Revista Iberoamericana para la Investigación y el Desarrollo Educativo
ISSN 2007 - 7467

https://doi.org/10.23913/ride.v12i23.1043

Artículos científicos

La expresión oral y escrita en los estudiantes de nivel medio superior mediante el flipped classroom

Oral and Written Expression in Upper Secondary Level Students Through the Flipped Classroom

Expressão oral e escrita em alunos do ensino médio durante a sala de aula invertida

María Elena Zepeda Hurtado
Instituto Politécnico Nacional, CECyT No. 11, México
mezepedah@ipn.mx
https://orcid.org/0000-0001-9764-5013

Edgar Oliver Cardoso Espinosa
Instituto Politécnico Nacional, Escuela Superior de Comercio y Administración, Unidad Santo Tomás, México
eoce@hotmail.com
https://orcid.org/0000-0001-7588-9439

Jésica Alhelí Cortes Ruíz
Instituto Politécnico Nacional, Centro de Investigaciones Económicas, Administrativas y Sociales, México
jacr2709@hotmail.com
https://orcid.org/0000-0002-5459-4874

Revista Iberoamericana para la Investigación y el Desarrollo Educativo
ISSN 2007 - 7467

Resumen

El objetivo de este estudio fue contribuir con el desarrollo de la expresión oral y escrita mediante el empleo de la estrategia didáctica *flipped classroom* en estudiantes de nivel medio superior del Instituto Politécnico Nacional. La investigación fue descriptiva con una metodología cuantitativa. Los participantes fueron alumnos que cursaban la unidad Expresión Oral y Escrita II del segundo semestre. El instrumento utilizado fue un cuestionario basado en la escala de Likert. Como parte de los resultados se encontró que el empleo del *flipped classroom* promueve tres dimensiones: *1)* tecnológica: los estudiantes reconocieron una diversidad de recursos tales como el calendario, foros, chats, correo electrónico, autoevaluaciones y consulta de materiales para promover el aprendizaje; *2)* comunicativa: los alumnos manifestaron estar de acuerdo con la elaboración de historieta e infografías, analogías, adivinanzas e investigación documental, actividades que favorecieron una participación activa, y *3)* prácticas de uso: los alumnos manifestaron que se promovió la comprensión de la estructura del texto literario, así como evaluar y crear una historieta con la estructura literaria.

Palabras clave: aprendizaje, estrategia didáctica, flipped classroom, herramientas tecnológicas.

Abstract

The objective of this study was to contribute to the development of oral and written expression through the use of the flipped classroom didactic strategy in high school students of the Instituto Politécnico Nacional. The research was descriptive with a quantitative methodology. The participants were students who were studying the Oral and Written Expression II unit of the second semester. The instrument used was a questionnaire based on the Likert scale. As part of the results, it was found that the use of the flipped classroom promotes three dimensions: *1)* technological dimension: the students recognized a diversity of resources such as the calendar, forums, chats, e-mail, self-assessments and consultation of materials to promote learning; *2)* communicative dimension: the students stated that they agreed with the elaboration of comic strips and infographics, analogies, riddles and documentary research, activities that favored active participation, and *3)* usage practices: the students stated that the understanding of the structure of the literary text was promoted, as well as evaluating and creating a short story with the literary structure.

Keywords: learning, didactic strategy, flipped classroom, technological tools.

Resumo

O objetivo deste estudo foi contribuir para o desenvolvimento da expressão oral e escrita por meio da utilização da estratégia didática de sala de aula invertida em alunos do ensino médio do Instituto Politécnico Nacional. A pesquisa foi descritiva com metodologia quantitativa. Os participantes foram alunos que cursavam a unidade Expressão Oral e Escrita II do segundo semestre. O instrumento utilizado foi um questionário baseado na escala Likert. Como parte dos resultados, constatou-se que o uso da sala de aula invertida promove três dimensões: 1) tecnológica: os alunos reconheceram uma diversidade de recursos como calendário, fóruns, chats, e-mail, autoavaliação e consulta de materiais para promover a aprendizagem; 2) comunicativa: os alunos afirmaram concordar com a elaboração de histórias em quadrinhos e infográficos, analogias, charadas e pesquisa documental, atividades que favoreciam a participação ativa e 3) práticas de uso: os alunos afirmaram que foi promovida a compreensão da estrutura de o texto literário, bem como avaliar e criar uma história em quadrinhos com a estrutura literária.

Palavras-chave: aprendizagem, estratégia didática, sala de aula invertida, ferramentas tecnológicas.

Fecha Recepción: Marzo 2021 **Fecha Aceptación:** Septiembre 2021

Introduction

Globalization has generated multiple changes in various fields: in the field of communication, politics, in the provision of services and the offer of products, among others. These changes have meant that societies have to modify their ways of relating to each other in order to achieve their main objectives of growth and development at the regional and national level. The foregoing also brought with it a series of new challenges for the formation of human capital, such as being able to face the various demands that emerge due to the great generation of information and problems to be solved (Núñez and González, 2019). Without a doubt, it is necessary for 21st century education to reinvent itself in order to develop diverse capacities in students, such as critical thinking, creativity and emotional intelligence (Mendoza, 2019).

Hence, the long-awaited change in teaching, not focused on the teacher, but on the student, of course, is a pedagogical leap that implies substantial modifications in the planning, implementation and evaluation of the educational process. Thus, gradually, teachers have tried to abandon the traditional model of memorization of content and verification (Santos, Simões and Vieira, 2019). In this sense, Domínguez and Palomares (2020) indicate the preponderance of promoting active learning, accompanied by the use of information and communication technologies (ICT) that promotes a greater role of the student and gives rise to the introduction of active didactic methodologies . It is, once again, a pedagogical and didactic reform with direct influence on the student body (López, León and Pérez, 2018). However, the implementation of active methodologies is conditioned by teaching practice and educational environments, so it is relevant to contextualize them at each level. (Navaridas y Jiménez, 2016).

