

<https://doi.org/10.23913/ride.v16i32.2923>

Scientific articles

Metodologías emergentes, aplicación y creatividad en el aula para lograr un aprendizaje significativo

Emerging methodologies, application and creativity in the classroom to achieve meaningful learning

Metodologias emergentes, aplicação e criatividade em sala de aula para alcançar uma aprendizagem significativa

Veronica Mendoza Duran

Universidad Autónoma de Baja California, México

mendoza.veronica@uabc.edu.mx

<https://orcid.org/0009-0004-6382-6448>

Mayra Alejandra Heredia Aguilar

Universidad Autónoma de Baja California, México

mayra.heredia@uabc.edu.mx

<https://orcid.org/0009-0003-6998-7077>

Resumen

El estudio tuvo como objetivo identificar el uso adecuado de las metodologías emergentes en la práctica de estudiantes universitarios del área educativa. Se fundamenta en tres ejes: a) nuevas realidades formativas, b) metodologías emergentes y su c) uso en la práctica docente. La metodología propuesta muestra un estudio de investigación–acción, llevado a cabo mediante un proceso sistemático orientado a la resolución de problemas. La unidad de análisis estuvo conformada por 17 estudiantes de educación superior, con edades entre 19 y 34 años, pertenecientes a seis universidades. La recolección de los datos se realizó mediante un instrumento estructurado en escala tipo Likert, en el que se obtuvieron datos generales y experiencia de aprendizaje de los participantes. Los hallazgos evidencian cooperación, participación activa y reflexiva, así como el desarrollo de nuevas formas creativas de enseñar y aprender, orientadas a romper con la enseñanza tradicional. Se concluye, que la estrategia

docente favoreció el aprendizaje significativo mediante experiencias activas y retadoras, a través de la integración de conocimientos previos con nuevos, fortaleciendo la formación pedagógica. En este sentido, la propuesta es flexible y adaptable a distintos contextos y necesidades educativas y representa un aporte valioso para futuras investigaciones relacionadas con las nuevas realidades formativas.

Palabras clave: metodologías emergentes, práctica docente, investigación-acción, aprendizaje significativo

Abstract

The aim of this study was to identify the appropriate use of emerging methodologies in the practice of university students in the field of education. It is grounded in three main dimensions: (a) new educational realities, (b) emerging methodologies, and (c) their application in teaching practice. The proposed methodology adopts an action research approach, conducted through a systematic process oriented toward problem-solving. The unit of analysis consisted of 17 higher education students, aged between 19 and 34 years old, from six different universities. Data collection was carried out using a structured Likert-scale instrument, through which general information and participants' learning experiences were obtained. The findings reveal cooperation, active and reflective participation, as well as the development of new creative ways of teaching and learning aimed at moving beyond traditional instructional approaches. The study concludes that the teaching strategy promoted meaningful learning through active and challenging experiences by integrating prior and new knowledge, thereby strengthening pedagogical training. In this regard, the study proposes a flexible and adaptable approach to diverse educational contexts and needs, representing a valuable contribution to future research related to emerging educational realities.

Keywords: emerging pedagogies, teaching practice, action research, meaningful learning.

Resumo

O estudo teve como objetivo identificar o uso apropriado de metodologias emergentes na prática docente de estudantes universitários na área da educação. Baseia-se em três pilares: a) novas realidades educacionais, b) metodologias emergentes e c) seu uso na prática docente. A metodologia proposta é uma pesquisa-ação, conduzida por meio de um processo sistemático de resolução de problemas. A unidade de análise foi composta por 17 estudantes do ensino superior, com idades entre 19 e 34 anos, de seis universidades. A coleta de dados foi realizada utilizando um instrumento estruturado em escala Likert, que reuniu informações gerais e detalhes das experiências de aprendizagem dos participantes. Os resultados demonstram cooperação, participação ativa e reflexiva, e o desenvolvimento de novas formas criativas de ensino e aprendizagem, visando romper com os métodos tradicionais de ensino. O estudo conclui que a estratégia de ensino promoveu aprendizagem significativa por meio de experiências ativas e desafiadoras, integrando conhecimentos prévios com novas informações, fortalecendo, assim, a formação pedagógica. Nesse sentido, a proposta é flexível e adaptável a diferentes contextos e necessidades educacionais, representando uma valiosa contribuição para futuras pesquisas relacionadas às novas realidades educacionais.

