International Journal of Human Sciences Research

ISSN 2764-0558 vol. 5, n. 12, 2025

ARTICLE 7
Acceptance date: 03/12/2025

ACTIVE METHODOLOGIES AND 21ST CENTURY SKILLS AT CECYT 16 “HIDALGO” IN THE AUTOMATED SYSTEMS MACHINERY PROGRAM

María Mónica García Arroyo
Instituto Politécnico Nacional
Pachuca de Soto, Hidalgo

ABSTRACT: In Mexico, technical education faces the challenge of training professionals who not only possess specific knowledge but also cross-cutting skills that enable them to adapt to the demands of Industry 4.0. The objective of this study was to examine the fourth-semester curriculum of the "Automated Systems Technician" program at the Hidalgo Scientific and Technological Center (CECyT) of the National Polytechnic Institute (IPN). The objective is to understand the integration of 21st-century skills and active methodologies in the implemented curriculum design, which involved reviewing the current study programs of the four corresponding learning units through content analysis. The findings indicate a systematic analysis and progressive application of a variety of active methodologies: collaborative learning, flipped classroom, project-based learning (PBL), and challenge-based learning. The results show that these methodologies support the development of soft skills such as critical thinking, creativity, collaboration, communication, and digital literacy, which are necessary for solving social, economic, and technological problems. The curricular structure of the 2022 study programs is a deliberate and coherent response to the vision of the IPN's New Educational Model, demonstrating a commitment to comprehensive training and preparing students for a dynamic and technologically globalized work environment.

KEYWORDS: Active methodologies, 21st-century skills, Curriculum analysis.

Introduction

Upper secondary technical education is a strategic factor for the country's development, a driver of social mobility and a means of strengthening the productive sector in Mexico. Its function is twofold: to provide young people with technical professional skills and knowledge for a profession that allows them to enter the world of work immediately, and to prepare them with a solid foundation for higher education (Hablamex, 2024). This level of education represents the link that connects higher education with the world of work and industry, promoting labor inclusion and closing the technical skills gaps that impact the country's competitiveness.

In the Fourth Industrial Revolution, where digital, physical, and biological technologies converge, technical education systems face the challenge of adapting to the needs of Industry 4.0. Automation, advanced robotics, the Internet of Things, and artificial intelligence are transforming job profiles, requiring specialized technicians who can operate preferred equipment and solve unstructured problems, work in multidisciplinary teams, and learn continuously (World Economic Forum, 2020). In this regard, the National Polytechnic Institute (IPN) is an institution that has initiated an intentional and organized process of educational innovation, which is radical in its conventional pedagogical approaches, moving from models focused on the transmission of knowledge to models that prioritize the development of competencies and soft skills.

Thus, since the last decade, the IPN has developed a "New Educational Model" to transform itself into a competitive, innovative institution that takes advantage of cutting-edge technologies, cares for the environment, and preserves its identity and social commitment (DEMS, 2014). Its trajectory is a benchmark for quality technical education at the national and global levels, demonstrating a commitment to increasing its social impact. The objective of this work is to contribute to how the IPN is implementing pedagogical innovation in a specific context and in a technical career that is highly relevant to the country's industrial development. It is a proposal that anticipates global and national challenges in higher education, seeking to transcend conventional and pragmatic pedagogical models by integrating active methodologies and the development of soft skills.

Established in 2012, this campus was developed with the aim of expanding upper secondary education and meeting a social need in the region, contributing to the scientific and technologic e development of Hidalgo (Oncenoticias.digital, sf). CECyT 16 "Hidalgo" has become a benchmark for quality technical education, demonstrating the IPN's commitment to increasing its social impact and democratizing technical education.

The objective of this work is to contribute to this field by showing how the IPN is implementing pedagogical innovation in a specific context and in a technical degree program that is highly relevant to the country's industrial development. The study focuses on the degree program in Automated Systems Machinery Technology, whose graduate profile meets the needs of advanced manufacturing and industrial automation, which are priority areas for Mexican industrial policy.

