativos. En consecuencia, las sugerencias se enfocaron en la aplicación confusa de las plataformas educativas.</p>		

Fuente: Elaboración propia

### Third session

In the review of the third presentation (Table 2), writing techniques in both the first person (narrative) and the third person (descriptive prose) were suggested in an exemplified way for the preparation of the slides because the participants, after two investigations

Repeatedly, they acquired greater mastery of the subject and summary and synthesis were not enough as means of written expression. Examples:

Narrative: Expression in the first person that seeks to tell, relate what happened, or an event or a story.

- I brush my teeth before leaving home and it was a wonderful experience.

Descriptive prose: Expression in the third person that seeks to indicate in a habitual way, oral or written, not subject to the rules of the verse and that specifically describes the actions that are carried out. The elements that are required to elaborate a prose are the arguments (examples) and the support in the facts and investigations (knowledge).

- Individual has brushed their teeth using a soft bristle brush with a bamboo handle and an aromatic toothpaste flavored with intense Brazilian mint (purchased from an expensive department store).



**Tabla 2.** Análisis del segundo momento de las presentaciones

Aportaciones del trabajo hacia la formación	Qué habilidades se desarrollaron	Manejo del tiempo
<ul style="list-style-type: none"> <li>• Conocimiento</li> <li>• Comprensión</li> <li>• Análisis</li> <li>• Cambio</li> <li>• Claridad</li> <li>• Aplicación</li> <li>• Aprendizaje</li> <li>• Implementación</li> <li>• Descubrimiento</li> <li>• Ausencias</li> <li>• Entendimiento</li> <li>• Enseñanza</li> <li>• Dominio del concepto del tema</li> <li>• Atención</li> <li>• Adaptación (modificación)</li> <li>• Progreso</li> <li>• Mayor manejo del tema</li> </ul>	<ul style="list-style-type: none"> <li>• Técnicas</li> <li>• Creatividad</li> <li>• Métodos</li> <li>• Indagación</li> <li>• Persistencia</li> <li>• Planificación</li> <li>• Integración</li> <li>• Desarrollo (mayor manejo de grupo)</li> <li>• Motivación</li> <li>• Expresión</li> <li>• Proceso/ mecanización / sistematización</li> <li>• Experiencia (argumento)</li> </ul>	<ul style="list-style-type: none"> <li>• Incómodo</li> <li>• Inseguro</li> <li>• Nervioso</li> <li>• Rapidez</li> <li>• Precisión</li> <li>• Organización</li> <li>• Seguros</li> <li>• Capacidad</li> <li>• Habilidad</li> <li>• Desarrollo (Organización)</li> <li>• Experiencia (Confianza) -&gt; ¿Cómo manifestarla? -&gt; observación como experto</li> </ul>
<p>En la segunda presentación las aportaciones a la formación de los participantes fueron menores, pero con mayor precisión. En cuanto al manejo del tiempo, disminuyeron las expresiones de frustración y sus efectos físicos (nervios). En cuanto al contenido presentado, han disminuido, pero no se excluyen en su totalidad las referencias a los aportes de las TIC como recursos tecnológicos y se juzga que los participantes comprenden con mayor claridad que la infraestructura educativa y los espacios educativos son los principales recursos tecnológicos para la enseñanza y el aprendizaje.</p>		

Fuente: Elaboración propia

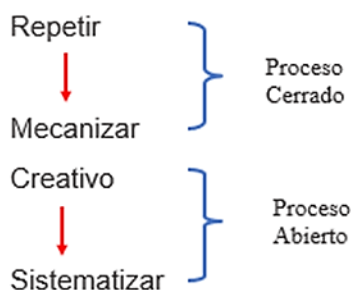
### Fourth session

During the analysis of the fourth session (table 3) the attitudinal problems continued during the face-to-face expositions and became more noticeable, which were internal in the work team due to the existence of a feeling of apathy. This element was reflected on in a group way and it was determined that among the conditions that caused it were fatigue,

routine, lack of interest, work outside the comfort zone, timelessness and the discrepancy between graduation profiles. and income.

To overcome this eventuality, it was necessary to complement the development of the face-to-face class with the study of the types of processes that occur in teaching and learning (figure 8). For this, differences were established between traditional didactic elements (Socratic method) without incorporation of educational technology and innovative didactic elements that evolve with didactics and that adapt to cutting-edge technological changes (virtuality).

**Figura 8.** Desambiguación de los tipos de procesos mecánicos y sistemáticos



Fuente: Elaboración propia

In this session it was explained that it is not always essential to have the best infrastructure to offer quality education, as says Zahra Al-Tabal (United Nations Development Program [UNDP], 2020), who has taught in a school in Tripoli (Libya) for 34 years. Indeed, during that time, neither the war nor the lack of maintenance of the buildings have made her lose the impulse to give her students the best musical education that she can. Therefore, it should be clear that the best technology does not replace the vocation and inventiveness of teachers.

