

Educational Lag in Higher Secondary Education Institutions in Ixtapaluca, Valle de Chalco and Chalco

Rezago educativo en las Instituciones de Educación Media Superior en Ixtapaluca, Valle de Chalco y Chalco

Aldape-Enriquez, Elsa Georgina ^{*a}, Flores-Valtierra, José Juan ^b, Mojica-Galaviz, Luis Alberto ^c and Valdés-Torres, Arturo ^d

^a  Tecnológico Universitario del Valle de Chalco •  LUY-6115-2024 •  0009-0005-7829-8438 •  2020829

^b  Tecnológico Universitario del Valle de Chalco •  LUY-6364-2024 •  0009-0005-9663-5346 •  2040423

^c  Tecnológico Universitario del Valle de Chalco •  LUY-7176-2024 •  0009-0003-5868-5049 •  1010164

^d  Tecnológico Universitario del Valle de Chalco •  LUY-6264-2024 •  0009-0006-9574-2382 •  415133

CONAHCYT classification:

Area: Social Sciences
Field: Educational Sciences
Discipline: Education
Subdiscipline: Comparative education

 <https://doi.org/10.35429/JBE.2024.8.19.1.18>

History of the article:

Received: September 15, 2024

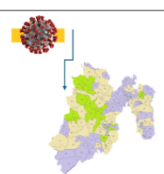
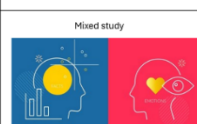

Accepted: November 24, 2024

*  [mx]



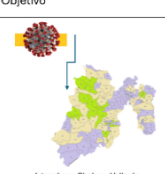


Abstract

Objective: The study entitled "Educational Lag in Higher Secondary Education Institutions in Ixtapaluca, Valle de Chalco, and Chalco" is to analyze the impact of the COVID-19 pandemic on school dropout rates and educational quality in these municipalities. **Methodology:** The research uses a mixed-methods approach, combining quantitative and qualitative data. Data collection included surveys, interviews with school principals, and focus groups with students and teachers. This methodology allows for a comprehensive analysis of dropout rates and educational quality, considering both statistical data and personal experiences of those affected by the pandemic. **Contribution:** The findings of this study are expected to provide valuable insights into the specific challenges faced by upper secondary education institutions in the target municipalities. The research will inform the development of effective strategies to address educational lag, improve retention rates, and enhance the overall quality of education. It aims to benefit policymakers, educators, and the student community by providing evidence-based recommendations to mitigate the adverse effects of the pandemic on education. The study highlights the importance of tailored interventions and support systems to help students address the challenges posed by the COVID-19 pandemic and ensure a more resilient and inclusive educational environment in the future.

Objective	Methodology	Contribution
 <p>Ixtapaluca, Chalco y Valle de Chalco</p> <ul style="list-style-type: none">• School dropout rates.• Follow-up strategies.• Significant socioemotional effects.• Impact on educational quality.	 <p>Mixed study</p> <p>1st. Stage, design of instruments and location of sources of data collection. 2nd. Stage, delimitation. 3rd. Stage, analysis and cross-checking of information. 4th. Stage, results.</p>	 <p>Information</p> <ul style="list-style-type: none">• That it serves as a basis for the design of strategies for comprehensive follow-up and accompaniment of high school students.• It allows identifying policies and strategies that facilitate the improvement of educational quality.

Resumen

Objetivo: El estudio titulado "Rezago educativo en las Instituciones de Educación Media Superior en Ixtapaluca, Valle de Chalco y Chalco" tiene como objetivo analizar el impacto de la pandemia de COVID-19 en las tasas de deserción escolar y la calidad educativa en estos municipios. **Metodología:** La investigación utiliza un enfoque de métodos mixtos, combinando datos cuantitativos y cualitativos. La recopilación de datos incluyó encuestas, entrevistas con directores de escuelas y grupos focales con estudiantes y docentes. Esta metodología permite un análisis integral de las tasas de deserción y la calidad educativa, considerando tanto los datos estadísticos como las experiencias personales de los afectados por la pandemia. **Contribución:** Se espera que los hallazgos de este estudio proporcionen información valiosa sobre los desafíos específicos que enfrentan las instituciones de educación media superior en los municipios objetivo. La investigación informará el desarrollo de estrategias efectivas para abordar el rezago educativo, mejorar las tasas de retención y mejorar la calidad general de la educación. Tiene como objetivo beneficiar a los responsables de políticas, educadores y la comunidad estudiantil al ofrecer recomendaciones basadas en evidencia para mitigar los efectos adversos de la pandemia en la educación. El estudio destaca la importancia de intervenciones y sistemas de apoyo personalizados para ayudar a los estudiantes a enfrentar los desafíos planteados por la pandemia de COVID-19 y garantizar un entorno educativo más resiliente e inclusivo en el futuro.

Objetivo	Metodología	Contribución
 <p>Ixtapaluca, Chalco y Valle de Chalco</p> <ul style="list-style-type: none">• Tasas de deserción escolar.• Estrategias de seguimiento.• Afectaciones socioemocionales significativas.• Repercusiones en la calidad educativa.	 <p>Estudio mixto</p> <p>1er etapa, diseño de instrumentos y ubicación de fuentes de recolección de datos. 2da. etapa, delimitación. 3er. Etapa, análisis y cruces de información. 4ta. Etapa, resultados.</p>	 <p>Información</p> <p>Que sirve como base en diseño de estrategias de un seguimiento y acompañamiento integral a estudiantes de nivel medio superior.</p> <p>Que permite identificar políticas y estrategias que faciliten la mejora en la calidad educativa.</p>

Educational lag, School dropout, Educational quality

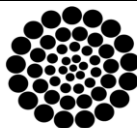
Rezago educativo, Deserción escolar, Calidad educativa

Citation: Aldape-Enriquez, Elsa Georgina, Flores-Valtierra, José Juan, Mojica-Galaviz, Luis Alberto and Valdés-Torres, Arturo. [2024]. Educational Lag in Higher Secondary Education Institutions in Ixtapaluca, Valle de Chalco and Chalco. Journal Basic Education. 8[19]1-18: e3819118.



ISSN: 2523-2452 / © 2009 The Author[s]. Published by ECORFAN-Mexico, S.C. for its Holding Republic of Peru on behalf of Journal Basic Education. This is an open access article under the CC BY-NC-ND license [<http://creativecommons.org/licenses/by-nc-nd/4.0/>]

Peer review under the responsibility of the Scientific Committee MARVID® in the contribution to the scientific, technological and innovation Peer Review Process through the training of Human Resources for continuity in the Critical Analysis of International Research.



RENIECYT
Registro Nacional de Instituciones y
Empresas Científicas y Tecnológicas

1702902

CONAHCYT

Introduction

The research 'Educational backwardness in Higher Secondary Education Institutions in Ixtapaluca, Valle de Chalco and Chalco' arises from the need to identify the current demands of young people after the pandemic in the academic sphere.