The purpose of this article is to critically review the incorporation of active methodologies and 21st-century skills in the fourth-semester curriculum design of the Technician in Machines with Automated Systems program at CECyT 16 "Hidalgo"; verifying whether the pedagogical strategy of the curriculum is aligned with the program's graduate profile and the institutional philosophy of the IPN, recognizing its strengths in design and the challenges for its implementation.

Problem Statement

Current technical training faces a fundamental challenge with rapid technological evolution and the transition to so-called Education 4.0, which requires graduates to possess a set of skills that goes beyond memorizing knowledge and repeating standardized procedures. The generic and disciplinary competencies of the graduate profile for the "Technician in Automated Systems" degree require students to be able to develop innovations, propose solutions to complex problems, learn on their own initiative, and contribute critically to sustainable development. so the pedagogical challenge lies in how curriculum design can actively foster these skills in an educational environment that has traditionally favored the knowledge transmission model.

The National Polytechnic Institute addresses this challenge through its New Educational Model, which pursues both structural and curricular transformation. In this context, the curriculum is conceived not only as a set of learning units and topics, but as an integral component of the educational policy being implemented, where the structure of the study programs, the selection of methodologies, and the definition of expected learning outcomes reflect the institution's pedagogical intention to innovate and improve. This approach is aligned with an interpretive paradigm, in which the curriculum is conceived as a dynamic and contextual text. In this sense, the meaning of the curriculum is actively constructed by

DOI https://doi.org/10.22533/at.ed.5585122530097

the subjects involved, as opposed to a managerial perspective that tends to objectify reality and measure performance exclusively.

With these considerations in mind, the research question that guides this study is: How does the curriculum design for the fourth semester of the Technical Degree in Automated Systems Machinery at CECyT 16 "Hidalgo" use active methodologies and promote the development of 21st-century skills, and how does this strategy align with the IPN's graduate profile and institutional objectives?

The relevance of this question lies in the fact that the answer allows us to go beyond a simple statement of intent. An in-depth analysis of the curriculum design in the context of CECyT 16 provides a window through which to examine the internal coherence of the study program. The study will help identify strengths in the implementation of the IPN educational model in one of its units and understand the implications of adopting these methodologies in the training of future technicians.

Theoretical Framework

The IPN's New Educational Model is based on the recognition of the challenges facing higher education at the global and national levels, as well as on a diagnosis of the institution's internal conditions. Its fundamental principles focus on competitiveness, innovation, the use of technologies, care for the environment, and social commitment. This model seeks to transform the conception of education from a hierarchical and unidirectional vision to a democratic perspective, where the active participation of individuals in the construction of knowledge is central and meaningful.

In this context, the study programs are documents that reflect this transformation. The redesign of the IPN's plans and programs guides the structuring of content so that it moves beyond a vision that considers performance as the only metric of success. The inclusion of active methodologies shows that the curriculum is being designed to foster critical thinking skills, creativity, and complex problem-solving, pillars that oppose a purely rote-learning pedagogy or a vision that reduces the curriculum to a study plan focused on measuring immediate results. The presence of these pedagogical approaches in the curriculum of the Technician in Automated Systems program is a tangible manifestation of the institution's intention to align its educational offerings with its philosophy of comprehensive training and its social role.

Active Methodologies and Their Impact on Technical Education

Active methodologies are a set of pedagogical approaches that place students in a proactive role in their own learning process, and their application in technical education is particularly valuable because of their ability to link theory with practice, developing essential cross-cutting skills.

- Collaborative Learning: This is a pedagogical method in which students collaborate to solve problems and build knowledge, relying on everyone's learning and positive interdependence. Educational research shows that this model not only raises academic performance but also strengthens critical thinking, social skills, and self-awareness. In addition, it is in line with 21st-

DOI https://doi.org/10.22533/at.ed.5585122530097

-century skills training, promoting collaborative work, communication, and the simultaneous development of individual and collective responsibility.