According to Hinojo, Mingorance, Trujillo, Aznar and Cáceres (2018), the flipped classroom pedagogical model is playing a major role because it interrelates this educational trend of active learning by the student with the diversified use of ICT. The flipped classroom is also known as inverted or reverse classroom, it is usually defined as a didactic strategy focused on giving greater emphasis to practice (Martínez, Nolla, Vidal and de la Torre, 2016), in this way, it is a didactic methodology that changes or reverses the action of expository teaching in the classroom by the teacher to focus on carrying out other activities focused on student participation: problem solving and case analysis, mainly.

Indeed, the flipped classroom, as its name indicates, focuses on inverting the moments and roles of traditional teaching (Martínez, Esquivel & Martínez, 2014). Prior to each session, the student consults the multimedia material and the face-to-face time is used to review the content through activities and active strategies, that is, through different resources, the student recognizes the contents of the topic to be addressed; While the face-to-face session is used to solve practical situations where knowledge is applied to develop skills in a collaborative work environment (García and Cremades, 2019).

Furthermore, following Del Moral (2012), this didactic methodology promotes in the student the progressive management of simple to complex actions and encourages the achievement of both the first three basic levels (know, remember, apply) and those of a higher order (analyze, evaluate and create) of Bloom's taxonomy to achieve effective learning, which promote responsibility for one's own learning.

In the traditional approach, the teacher is the one in charge of reviewing the theoretical contents during the sessions; there is little opportunity to analyze the information, to carry out exercises or diverse practices that allow the student to approach the levels of learning of greater depth or more complex, as well as to understand, apply in different contexts or evaluate the learning object. This form of teaching-learning has been surpassed by the economic, social, cultural and environmental challenges that we currently face, hence the need to move towards active student-centered methodologies, which propose a more ad hoc perspective to address current problems. Following this line, the flipped classroom methodology was selected to be applied at the upper secondary level and to determine the impact on oral and written expression in students.

Based on the above, the questions that guide the research are: what does the flipped classroom methodology consist of ?; What are the communication skills developed through this methodology? And to what extent does the flipped classroom promote complex learning levels in students?

Theoretical foundation

The United Nations Educational, Scientific and Cultural Organization [UNESCO] (2016) has positioned education as a fundamental pillar, an objective in itself, for the achievement of the various points that make up the 2030 Agenda for Sustainable development. In this document, in objective 4, it reads: “Guarantee an inclusive and equitable quality education and promote lifelong learning opportunities for all” (p. 7).

In the same document, in addition to recognizing educational needs, political proposals were also made to offer quality, inclusive and equitable education:

- Guarantee the acquisition of cognitive, interpersonal and social skills.
- Develop competencies related to values and attitudes to lead a healthy and responsible life to respond to the challenges of the immediate and extended context.
- Offer quality and permanent learning at all educational levels.
- Consider flexible learning for validation and accreditation.
- Take advantage of ICT.

In the particular case of Mexico, the norms and policies framed in the Political Constitution of the United Mexican States (2020), the General Law of Education (2019) and The New Mexican School (2019) are considered, in the latter, they are mentioned the

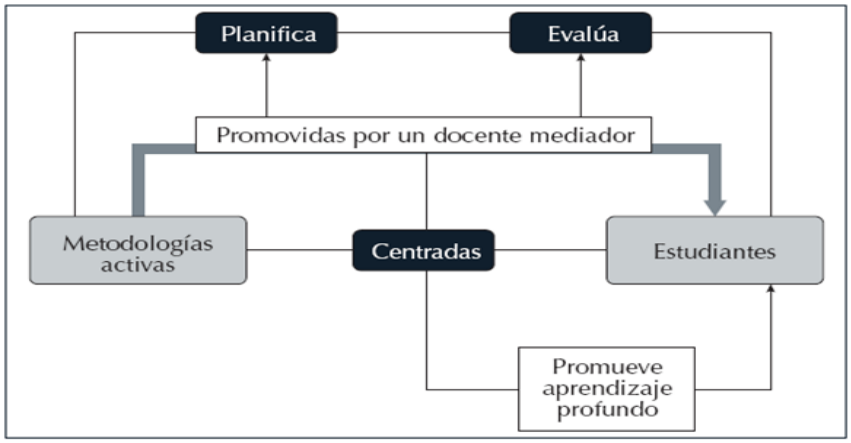
characteristics that concern upper secondary education with regard to the development of knowledge, skills, aptitudes and attitudes of the student body. To achieve this, this level will promote values, through a humanistic training, which will allow the strengthening of professional skills for the generation of high-level human capital with a productive professional performance. Therefore, main attention will be paid to:

- The maximum achievement of learning considering the context and the characteristics of the student, emphasizing collaborative learning and teamwork.
- The teaching-learning process based on the use of technical-pedagogical resources.
- The learning, use and use of technology through platforms, tools or programs that enable the implementation of the various educational modalities (face-to-face, blended or virtual).
- Problem solving based on innovation.

The flipped classroom is a strategy that considers the previous points in its implementation, it goes beyond providing digital materials for students to review at home; focuses on combining the use of technological tools with constructivist teaching techniques that enhance the development of competencies. Consequently, to put into practice active methodologies, it is necessary to conceptualize the learning and performance of the teacher and the student in a different way.

Calvo (2020) establishes that flipped learning is “an interactive process based on teacher-student, student-student, student-didactic material and student-medium communication that enhances the responsible involvement of the latter and entails the satisfaction and enrichment of teachers and students ”. While Silva and Maturana (2017) indicate that active methodologies focus on the development of activities or learning experiences more than on the content, which implies changes in the teacher, who has the role of mediator, and in the student, center of the development of strategies (figure 1).

Figura 1. Metodologías activas



Fuente: Silva y Maturana (2017)

Figure 1 highlights that the implementation of flipped learning requires not only knowledge and use of ICT, but also active methodologies that promote the role of mediator on the part of the teacher.