The isolation due to the COVID-19 contingency in Mexico was extended from 23 March 2020 to 10 October 2022, aggravating an already existing educational problem and making even more evident the polarisation of education in Mexico, as well as having a significant impact on the mental health of students, the uncertainty of this situation increased the insecurity of young people, as well as that of their teachers and school authorities.

After the isolation, staggered schedules were adopted adopting a mixed modality, where part of the students stayed at home and another part attended the educational institution in person, however, the concern about feeling vulnerable was evident, (Roy et al, 2024) mentions how factors such as the perception of safety, effectiveness of the vaccine and the quality of communication influenced the decision of the students to receive the vaccine, placing 69.9%, the level of acceptance of the vaccine in the students.

The level of acceptance of the vaccine was 69.9%, although despite this, concerns about side effects and effectiveness persisted. However, as time went on, there was more certainty and confidence in adopting the hybrid model. In this context, emotional challenges were a determining factor in adopting appropriate strategies:

'For their part, more than a third of students (37%) say they were able to cope successfully with the emotional challenges posed by the pandemic, but equally, more than a third (36%) report not agreeing that they were able to cope with these challenges. More than half of the students (56%) have maintained positive thoughts in the face of the adversity experienced during the contingency, and only 26% say they are affected by the news circulating on this issue in the media'. (Medina Gual, et al., 2021, p. 136).

According to (INEGI, 2021, p. 1).

- 33.6 million people between the ages of 3 and 29 were enrolled in the 2019 - 2020 school cycle (62.0% of the total). Of these, 740,000 (2.2%) did not complete the school cycle: 58.9% for some reason associated with COVID-19 and 8.9% for lack of money or resources.
- 'For the 2020-2021 school cycle, 32.9 million (60.6% of the population aged 3-29) were enrolled.'
- 'For reasons associated with COVID-19 or for lack of money or resources, 5.2 million people (9.6% of the total 3-29 year-olds) did not enrol for the 2020-2021 school year.'

Meanwhile, interviews conducted with directors of Secondary Education Institutions (IEMS) in the eastern zone revealed worrying data, they mentioned having a dropout rate of 70% in the third year of baccalaureate and a decrease of 30% in the entry to the first grade.

They highlighted the lack of retention mechanisms in the institutions for students who left the synchronous virtual classes, and many of them opted to enter the labour market.

This context motivated the research project on the impact of the pandemic on the IEMS in the Eastern zone of the State of Mexico.

The research uses a mixed methods approach, combining quantitative and qualitative data, through interdisciplinary work with documentary research axes. Data collection included 3 interviews with school principals, 4 focus groups with students and 1 focus group with teachers. This methodology allows for a comprehensive analysis of dropout rates and educational quality, considering both statistical data and the personal experiences of those affected by the pandemic. The research proposes to examine in depth the impact of dropout on at least three generational cohorts, analysing existing retention and recapture strategies.

This analysis is essential to develop targeted interventions and educational policies that can mitigate the impact of educational backwardness and promote a sustainable recovery in the quality and accessibility of upper secondary education in the region.

Study problem

The COVID-19 pandemic caused a high dropout rate at the upper secondary education level in the municipalities of Chalco, Valle de Chalco and Ixtapaluca in the 2019-2020 school year. By 2021, their terminal efficiency was reduced and the number of secondary level students entering the Institutions of Higher Secondary Education (IEMS) was also lower, which suggests that the recovery of enrolment and terminal efficiency of these schools will be in the medium term, and will require strategies for attracting, retaining and levelling students by the management and educational staff of their schools.

This situation is critical not only because of its immediate effects on the affected students and educational institutions, but also because of its long-term implications for the social and economic fabric of these municipalities.

Therefore, the research questions that give rise to this study are as follows:

- How has the dropout rate evolved in the IEMS of Chalco, Valle de Chalco and Ixtapaluca before, during and after the COVID-19 pandemic, and what socio-economic, academic and contextual factors have influenced these variations?
- What follow-up and accompaniment strategies have the IEMS in the region implemented to prevent and address school dropout cases during and after the pandemic, and how effective have they been in reducing dropout rates?
- What are the most significant socio-emotional impacts experienced by students at IEMS in the region as a result of the COVID-19 pandemic?
- How was the educational quality of students at the upper secondary level affected during the pandemic?

Objectives

General Objective

To evaluate the impact of the COVID-19 pandemic on dropout levels in the IEMS of the municipalities of Chalco, Valle de Chalco and Ixtapaluca, analysing the institutional mechanisms for monitoring dropout, the socio-emotional effects on students and the effect on the quality of education.

Specific objectives

- To analyse school dropout levels in the IEMS of Chalco, Valle de Chalco and Ixtapaluca before, during and after the COVID-19 pandemic, identifying variations and trends at different educational levels.
- Examine the institutional mechanisms implemented by the IEMS to follow up on school dropout cases during and after the pandemic, assessing their effectiveness and scope.
- To assess the socio-emotional effects of the pandemic on students at the IEMS in the region under study.
- To analyse the impact on the educational quality of students in the context of the pandemic.

Methodological framework

The research arises from the need to identify the current demands of young people after the pandemic in the academic sphere. Isolation due to the COVID-19 contingency in Mexico lasted from 23 March 2020 to 10 October 2022.

Although there was already a serious educational problem and a gap that polarised education was recognised, this situation highlighted and aggravated this scenario, extending further and impacting the mental health of students.

As a result of some dialogues carried out with various IEMS directors in the eastern zone of the State of Mexico, which encompasses the municipalities of Ixtapaluca, Valle Chalco and Chalco, statements were compiled that gave shape to the intention to investigate more about the impacts of the pandemic, namely:

- It was noted that the dropout rate in the third year of baccalaureate reached a worrying 70%.
- Some institutions reported a 30% drop in first grade entry compared to the previous year.
- The absence of clear retention mechanisms in upper secondary institutions for those students who stopped participating in synchronous virtual classes was highlighted.

- It was noted that most of the students who dropped out of synchronous classes made the decision to enter the labour market.

This project has had a duration of three years and has worked with an interdisciplinary team according to three research axes:

- Documentary and data processing;
- Educational research;
- Processes and dynamics of educational retention.

These research axes have been managed in their research productivity in a diachronic way and by annual stages that can be identified as follows:

First stage (2022). In this stage, the design of instruments and location of sources of information collection that would be necessary for each axis, as well as their different instruments, was begun. This was a stage of design and validation of different data collection instruments. Both in terms of statistical documentation and methodological design of data collection, it was necessary to contemplate various instruments such as:

1. A matrix for the collection of data, such as enrolment, graduation, leaving and averages by generational cohort of the selected IEMS.
2. A questionnaire for conducting interviews with directors.
3. A script for conducting student groups.
4. A script for the application of focus groups with teachers.