- Flipped Classroom (Flip Teaching): This pedagogical model transforms learning times, allowing students to acquire theory and concepts asynchronously outside the classroom (through videos, podcasts, or readings). In this way, classroom or synchronous time is devoted to activities of high cognitive value, such as active practice, resolving doubts, and the contextualized application of content. This methodology can be implemented in any area of knowledge and develops student autonomy and self-management of their learning, reinforcing content and achieving more functional and lasting knowledge.
- Project-Based Learning (PBL): This is an active methodology where students learn by designing and creating real projects. Through practice and the resolution of complex problems, this strategy develops both in-depth disciplinary knowledge and 21st-century skills. In addition, PBL is especially useful in teaching any area of knowledge and STEM (Science, Technology, Engineering, and Mathematics) methodology, as it generates motivation and interest among students in applying it.
- Challenge-Based Learning (CBL): This is a pedagogical methodology that aims to integrate school knowledge with real and meaningful problems, organizing learning around the identification of a real problem and its solution; it supports the development of initiative, creativity, reflection, and understanding of content by the student. In this context, the teacher goes from being an expert to a companion and guide, accompanying the student in their learning process.
- Case Method: This strategy allows students to construct their learning based on the analysis and discussion of real-life situations that are narrated. It develops crucial skills such as decision-making, analysis, the development of alternatives, and the communication and defense of ideas.

21st Century Skills for Technical Careers

For a technician in Automated Systems Machinery, 21st Century Skills are the key to employability (Table 1).

21st Century Skill	Relevance in Automated Systems
Critical Thinking and Problem Solving	Essential for rigorous analysis of information, diagnosis of complex situations, and formulation of effective and logical solutions in various contexts.
Collaboration and Communication	Fundamental for effective interaction in multidisciplinary work teams, the negotiation of ideas, and the successful management of group projects.
Creativity and Innovation (Design Thinking)	Applied in the generation of original ideas, the search for novel approaches, and the adaptation of existing solutions to new challenges or scenarios.
Autonomy and Self-Management	Necessary for the development of individual responsibility for one's own learning process, the continuous acquisition of knowledge, and proactive adaptation to changing environments.

Source: Own creation

Methodology

Type of Research

This study is conceived as a qualitative case study. It focuses on the curriculum of an academic program for Technicians in Machines with Automated Systems at the IPN's foreign academic unit (CECyT 16 "Hidalgo"). This approach allows for a deep understanding of the dynamics and internal logic of curriculum design in its real context, with the 2021 study programs of the professional learning units: lathe and milling machine operation, mechanical parts manufacturing, hydraulics and pneumatics, and electric motor control.

Sample and Analysis Units

The study sample consists of the four learning units from the fourth semester of the Technician in Machines with Automated Systems program at CECyT 16 "Hidalgo," school year 25-2 (January-July 2025). The analysis units are the textual descriptions of the expected learning outcomes ( ), the active methodologies applied, and the 21st-century skills applied that are contained in the study programs.

Data Collection Instruments

The academic programs of the four learning units, presented in tabular format, constituted the main data collection instrument. The tables explicitly contain the variables to be analyzed, allowing for a direct and systematic examination of the curricular intent.

Data Analysis Process

The analysis of the textual data was carried out in the following phases:

1. Information Reduction: The tables were reviewed to identify and separate relevant units of meaning. References to active methodology, 21st-century skills, and the activity environment (classroom or laboratory) were treated as a unit of analysis.
2. Open Coding: Descriptive codes were assigned to each unit of analysis. The variables: Teamwork and Collaboration were grouped under the category Collaborative Skills; Critical Judgment and Critical Thinking were coded as Critical Thinking.
3. Categorization and Contextualization: The codes were grouped into broader thematic categories to identify patterns and trends. This process, which is not linear but recurrent, allowed for the creation of a consolidated table for the visualization of the findings. The recurrence and distribution of methodologies and skills were analyzed, considering the context of each learning unit and its relationship with the environment (classroom or laboratory). The contextualization of data is essential for obtaining meaningful results. (31)

Analysis of Results

To summarize the findings of the content analysis, the following consolidated table illustrates the frequency and distribution of active methodologies and 21st-century skills in the fourth-semester curriculum.