**Tabla 3.** Análisis del tercer momento de las presentaciones

Aportaciones del trabajo hacia la formación	Qué habilidades se desarrollaron	Manejo del tiempo
<ul style="list-style-type: none"> <li>• Comprensión</li> <li>• Experiencia (expresión oral)</li> <li>• Fluidez</li> <li>• Análisis</li> <li>• Novedad</li> <li>• Involucrar</li> <li>• Descubrimiento</li> <li>• Rechazo</li> <li>• Cambio</li> <li>• Correcciones/adaptaciones</li> <li>• Improvisar</li> <li>• Seguridad (fortalezas)</li> <li>• Claridad</li> <li>• Integrar</li> </ul>	<ul style="list-style-type: none"> <li>• Dominio</li> <li>• Creatividad</li> <li>• Estrategia</li> <li>• Rapidez de lectura</li> <li>• Síntesis</li> <li>• Investigación</li> <li>• Comunicación</li> <li>• Ingenio</li> <li>• Postura (expresión corporal)</li> <li>• Lenguaje</li> <li>• Organización</li> <li>• Planeación</li> <li>• Ejemplificación</li> <li>• Liderazgo</li> </ul>	<ul style="list-style-type: none"> <li>• No existió manejo del tiempo</li> <li>• El conocimiento se profundizó</li> <li>• Ausencia de síntesis de la información</li> <li>• Escucha activa (atención prestada a las indicaciones)</li> </ul>
<p>En la tercera presentación, el dominio del tema <i>diseño de espacios educativos</i> adquirió mayor profundidad y no tuvo relevancia el manejo del tiempo (debido a la mejor organización de los integrantes), y no hubo manifestación de la sensación de afectación física o anímica (frustración). Los participantes demostraban mayor confianza y mejor desenvolvimiento, y se involucraron con mayor compromiso en los roles de consultores o asesores en el diseño de espacios educativos. Las evaluaciones por lista de observación tomaron mayor relevancia y las participaciones estuvieron más enfocadas en la mejora propositiva, y no en la crítica destructiva.</p>		

Fuente: Elaboración propia

### Fifth session

The fifth session review (table 4) was more productive in terms of the proposals presented by the class teams. In it, the project was concluded and the improvements achieved in the proposals for educational spaces were observed through the review of the analysis tables.

**Tabla 4.** Análisis del cuarto momento de las presentaciones

Aportaciones del trabajo hacia la formación	Qué habilidades se desarrollaron	Manejo del tiempo
<ul style="list-style-type: none"> <li>• Mejor experiencia</li> <li>• Apertura (disposición)</li> <li>• Retroalimentación</li> <li>• Claridad</li> </ul>	<ul style="list-style-type: none"> <li>• Mejor organización</li> <li>• Análisis (problemática específica inclusión)</li> <li>• Sincronización</li> <li>• Liderazgo</li> </ul>	<ul style="list-style-type: none"> <li>• Trabajo por objetivos</li> <li>• Selección documentos</li> <li>• Control de emociones</li> <li>• Autoestima</li> </ul>
<p>La cuarta ronda de presentación sobre el diseño de espacios educativos y su correspondiente análisis fue significativa en lo concerniente a la claridad de las propuestas realizadas por los participantes, con argumentos de sobrada calidad y referencia bibliográfica. Muy relevante fue este análisis, ya que permitió identificar a los participantes que los recursos tecnológicos no se deben encasillar en las TIC y que el diseño de los espacios educativos es una contribución significativa e innovadora en las IES.</p>		

Fuente: Elaboración propia

## Discussion

The first moment of analysis coincides with the results of Gómez (2017), since it is clear that the participants in higher education courses lack precision and lack of ability to follow instructions and write. Therefore, it is necessary to promote a continuous and permanent improvement in the quality of education to ensure that students have the fundamental tools and capacities to understand and analyze texts, express themselves in writing, have critical, reflective, creative and purposeful thinking with mathematical reasoning ability to become active and participatory citizens (Gómez, 2017).

In this sense, in the fourth moment of the presentations (table 4) the precision achieved by the participants to express the knowledge learned was motivating. All this was possible based on the format of research procedures for the design of educational spaces (De Miguel, 2006; Vargas, 2008) as a constructivist teaching strategy, to which HEIs should direct their resources and innovate in research to the production of teaching resources (Organization for Economic Cooperation and Development [OECD], 2019).

The relevance of the theme of this case study was significant, since the generation of a research procedure for the design of educational spaces was sought, having as its central axis the improvement of the educational infrastructure. In fact, work was done on balancing the structural safety and durability of the buildings with the flexibility required by the

pedagogical models and the particular needs of the different areas of the country. (INEE, 2018).

## Conclusions

At the end of the development of the case study - and based on the argument provided by the observation of the participants' presentations through the interpretation of the analysis tables -, it can be ensured that the learning achieved is condensed into greater employment of complex concepts of high cognitive level, as can be verified in the fourth presentation (table 4), in contrast to the ambiguous use of general simplistic concepts that were presented in the first session.

Likewise, it can be indicated that the proposed objective was achieved, since each presentation showed how the didactic strategy implemented generated recommendations for the optimization of institutional spaces and the selection of furniture changes, including the general use infrastructure for specific use elements for the different educational offers of the HEIs.

In addition, the participants developed as evidence of learning a document that contains a constructivist didactic strategy to make innovative proposals in the educational spaces of an HEI. This was achieved, for example, by contributing ideas and strategies (such as the incorporation of climbing walls in the patios of the IES to meet the requirements of the Bachelor's degrees in Tourism) that can stimulate coexistence between students and allow educational activities to be open and conducted in a systematic way.

In fact, the most important conclusion for the study group was to reflect and determine that technological resources can not only be supported by ICT and that through educational infrastructure it is possible to promote teaching through perceptual means.

Finally, it can be said that planning a teaching-learning process (class or course) through the constructivist didactic strategy of a research procedure for the design of educational spaces leads and brings students closer to meeting the postgraduate graduation profile in Educational Innovation, because in this way the gap of concepts and ambiguous interpretations between technological applications (TA) and information and communication technologies (ICT) is reduced through ideas and clear applications of infrastructure and institutional spaces.

## Future lines of research

The monitoring and strengthening of each proposal for innovation and technological contribution in educational spaces is the line of research that will continue to be documented. Identifying and quantifying the impact of each successfully proposed strategy constitutes a valuable collection of knowledge that will allow the continuous improvement of educational spaces in private HEIs and will favor the permanent increase in educational quality.

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