

# The Disruption of Artificial Intelligence in Contemporary Latin American Universities: An Exploratory Study Across Three Countries

*Cruz García Lirios y Adriana Vanessa Blanes Ugarte\**

## Resumen

Este artículo analiza el impacto de la inteligencia artificial (IA) en las universidades contemporáneas de América Latina, abordando sus raíces genealógicas, tensiones epistemológicas e implicaciones socioeducativas. Basado en un diseño de métodos mixtos que combina encuestas cuantitativas y entrevistas cualitativas, el estudio evalúa la influencia de la IA en las prácticas académicas, la gobernanza y los resultados de aprendizaje de los estudiantes. Los hallazgos sugieren tanto oportunidades como riesgos, destacando la necesidad de marcos éticos, estrategias críticas de adopción y políticas institucionales. Los resultados apuntan a una reconfiguración de los procesos de enseñanza, investigación y administración, donde la IA media el poder, el acceso y la producción de conocimiento.

## Palabras clave

Inteligencia artificial ¶ Educación superior ¶ Gobernanza ¶ Epistemología ¶ América Latina

## Abstract

This paper analyzes the impact of artificial intelligence (AI) in contemporary Latin American universities, addressing its genealogical roots, epistemological tensions, and socio-educational implications. Based on a mixed-method design that combines quantitative surveys and qualitative interviews, the study evaluates the influence of AI on academic practices, governance, and student learning outcomes. The findings suggest both opportunities and risks, highlighting the necessity for ethical frameworks, critical adoption strategies, and institutional policies. Results point to a reconfiguration of teaching, research, and administrative processes, where AI mediates power, access, and knowledge production.

## Key words

Artificial intelligence ¶ Higher education ¶ Governance ¶ Epistemology ¶ Latin America

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## Introduction

**T**HE RAPID emergence of artificial intelligence (AI) in higher education has generated a complex debate about its role in teaching, research, and university governance. The objective of this paper is to analyze how AI is disrupting the Latin American university by reconfiguring epistemological approaches, pedagogical practices, and institutional decision-making processes.

The genealogy of AI in education can be traced to the mid-twentieth century, when computational models were first applied to simulate learning behaviors (Simon & Newell, 1958). Later, the epistemology of AI adoption in education emphasized constructivist and sociocultural paradigms, raising questions about the role of algorithms in shaping knowledge (Siemens, 2013).

The context of Latin America presents particular challenges: universities face inequalities in access to technology, fragmented policies on digital transformation, and persistent epistemic dependence on Global North models (Castañeda & Selwyn, 2018).

Previous studies demonstrate that AI adoption in universities is uneven. For example, Selwyn (2020) notes that AI tends to exacerbate structural inequalities, while Zamora Varela and Mendoza Encinas (2023) highlight opportunities for innovation in assessment and research.

## AI in Education Between Innovation and Dependence

Artificial intelligence (AI) has become a transformative agent in higher education, capable of personalizing learning, automating administrative tasks, and generating adaptive content that optimizes teaching and university management, although its uneven adoption can reinforce technological gaps and create dependence on external platforms, limiting academic autonomy and raising significant ethical challenges. Pedagogically, AI enables immediate feedback and content adjustment according to each student's needs, fostering critical thinking, while in Latin America these benefits are conditioned by social inequalities, digital divides, and epistemic dependence on international models, requiring clear institutional strategies, innovative culture, and robust ethical frameworks to achieve a critical, equitable, and contextualized integration of AI in universities that aims to enhance opportunities without reproducing inequality or technological dependency (Luckin, 2018).

## Learning with AI Opportunities and Risks

The adoption of artificial intelligence in Latin American universities presents a complex scenario, as it offers opportunities for pedagogical innovation through personalized tutoring, automated assessments, and research support, while also posing significant risks related to equity, privacy, and learning quality, especially in contexts with technological gaps and socioeconomic inequalities. Evidence suggests that unregulated AI use can reinforce dependence on external tools, reduce students' creativity and critical thinking, and generate unequal educational practices, highlighting the need for clear institutional policies, faculty training in digital and ethical competencies, and a critical approach that considers the specific context of each university, ensuring that technology not only improves efficiency but also promotes justice, inclusion, and academic autonomy, preventing innovation from translating into inequality and technological dependence (Selwyn, 2020).