Palavras-chave: metodologias emergentes, prática docente, pesquisa-ação, aprendizagem significativa

Date Received: November 2025

Date Accepted: April 2026

Introduction

Since the COVID-19 health emergency, it has become evident that teacher training and innovation are fundamental in order to respond to changes and sudden situations that may arise in education. In this sense, emerging methodologies represent tools that are applicable to the constant changes occurring today.

Adell and Castañeda (2012) emphasize that emerging methodologies allow us to address the basic competencies required for 21st century education, as they are characterized by the use and mastery of technologies during their implementation, which promote the acquisition of digital competence and the ability to learn autonomously.

They also foster meaningful, collaborative, and participatory learning, assuming commitment as an integral part of the learning process; they enhance the use and effective utilization of available resources; they reduce space-time barriers among educational agents

and enable a better understanding of educational transformations, thereby responding to social demands.

In this sense, the need for teachers to continuously update and innovate in order to respond effectively to changes in the educational environment is evident, integrating methodologies that allow them to address unforeseen situations and emerging educational realities.

In this way, today's teachers recognize the need to integrate new teaching methodologies into their practice in a creative and innovative manner. Therefore, it is important for teacher educators to master these methodologies to ensure their proper implementation in real academic contexts.

This paper demonstrates how a student teacher identifies and analyzes emerging methodologies for use in academic situations related to their future professional practice. It describes how, based on prior knowledge and its application, practice enables an approach to new educational realities, fostering their implementation through creativity and educational innovation.

Theoretical references

This study is grounded in the perspective of new educational realities and the challenges posed by the development of skills such as critical thinking, problem-solving, and informed decision-making. One of its objectives is for the reader to understand how theory is translated into practice. Therefore, a general review of emerging methodologies is conducted, along with key aspects for their implementation in educational practice.

- Recognize cognitive theories and the influence of environmental conditions on learning.
- Identify how the explanations and demonstrations provided by teachers facilitate students' acquisition of information.
- Promote meaningful learning through the practice of students' skills combined with timely and formative feedback.

According to Szabó and Csépes (2023), the constructivist approach is characterized by its adaptability to the constant changes in the teaching and learning process, assuming that knowledge is constructed and interpreted through students' active experiences. From a

constructivist perspective, classrooms become learning spaces that prioritize student autonomy and collaboration, placing them at the center of the process.

Based on the contributions of this theory, the importance of learners' self-regulation in the construction of their own knowledge is highlighted, as well as how this process occurs in progressive stages from the concrete to the abstract (Zhang, 2022).

Furthermore, from a constructivist perspective, the emergence of new methodologies considered active, such as problem-based learning and cooperative learning, has been promoted. Their implementation has become a challenge for teachers, however, at the same time, it enables inclusive education that adapts to different learning styles and paces (Szabó and Csépes, 2023).

New educational realities

The current landscape in university education shows a growing trend in the integration of active methodologies and emerging technologies as a response to the need to train competent professionals capable of facing the challenges of a globalized and changing world.

Active learning methodologies involve a shift from the traditional educational approach, in which the roles of student and teacher are redefined. Students assume an active and collaborative role in their own learning process, while teachers design didactic proposals, acting as facilitators and educational guides. Key advantages of active learning methodologies include the development of critical thinking, collaborative work skills, and the promotion of active participation (Aparicio-Gómez et al., 2024).

Learning is an active process composed of three dimensions: cognitive, social, and physical. The results of implementing active learning strategies represent a prominent approach to teaching and learning (Vale & Barbosa, 2023).

Emerging methodologies

Emerging methodologies are characterized by transforming the traditional way in which education is perceived, with the aim of fostering the acquisition of contextualized and meaningful learning through greater student involvement.

One of the main characteristics of this methodological proposal is that it presents a change in roles between the teacher and the students, with the latter assuming an active role

in their own learning process in order to develop greater autonomy and regulation of their cognitive processes.

As part of the theoretical framework that supports the intervention presented in this study, a brief conceptual review of the proposed active methodologies is carried out: Project-Based Learning, Gamification, Flipped Classroom, Cooperative Learning and User-Centered Design.