Second stage (2023). The delimitation involved comparatively segmenting generational cohorts, before, during and after the confinement due to the pandemic. Since the confinement implied a rupture in the school dynamics linked to the economic dynamics of the students' household units, a significant break point for school dropout was located.

The IEMS that were selected provided information segmented longitudinal cohorts over time to analyse their behaviour before and after the pandemic, corresponding to the school cycles of:

1. 2016-2019 Pre-confinement.
2. 2017-2020 With effects on terminal efficiency in the third year of baccalaureate.
3. 2018-2021 With effects on dropout, terminal efficiency of baccalaureate.
4. 2019-2022 With effects on entrance percentage in first year of baccalaureate, dropout and terminal efficiency.
5. 2020-2023 With effects on all indicators, which we could call post-confinement.

At this stage, data were collected according to the case studies, through an Excel matrix. It should be noted that we are still working on a cross-sectional comparative analysis of enrolment behaviour between the different IEMS, so this study only presents 4 of the 8 cases that are only the subject of this study. Similarly, other data collection instruments were applied: two in-depth interviews with high school directors and/or officials, meetings with two zone supervisors, three directors and two deputy directors, as well as the collection of qualitative information with young people through four focus groups, in addition to the application of a focus group with teachers.

In addition to this, three working days were held with the IEMS, two in the TUVCH and one more in the zone supervision of the general baccalaureate schools, through which teachers, counsellors, liaisons, vice-directors and directors shared their experiences of their educational centres,

The IEMS located in Ixtapaluca, Chalco and Valle de Chalco participated, with an average of 75 teachers, counsellors and administrative authorities on the first day, 30 people on the second day and 200 teachers, counsellors and administrative authorities from the area on the last day.

Third stage (2024). We are currently in this stage, carrying out the analysis and cross-checking of information between the different instruments in order to understand and explain the dropout in the different generational cohorts, the relationships between the different case studies and, to elaborate a series of recommendations from the general, academic and academic management, to the IEMS of the eastern zone of the State of Mexico.

In sum, with these three stages, the research is approached with a mixed methodology in which both quantitative and qualitative data are considered. In this sense, a comparative analysis between institutions is considered in order to review the dropout variables in IEMS in the regions of Ixtapaluca, Chalco and Valle de Chalco, as well as to detect aspects such as dropout and retention, academic follow-up, teaching and learning practices and educational quality.

Epistemic frame of reference

The research aims to work under a systemic approach to complex problems, which identifies the cut-off from a territorial delimitation of units of analysis that share the same dynamics of exclusion, demographic characteristics, profiles of higher secondary education institutions, linked to the economic activity of the students and the educational offer at the baccalaureate level.

We assume that the entry of students at each level of education (primary, secondary, baccalaureate and higher education) has a cascading effect that depends on the immediate previous level of education. As he conceives, in complex systems, each part is interrelated with the whole, which means that the behaviour of students at different educational levels cannot be analysed in isolation, but rather in terms of their interaction with various factors.

The recovery of enrolment at the various levels of education with respect to dropout has a structural effect at baccalaureate level that depends on the recovery of previous levels, and on at least four factors related to the following units of analysis:

1. The territorial delimitation, Chalco, Valle de Chalco and Ixtapaluca, municipalities that share similar exclusion indicators and similar urban, educational and youth dynamics;
2. Educational quality indicators such as PISA and PLANEA, diagnostic exams such as EXCOBA (Entrance exam applied at the Tecnológico Universitario del Valle de Chalco -TUVCH) and COMIPEMS (Entrance exam applied to upper secondary level students).

3. The experiences of directors and/or authorities, teachers and the young people themselves in their academic trajectories.

Given these units of analysis, the construction of a common epistemic framework is required in order to work on the basis of the same reading of the complex problem to be analysed.

Frame of reference: Description of the Case Studies

The research on educational backwardness in Higher Secondary Education Institutions (IEMS) in the municipalities of Chalco, Valle de Chalco and Ixtapaluca, following the COVID-19 pandemic.

The research initially contemplated working with a sample, however, difficulties arose with data collection, as many of the institutions visited did not have the information and others did not have the confidence or willingness to collaborate with the study. For this reason, it was decided to work by case studies; selecting IEMS covering the three municipalities of Ixtapaluca, Chalco and Valle de Chalco.

These cases were chosen considering their relevance and geographical location, in addition to the fact that these institutions showed interest in the study and provided the information for this research.

These case studies allow for a better understanding of the challenges faced by the aforementioned municipalities belonging to the State of Mexico. This study presents partial results by looking at only four of the eight case studies contemplated for this research. Below are four of them, representing the three municipalities contemplated in this research, as part of the partial advances of this study.

I) Case study - School 1

This school, located in San Francisco Cuautla, Ixtapaluca in a context where customs are rooted in the community, has involved adapting school dates to the customs of the place (patron saint festivals, fairs and processions, for example).

The educational institution is a socially organised school with a small population and a single shift.

The school population reported difficulties in maintaining the motivation of the students during the confinement, as they were hard hit by the pandemic and suffered the loss of family members and neighbours.

In addition, a drop in income was reported, compared to the levels of previous generational cohorts. (See table 1).

Box 1

Table 1

Data analysed from Case Study 1

Generational cohort	Students by generational cohort	COMIPEMS Reports
2016 – 2019	118	No data
2017 – 2020	243	61
2018 – 2021	160	59
2019 – 2022	133	55
2020 – 2023	123	59

Source: Own elaboration (2023). Confidential information provided by School 1 authorities.

II) Case study - School 2

Located in Chalco, this campus faced the pandemic requiring a rapid transition to online education, which presented challenges for both students and teachers in terms of internet access and digital competencies. As in the previous case, a decline in the generational cohort is reported. (See table 2 below)

Box 2

Table 2

Data analysed from Case Study 2

Generational cohort	Students by generational cohort	COMIPEMS Reports
2016 - 2019	63	There is a consolidated COMIPEMS score per year, however, there is no correspondence of COMIPEMS reports per student..
2017 – 2020	68	
2018 - 2021	41	
2019 - 2022	65	
2020 - 2023	61 (first year only)	

Source: Own elaboration (2024). Confidential information provided by the authorities of the schools presented in the study

III) Case study - School 3

Located in Valle de Chalco, this small to medium-sized single-shift school faces several problems due to its economic and social context. Students lack sufficient technological resources and adequate conditions necessary for optimal academic development. These difficulties were exacerbated by the isolation caused by the COVID-19 pandemic (see table 3).

Box 3

Table 3

Data analysed from Case Study 3

Generational cohort	Students by generational cohort	COMIPEMS Reports
2016 - 2019	145	Not provided by EMI
2017 – 2020	157	Not provided by EMI
2018 - 2021	122	Not provided by EMI
2019 - 2022	139	Not provided by EMI
2020 - 2023	141 (solo primer año)	Not provided by EMI

Source: Own elaboration (2022). Confidential information provided by School 3 authorities.