In addition to the flipped classroom, the most popular active methodologies include: gamification, challenge-based learning and problem solving, among others. This is how, from the combination of work carried out outside the classroom and the use of active methodologies, the mastery of simple cognitive levels of thought is promoted in a staggered way, first, and then the complex ones, of a higher order (Vidal et al. ., 2016). All this encourages learning that goes beyond the repetition of data, memorization or understanding of the contents, since the intention is to use knowledge as an instrument to solve problems or adapt and apply knowledge in new situations.

Therefore, active methodologies are intended to promote greater student participation in their training. From this perspective, students are the protagonists in the construction of their learning experiences from doing, inquiring and interacting using ICT (Konopka, Adaime & Mosele, 2015). According to Gilboy, Heinerichs and Pazzaglia (2015) and Pienta (2016), the flipped classroom generates the following benefits in the teaching-learning process: efficient use of the time of the face-to-face session, optimizes the interaction between teacher and student and develops autonomy in each student.

Specifically, Bondad, Rice and Pearce (2012) point out that in the flipped classroom method, the use of online videos becomes an ideal resource. In addition, they recommend that such videos have the following characteristics: short for reference, the content must have a manageable amount of information to be interesting and its design must be adapted to the

students. In the same way, certain interactivity should be anticipated because it improves the learning experience (Huang, Chen and Weng, 2012; Verleur, Heuvelman and Verhagen, 2011).

Therefore, taking into account that the flipped classroom integrates learning environments mediated by ICT, it is relevant to identify, analyze, discern and select the information that enables the achievement of competencies (Álvarez and Boillos, 2015). Finally, something that is impossible to ignore is that this method encourages collaborative work, which, in the long run, allows the formation of attitudes such as creativity, negotiation and decision-making that help students to form previous work experience (Álvarez, Herrejón, Morelos y Rubio, 2010).

Previous literature

In the work of Melo and Sánchez (2017), the participating students recognized that the flipped classroom methodology gave the opportunity for a more active and experiential learning; the organization and structure of each of the sessions allowed them to find the relevance of the contents; the time invested was productive, the videos used and their influence on the development of the activities during the classes were practical. Thus, 81% indicated a high level of satisfaction with the use of this methodology.

Simon, Ojando, Avila, Miralpeix, Lopez and Prats (2018), for their part, found that 96.9% of the students considered that the flipped classroom model is positive for the formation of their learning; 44% indicated that the materials were easily accessible; 60% indicated that the teaching materials combine various formats (text, audio and video); 35.7% recognized the usefulness and relevance of the materials and resources used being in digital format, and 33.7% valued that the materials respect their learning style. In addition, 61.2% recognized that learning is more experiential and 38.8% stated that creation, analysis and evaluation skills are acquired. On the other hand, 54.1% identified that the teacher becomes a guide for learning; 64.3% considered that the planning of activities is characterized by being interactive, that is, students and teacher participate in the planning of activities. In the end, they concluded that the teacher uses continuous evaluation, uses self-evaluation and co-evaluation.

While Schmeisser and Medina (2018) determined that in mathematics and Spanish subjects the flipped classroom methodology improved academic performance in statistical

terms. The technological resources used were the use of smartphones, tablets and laptops; while the teaching materials used were videos, readings and exercises. The main conclusion was that the flipped classroom developed critical thinking, autonomy and responsibility for learning.

It should be noted that critical thinking develops when various sources are consulted in which the information is analyzed and evaluated. For example, the reliability of the source is assessed, claims are questioned and contrasted with real events to interpret and explain with arguments.

Finally, the participants in the study by García and Cremades (2019) characterized the flipped classroom methodology as innovative and useful, which allows cooperative learning, socialization and autonomy. They also stated that the materials and the face-to-face sessions allowed them to acquire conceptual, procedural and attitudinal content. Therefore, the learning process involved the learning levels of Bloom's taxonomy (citado en Del Moral, 2012).

The purpose of the study

The objective of this research is to use the flipped classroom didactic strategy to develop oral and written expression in students of the upper secondary level of the National Polytechnic Institute (IPN).

Method

Type of study

This research had a quantitative approach with a descriptive scope because it was proposed to assess the levels of development of both oral and written expression in the participating students (Hernández and Mendoza, 2018; Namakforoosh, 2011).

To achieve this, the flipped classroom didactic strategy was used in students who attend the Oral and Written Expression II (EOYE II) learning unit, located at the second level of the curriculum map of upper secondary education. The challenge was for the students to tackle the theoretical contents outside the classroom in order to give the opportunity for the face-to-face class to focus on carrying out practical activities that would promote the development of written and oral communication in students.

It goes without saying that the contents of this learning unit are aimed at addressing issues related to literature. Due to the extensive content and the ambitiousness of the skills to be developed, methodologies such as the flipped classroom are ideal for triggering the creative process and the development of literary productions such as the writing of short expressive texts corresponding to the three literary genres par excellence (narrative, lyrical or poetry and dramatic or theater). Thus, this learning unit has the objective of developing communicative skills that are used throughout the course: speaking, listening, reading and writing, which are considered instrumental or generic skills useful in various areas such as personal, academic and work or professional.

Specifically, for this research, the first programmatic unit of the course was selected, called "Literary Analysis", whose specific competence, according to the study program (IPN, 2008), is the following: "It makes critical judgments about expressive messages to starting from the social context in which they arise ”(p. 17); and whose expected learning result is: "Analyze expressive texts and determine the structure of the literary text from the forms of expression and literary figures" (p. 7).

Participants

The participants were 54, who were between 15 and 17 years old. Regarding gender, 32 (59%) corresponded to the female gender and 22 (41%) to the male. An incidental non-probabilistic sample was used, so the selected students were those who were enrolled in the second semester.

Didactic intervention

The IPN (2008), with a view to strengthening the autonomous work of students, allocates 18 hours per semester to carry out activities outside the classroom, in other environments, to promote research, collaborative work or development of the various phases of the projects and thus move from theory to practice through practical activities. In addition, the methodology is based on competency-based learning standards, which will be assessed through the expected learning outcomes. The evaluation focuses on the generation of evidence that demonstrates know-how through a performance or product related to applied knowledge in situations that allow transfer to similar or different contexts.