Project-Based Learning (PBL)

Project-based learning is a new pedagogical approach that enhances the development of problem-solving and collaborative work skills. This methodology fosters experiences that allows for a better understanding of theoretical principles, interdisciplinarity, and promotes a problem-solving mindset, thereby connecting theory with practice (Husin et al., 2025).

As part of this methodology, the teacher proposes a real or simulated problem, with the aim of having students develop a product that may consist of a proposed solution, a device or a service, within a set period (López, 2011).

It can be highlighted that the characteristics that distinguish the project-based learning methodology are that it fosters the construction of meaningful learning, uses authentic real-world contexts, and promotes metacognition and collaborative learning.

Gamification

Gamification is a methodology that consists of designing learning environments with game-like characteristics in order to make them more attractive and interesting for students. According to Ibáñez (2024),

It consists of transferring the dynamics of games to the teaching and learning process. However, the elements of the game (rules, design, aesthetics, avatars, scoring, motivation, etc.) must be taken into account to gamify the classroom, and for this purpose, there is a variety of technological resources that can be useful (p. 34).

The appeal of gamification lies in its potential to positively influence student engagement and motivation through the use of scores, levels, and leaderboards that it incorporates into the teaching and learning process. Despite the controversy surrounding the promotion of a competitive environment, gamification has demonstrated a positive impact on student motivation, engagement, and academic performance (Rahmi et al., 2025).

Flipped Classroom



In order to promote the competence of learning to learn, the flipped classroom method is proposed, in which students take an active and autonomous role in their learning processes.

The flipped classroom is one of the most widely used active learning methodologies for replacing the traditional teaching model. Its main characteristic is that learning activities are distributed between work outside and inside the classroom. Before class, the teacher provides audiovisual or reading materials for students to review the theoretical foundations and concepts that will be covered. During the class session, time is allocated for addressing questions, consolidating concepts, and applying the knowledge acquired (Torres-Martín et al., 2022).

According to Sandobal et al (2021), based on the analyzed articles, it is recommended that, when implementing the flipped classroom, the following considerations should be taken into account:

- Proper planning of the activities to be carried out by the students before, during and after class; [...]
- Knowledge of the methodology to be used in class. [...]
- Contextualize the proposal to the environment in which it will be applied, taking into account the availability of resources for all actors.
- Define assessment rubrics that consider the competencies that will be assessed; and how they will be assessed [...] (p. 298)

Cooperative Learning

In recent years, the importance of integrating soft skills development with professional knowledge for the successful integration of human capital into the workplace has become increasingly evident. In this regard, it is essential that current educational processes intentionally promote skills such as teamwork, effective communication, and conflict resolution, among others.

Cooperative learning involves planning activities that require a series of group interactions to achieve shared goals. This methodology has been empirically proven effective in improving academic performance, interpersonal development, and psychosocial adjustment. Key aspects of its implementation include proper team organization, planning interdependent tasks, and using reliable assessment mechanisms (Qin et al., 2025).

According to Barceló et al (2024),

[...] The results obtained confirm that the participants in this research perceive with a high degree of agreement that the strategies used to implement AC promote social skills,

interaction, and positive interdependence. These three dimensions are essential for developing greater social awareness of cooperation and solidarity, with greater possibilities for transforming society (p. 563).

User-Centered Design

User-centered design aims to design learning experiences, teaching materials, or learning environments that meet the real needs of students, rather than focusing solely on curricular content.

It is a methodological approach that seeks to develop a solution that meets the user's requirements. To this end, the user is placed at the center of the design so that the proposal satisfies their needs in terms of effectiveness and efficiency. Its stages emphasize, firstly, understanding the needs of the user and the business. Subsequently, the design stage is divided into three phases: sketching, visual structuring, and prototyping. Finally, a user test is conducted to analyze its implementation and evaluate it (Alsadi, 2021).

According to Carballo et al. (2023),

The DCU model considers aspects beyond aesthetics, analyzing usability and experience of environments, objects and messages during the development process, which allows the user to obtain superior alternatives to the different options of a product (p. 1).

Use in teaching practice (practical aspects for carrying out learning)

A key characteristic of active learning is the proposal of activities that emphasize student participation and interaction, rather than limiting them to being passive recipients of information. As Martella and Schneider (2024) point out, active learning can be considered from two perspectives: the promotion of cognitive or behavioral activities.