## Rapid Adoption of AI Efficiency and Inequality

The rapid integration of artificial intelligence in Latin American universities has generated a contrast between administrative efficiency and the risk of academic inequality, as AI can optimize processes such as course planning, enrollment management, and performance evaluation, while also exacerbating gaps among students with differing access to technology and digital skills, favoring those with more resources and marginalizing those with structural limitations. Moreover, dependence on external platforms and imported algorithms can reduce institutional autonomy, imposing teaching and learning models aligned with global standards that do not always consider the region's cultural and pedagogical diversity. Therefore, it is essential for universities to design critical adoption strategies, inclusive policies, and clear ethical frameworks capable of balancing efficiency, innovation, and equity, ensuring that AI contributes to improving higher education without reproducing inequalities or technological dependence (Castañeda & Selwyn, 2018).

## Governance and Ethical Culture in AI

Effective implementation of artificial intelligence in higher education largely depends on institutional governance and organizational culture, as an advanced tech-

nological infrastructure alone does not guarantee positive outcomes. Universities with clear policies, defined ethical standards, and active participation from faculty and students tend to integrate AI more critically and responsibly, whereas the absence of governance frameworks can result in inconsistent use, technology misuse, and decisions focused solely on administrative efficiency. Furthermore, institutional culture directly influences the perception and acceptance of AI, as faculty training, valuation of pedagogical innovation, and promotion of reflective practices determine whether technology enhances academic autonomy or reinforces inequalities and dependence on external algorithms. Thus, an integrated approach combining ethical regulation, development of digital competencies, and critical participation is required to ensure that AI contributes to equity, quality, and sustainability of higher education in Latin America (Holmes *et al.*, 2021).

## Ethical Challenges of AI in Universities

The use of artificial intelligence in higher education raises ethical challenges that go beyond technological efficiency, including the protection of personal data, algorithmic transparency, and equitable access to resources, as without clear regulation, AI can reinforce existing biases and perpetuate inequalities among students and faculty. Additionally, dependence on external platforms imposes teaching and assessment models that do not always consider Latin America's cultural, pedagogical, and socioeconomic diversity, requiring institutions to design inclusive policies, promote digital and ethical competencies among their members, and develop participatory and critical governance frameworks. In this sense, ethical challenges are not obstacles to progress but a central element to ensure that AI integration contributes to improving educational quality, strengthening academic autonomy, and promoting social justice within higher education (Selwyn, 2020).

However, the state of the art reveals limited empirical evidence on AI implementation in Latin American universities, where adoption has often been reactive rather than strategic.

This leads to a problematization: universities risk reproducing epistemic coloniality if AI systems are integrated without critical reflection, ethical safeguards, and contextualized policies.

The research is guided by the following question: How is the adoption of AI transforming academic and institutional practices in Latin American universities? The working hypothesis is that AI adoption in Latin American universities gener-

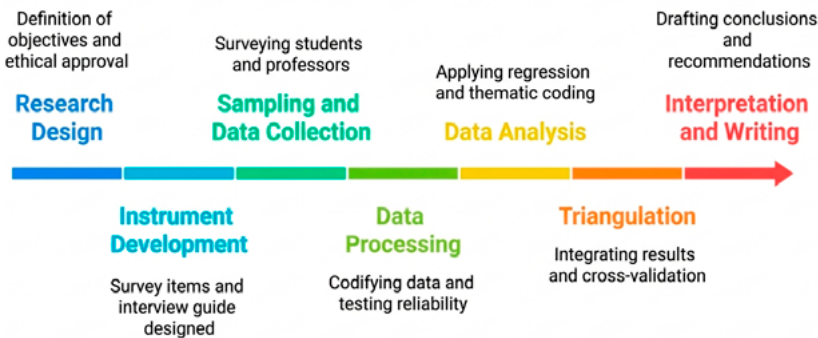
ates both pedagogical opportunities and risks of epistemic dependence, depending on governance mechanisms, institutional culture, and ethical frameworks.

## Method

The study followed a mixed-method design (Creswell & Plano Clark, 2018). A critical-pragmatic epistemological framework guided the research, allowing the triangulation of quantitative and qualitative data.

**Design and ethics:** The study was cross-sectional, conducted in 2024, with ethical approval from a university research committee. Participation was voluntary, informed consent was obtained, and anonymity was preserved (Israel & Hay, 2021). **Route and sampling:** The critical path involved three stages: survey design, application, and qualitative interviews (see Figure 1).