To apply the flipped classroom, Unit I of the program was considered, entitled "Literary Analysis". Due to the characteristics of this unit, aimed at carrying out practical activities, the workshop-type modality was chosen, the theoretical contents were developed outside the classroom through the review of materials provided and the face-to-face sessions were devoted to work to consolidate knowledge.

In this sense, the planning that was implemented was relevant because it allowed both the selection of digital material or the elaboration of resources related to the contents of the learning unit, mainly short videos, between 5 and 10 minutes long, interesting, attractive and available. for the students.

Thus, such planning was based on the proposal of García and Quijada (2015), whose elements are applicable for this study, making some adaptations and taking into account the available resources, the following were considered: a) technological dimension, b) psychopedagogical dimension and c) educational practices. use. Table 1 shows the relationship between contents, dimensions, use practices and the competence that were considered in the planning carried out.

Tabla 1. Planeación unidad I "Análisis literario"

Contenido	Dimensión tecnológica, recursos informáticos	Dimensión psicopedagógica	Prácticas de uso. Niveles cognitivos	Competencia relacionada con el ítem
Estructura de los textos literarios: - Inicio - Desarrollo (nudo y clímax) - Final	Uso de plataforma virtual y sus herramientas: calendario, foros, chats, correo electrónico, autoevaluaciones, acceso a materiales. Programas para elaboración de historietas.	Aprendizaje por proyecto: presentación de una historieta. Aprendizaje colaborativo.	Conocimiento y comprensión de la estructura a través de la lectura de textos. Análisis de textos. Crea una historieta con la estructura literaria.	A través de la historieta pudiste identificar la estructura del texto narrativo.
Formas de expresión: - Diálogo - Monólogo - Exposición - Narración	Uso de plataforma virtual y sus herramientas. Videos y blogs.	Aprendizaje por proyecto: presentación de una historieta agregando otros elementos. Aprendizaje colaborativo.	Evalúa la historieta elaborada. Integra formas de expresión dentro de las viñetas.	A través del empleo de la historieta se identificaron las características de las formas de expresión. En la historieta se emplearon las formas de expresión.
Figuras literarias: - Comparación - Metáfora - Epíteto - Paradoja - Hipérbole	Uso de plataforma virtual y sus herramientas: calendario, foros, chats, correo electrónico, autoevaluaciones, acceso a materiales y presentaciones. Videos, audios (canciones)yQuizizz	Analogías, adivinanzas. Gamificación.	Selección de audios, canciones. Analiza la letra y elige figuras literarias. Evalúa la estructura de acuerdo con la forma (prosa, verso, estrofa) Crea una composición.	Los recursos digitales empleados te permitieron la identificación de las figuras literarias. Los recursos digitales empleados te permitieron la clasificación de las figuras literarias.

Niveles de análisis literario: - Informativo - Ideológico - Estilístico	Uso de plataforma virtual y sus herramientas: calendario, foros, chats, correo electrónico, autoevaluaciones, acceso a materiales: presentaciones, cortometrajes y textos breves: narrativos, dramáticos y líricos.	Impulso de actividades de investigación documental. Aprendizaje por proyectos: - Infografía	Análisis del material por niveles. Emite juicio valorativo sobre la obra y su contexto. Crea una infografía del análisis literario.	A través de los recursos empleados se realizó el análisis por niveles de las obras literarias. El análisis literario fue empleado para la reflexión de la obra.

Fuente: Elaboración propia

Thus, following the provisions of Table 1, in the first two sessions the participants were explained what the flipped classroom methodology consisted of, emphasizing the importance of reviewing the material before the face-to-face session available on the platform. named Classroom. They were also informed that there would be other digital resources, such as videos, readings, blogs, interactive material with free access on the Internet to carry out exercises and evaluations, material that, in addition, immediately produces evaluation results for provide feedback, delve into the issues and clarify doubts, a material exploration practice was carried out.

Subsequently, during each of the face-to-face sessions, the first minutes were oriented towards the content of the platform and reviewed by the students through triggering questions, exercise or scheme to give way to practical activities, which led to the preparation of briefs projects in teams and in the classroom (those that are indicated in the column of the psychopedagogical dimension). The class concluded with the evaluation, suggestions and comments regarding the work carried out.

It is necessary to clarify that communication skills are implicit in the Oral and Written Expression II study program. In addition, that within the curriculum map of the middle level they are considered within the generic competences, applicable in various contexts, relevant to all disciplines and transferable, both teamwork and expression and communication in different contexts and the use of codes , tools and appropriate means or channels.

It is in classroom activities where communication skills are developed; were oriented to promote learning by speaking, solving challenges, discussing for decision-making, according to what the communicative situation to solve implies, for example, the design of a comic (involves the sequence of the structure of a narrative text to through drawings) and expressive playful activities associated with games, such as riddles and the use of analogies, in order to easily encourage listening, reading, oral and written expression, thus making the communicative competences a permanent and gradual process in its complexity.

In addition to all this, the different types of evaluation were carried out for the time, intention and participation of those involved: diagnostic, formative, summative, self-evaluation and co-evaluation, using techniques and instruments according to each purpose.

Instrument

The instrument to collect the information was the questionnaire. It was one made up of three dimensions: technological, psychopedagogical and usage practices. This instrument was formulated using a Likert scale with five levels for the items: “Very frequent”, “Frequently”, “Occasionally”, “Rarely” and “Never”. Once the initial questionnaire was formulated, the content was validated through the expert judgment technique, in order to corroborate both the consistency and the wording of each item and subsequently carry out the necessary modifications.

In the same way, the internal consistency of the instrument was investigated through Cronbach's alpha coefficient. And as a result, a value of 0.878 was obtained, so it was interpreted as reliable. Its application was in person, explaining the objective and relevance of the study to the participants, guaranteeing the confidentiality of the information obtained, which was subsequently analyzed through descriptive statistics.