Academic Program: Technician in Machines with Automated Systems

Learning Unit: Lathe and Milling Machine Operation

Expected Learning	Active methodology applied	21st-century skills applied	Key activities (learning environment)
Recognize the basic elements of the lathe and milling machine, applying safety and collaborative work standards.	Collaborative learning	- Teamwork - Effective communication - Responsibility and tolerance - Critical thinking	Classroom: - A comparative table is drawn up with the characteristics of the lathe and the milling machine.
Assemble materials and tools using critical judgment and safety.	Flipped Classroom	- Self-management - Collaboration - Responsible use of equipment - Critical thinking	Classroom: -The teacher supports the preparation of a descriptive report on the assembly process.
Prepares process sheets with machining calculations, solving complex problems.	Case study method	- Problem solving - Collaboration - Effective communication	Classroom: - Students develop a practical case report with process sheets.
Demonstrate basic turning operations based on the process sheet.	Flipped Classroom	- Teamwork - Time management - Responsibility - Critical thinking	Laboratory: -Students machine the workpiece on a lathe.
Apply advanced turning techniques (cones and threads) with critical judgment and care.	Problem-Based Learning (PBL)	- Problem solving - Use of measuring equipment - Collaboration - Responsibility	Laboratory: - Process sheets, calculations, and machined parts are analyzed.
Demonstration of basic milling operations on flat surfaces and simple profiles.	Flipped Classroom	- Sustainability - Collaborative work - Responsibility	Laboratory: -Work report and milled part with annotations.

Academic Program: Technician in Machines with Automated Systems

Learning Unit: Manufacturing of Mechanical Parts

Expected learning	Active methodology applied	21st-century skills applied	Key activities (learning environment)
Critically and analytically describe mechanical part drawings in accordance with ISO standards for the manufacturing process.	Flipped classroom and collaborative learning	- Critical thinking - Graphic expression - Individual and social responsibility	Classroom: - Standardized plans are described
Interpret process sheets according to parameters, conditions, and standardized plans.	Flipped classroom and collaborative learning	- Critical thinking - Teamwork - Social responsibility	Classroom: -The teacher explains what the process sheet is - Questions are asked regarding its interpretation
Determines working conditions and machining parameters for chip removal.	Flipped classroom and collaborative learning	- Technical and critical analysis - Problem solving	Classroom: - Calculate parameters and conditions
Machining mechanical parts by chip removal, applying sustainability principles.	Project-based learning (PBL)	- Creative thinking - Responsible and collaborative work - Sustainability	Laboratory: -A machined part is made according to plans
Determine process parameters without chip removal.	Collaborative work and problem solving	- Solving complex problems - Sustainability - Decision making	Classroom: -More complex calculations explained by the machining parameters instructor
Manufactures parts using non-cutting processes for automated systems.	Project-based learning (PBL)	- Use of emerging technologies (such as 3D printing) - Technical verification - Responsibility and safety	Laboratory: -The project and finished piece are constructed