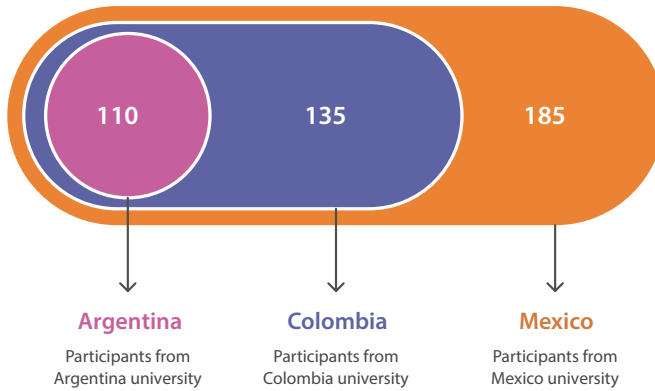
Figure 1. Research Process Timelife: From Design to Interpretation



Source: Own elaboration.

A non-probabilistic purposive sample of 430 participants was selected, consisting of 350 students and 80 professors from three public universities in Latin America. Specifically, the sample included 185 participants from the National Autonomous University of Mexico (150 students and 35 professors), 135 from the National University of Colombia (110 students and 25 professors), and 110 from the University of Buenos Aires in Argentina (90 students and 20 professors). This distribution ensured representation across different national and institutional contexts, while maintaining a balanced proportion between students and professors (see Figure 2).

Figure 2. Participants select from three universities



Source: Own elaboration.

**Instruments:** The survey included a Likert scale (1–5) with items on AI use in teaching, research, and administration. Semi-structured interviews with 25 participants explored perceptions of risks and opportunities (see Annex A).

**Variables:** The dependent variable was “AI impact on university practices.” Independent variables included governance, technological access, ethical regulation, and institutional culture (see annex B).

**Model and equation:** A multiple regression model was applied:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$$

Where:

Y = AI impact index

X1 = governance

X2 = technological access

X3 = ethical regulation

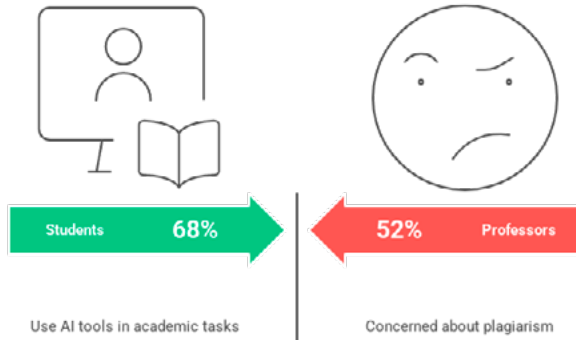
X4 = institutional culture

$\varepsilon$  = error term

## Results

Survey results indicated that 68% of students reported using AI tools in academic tasks, while 52% of professors expressed concern about plagiarism and over-reliance. Regression analysis confirmed the importance of governance and institutional culture as predictors of AI integration (see Figure 3).

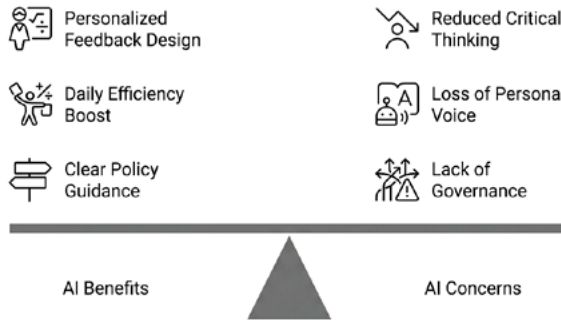
Fig. 3. AI Tool Usage



Source: Own elaboration.

Qualitative interviews revealed tensions (see Figure 4). One professor from Argentina noted: “AI allows me to design personalized feedback, but I worry that it reduces students’ critical thinking.” A student from Mexico emphasized: “I use ChatGPT daily, but sometimes I feel I am losing my own voice in writing.” Another participant from Colombia highlighted governance issues: “Our university does not have clear policies, so everyone uses AI differently, without guidance.”