Results

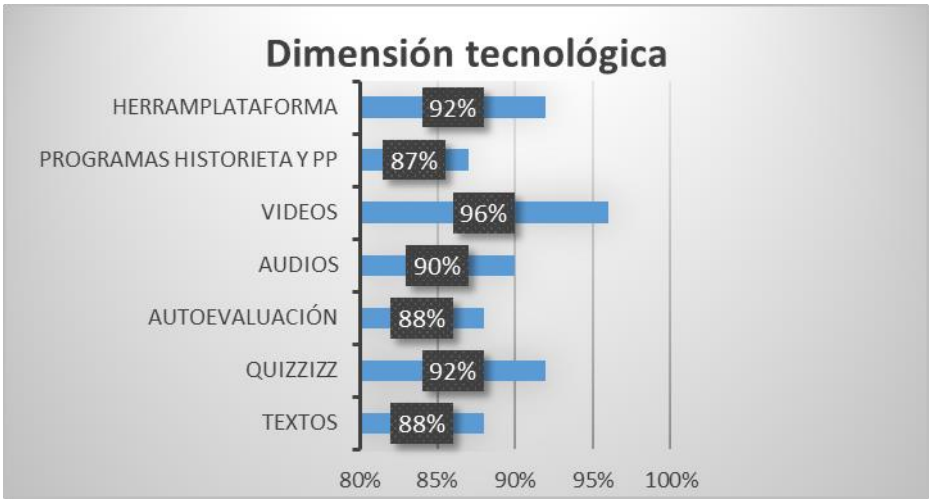
In order to have elements that would give certainty of the success of the present study, the electronic devices available to the students were identified. It was found that only 3% use the tablet, 6% use the laptop, 86% the cell phone and 92% the desktop computer. Likewise, it was found that 28% do not have a smart device, do not have data or do not have an internet connection. In the latter cases, the student was offered support and allowed to deliver the

evidence at the time and in the way that he could (handwritten, photos, emails), requesting continuous and permanent communication.

On the other hand, regarding the technological dimension (figure 2), most of the participants stated that the implementation of the flipped classroom strategy gave the opportunity to work with computer resources. Within this category, the same elements considered in planning were integrated; Here it was found that the virtual platform and its tools such as the calendar, forums, chats, email and self-evaluations were used very frequently (92%); programs for making comics and presentations (87%); short films and films (96%); songs (90%), and self-evaluations (88%). On the other hand, as gamification the Quizizz (92%) and, finally, the reading of texts (88%) were used.

This finding confirms the result obtained by Schmeisser and Medina (2018) regarding the effectiveness of the flipped classroom methodology when using technological resources by students. Furthermore, it coincides with what was found by Simon et al. (2018) regarding the fact that teaching materials have to be diverse to promote active participation in students and that multiple formats should be considered and the learning style of each of the students should be respected.

Figura 2. Dimensión tecnológica



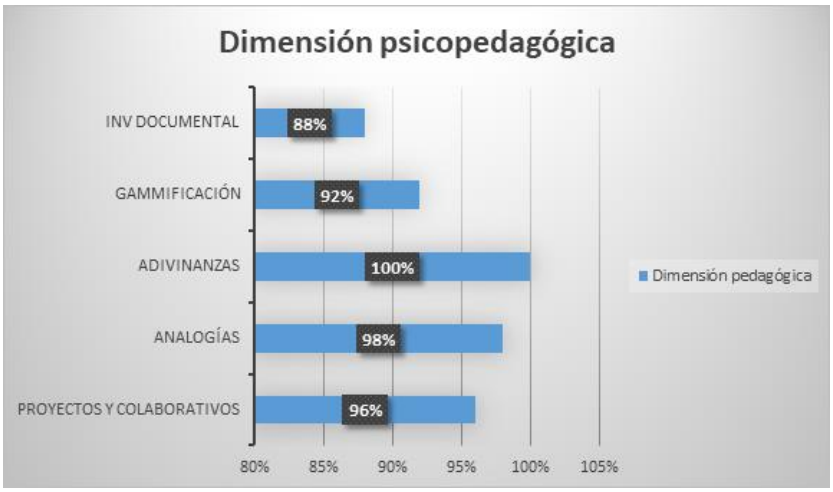
Fuente: Elaboración propia

Regarding the psychopedagogical dimension (figure 3), which considered the use of instructional design resources, active methodologies and strategies were integrated such as project-based and collaborative learning, carried out by teams of four or five members. Thus, the activities that were most frequently carried out were: preparation of comic strips and

infographics (96%); use of analogies (98%); riddles (100%); gamification (92%), and documentary research (88%).

These data confirm what was found by Melo and Sánchez (2017) regarding the fact that the flipped classroom encourages collaborative work, fosters experiential learning, as well as carrying out practical activities that are easy to relate to the contents to be developed in the subject.