IV) Case study - School 4

The school has a low enrolment. It is located in Cerro del Tejolote, Ixtapaluca, in a context where the economic needs of the students meant great challenges, due to the socio-demographic situation in which it is located, as it is a marginalised area with problems in the social fabric resulting from high levels of insecurity. (See table 4).

Box 4

Table 4

Data analysed from Case Study 4

Generational cohort	Students by generational cohort	COMIPEMS Reports
2016 - 2019	31	Not provided by EMI
2017 – 2020	17	Not provided by EMI
2018 - 2021	23	Not provided by EMI
2019 - 2022	26	Not provided by EMI
2020 - 2023	22	Not provided by EMI

Source: Own elaboration (2023). Confidential information provided by School 3 authorities

In the eastern region of the State of Mexico, IEMS faced unprecedented challenges that tested their capacity for adaptation and resilience.

The selection of these four case studies in the municipalities of Chalco, Valle de Chalco and Ixtapaluca, reported so far, provides a detailed overview of how these institutions managed the transition to distance learning modalities, facing challenges such as dropout, lack of technological resources and socio-economic barriers that aggravated existing inequalities among students.

These cases not only reflect the unique difficulties of each locality, but also highlight the strategies implemented to continue education under extremely difficult circumstances.

Reflecting on these experiences is essential to understand not only the immediate impact of the pandemic on education, but also to project lessons learned into the future of the education sector.

It is crucial to assess the effectiveness of responses and the sustainability of emerging educational innovations.

In addition, considering these experiences allows for the identification of areas of vulnerability and strength within the education system, facilitating the development of more robust and equitable policies that can sustain education in times of crisis.

As mentioned, education is a fundamental pillar for economic development, as it provides the essential human resources to drive a country's growth, so it is necessary to implement effective policies that address disparities in access to quality education and promote greater educational equity.

This analysis contributes not only to a better understanding of the current educational landscape, but also paves the way for strengthening the resilience and adaptability of institutions in the face of future global challenges. (See table 5, concentrated case studies).

Box 5

Table 5

Concentrated case studies presented as partial results			
Case Study	Location	Reflection on the Case	Important Considerations
School 1	San Francisco Acuautla, Ixtapaluca	The adaptation of school dates to local customs shows the need for flexibility in educational planning.	It is important to consider the uses and customs of the community in which the school is located and to match academic activities in order to generate greater student participation.
School 2	Chalco	The rapid transition to online education highlighted the lack of digital skills.	It is necessary to invest in digital training for students and teachers to better adapt to online learning.
School 3	Valle de Chalco	Isolation during the pandemic added emotional and academic challenges in a community with pre-existing problems.	Develop emotional and academic support programmes that respond to the specific needs of the community.
School 4	Cerro del Tejolote, Ixtapaluca	Students' economic hardship affected their participation and continuity in education.	Implement scholarship and financial support programmes for students at risk.

Source: Own elaboration. (2024).

The COVID-19 pandemic triggered a global crisis that affected all aspects of daily life, with education being one of the most impacted sectors. In the eastern region of the State of Mexico, IEMS faced major challenges that tested their capacity to adapt and resilience. The selection of eight case studies in the municipalities of Chalco, Valle de Chalco and Ixtapaluca details how institutions managed the transition to distance learning modalities, facing challenges such as dropout, lack of technological resources and socio-economic barriers that aggravated inequalities among students.

These cases not only reflect the difficulties of each locality, but also highlight the strategies implemented to continue education under complex circumstances.

Interviews and focus groups conducted with teachers and students in these institutions show testimonies of the stress and anxiety of the transition to online education, the lack of access to adequate technological devices and reliable internet connection.

In addition, an urgent need for emotional and psychological support was identified for students who faced personal and family losses due to the pandemic. According to the study, self-esteem has a significant negative effect on anxiety, suggesting that higher levels of self-esteem may contribute to reduced anxiety in students.

Furthermore, self-esteem is also positively correlated with academic self-efficacy, implying that higher self-esteem may increase students' perception of their ability to succeed in their studies.

Teachers also expressed the need for more training in digital tools and distance learning methodologies. It is necessary to reflect on these experiences in order to understand not only the immediate impact of the pandemic on education, but also to project lessons learned into the future of the educational context. In this sense, it is essential to evaluate the effectiveness of the responses and the sustainability of emerging educational innovations.

Results

Case Study School 1

School 1, a general high school located in San Francisco Acuautila, Ixtapaluca, has faced considerable challenges during the COVID-19 pandemic. The research conducted analyses several key aspects that impacted the institution and the student community (see Figure 1).

The results are presented below in three main areas: attrition and retention, academic monitoring and teaching-learning practices, and educational quality.

a. Attrition and retention:

The institution faced a high dropout rate during the pandemic. Lack of motivation and financial difficulties were the main reasons mentioned by the students who participated in the focus group.

The school implemented emotional support programmes and personalised tutoring to try to retain students, but with limited success. (See Figure 3).

In this EMI, the pandemic had a significant impact on school dropout, with a total dropout rate of 41.52% in 2016 and an increase in the following years, with a lower percentage observed in the 2020-2023 generational cohort. Generational cohorts show variability in attrition rates, with a significant impact on retention during the pandemic. (See figure 2).

Some of these strategies were:

- Constant communication: Counsellors maintained regular contact with students and their families, using phone calls, Whatsapp messages and social media to offer support and follow-up.
 - Administrative flexibility: Adjustments were made to administrative processes, such as the extension of extensions for the collection of extraordinary fees and even their omission in exceptional cases, flexibility in the enrolment process, all of this to be more empathetic to the difficulties of students.
 - Emotional support: The counsellors provided emotional support to students and parents, helping to maintain motivation and commitment to education.
 - According to the school principal, these strategies reduced dropout and motivated her students, although not all dropouts returned to the school when the situation began to normalise.
- b. Academic monitoring and Teaching and Learning practices:

Academic follow-up during the pandemic was mainly based on the use of digital technologies and adapting teaching methods for the virtual modality. Students reported that communication with their teachers was done through platforms such as WhatsApp, Facebook, and Classroom.

This modality allowed for some flexibility, but also presented significant challenges. Despite follow-up, the online classes failed to capture the interest of all students, reporting many difficulties in keeping up with the pace of the virtual classes.

While teachers also faced significant challenges in adapting to new technologies and teaching methods.

Teaching practices:

- Use of digital platforms: classes and activities were conducted using applications such as Classroom, Meet and WhatsApp. This allowed students to submit assignments and receive feedback, although connectivity and access to devices were recurrent problems.
- Flexibility in submitting assignments: Students were able to submit assignments in a flexible manner, which allowed them to combine their academic responsibilities with other activities, such as work.
- WhatsApp groups: WhatsApp groups with tutors and counsellors facilitated communication and monitoring of academic activities, helping to maintain an open channel for doubts and problems.

c. Educational quality:

Educational quality in the institution declined considerably during the pandemic. Post-pandemic academic evaluations revealed a drop in performance in several subjects, mainly in mathematics,

Spanish and English, highlighting the need for specific interventions to recover the previous educational level.