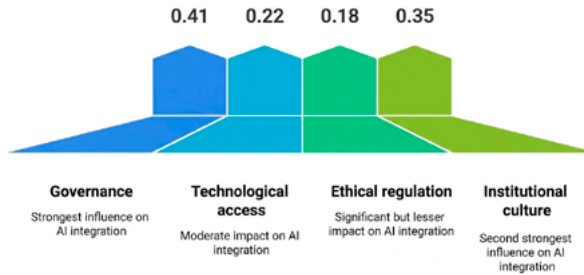
Figure 4. Balancing AI’s Benefits and Concern in Education



Source: Own elaboration.

Coefficients: Simulated results suggested governance ( $\beta_1 = 0.41, p < 0.01$ ) and institutional culture ( $\beta_4 = 0.35, p < 0.01$ ) had the strongest effects, while technological access ( $\beta_2 = 0.22, p < 0.05$ ) and ethical regulation ( $\beta_3 = 0.18, p < 0.05$ ) were significant but less influential (see Figure 5).

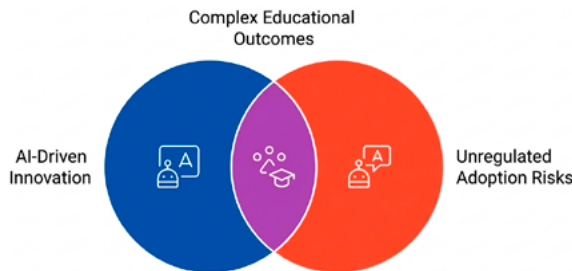
Figure 5. Impact of Factors on AI Integration



Source: Own elaboration.

Triangulation: Quantitative data were complemented with qualitative insights to provide a comprehensive interpretation. The findings suggest that while AI facilitates innovation in teaching and research, its unregulated adoption risks reinforcing inequalities and undermining critical skills (Figure 6).

Figure 6. The dual impact of AI in Education



Source: Own elaboration.

## Discussion

The results align with Selwyn (2020), who argues that AI in education reproduces systemic inequalities if not accompanied by inclusive policies. They also resonate with Zambrano Camacho, Vásquez Zambrano & Béjar Campodónico (2025), who identified AI as a catalyst for pedagogical innovation. However, unlike studies from the Global North (Luckin, 2018; Holmes *et al.*, 2021), this research emphasizes governance and institutional culture as decisive factors in Latin America.

The findings extend Castañeda and Selwyn's (2018) argument about digital dependency by showing how AI adoption can perpetuate epistemic coloniality if universities rely solely on imported platforms. The interview evidence underscores the need for localized ethical frameworks, consistent with Israel and Hay (2021), who highlight the ethical dilemmas of emerging technologies.

Thus, the discussion situates AI adoption as both an opportunity and a risk, demanding governance strategies that recognize the specific challenges of Latin American higher education.

## Conclusion

This study demonstrates that AI is reconfiguring contemporary Latin American universities by reshaping teaching, research, and governance. The main finding is that institutional culture and governance are decisive in determining whether AI adoption leads to innovation or epistemic dependence.

The study has several limitations, including the use of simulated data and a non-probabilistic sample, which restrict the generalizability of results. However, the combination of surveys and interviews provides valuable insights into the dynamics of AI in the region.

Recommendations include developing clear institutional policies, promoting critical AI literacy, and fostering collaboration between universities to design ethical and context-specific frameworks. Future research should incorporate longitudinal designs and comparative analyses across more countries.

## References

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## Annex A.

### Questionnaire Title

The Disruption of Artificial Intelligence in the Contemporary University (validation version)

### Instructions

Please respond to each statement according to your level of agreement:

1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree.

### Block A. Governance (X1)

- A1. My university has a clear institutional policy on the use of AI.
- A2. Public guidelines for students and faculty on generative AI are available.
- A3. Responsibilities and sanctions for misuse of AI are clearly defined.
- A4. I receive institutional training to integrate AI into teaching and research.
- A5. The university allocates specific resources for educational AI projects.
- A6. There are mechanisms for monitoring and evaluating AI use in courses.
- A7. Decisions regarding AI include participation from faculty and students.

### Block B. Technological Access (X2)

- B1. Campus internet connectivity is sufficient to use AI tools.
- B2. I have access to appropriate devices to work with AI.
- B3. The university provides licenses or subscriptions to AI tools.
- B4. There is timely technical support to resolve AI-related issues.
- B5. The platforms we use integrate well with the virtual classroom.
- B6. Students with disabilities are given reasonable adjustments to use AI.