Currently, a variety of strategies exist to promote active learning; however, further study is needed regarding their effectiveness and efficient integration in the classroom. One of the main challenges is to promote opportunities for adequate teacher training in the implementation of active learning methodologies.

Implementing active learning strategies requires considering three components: cognitive, physical, and social, as this determines the student's level of participation. However, the physical dimension is the least considered when applying the strategy in the

classroom, despite its relevance to the educational process, since moving, collaborating, and debating with classmates stimulates the brain (Vale & Barbosa, 2023).

From this point of view, an important aspect is the careful planning of the learning sequence that considers the educational context, the content, the integration of the three components (cognitive, physical and social), continuous assessment, the promotion of an appropriate learning environment and the desired skills to be developed.

Methodology

This study employs an action research approach, which, as Kemmis, cited in Murillo (2011), mentions, is a form of self-reflective inquiry undertaken to improve the rationality and understanding of educational practice. It is carried out through a systematic process oriented toward problem-solving. In this sense, the implementation of various emerging methodologies allowed participating students to acquire knowledge and reflection by applying them in an educational context.

The unit of analysis considered was 17 higher education students aged between 19 and 34 years from six universities in Mexico.

- Three students from the Higher School of Physical Education (ESEF).
- A student from the Institute of Educational Sciences (ICE of UAEM).
- A student from the Autonomous University of Yucatan (UADY).
- Six students from the Autonomous University of the State of Morelos (UAEM).
- Two students from the National Autonomous University of Mexico (UNAM).
- Four students from the Central University of Querétaro (UNICEQ).

Instrument

Student feedback was gathered using a structured five-question instrument, which also yielded general data and information about their learning experiences. The evaluation was based on a presentation of the characteristics of the five emerging methodologies, using a Likert scale from one to five, where one represents being very dissatisfied and five represents being very satisfied.

- The first question is directed at analyzing the understanding of the methodologies used for teaching practice.

- The second question focuses on evaluating the usefulness of the information in educational practice.
- The third question examines the benefits of the strategies used by the teacher.
- The fourth question assesses the relevance and suitability of the teaching material used.
- The fifth question addresses the management and use of time in the application of pedagogical strategies.

The instrument was applied exclusively for diagnostic and exploratory purposes, focusing on describing how students applied emerging methodologies in a specific teaching situation. Therefore, the results obtained are descriptive in nature, and no generalizations or in-depth causal inferences are drawn.

Design and implementation

In this phase, the use of three dimensions is proposed to promote active learning (Vale and Barbosa, 2023):

- Cognitive; in which the student applies their knowledge and pedagogical skills in the generation of a new proposal.
- Social; by posing a challenge that promotes the formulation of solutions through dialogue, analysis of ideas and team decision-making for the creation of the teaching material.
- Physics; when asking students to develop materials from the resources provided, it involves leaving their comfort zone and adapting to the needs presented in the case.

The student is instructed through step-by-step instructions, in which each concept and characteristics of the emerging methodologies to be used and their characteristics are defined, which are oriented towards the resolution of an existing educational problem.

- What will the student learn?
- How will he learn it?
- How will you know you completed the activity?

The group of participants, composed of 17 undergraduate students with a focus on education, was divided into four teams. Each team randomly selected one of the five methodologies presented by the instructor. During the 50-minute session, each team applied

one of the following methodologies: Project-Based Learning (PBL), Gamification, Flipped Classroom, Cooperative Learning, or User-Centered Design. Some students showed resistance to applying the Project-Based Learning (PBL) methodology, preferring to switch to a different approach rather than implement it.

Each team received the teaching materials to carry out the activity as shown in Figure 1, so that everyone had the same opportunities.

Figure 1. Teaching material.



Source: own elaboration.

Results

In the evaluation of the exercise, the 17 university students were observed to be attentive, engaged and collaborative, focused on achieving the objective of solving an educational problem through the implementation of an emerging methodology assigned by the teacher.

The process fostered cooperation, active participation, and reflection. Each team presented new and creative ways of teaching and learning, aiming to move beyond traditional teaching methods.