Educational quality has been a constant concern, with exit rates reflecting efforts to maintain educational standards. The overall completion rate was 57.62% in 2016, with variations in subsequent years due to the challenges presented by the pandemic.

Although overall average grades increased during the period of virtual education, this did not reflect students' true learning and understanding of the subjects.

The flexibility and facilities offered during the pandemic resulted in higher grades than were usually reported.

Some data on academic results are presented below:

- Grade point averages: Semester averages showed an increase during the pandemic, with values ranging from 7.4 to 7.6, depending on the semester and generation.
- Exam performance: Many students reported that their grades did not reflect their true knowledge and skills. In post-pandemic diagnostic tests, students were found to lack basic competencies in key areas such as mathematics and reading comprehension.
- Differences in modalities: There was a general preference for face-to-face classes, where students felt more involved and had a better understanding of the topics. Face-to-face interaction with teachers and peers was seen as essential for effective learning.

In sum, the results of the research in School 1 reveal the profound challenges and adaptations experienced during the COVID-19 pandemic. Retention strategies and emotional support were crucial to keep students connected to their education, although the quality of education was affected by the virtual modality and the lack of preparedness to deal with such an abrupt change.

The lessons learnt from this study will be fundamental to strengthening the resilience of the HEI in the face of future crises.

Case Study School 2

Research on the educational backlog at Escuela 2, a technological baccalaureate institution (see Figure 1), located in Chalco has revealed different challenges and responses during the COVID-19 pandemic, focusing on student attrition and retention, academic monitoring and teaching-learning practices, and educational quality.

a. Attrition and retention:

The pandemic evidenced dropout in this institution, with a notable increase in the number of students dropping out due to economic problems and lack of access to technological resources. Before the pandemic, the dropout rate was already significant, but during and after the confinement, the numbers skyrocketed.

The school implemented several strategies to retain students, such as the provision of internet data packs and the loan of electronic devices, but these measures were not enough to fully mitigate the impact. Interviews and focus groups revealed that many students felt overwhelmed by the workload and lack of adequate support, leading some to consider dropping out of their studies.

However, the institution implemented several strategies to mitigate these problems, including the use of digital platforms to maintain communication and academic follow-up. These measures helped some students to feel accompanied and supported, although not all experienced the same level of satisfaction. (See figure 2).

The institution faced significant challenges in terms of dropout during and after the pandemic.

Prior to the pandemic, the institution already faced challenges in student retention. In 2016, the total attrition rate was 41.52%, with an increase in male attrition (44.77%) compared to female attrition (37.25%). During the pandemic, these challenges intensified, highlighting the need for more effective strategies to retain students and prevent dropout.

Dropout was mainly attributed to failure and the lack of technological resources needed to follow online classes. The pandemic highlighted these difficulties, making the digital divide and the lack of adequate support for students in vulnerable contexts even more visible.

b. Academic monitoring and Teaching and Learning practices:

During the pandemic, teaching practices moved rapidly to the online format. However, many teachers and students faced technical and adaptation difficulties. Teachers were trained in the use of digital platforms, but academic follow-up was uneven due to a lack of direct interaction and some students' disinterest in virtual classes.

During the pandemic, this school adopted a combination of digital tools such as Google Classroom, WhatsApp, Teams and Google Chat to continue teaching and academic follow-up.

Students reported a mixed experience of the effectiveness of these tools. Some found that these platforms facilitated the organisation and submission of assignments, while others faced difficulties due to the lack of direct interaction with teachers.

The transition to a hybrid model also presented challenges, as staggered attendance and the use of digital media did not always replicate the effectiveness of face-to-face teaching. Despite these problems, many students valued the use of digital tools and suggested that certain practices, such as the use of Google Classroom for homework submission, should be maintained even in a post-pandemic environment.

Students highlighted that while some online teaching strategies were effective, the lack of face-to-face contact affected their learning. Some mentioned that digital platforms helped to maintain communication and follow-up, but also pointed to the need for more engagement from teachers to ensure better understanding of the topics. Homework overload and the lack of a proper balance between online and face-to-face activities were recurrent problems that negatively affected academic performance.

The transition to online education presented numerous challenges for both students and teachers. Academic monitoring became more complex due to a lack of digital skills and adequate technological infrastructure.

The report reveals that although significant efforts were made to adapt teaching practices to a virtual format, the lack of adequate preparation and resources limited the success of these initiatives.

c. Educational quality:

Educational quality at the institution suffered during the pandemic, with a notable decline in students' academic performance on standardised tests such as the EXCOBA[1], administered at TUVCH. Overall, students reported that while some teachers adapted well to the new environment and provided useful resources, others failed to maintain the quality of instruction. The lack of direct interaction and reliance on self-study also contributed to this decline in educational quality.

In addition, students mentioned that the quality of education varied significantly depending on the commitment of teachers and their ability to use digital tools effectively.

Despite these challenges, it was recognised that some tools and practices adopted during the pandemic could be useful in the future if properly integrated with face-to-face teaching.

The need for a balanced approach that combines the best of both worlds is essential to improve the quality of education and ensure that students receive a well-rounded and effective education.

Some of the teaching and academic monitoring practices implemented were:

- Digital platforms and online classes: Digital platforms were used to continue teaching, but the lack of digital competences in both students and teachers affected the effectiveness of these tools.
- Tutoring and mentoring: Tutoring programmes were implemented to support students, although the lack of direct contact and isolation negatively affected motivation and academic performance.
- Need for socio-emotional support: The importance of providing socio-emotional support to students to manage stress and anxiety stemming from the pandemic was highlighted.

Despite the challenges, the institution has maintained a consistent effort to ensure educational quality. Exit rates before and during the pandemic show a positive trend, with an overall exit rate of 69.84% in 2016 and increasing to 70.76% in 2019. Females showed a higher exit rate compared to males in most of the years analysed. (See figure 3).

Case Study School 3

School 3 is a secondary school offering a technological baccalaureate, located in an area with many economic, social and educational needs. (See graph 1). The COVID-19 pandemic exacerbated these challenges, significantly affecting educational quality.

Assessments showed a decline in proficiency levels in key areas due to the disruption of face-to-face classes and the transition to online education. Relevant data on School 3 is presented below.

a. Attrition and retention:

The institution faced a significant increase in attrition rates during the pandemic, which presented a critical problem. In 2016, the total attrition rate was 36.55%, and although there was a decrease in subsequent cohorts, the figures were still considerably high. During the pandemic, the attrition rate remained a major concern, affecting long-term student retention.