DOI https://doi.org/10.22533/at.ed.5585122530097

Academic Program: Technician in Machines with Automated Systems

Learning Unit: Hydraulics and Pneumatics

Expected learning	Active methodology applied	21st-century skills applied	Key activities (learning environment)
Recognize fluid and pressurized energy generation systems in hydraulics and pneumatics.	Flipped classroom, problem-based learning, collaborative learning	- Analytical thinking - Social responsibility - Effective communication - Collaborative work	Laboratory: -Practice identifying hydraulic and pneumatic systems
Schematize hydraulic and pneumatic components with symbols and operation.	Flipped classroom, challenge-based learning	Creativity Effective communication Organization Collaborative work	Classroom: -The teacher explains the standard symbols for elements
Relate elements and symbols of basic hydraulic and pneumatic circuits.	Collaborative learning, workshop	Decision making Critical thinking Teamwork	Classroom: -Identification of elements in basic circuits
Manipulate sequential and combinational circuits based on diagrams.	Project-based learning	Sustainability Effective communication Critical thinking Problem solving	Laboratory: -Construction and simulation of sequential/combinational circuits
Explains how complex circuits work using symbols and standards.	Flipped classroom, challenge-based learning	Social responsibility Critical thinking Decision making	Classroom: - Analysis of elements in industrial circuits
Builds and operates complex hydraulic and pneumatic circuits, detecting and correcting faults.	Project-based learning	-Innovation - Critical thinking - Personal responsibility - Collaborative work	Laboratory: -The aim will be to find solutions to faults in industrial circuits

Academic Program: Technician in Machines with Automated Systems

Learning Unit: Electric Motor Control

Expected learning	Active methodology applied	21st-century skills applied	Key activities (learning environment)
Recognize the elements for controlling and protecting electric motors.	Collaborative learning: Trigger questions, group discussion, identification and labeling of components.	Critical thinking	Classroom: - Questions about automated doors and verbal discussion. -The teacher explains the importance of motors and shows examples (fans, washing machines).
Demonstrates how basic circuits work through physical connection and software.	Challenge-based learning, simulation, collaborative learning	Analytical thinking Use of digital technologies Teamwork Following safety rules	Classroom: Practical demonstrations and circuit simulations
Build electrical circuits with control and power elements, applying regulations and sustainability.	Project-based learning, cooperative learning	Creativity Critical thinking Social responsibility Collaborative work	Laboratory: -Physical assembly and circuit simulation
Uses frequency converters to control the speed of electric motors.	Problem solving, simulation	- Problem solving - Creativity, - Social responsibility	Classroom: -Practice speed control with frequency converter
Connect and use electronic devices to control motors.	Project-based learning	Innovation Critical thinking Collaborative work	Laboratory: -Practice integrating electronic devices
Performs preventive and corrective maintenance on control and power circuits.	Challenge-based learning	Responsibility Problem solving Collaborative work	Laboratory: -Practice in detecting and correcting faults

Analysis by Learning Unit:

- **Lathe and Milling Machine Operation:** The curriculum for this unit follows a deliberate pedagogical sequence, starting with initial activities to recognize parts, which are carried out using collaborative learning and the flipped classroom approach, promoting teamwork and critical thinking. Complex activities, such as creating process sheets and machining parts, are linked to the Case Method and PBL, solving complex problems and working as a team to apply them in practice.
- **Manufacturing of Mechanical Parts:** Here, there is a clear duality between theoretical work in the classroom and

practical application in the laboratory. The phases of describing and interpreting plans are carried out in the classroom using methodologies such as the Flipped Classroom and Collaborative Learning, which focus on critical thinking. On the other hand, the machining of parts is carried out in the laboratory, using Project-Based Learning (PBL), which promotes sustainability, creative thinking, and the use of emerging technologies.

- **Hydraulics and Pneumatics:** This is the most methodologically diverse teaching unit, focusing on innovation, creativity, and complex problem solving. The relationship between the task and PBL methodologies, where the curriculum seeks to prepare students for the real world, in which they will encounter diverse problems to solve.
- **Electric Motor Control:** The emphasis in this unit is on practical application and maintenance; assembly, simulation, and preventive and corrective maintenance activities are directly linked to methodologies such as Project-Based Learning and Challenge-Based Learning. This directly aligns learning with job tasks, fostering skills such as responsibility, creativity, and complex problem solving in the laboratory.