The following is derived from experience:

cooperative learning methodology, the four university students in the group created a product that represents the human body and identifies its parts. Through collaboration and empathy, they achieved their goal (Fig. 2), ensuring personal success through group achievement.

The results obtained coincide with the characteristics indicated by Mejía and Rodríguez (2011) “solving problems, taking the initiative, planning activities, proposing rules, respecting opinions and values” (p. 173).

Figure 2. Application of the cooperative learning methodology.

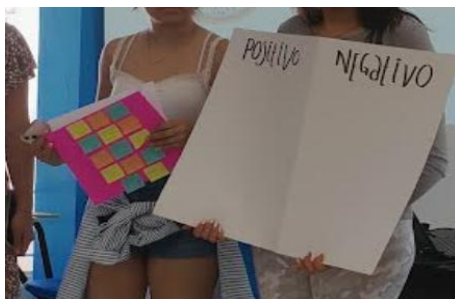


Source: own elaboration.

Based on the implementation of the *flipped classroom methodology*, the team of five students designed a product that allowed them to understand the topic of water conservation. With the use of cell phones, the classroom was no longer limited to four walls. They also managed to develop their product, through which they represented positive and negative aspects of the topic (Fig. 3).

This practice allowed them to access new teaching proposals with active pedagogical activities, which make the learning environment more enjoyable (Adell and Castañeda, 2012).

Figure 3. Application of the *flipped classroom methodology*.



Source: own elaboration.

During the application of the *user-centered design methodology*, the four members of the team designed a product that allows the user to understand the importance of hygiene, in addition to considering the needs of the user with different abilities and capacities, which made it possible to generate awareness about hygiene (Fig. 4).

In this way, the importance of “knowing the particularities of the users in order to reflect them in the interaction and appearance offered by the interface and thus increase its effectiveness” is highlighted (Galeano, 2008, p. 6).

Figure 4. Application of the user-centered design methodology.



Source: own elaboration.

In implementing the *gamification methodology*, the four team members created a product that allowed students to learn the basic operation of addition through a user-friendly competition system, leaderboards, and music. This promoted participation and learning, thus enhancing the user's skills (Fig. 5). A positive effect was identified on student motivation, engagement, and assimilation of new knowledge.

According to Thamarasseri and Chandran (2025), by addressing these challenges and taking advantage of the opportunities offered by gamification, it was possible to create innovative and effective learning experiences that foster a sustainable future.

Figure 5. Application of the gamification method.

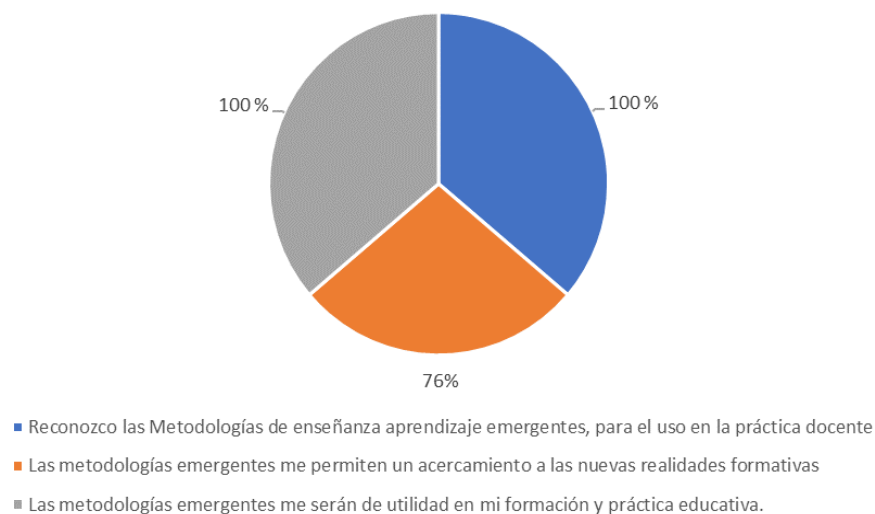


Source: own elaboration.

As part of the implementation of this proposal, an instrument was applied with the purpose of gathering the opinion of the participating students in order to learn about their experience regarding the application of emerging methodologies in educational contexts.

Figure 6 shows the results obtained from the instrument, from the perspective of the students.

Figure 6. Learning experience of university students.



Source: own elaboration.