Data from generational cohorts reveal that attrition rates remained high, with factors such as failure and lack of access to technological resources as major contributors. (See Figure 2).

High attrition, especially in the early years, highlights the need for improved retention strategies and support for students, especially in adapting to online learning and managing emotional and academic load.

b. Academic monitoring and teaching and learning practices:

Due to time adjustments and the workload of EMI staff, the implementation of focus groups with teachers and students was not possible. However, according to the material reviewed, a pressing need to improve academic monitoring and teaching and learning practices was identified.

The data suggest that it is essential to implement personalised follow-up strategies for students, as well as to strengthen the digital competences of both teachers and students. In addition, it is crucial to develop socio-emotional and academic support programmes that respond to the specific needs that arise during and after the pandemic to ensure quality education and reduce dropout rates.

c. Educational quality:

Educational quality at School 3, a technological baccalaureate institution located in Valle de Chalco deteriorated significantly during the pandemic.

Assessments indicated a decline in proficiency levels in key areas. Educational quality at this institution shows a gradual improvement in graduation rates, with an increase from 63.19% in 2016 to 65.46% in 2019.

However, the pandemic presented a significant challenge in maintaining this quality due to disruptions in learning and lack of adequate resources for online education.

Although final averages by generational cohort varied, with a slight improvement observed in the most recent generations, with averages ranging between 7.3 and 8.0, the results for entry to tertiary level, such as the TUVCH, show that overall the average upper secondary graduation rate is not consistent with the results on the EXCOBA diagnostic test.

The analysis suggests that the deficiencies in academic preparation are largely due to the disruption of traditional educational processes and the abrupt transition to online education.

Case Study School 4

School 4, located in Cerro del Tejolote, Ixtapaluca, faced significant challenges due to its context where students have different economic and socio-emotional needs, which put them in a vulnerable position (see Figure 1). (See Figure 1).

a. Attrition and retention:

This institution recorded a significant dropout rate during the pandemic. Economic factors and the need to work were the main reasons for dropout (see figure 2).

In terms of retention strategies, needs were identified as follows:

- Dissemination of activities: Television was used to disseminate educational activities and keep students informed.
- Support with materials: Textbooks were provided to those students who did not have access to the internet due to economic difficulties.

- Personalised follow-up: Through WhatsApp, phone calls and home visits, teachers and zone coordinators constantly followed up with students accompanied by guardians or parents.

b. Academic monitoring and Teaching and Learning practices:

Academic follow-up at the Institution was inconsistent, in addition to having the challenge of serving students with a reduced teaching staff. Online classes presented many challenges, including lack of internet access and devices suitable for students.

Faculty had to adapt quickly to digital platforms, but the quality of teaching was compromised.

Adapting to online education was a considerable challenge for the school. Lack of adequate technological resources and geographical constraints complicated the implementation of effective academic monitoring.

Some of the teaching practices reported were:

- Use of digital platforms: classes and activities were conducted via WhatsApp, Classroom and phone calls. These tools facilitated communication and the submission of assignments, although limited student connectivity presented a significant challenge.
- Checklists and attendance: To maintain academic control, checklists and attendance were used, as well as Classroom's tracking functionalities.
- Flipped classrooms: Practices such as flipped classrooms were implemented, where students reviewed reading materials prior to face-to-face classes, allowing for better planning and control of the topics covered.

c. Educational quality:

Educational quality in this school suffered during the pandemic. Although average grades increased slightly, this did not necessarily reflect better learning or understanding of the subjects. Information on academic outcomes is presented below:

- Generational GPAs: Final GPAs for generational cohorts ranged from 7.75 to 7.81, with a slight increase in some semesters.
- Exam performance: Despite the apparently high averages, interviews suggest that grades did not always reflect students' true knowledge. The pandemic situation led to more empathetic assessment, considering students' personal and family difficulties.
- Adapted assessment: During the pandemic, students' assessment was adapted to consider their emotional and family situation, sometimes resulting in inflated grades.
- Lack of participation: There was a lack of participation by some students and teachers in updates and use of digital tools, which affected the effectiveness of distance learning.

Despite the challenges, the institution has made efforts to maintain the quality of education, with graduation rates reflecting an effort on the part of students as well as their teachers.

In 2016, the overall graduation rate was 57.62%, while in 2019 it was 59.09%, showing a continuous effort to maintain and improve these figures despite the challenges presented by the pandemic (see graph 3).

Below are graphs with information on the entry rate, attrition rate and exit rate for the four case studies.

[1] EXCOBA (Examination of Basic Competencies): Diagnostic test given at TUVCH.:

Box 6

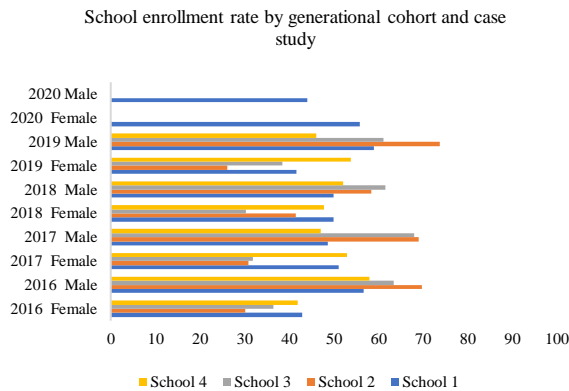


Figure 1

Entry rate by generational cohort and case study

Source: own elaboration 2024

Box 7

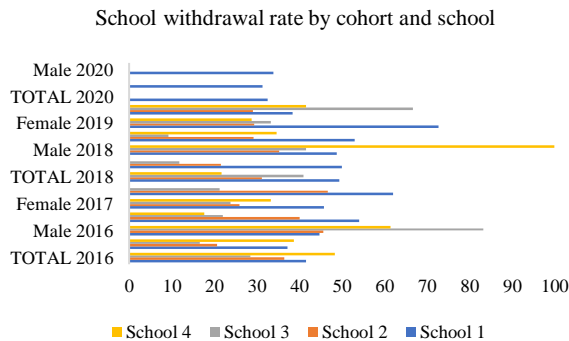


Figure 2

Departures by generational cohort and school
Source: Own elaboration (2024) with information provided by school authorities

Box 7

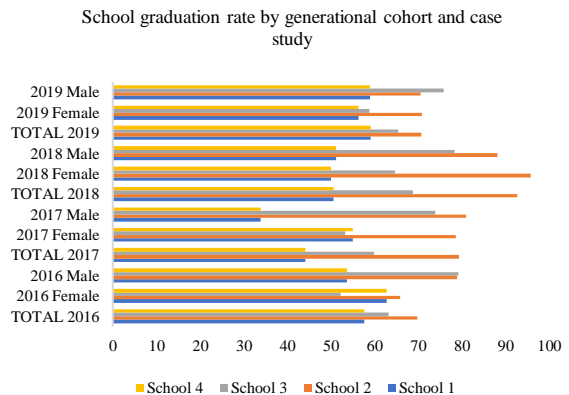


Figure 3

Graduation rate by generational cohort and school

Source: Own elaboration (2024) with information provided by school authorities

After reviewing the four case studies, we observe that the data in table 6 are common to the IEMS considered in this study:

Box 8

Table 6
Incidence of problems in upper secondary education due to the impact of the pandemic by COVID 19

#	Her	Frequency	Remarks
1	School dropout	8	Main cause for concern across the rapporteurships.
2	Socio-emotional impact	7	Widespread concern for student welfare.
3	Digital divide and access to resources	6	Highlighted need for improved infrastructure and access.
4	Adaptation to virtual education	6	Challenges in transition and effectiveness of e-learning.
5	Need for retention and recapture strategies	8	Efforts to recapture students disengaged from the education system.
6	Inclusion and diversity	5	The importance of addressing the needs of vulnerable groups is highlighted.
7	Relationship with families	4	The importance of family support and commitment is emphasised.
8	Teacher training and use of technology	6	Recurrent need to improve digital skills and methodologies.
9	Follow-up of graduates	4	Interest in post-graduation follow-up to evaluate educational effectiveness.
10	Government collaboration and support	3	More support and specific public policies are suggested.

On the other hand, according to the results found in this research, the low scores, mostly ranging between 30 and 65 points out of 128 on the COMIPEMS high school entrance exam, indicate that students enter high school underprepared in key areas such as mathematics, science, and reading and writing skills.

This underachievement exacerbates the problem in their educational transition, a problem that was exacerbated by the pandemic due to the disruptions caused by COVID-19. This increased dropout rates and negatively affected the quality of education. The pandemic intensified these problems by imposing additional barriers, such as lack of access to technological resources and the need for many students to work to support their families.

The study on educational backwardness in the IEMS in Ixtapaluca, Valle de Chalco and Chalco has yielded several significant findings regarding the impact of the COVID-19 pandemic. We have analysed the impact, so far, on three main common aspects: school dropout, academic monitoring and teaching and learning practices, and educational quality. This allows us to answer one of our research questions:

- What is the impact of the pandemic in the IEMS of these municipalities, in relation to school dropout at all three levels?

The COVID-19 pandemic had a significant impact on the terminal efficiency of the IEMS in Ixtapaluca, Valle de Chalco and Chalco, as evidenced by the data on the graduation rates of the different generational cohorts analysed in the study. During the period of confinement, the institutions faced increased dropout rates due to factors such as lack of access to technological resources, the need to work to financially support their families, and the socio-emotional impact of isolation.

For example, in School 1, the exit rate decreased significantly in the 2019 and 2020 cohorts compared to previous years. Similarly, School 2 and School 3 also recorded a reduction in exit rates, reflecting the difficulties students faced in completing their studies in a virtual environment.

Taken together, these results underscore the need to implement academic recovery strategies and comprehensive support to mitigate the adverse effects of the pandemic on education, ensuring that students can reach their full academic potential in the future.

In summary, the pandemic highlighted existing problems such as dropout and terminal efficiency in the IEMS in these municipalities.

The combination of high dropout rates and grade inflation highlights the need to review education policies and assessment strategies to ensure that students not only remain in the education system, but also receive a quality education that effectively prepares them for the future.

Conclusions

The IEMS in Ixtapaluca, Chalco and Valle de Chalco implemented various strategies to retain and follow up with their students in order to mitigate the impact of the pandemic.

These strategies included the use of digital platforms to maintain communication and academic follow-up, the delivery of content packs, as well as online activities and the loan of electronic devices.

However, these measures were not always sufficient to counter the challenges presented. Although school dropout was already a problem before the health crisis, the pandemic highlighted the difficulties related to academic quality.

The socio-emotional aspect considerably affected students, generating a negative impact that, after the pandemic, triggered other problems, such as increased anxiety and lack of motivation to continue their studies. In the area, there is a higher dropout rate among males than females, despite the fact that female enrolment is lower than that of males.

This poses an additional challenge for educational institutions to address gender disparities.

A crucial aspect during the pandemic was the almost personalised attention provided by counsellors and teachers, who played a pivotal role in monitoring and supporting students.

Their involvement with guardians or parents was also critical in order to create a more robust supportive environment. Despite these efforts, the main impact was reflected in declining proficiency levels in key areas such as mathematics and Spanish.

Students repeatedly mentioned that they do not feel confident in their knowledge and that their grades do not reflect their real performance, highlighting the importance of regularising the knowledge acquired. In addition, it was necessary to implement flexibility in school processes, including making late payments or definitively exempting some of them in exceptional cases, in order to contain dropout and facilitate educational continuity.

To face future challenges, more support from the authorities in terms of infrastructure and technology is required. Appropriate policies and strategies should be promoted that not only improve the quality of education, but also help to reduce dropout rates.

Furthermore, teacher training in technopedagogical skills must continue, ensuring that teachers are equipped to effectively use digital tools and adapt to new educational demands and implement interventions that respond to the specific needs of students is essential to promote meaningful learning as well as a more resilient and inclusive educational context.

During the research, a system of bulletins was created to address issues of education, drug addiction, training and gender violence through documentary research and focus groups with the community of the institutions participating in the research, resulting in 12 bulletins that included research advances, which were shared with the IEMS of Ixtapaluca, Chalco and Valle de Chalco, which allowed us to obtain more information for this study, as well as to strengthen our partnerships with them.

Final reflections

The implications for the future of this research underline the importance of investing in technological infrastructure and digital training for both students and teachers. In addition, it is crucial to implement socio-emotional support programmes that help students manage the stress and anxiety stemming from the pandemic.

Lessons learned during this crisis should be incorporated into education policies that promote greater equity and quality in education, ensuring an educational environment appropriate to the needs of young people.

The contribution of this research is the generation of information that can be used by educational authorities and institutions for the creation of policies and relevant strategies so that high school students can receive the necessary support to continue their studies and improve their quality of life.

This information also allows teachers and educational authorities to see the need to generate new ways or processes to improve their pedagogical practices and retention strategies.

However, we recognise that a more refined analysis is still needed to sift through the data and reflect more on the needs and challenges that the COVID-19 pandemic has left us with in terms of educational backwardness.

To complement this analysis, four more cases will be included in the study that will give us a complete picture of the school situation of students during the pandemic, in terms of dropout, follow-up, emotional situation and the consequences in terms of educational quality; these case studies belong to the Ixtapaluca and Valle de Chalco areas.

Finally, we can highlight that the bulletin system is an example that allows us to have real information about the real needs of the IEMS for the formulation of relevant strategies to address the current challenges in the region of Ixtapaluca, Chalco and Valle de Chalco. In sum, this study provides an understanding of the challenges and opportunities facing the education system in these regions. Its findings, so far reported, and evidence-based recommendations are essential to design effective interventions to mitigate the adverse effects of the pandemic and strengthen the quality and accessibility of upper secondary education in the future.