There is a clear correlation between the complexity of the learning task and the active methodology selected. Tasks involving the recognition of basic concepts and the acquisition of theory are approached with more structured approaches such as Collaborative Learning and the Flipped Classroom, which provide a solid foundation of knowledge. In contrast, more complex tasks that require innovation or the resolution of unforeseen problems are associated with more open-ended methodologies such as PBL and RBL. This pattern indicates that the curriculum is not a simple list of activities, but rather an intentional pedagogical design that seeks progression from the acquisition of concepts to creative application and real-world problem solving.

Discussion

Curriculum Alignment and Graduate Profile

The analysis shows strong consistency between the fourth semester curriculum design and the program's graduate profile, which requires graduates to have leadership skills, teamwork skills, the ability to propose solutions to problems, and a commitment to sustainable development. The recurrence of skills such as critical thinking, complex problem solving, collaboration, and sustainability in the learning units analyzed is a strong indicator that the curriculum is designed to foster the development of these cross-cutting competencies. In this way, CECyT 16 "Hidalgo" is training its students to become well-rounded professionals, capable of facing the challenges of modern industry.

Pedagogical Strengths of the Design

The curriculum design has a number of pedagogical strengths, such as: the logical progression between learning units is evident, students begin with knowledge of machinery operation and then move on to parts manufacturing, control systems, and finally, complex problem solving in the laboratory. The curriculum promotes complementarity between the methodologies used, alternating between classroom and laboratory work, allowing for a complete learning cycle, where the Flipped Classroom introduces theory autonomously, while PBL allows for practical application and innovation.

Challenges and Future Implications

The effective implementation of these active methodologies requires a fundamental change in the role of the teacher, who must shift from being an instructor to a facilitator, guide, and mentor. This change is not trivial and raises the critical need for robust and continuous teacher training programs; the success of approaches such as Challenge-Based Learning depends on the teacher's ability to guide students with trigger questions, allowing them to make mistakes and learn from them, rather than providing direct answers. Therefore, the challenge for the institution is not limited to creating an innovative curriculum on paper, but also to providing the resources, training, and support necessary for these methodologies to be successfully implemented in the classroom and laboratory. The sustainability of this pedagogical model ultimately depends on the institution's commitment to the continuous training of its academic staff.

Conclusions

This study demonstrates how a curriculum designed with active methodologies can be a tool for training graduates with a set of technical and cross-cutting skills. The institution prepares its students to meet the needs of local industry and contribute to the scientific and technologic y advancement of their environment, thus fulfilling the social mission of the IPN in the Hidalgo region.

The qualitative analysis of the fourth semester curriculum of the Technician in Machines with Automated Systems program at CECyT 16 "Hidalgo" reveals an intentional and articulated pedagogical design with the integration of active methodologies, which follows a curriculum strategy that uses the appropriate approach for each learning objective. This structure is aligned with the program's graduate profile and with the innovation and social commitment of the IPN's Educational Model and its new study programs.

The answer to the research question is that CECyT 16 "Hidalgo" successfully achieves integration by correlating the complexity of tasks with the type of active methodology, promoting a pedagogical progression that goes from theory to practical application and innovation.

References

CECyT 16 "Hidalgo". (s. f.). *Técnico en Máquinas con Sistemas Automatizados*. Recuperado de https://www.cecyt16.ipn.mx/oferta-educativa/ver-carrera.html?lg=es&id=11

Chancusi Herrera, A. A., & Peralvo Arequipa, C. del R. (2021). El Método de Caso en las Estrategias Metodológicas de Enseñanza y Aprendizaje. *Revista Científica Hallazgos21*, *6*(3), 369–389. https://doi.org/10.69890/hallazgos21.v6i3.544

Chao, F., & Alva, M. (2024). *La evaluación curricular como objeto de estudio en la investigación educativa*.