Figura 3. Dimensión psicopedagógica



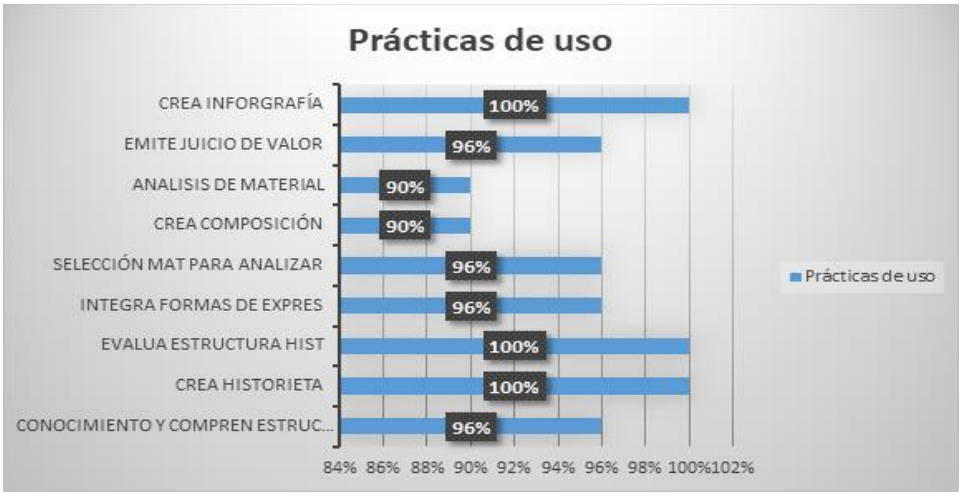
Fuente: Elaboración propia

Lastly, the dimension related to the practices of use, whose main characteristic is related to unit I, for example, the thematic contents used in the strategies focused on the students and the products considered as integrative evidences of the collaborative projects; the results obtained (figure 4) in the category "Very frequent" were the following: knowledge and understanding of the structure of the literary text (96%); creation of a comic with the literary structure (100%); evaluation of the structure of the elaborated comic (100%); integration of forms of expression within the vignettes (96%); selection of audios and songs to analyze the letters and literary figures (96%); elaboration of a composition (90%); analysis of the material (short film, video and texts) by levels (90%); issuance of evaluative judgments about the work and its context (96%), and creation of an infographic of literary analysis (100%).

In this way, the results allow corroborating the scope of higher-order levels of knowledge such as application, analysis, synthesis and evaluation, as well as the achievement of the particular competence and the expected learning results. This finding confirms what was found by García and Cremades (2019) regarding the fact that the flipped classroom

promotes the learning process at its various established levels: remembering, applying, analyzing and evaluating to achieve that of creating.

Figura 4. Prácticas de uso



Fuente: Elaboración propia

By way of closing this section, it is confirmed that the implementation of the flipped classroom specified the use and development of the technological dimension through the use of technological tools for the consultation and elaboration of comics, videos, audios, self-evaluations, quizzes and texts . The tendency of students to accept the activities carried out in the classroom indicated in the psychopedagogical dimension is clear, especially the use of riddles, analogies and collaborative projects.

Regarding the practice dimension, the highest percentages tend to like or accept for creating a comic and evaluating it, as well as creating infographics. Of the three dimensions, this is the one with the highest percentage of acceptance, the one that allows the practice of expression, analysis, synthesis and creativity.

Discussion

The results of this research confirm the relevance of incorporating active methodologies such as the flipped classroom at the upper secondary level that allow the student to participate in a leading way in the construction of competencies in a collaborative work environment, as mentioned by Álvarez et al. to the. (2010).

In the same way, the integration and continuous use of ICT in the student's learning processes is important in order to achieve the expected learning of each educational level. In

addition, the flipped classroom allows the student the ability to identify, analyze, discern and select information to carry out any training activity (Álvarez and Boillos, 2015).

In this sense, it is also important to highlight that, during the implementation of the flipped classroom, the students accepted learning through the strategy in a good way. At first it was difficult to review the materials outside the classroom by the students; However, when she realized that it was a necessary step to be able to carry out the activities in the classroom, her commitment grew. Thus, this strategy generated greater interest in activities carried out both outside and inside the classroom.

However, it is relevant to identify that, although there were only four students (13%) who did not have the technology required for this type of strategy, this situation affected their performance and the teams because, as already mentioned, in In these cases, the student delivered the evidence at the time and in the way their circumstances allowed, which impacted on collaborative work and performance for the search for information, communication, use of tools to make infographics, comics, etc. . It is also important to mention that the teacher really does his job as a mediator and that this is a way to replace traditional teaching-learning practices. In short, this methodology is more attractive for students, since they interact with technology when they search and consult information, and even compare it with other sources, coupled with the fact that they use programs to design infographics and presentations, mainly.

Here are some advantages and disadvantages found in the application of this didactic strategy:

- At the beginning there was confusion on the part of the students when they discovered that carrying out the activities outside the classroom for the theoretical review of the contents was necessary, which demanded responsibility and commitment, which they are not always willing to give; on the other hand, it is a way of specifying what is institutionally established as goals or achievements in the study programs.
- For the teacher it implies, on the one hand, knowledge and management of the platform and technological tools; and on the other, it requires integrative planning that will be the driving force behind activities outside the classroom and active strategies. Also, it is important to note that time was invested in the consultation and review of materials suitable for the established purposes and the characteristics of the students.

- Finally, it is vitally important to verify that students have the equipment, devices and connectivity, that they have access to materials and platforms at home or in other spaces, otherwise it will be a selective strategy and not an inclusive one.

Conclusions

The inverted classroom or flipped classroom is a didactic strategy that raises, as its name says, investing or changing the tasks or jobs that are done in a traditional way: what is done at home, do it in class and vice versa: put into practice in the classroom and In the company of a teacher as a mediator, the knowledge acquired at home, where technological resources can be of great help.

The implementation of the flipped classroom strategy requires the creation and search of materials to work in spaces outside the classroom. For this, it is necessary for the teacher to dedicate time to the design and identification of digital teaching resources that are capable of being used in the learning unit and thus obtain the maximum benefit from them as a means of support in the development of competencies. In addition, it is relevant that teachers master active strategies or methodologies to be able to implement them in the classroom, thus motivating and promoting meaningful learning that includes higher or complex order processes such as critical thinking, creativity and collaborative work. Therefore, it implies that the teaching work goes far beyond a master class, which is usually oriented only to the receptive skills of low cognitive levels, such as remembering, repeating or memorizing.

Definitely, the use of technology and the flipped classroom strategy promotes complex learning levels: it motivates the development of critical thinking skills from the moment students reflect, analyze, make decisions, communicate effectively (through various channels and codes) and use creativity to design and produce partial evidence and final products.

Therefore, here the communicative skills developed through the use of the flipped classroom were written, oral, reading and listening, which were formed by the exchange of ideas expressed as individual or team points of view through expositions, dialogue,

discussion, exploration or investigation and argumentation with the use of various communication channels and codes.

Thus, the flipped classroom strategy allowed the development of some of the necessary skills for the student to be able to cope with real-world situations: the use of communication, creativity and collaborative work.