Annexes

Box 9

Table 7

Statistical data for School 1

Indicator	2016	2017	2018	2019	2020
Total, enrolled students	118	242	160	132	120
Female enrolment rate	30.15%	51.20%	50%	41.60%	55.83%
Male intake rate	56.70%	48.70%	50%	59.09%	44.16%
Average intake	No data	No data	No data	No data	No data
Total dropout rate	41.52%	51.13%	49.37%	53.03%	32.50%
Total, female dropouts	37.25%	45.76%	50%	72.77%	31.34%
Total, male leavers	44.77%	62.09%	48.75%	38.46%	33.96%
Exit rate	57.62%	44.21%	50.62%	59.09%	No data
Female exit rate	62.74%	55.08%	50%	56.36%	No data
Male graduation rate	53.73%	33.87%	51.25%	58.97%	No data
Final average of generational cohort	7.6	7.6	7.4	7.4	No data

Box 10

Table 8

Statistical data for School 2

Indicator	2016	2017	2018	2019	2020
Total, enrolled students	63	68	41	65	No data
Female enrolment rate	30.15%	30.88%	41.46%	26.15%	No data
Male intake rate	69.84%	69.11%	56.70%	73.84%	No data
Average intake	8.1	8.2	8.4	8.4	No data
Total dropout rate	28.57%	22.05%	41%	9.20%	No data
Total, female dropouts	16.66%	23.88%	11.76%	33.30%	No data
Total, male leavers	83.33%	21.27%	41.60%	66.60%	No data
Exit rate	69.84%	79.41%	92.68%	70.76%	No data
Female exit rate	65.90%	78.72%	95.83%	70.83%	No data
Male graduation rate	78.94%	80.95%	88.23%	70.58%	No data
Final average of generational cohort	8.1	7.8	8.1	7.9	No data

Source: Own elaboration (2024) with information provided by school authorities

Box 11

Tabla 3

Statistical data for School 3

Indicator	2016	2017	2018	2019	2020
Total, enrolled students	145	157	122	139	No data
Female enrolment rate	36.55%	31.84%	30.32%	38.44%	No data
Male intake rate	66.44%	68.15%	61.67%	61.15%	No data
Average intake	7.88	8.1	8.1	7.7	No data
Total dropout rate	36.50%	40.12%	31.14%	34.53%	No data
Total, female dropouts	20.75%	26.00%	21.62%	29.41%	No data
Total, male leavers	45.65%	46.72%	35.29%	29.16%	No data
Exit rate	63.19%	59.87%	68.85%	65.46%	No data
Female exit rate	52.17%	53.27%	64.70%	58.82%	No data
Male graduation rate	79.24%	74%	78.34%	75.92%	No data
Final average of generational cohort	7.3	7.57	8.15	8	No data

Source: Own elaboration (2024) with information provided by school authorities

Box 12

Tabla 4

Statistical data for School 4					
Indicator	2016	2017	2018	2019	2020
Total, enrolled students	30	17	23	26	No data
Female enrolment rate	41.93%	52.94%	47.82%	53.84%	No data
Male intake rate	58.06%	47.05%	52.17%	46.15%	No data
Average intake	Sin datos	Sin datos	Sin datos	Sin datos	No data
Total dropout rate	48.38%	17.64%	21.73%	34.61%	No data
Total, female dropouts	38.80%	33.33%	0%	28.80%	No data
Total, male leavers	61.53%	0%	100%	41.66%	No data
Exit rate	57.62%	44.21%	50.62%	59.09%	No data
Female exit rate	62.74%	55.08%	50%	56.36%	No data
Male graduation rate	53.23%	33.87%	51.25%	58.97%	No data
Final average of generational cohort	7.75	7.75	7.8	7.81	No data

Source: Own elaboration (2024) with information provided by school authorities

Declarations

Conflict of interest

The authors declare that they have no conflicts of interest. They have no known competing financial interests or personal relationships that might have appeared to have influenced the article reported in this paper.

Authors' contributions

Aldape-Enriquez, Elsa Georgina: I contributed with research coordination, liaison with participating IEMS, data collection and research development.

Flores-Valtierra, José Juan: I contributed with the initial visits to the IEMS, liaison with the IEMS and development of the research.

Mojica-Galaviz, Luis Alberto: I contribute with data collection and research development.

Torres-Valdés, Arturo: I contribute with data collection and research development.

Availability of data and materials

The data collection matrix, questionnaires, focus group scripts and conference information are available on request from the institution to which the lead author and her co-authors belong.

Acknowledgements

Without the financial support of the Instituto de Investigaciones para el Desarrollo de la Educación (INIDE), this research would not have been possible.

We would like to thank the authorities of the IEMS for their support to the TUVCH by providing information about their institutions and participating in the organisation of joint activities, such as talks and the development of newsletters on topics of interest to the IEMS. It is important to note that the TUVCH and its authorities, as well as the research team, always showed valuable support.

Funding

This work has been funded by the Instituto de Investigaciones para el Desarrollo de la Educación (INIDE) research institute of IBERO CDMX.

Abbreviations

IEMS: Higher Secondary Education Institutions
INEGI: National Institute of Statistics and Geography

COMIPEMS: Metropolitan Commission of Public Institutions of Higher Secondary Education (Comisión Metropolitana de Instituciones Públicas de Educación Media Superior)

EXCOBA: Core Competency Examination

References

Background

INEGI. (2021). [Resultados de la Encuesta para la Medición del Impacto COVID-19 en la Educación \(ECOVIED-ED\) 2020](#). URL:

TUVCH. (2022). First Working Day with IEMS.

Support

Cao, X., & Liu, X. (2024). [Self-esteem as a predictor of anxiety and academic self-efficacy among Chinese university students: a cross-lagged analysis](#). *Current Psychology*, 1-11.

Article

Carro Olvera, A., & Lima Gutiérrez, A. (2022). Pandemia, rezago y abandono escolar: Sus factores asociados. *Revista Andina de Educación*.

Mehta, A., & Singh, U. (2024). An evaluation of the performance of key indicators of school education in India: With special reference to Jharkhand. *Journal of Emerging Technologies and Innovative Research*.

Fundamentals

Medina Gual, L., Chao Rebolledo, C., Rebolledo, C., Baptista Lucio, P., González Videgaray, M., Covarrubias-Santiago, C. A., Ojeda Núñez, J. A. (2021). El impacto de la pandemia en la educación media superior mexicana: un análisis desde lo pedagógico, psicológico y tecnológico. *Revista Iberoamericana de Educación*. Obtenido de El impacto de la pandemia en la educación media superior mexicana: un análisis desde lo pedagógico, psicológico y tecnológico.

Morin, E. (2017). *Introducción al pensamiento complejo*. Gedisa.