Regarding the learning experience, once the university students were instructed in each of the emerging methodologies, according to their characteristics and recommendations for their proper application, it can be observed, as shown in Figure 6, that after receiving the teacher's explanation and completing the learning experience proposed in this study, 17 (100%) of the participating students were able to understand the methodologies and their practical application. This result suggests that the teaching strategy was effective in terms of conceptual and procedural understanding.

However, only 13 (76%) believe the information provided them with insight into new educational realities, highlighting a potential gap between theoretical understanding and the ability to transfer such knowledge to broader contexts. This difference may be related to factors such as students' prior experience, their familiarity with innovative approaches, or the contextual conditions in which they plan their professional practice. Nevertheless, 17 (100%) believe the information will be useful in their training and educational practice. Despite this,

the students acknowledge the usefulness of the information in their training and educational practice, thereby reinforcing the relevance of the implemented strategy.

In this sense, the students report that the implemented strategy facilitated meaningful learning, which fostered the understanding of the theoretical basis of the topic and its relationship with their prior knowledge to the experience (Rodríguez, 2015).

Discussion

The results of the learning experience in the use of various emerging methodologies made it possible to identify that the majority of university students understand the implementation of the following methodologies: Project-Based Learning (PBL), Gamification, Flipped Classroom, Cooperative Learning and User-Centered Design, applied to teaching practice, and show a willingness to create meaningful learning experiences.

In accordance with the characteristics described in the Curriculum Framework of the New Mexican School (Secretariat of Public Education [SEP], 2022), students are characterized by a reflective attitude when analyzing new formative realities, manifesting critical thinking and actively involved in the process and in the construction of their own knowledge.

Furthermore, according to Moreira (2017), confronting and solving real-world problems promoted meaningful learning. This process fostered innovation and educational quality, encouraging the acquisition of knowledge with meaning, understanding, and critical thinking. It also enabled students to apply this knowledge to argumentation and problem-solving in diverse contexts.

Compared to the proposal by Sologuren et al. (2019), who implemented a didactic strategy based on resources and methodologies for active learning in first-year university students of engineering and science, aimed at strengthening their communication and innovation skills, relevant similarities were identified. In particular, a positive motivation and response were observed among the students, despite their diverse disciplinary backgrounds, such as pedagogy and engineering. This suggests that active methodologies foster greater student engagement and satisfaction with the implementation of emerging and innovative strategies in the classroom.

In this way, the practical experience in which students applied their newly acquired knowledge fostered active learning by providing an authentic experience that enables innovation and improvement in teaching and offers a comprehensive view of education.

Limitations

The study was conducted with a non-probability sample of 17 student teachers from six educational institutions. The analysis revealed both difficulties and areas for improvement.

According to the application of five emerging methodologies, several problems were detected that require attention for the improvement of the teaching-learning process in future teachers in education.

First, it was identified that students tend to dismiss the implementation of certain methodologies due to a lack of mastery or a reluctance to confront their limitations. This attitude was evident in the present study, as students rejected the use and exchange of information in the application of a particular methodology.

In this sense, it is crucial to design teaching strategies and use tools that provide support to students with limited resources, in order to strengthen their confidence and help them face their difficulties and advance in their learning process.

Another limitation in Mexico is the infrastructure in vulnerable areas of the country, where the availability of services and technologies is insufficient, restricting their application and use. Likewise, it is necessary to consider the sociocultural component of the student body, particularly their beliefs and lifestyles, which influence educational processes.

Conclusion

The proposal presented can be adapted to various contexts depending on the specific needs of students in pedagogical training, through the integration of these or other methodologies and the adaptation of the materials and situations presented in the cases.

This experience represents an opportunity to integrate prior learning with new learning by putting into practice one of the activities they perform most frequently in their professional lives: the design of meaningful and challenging learning experiences.

In accordance with the above, this study constitutes a relevant contribution to future research focused on the transformations of teaching and the training of new generations of teachers.

The proposal is to extend the implementation of this type of practice in order to strengthen the knowledge and skills of pedagogy students, which will contribute significantly to their training and professional practice.

Future lines of research

As a result of the described study, several lines of research were identified that focus on replicating these types of learning experiences. These incorporate methodologies that allow for obtaining empirical evidence to support these practices, in order to facilitate their transfer and application in diverse educational contexts.