Future lines of research

Considering the results of the study, it is necessary to continue the investigation of the knowledge and practice of teachers on the use of active methodologies, since it is not enough to review the materials provided to students prior to the sessions. In this sense, it is relevant to analyze the type of activities and strategies implemented during the sessions so that students reach complex levels of knowledge. Therefore, it is suggested to use the qualitative approach as a future study, in order to obtain and interpret the testimonies of the students regarding their experience in the active methodologies.

Likewise, it is recommended to carry out further research on the implementation of the flipped classroom at the upper secondary level in other learning units. In the same way, broaden the horizon of the educational level in the IPN and consider the higher level, undergraduate and graduate.

Another important element to investigate is the scope of the technological resources available to the students, since it is assumed that in general they have the minimum resources, such as access and connectivity to a technological device, when in reality they have been detected unfortunate cases of students not counting on it.

Finally, it is suggested to carry out studies on the achievements of this active methodology in order to question whether it is the flipped classroom or the type of practical approach in the classroom or the strategies used that has the greatest impact on student learning. Also, it is recommended to carry out research on the assessment of teachers about the use of teaching methodologies based on ICT.

Acknowledgment

The authors thank the National Polytechnic Institute (IPN) for the facilities granted to carry out this study from the authorization of the research project: SIP20200758 entitled "Evaluation of the impact of the academic training of postgraduate degrees in administration" and the project 20211263 entitled "Flipped classroom for the development of soft skills in the Oral and Written expression learning unit I"

References

Álvarez, M. y Boillos, M. (2015). La competencia comunicación escrita. En Villardón, L. (coord.ª), *Competencias genéricas en educación superior*. *Metodologías específicas para su desarrollo* (pp. 55-78). España: Narcea Universitaria.

Álvarez, V. Herrejón, V., Morelos, M. y Rubio, M. (2010). Trabajo por proyectos: aprendizaje con sentido. *Revista Iberoamericana de Educación*, *52*(5), 1-13.

Bondad, B. A., Rice, R. E. and Pearce, K. E. (2012). Influences on TV Viewing and Online User-Shared Video Use: Demographics, Generations, Contextual Age, Media Use, Motivations, and Audience Activity. *Journal of Broadcasting & Electronic Media*, *56*(4), 471-493.

Calvo, A. (6 de febrero de 2017). Metodologías activas y flipped classroom. Recuperado de https://www.theflippedclassroom.es/metodologias-activas/.

Constitución Política de los Estados Unidos Mexicanos. (2020). *Diario Oficial de la Federación.* Recuperado de http://www.diputados.gob.mx/LeyesBiblio/pdf/1_280521.pdf.

Del Moral, C. (2012). Conocimiento didáctico general para el diseño y desarrollo de experiencias de aprendizaje significativas en la formación del profesorado. *Profesorado. Revista de Currículum y Formación de Profesorado*, *16*(2), 421-452. Recuperado de https://recyt.fecyt.es/index.php/profesorado/article/view/43811.

Domínguez, F. y Palomares, A. (2020). El aula invertida como metodología activa para fomentar la centralidad en el estudiante como protagonista de su aprendizaje. *Contextos Educativos*. *Revista de Educación*, (26), 261-275. Recuperado de https://doi.org/10.18172/con.4727.

García, D. y Cremades, R. (2019). "Flipped classroom" en educación superior. Un estudio a través de relatos de alumnos. *Revista Mexicana de Investigación Educativa*, *24*(80), 101-123.

García, M. y Quijada, V. (2015). El aula invertida y otras estrategias con uso de TIC. Experiencia de aprendizaje con docente. Ponencia presentada en el Simposio Virtual Internacional Somece 2015. Ciudad de México, del 11 al 13 de noviembre de 2015. Recuperado de http://somece2015.unam.mx/MEMORIA/57.pdf.

Gilboy, M. B., Heinerichs, S. and Pazzaglia, G. (2015). Enhancing Student Engagement Using the Flipped Classroom. *Journal of Nutrition Education and Behavior*, *47*(1), 109-114. Retrieved from http://dx.doi.org/10.1016/j.jneb.2014.08.008.

Hernández, R. y Mendoza, C. (2018). *Metodología de la investigación. Las rutas cuantitativa, cualitativa y mixta*. México: McGraw-Hill.

Hinojo, F., Mingorance, A., Trujillo, J., Aznar, I. and Cáceres, M (2018). Incidence of the Flipped Classroom in the Physical Education Student's Academic Performance in University Contexts. *Sustainability*, *10*(5), 1-13. Retrieved from https://doi.org/10.3390/su10051334.

Huang, J., Chen, R. and Wang, X. (2012). Factors influencing intention to forward short internet videos. *Social Behavior and Personality, 40*(1), 5-14.

Instituto Politécnico Nacional [IPN]. (2008). Programas de estudios de la Unidad de Aprendizaje: Expresión Oral y Escrita II. México: Instituto Politécnico Nacional.

Konopka, C., Adaime, M. and Mosele, P. (2015). Active Teaching and Learning Methodologies: Some Considerations. *Creative Education, 6*(14), 1536-1545.

López, M., León, M. y Pérez, P. (2018). El enfoque por competencias en el contexto universitario español. La visión del profesorado. *Revista de Investigación Educativa*, *36*(2), 529-545. Recuperado de http://dx.doi.org/10.6018/rie.36.2.314351.

Martínez, G., Nolla, N., Vidal, M. y de la Torre, L. M. (2016). Los entornos personales de aprendizaje en los procesos de formación formales e informales. *Educación Médica Superior*, *30*(3), 599-608. Recuperado de http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S086421412016000300013&lng=es&tlng=es.