DEMS (IPN). (2014). *Modelo Educativo IPN*. Recuperado de https://es.scribd.com/presentation/207231643/Modelo-Educativo-Ipn

Educarchile. (s. f.). *Cultura Maker: hacer en el presente, aprender para el futuro*. Recuperado de https://www.educarchile.cl/articulos/cultura-maker-hacer-en-el-presente-aprender-para-el-futuro

Foro Económico Mundial (World Economic Forum). (2020). *The Future of Jobs Report 2020*.

García Gonzalo, C. (2020). *Design thinking como metodología del proyecto empresarial*. Universidad de Zaragoza.

González, C., & Marín, D. (2024). Educational Innovation in Ecuador: Impact of Design Thinking on Civic Education. *Revista Ingeniería Industrial*, *21*.

Hablamex. (2024). *La importancia de la Educación Técnica en México*. Recuperado de https://hablamex.com/es/noticias/importancia-educacion-tecnica-mexico

Hernández, E. G. (2023). El Aprendizaje Basado en Proyectos (ABP) como Herramienta para el Desarrollo de Habilidades Del Siglo XXI. *Ciencia Latina Revista Científica Multidisciplinar*, *7*(5), 16329. https://doi.org/10.37811/cl_rcm.v7i5.16329

IPN. (s. f.). *Nivel Medio Superior*. Recuperado de https://www.ipn.mx/oferta-educativa/educacion-medio-superior/

iSpring. (2023). *Aprendizaje colaborativo: qué es, beneficios y ejemplos*. Recuperado de https://www.ispring.es/blog/aprendizaje-colaborativo

Meinel, C., & von Thienen, J. (2016). *Design Thinking: A Creative Approach to Educational Problems of Practice*.

Oncenoticias.digital. (s. f.).

Salinas, D., & Moreno, R. (2022). La importancia del aprendizaje basado en proyectos en la educación STEM. *Revista Científica Multidisciplinar*, *2*(2), 12. https://doi.org/10.62943/nrj.v2n2.2023.12

TEC Monterrey. (s. f.). *Aprendizaje Basado en Retos*. Recuperado de https://cgcai.unicauca.edu.co/innovacioneducativa/sites/default/files/recursos/Aprendizaje%20Basado%20en%20Retos%20Edutrend_Monterey.pdf

TryEngineering. (s. f.). *Design Thinking: un enfoque empático para ingenieros*. Recuperado de https://tryengineering.org/es/news/design-thinking-an-empathetic-approach-for-engineers/#:~:text=El%20proceso%20de%20Design%20Thinking,prueban%20exhaustivamente%2C%20analizan%20y%2repiten.

UNAM. (2014). *Enfoque cualitativo y crítico de la evaluación educativa*. Recuperado de https://tesiunamdocumentos.dgb.unam.mx/ptd2014/enero/0707209/0707209.pdf

Universidad de Deusto. (2012). *Metodología de la investigación cualitativa*.

Universidad de Valencia. (s. f.). *Aula Invertida (Flip Teaching)*. Recuperado de https://www.uv.es/uvweb/master-ingenieria-informatica/es/blog/aula-invertida-flip-teaching-master-ingenieria--informatica-semipresencial-1285949166190/GasetaRecerca.html?id=1285952756759

UNIPRO. (2024). *El análisis de contenido en la investigación cualitativa*. Recuperado de https://imoyeasesoriacademica.com/el-analisis-de-contenido-en-la-investigacion-cualitativa/

Vallejo, A., & Cárdenas, P. (2024). Análisis de datos cualitativos en la investigación sobre la diferenciación educativa. . Recuperado de https://core.ac.uk/download/pdf/161255904.pdf

Zaragoza, A. (2023). El Aprendizaje Basado en Proyectos (ABP) como Herramienta para el Desarrollo de Habilidades Del Siglo XXI. *ResearchGate*.