A first line of research proposes the incorporation of assessment instruments that allow measuring the impact of emerging methodologies on the development of 21st century skills and competencies.

A second line of research that carries out a comparative analysis between traditional methodologies and emerging methodologies.

Finally, the replication of the study is proposed with emphasis on contextualizing learning situations, based on the intentional selection of local and regional problems of interest to the students, in order to promote commitment, relevance and connection with the environment, and to favor the development of educational practices consistent with their immediate context.

References

- Adell, J., y Castañeda, L. (2012). Tecnologías emergentes, ¿pedagogías emergentes? En J. Hernández, M. Pennesi, D. Sobrino y A. Vázquez (coords.). Tendencias emergentes en educación con TIC. (pp. 13-32). Asociación Espiral, Educación y Tecnología. https://www.researchgate.net/profile/Jose-Hernandez-Ortega-3/publication/344826428_Tendencias_emergentes_en_Educacion_con_TIC/links/5f920f81299bf1b53e3d7dd7/Tendencias-emergentes-en-Educacion-con-TIC.pdf
- Alsadi, A. (2021). User-centred design in educational applications: A systematic literature review [Ponencia]. 2021 International Conference Engineering Technologies and Computer Science (EnT). <http://doi.org/10.1109/EnT52731.2021.00025>
- Aparicio-Gómez, O.Y., Ostos-Ortiz, O.L., y Abadía-García, C. (2024). Convergence between emerging technologies and active methodologies in the university. Journal

- of Technology and Science Education, 14(1), 31-44.
<https://doi.org/10.3926/jotse.2508>
- Barceló-Cerdá, M., López-Gómez, E., Poveda-García-Noblejas, B. y Rodríguez-Gómez, I. (2024). La aplicación del aprendizaje cooperativo en la universidad de acuerdo con la percepción de los estudiantes de Magisterio. *Educación*, 60(2), 553-568.
<https://doi.org/10.5565/rev/educar.2074>
- Carballo, M., y González, G. (2023). El diseño centrado en el usuario: Estrategia para la actualización docente. *Revista Legado de Arquitectura y Diseño*, 18 (34), 1-11.
<https://www.redalyc.org/articulo.oa?id=477975707014>
- Galeano, R. (2008). Diseño centrado en el usuario. *Revista Q*, 2(4), 1-12.
<https://www.proquest.com/openview/8d1d4c1e79287eaa27e7f59fdf351b22/1.pdf>
- Husin, M., Usmeldi., Masdi, H., Simatupang, W., Fadhilah., y Hendriyani, Y. (2025). Project-based problem learning: Improving problem-solving skills in higher education engineering students. *International Journal of Sociology of Education*, 14(1), 62-84 <http://dx.doi.org/10.17583/rise.15125>
- Ibáñez, P. (2024). Metodologías emergentes mediante entornos virtuales de aprendizaje. En M. T. Castilla Mesa (coord.), *Metodologías emergentes en Educación Superior* (pp. 27-43) Octaedro. <https://octaedro.com/libro/metodologias-emergentes-en-educacion-superior/>
- López, J. (2011). Una apuesta de futuro: aprender por proyectos en la universidad. *Revista Iberoamericana de Educación*, 55(1), 1-13.
<https://rieoei.org/RIE/article/view/1630/2677>
- Martella, A. M., y Schneider, D. W. (2024). A reflection on the current state of active learning research. *Journal of the Scholarship of Teaching and Learning*, 24(3), 119–136.
<https://doi.org/10.14434/josotl.v24i3.35263>
- Mejía, L. G. M., y Rodríguez, A. S. (2011). El foro como herramienta del aprendizaje cooperativo. En R.C. (ed.), *Aprendizaje y competencias en educación visiones y reflexiones* (pp. 157- 185). [Editorial]. https://www.researchgate.net/profile/Rocio-C-3/publication/269763958_Aprendizaje_y_competencias_en_educacion_Visiones_y_reflexiones/links/5495e5f50cf29b94482413cd/Aprendizaje-y-competencias-en-educacion-Visiones-y-reflexiones.pdf