Martínez, W., Esquivel, I. y Martínez, J. (2014). Aula invertida o modelo invertido de aprendizaje: origen, sustento e implicaciones. En Esquivel, I. (coord.), *Los modelos tecno-educativos, revolucionando el aprendizaje del siglo XXI* (pp. 143-160). México: DSAE-Universidad Veracruzana

Melo, L. y Sánchez, R. (2017). Análisis de las percepciones de los alumnos sobre la metodología flipped classroom para la enseñanza de técnicas avanzadas en

laboratorios de análisis de residuos de medicamentos veterinarios y contaminantes. *Educación Química*, *28*(1), 30-37. Recuperado de http://dx.doi.org/10.1016/j.eq.2016.09.010.

Mendoza, J. (2019). Hoy tenemos el poder de la transformación del proceso educativo: Ana Lidia Franzoni Velázquez. *Docencia Politécnica*, *1*(1), 10-12.

Namakforoosh, J. M. (2011). *Metodología de la investigación*. México: Limusa.

Navaridas, F. y Jiménez, M. (2016). Concepciones de los estudiantes sobre la eficacia de los ambientes de aprendizaje universitarios. *Revista de Investigación Educativa*, *34*(2), 503-519. Recuperado de http://dx.doi.org/10.6018/rie.34.2.239481.

Núñez, K. y González, J. (2019). Perfil de egreso doctoral: una propuesta desde el análisis documental y las expectativas de los doctorandos. *IE Revista de Investigación Educativa de la Rediech*, *10*(18), 161-175. Recuperado de http://dx.doi.org/10.33010/ie_rie_rediech.v10i18.604.

Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura [Unesco]. (2016). *Declaración de Incheon y Marco de Acción para la realización del Objetivo de Desarrollo Sostenible 4*. Recuperado de https://unesdoc.unesco.org/ark:/48223/pf0000245656_spa.

Pienta, N. (2016). A "Flipped Classroom" Reality Check. *Journal of Chemical Education*, *93*(1), 1-2. Retrieved from https://pubs.acs.org/doi/10.1021/acs.jchemed.5b00996.

Presidencia de la República. (30 de septiembre de 2019). Ley General de Educación. *Diario Oficial de la Federación*. Recuperado de https://www.sep.gob.mx/work/models/sep1/Resource/558c2c24-0b12-4676-ad90-8ab78086b184/ley_general_educacion.pdf.

Rangel,M y Quijada, V (2015). El aula invertida y otras estrategiascon uso de las TIC. Experiencia de aprendizaje con docentes. XXX Simposium SOMEC Recuperado de http://somece2015.unam.mx/MEMORIA/57.pdf

Santos, J., Simões, A. and Vieira, M. (2019). Innovative pedagogical practices in higher education: An integrative literature review. *Nurse Education Today*, *72*, 12-17.

Schmeisser, C. M. y Medina, J. A. (2018). Estudio comparativo entre metodología de aula invertida y metodología tradicional en clases de español, inglés y matemáticas. *MLS-Educational Research, 2*(2), 159-176.

Silva, J. y Maturana, D. (2017). Una propuesta de modelo para introducir metodologías activas en educación superior. *Innovación Educativa*, *17*(73), 117-131. Recuperado

de http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1665-26732017000100117&lng=es&tlng=es.

Simon, J., Ojando, E., Avila, X., Miralpeix, A., Lopez, P. y Prats, M. (2018). Reformulación de los roles del docente y del discente en la educación. El caso práctico del modelo de la Flipped Classroom en la universidad. *Revista de Estudios y Experiencias en Educación*, (número especial 2), 53-73.

Subsecretaría de Educación Media Superior. (2019). *La nueva escuela mexicana: principios y orientaciones pedagógicas.* Ciudad de México, México: Secretaría de Educación Pública. Recuperado de http://dfa.edomex.gob.mx/sites/dfa.edomex.gob.mx/files/files/NEM%20principios%20y%20orientacio%C3%ADn%20pedago%C3%ADgica.pdf.

Verleur, R., Heuvelman, A. and Verhagen, P. (2011). Trigger videos on the Web: Impact of audiovisual design. *British Journal of Educational Technology*, *42*(4), 573-582. Retrieved from https://doi.org/10.1111/j.1467-8535.2010.01065.x.

Vidal, M., Rivera, N., Nolla, N., Morales, I. y Vialart, M. N. (2016). Aula invertida, nueva estrategia didáctica. *Educación Médica Superior*, *30*(3), 678-688. Recuperado de http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0864-21412016000300020&lng=es&tlng=es.

Rol de Contribución	Autor (es)
Conceptualización	María Elena Zepeda Hurtado(igual), Edgar Oliver Cardoso Espinosa (igual) y Jésica Alhelí Cortes Ruíz (igual)
Metodología	Edgar Oliver Cardoso Espinosa (igual) y Jésica Alhelí Cortes Ruíz (igual)
Software	Edgar Oliver Cardoso Espinosa
Validación	Jésica Alhelí Cortes Ruíz
Análisis Formal	María Elena Zepeda Hurtado (igual) y Jésica Alhelí Cortes Ruíz (igual)
Investigación	María Elena Zepeda Hurtado (igual), Edgar Oliver Cardoso Espinosa (igual) y Jésica Alhelí Cortes Ruíz (igual)
Recursos	María Elena Zepeda Hurtado (igual), Edgar Oliver Cardoso Espinosa (igual) y Jésica Alhelí (igual)
Curación de datos	Edgar Oliver Cardoso Espinosa
Escritura - Preparación del borrador original	María Elena Zepeda Hurtado (igual), Edgar Oliver Cardoso Espinosa (igual) y Jésica Alhelí Cortes Ruíz (igual)
Escritura - Revisión y edición	María Elena Zepeda Hurtado (igual), Edgar Oliver Cardoso Espinosa (igual) y Jésica Alhelí Cortes Ruíz (igual)
Visualización	María Elena Zepeda Hurtado
Supervisión	Edgar Oliver Cardoso Espinosa
Administración de Proyectos	María Elena Zepeda Hurtado (igual), Edgar Oliver Cardoso Espinosa (igual) y Jésica Alhelí Cortes Ruíz (igual)
Adquisición de fondos	María Elena Zepeda