- Moreira, M. A. (2017). Aprendizaje significativo como un referente para la organización de la enseñanza. *Archivos de Ciencias de la Educación*, 11(12), e029. <https://doi.org/10.24215/23468866e029>
- Murillo T. F. J. (2011). *Métodos de investigación en educación especial* (3.^a ed.). https://files.cercomp.ufg.br/weby/up/97/o/IA._Madrid.pdf
- Qin, Z., Tesaputa, K., y Nualsing, T. (2025). Developing a Program to Strengthen Cooperative Learning Management Competencies of University Lecturers in Nanning. *Higher Education Studies*, 15(4). <https://doi.org/10.5539/hes.v15n4p1>
- Rahmi, I., Rimenda, T., y Ariyanti, T. D. (2025). Gamification as an alternative to increase students' motivation: a scoping review. *Journal of Education and Learning (EduLearn)*, 19(2), 1125–1133. <https://doi.org/10.11591/edulearn.v19i2.21771>
- Rodríguez, M. P. (2015). Mapa conceptual, una estrategia de aprendizaje significativa. *Revista Eduweb*, 9(2), 97-110. <https://servicio.bc.uc.edu.ve/educacion/eduweb/v9n2/art07.pdf>
- Sandobal-Verón, V. C., Marín, M. B., y Barrios, T. H. (2021). El aula invertida como estrategia didáctica para la generación de competencias: Una revisión sistemática. *RIED. Revista Iberoamericana de Educación a Distancia*, 24(2), pp. 285-308. <https://doi.org/10.5944/ried.24.2.29027>
- Secretaría de Educación Pública [SEP]. (2022). Marco Curricular Común de la Educación Media Superior (MCCEMS). Subsecretaría de Educación Media Superior. https://www.gob.mx/cms/uploads/attachment/file/1023480/2025_1_BN_MODELO_EDUCATIVO_2025_MCCMS.pdf
- Sologuren, E., Núñez, C. y González, M. (2019). La implementación de metodologías activas de enseñanza-aprendizaje en educación superior para el desarrollo de las competencias genéricas de innovación y comunicación en los primeros años de Ingeniería. *Cuaderno de Pedagogía Universitaria*, 16 (32), pp. 19-34. <https://doi.org/10.29197/cpu.v16i32.343>
- Szabó, F., y Csépes, I. (2023). Constructivism in language pedagogy. *Hungarian Educational Research Journal*, 13(3), 405–417. <https://doi.org/10.1556/063.2022.00136>
- Thamarasseri, I., y Chandran, V. (2025). Educating for Sustainability through Gamification: Exploring Challenges and Opportunities. *i-Manager's Journal of Educational Technology*, 21(4), 1-9. <https://doi.org/10.26634/jet.21.4.21580>

- Torres-Martín, C., Acal, C., El-Homrani, M., y Mingorance-Estrada, Á. C. (2022). Implementation of the flipped classroom and its longitudinal impact on improving academic performance. *Educational Technology Research and Development*, 70, 909–929. <https://doi.org/10.1007/s11423-022-10095-0>
- Vale, I., y Barbosa, A. (2023). Active learning strategies for an effective mathematics teaching and learning. *European Journal of Science and Mathematics Education*, 11(3), 573–588. <https://doi.org/10.30935/scimath/13135>
- Zhang, J. (2022). The Influence of Piaget in the Field of Learning Science. *Higher Education Studies*, 12(3), 162. <https://doi.org/10.5539/hes.v12n3p162>

Contribution Role	Author(s)
Conceptualization	Veronica Mendoza Duran
Methodology	Veronica Mendoza Duran
Software	Veronica Mendoza Duran
Validation	Veronica Mendoza Duran
Formal Analysis	Veronica Mendoza Duran
Investigation	Veronica Mendoza Duran/ Mayra Alejandra Heredia Aguilar
Resources	Veronica Mendoza Duran
Data curation	Veronica Mendoza Duran
Writing - Preparing the original draft	Veronica Mendoza Duran/ Mayra Alejandra Heredia Aguilar
Writing - Reviewing and Editing	Veronica Mendoza Duran/ Mayra Alejandra Heredia Aguilar
Display	Veronica Mendoza Duran/ Mayra Alejandra Heredia Aguilar
Supervision	Veronica Mendoza Duran
Project Management	Veronica Mendoza Duran
Acquisition of funds	Veronica Mendoza Duran