### Block C. Ethical Regulation (X3)

- C1. I am aware of the ethical guidelines for AI use at my university.
- C2. Privacy and personal data are protected in AI-related projects.
- C3. Transparency is required about when and how AI was used in academic work.
- C4. Procedures exist to detect and address algorithmic bias.
- C5. Proper citation and attribution of AI-generated content is encouraged.
- C6. I have received training on the ethical risks of AI in education.

### Block D. Institutional Culture (X4)

- D1. In my academic unit, innovation with AI is valued.
- D2. My colleagues are open to experimenting with AI in their courses.
- D3. There is cultural resistance that hinders AI adoption. (Reversed)

D4. Good practices with AI in teaching are recognized and rewarded.

D5. There are spaces for interdisciplinary collaboration on AI.

D6. A critical and reflective attitude toward AI is promoted.

#### Block E. AI Practices and Impact (Y)

E1. AI helps me personalize students' learning.

E2. AI improves the feedback I provide/receive in courses.

E3. AI increases my productivity in research.

E4. AI reduces administrative workload in my academic role.

E5. AI negatively affects students' critical thinking. (Reversed)

E6. AI widens gaps between students with different technological access. (Reversed)

E7. Overall, AI has had a positive impact on my academic practice.

E8. I feel competent to use AI ethically and effectively.

#### Block F. Contextual Data (control variables)

F1. Role (student/faculty/administrator/other).

F2. Field (social sciences, health, engineering, arts, etc.).

F3. Type of institution (public/private).

F4. Country.

F5. Experience with AI (none, basic, intermediate, advanced).

F6. Frequency of AI use (never, monthly, weekly, daily).

#### Scoring and Coding

Compute mean per construct.

Reverse-score D3, E5, and E6 before calculating averages.

AI Impact Index (Y): mean of E1–E8 (with reversals applied).

Proposed regression model:

$Y = \beta_0 + \beta_1(\text{Governance}) + \beta_2(\text{Access}) + \beta_3(\text{Ethical Regulation}) + \beta_4(\text{Culture}) + \varepsilon$

Simulated coefficients:  $\beta_1 = 0.41$  ( $p < .01$ ),  $\beta_2 = 0.22$  ( $p < .05$ ),  $\beta_3 = 0.18$  ( $p < .05$ ),  $\beta_4 = 0.35$  ( $p < .01$ ).

#### Reliability and Validity (reporting suggestions)

\* Internal reliability: Cronbach's alpha per block (expected  $\geq .70$ ).

\* Construct validity: EFA/CFA with four predictors (X1–X4) and one outcome (Y).

\* Measurement invariance: test by role (students vs. faculty) if sample size allows.

#### Semi-Structured Interview Guide (for triangulation)

1. What opportunities and risks do you observe when using AI in your course or

field?

2. How would you describe your university's policies on AI? Please give examples.
3. What technological barriers do you or your students face?
4. What ethical dilemmas have you experienced or anticipate with AI?
5. How does the culture of your faculty influence AI adoption?
6. In what ways has AI improved or worsened your academic outcomes?
7. What governance changes would be most urgent for responsible AI adoption?

## Annex B.

```
# --- Setup ---
!pip -q install pandas numpy scipy factor-analyzer semopy statsmodels

import pandas as pd
import numpy as np
from scipy import stats
from factor_analyzer import FactorAnalyzer, calculate_kmo, calculate_bartlett_
sphericity
import statsmodels.api as sm
from semopy import Model, Optimizer

# === 1) Cargar datos ===
# El CSV debe tener columnas A1..A7, B1..B6, C1..C6, D1..D6, E1..E8 (igual que
el instrumento en inglés).
# Además puede incluir F1..F6 (contexto), que ignoraremos para análisis psi-
cométrico.
# Opciones para cargar:
# - Subir archivo manualmente (Colab: carpeta de la izquierda)
# - Montar Drive y leer desde allí

# Ejemplo: lee un archivo en /content/data.csv
df = pd.read_csv('/content/data.csv')

# === 2) Limpieza básica y codificación ===
# Asegúrate de que las respuestas estén en escala 1-5 (numéricas)
likert_cols = [*[f'A{i}' for i in range(1,8)],
               *[f'B{i}' for i in range(1,7)],
               *[f'C{i}' for i in range(1,7)],
               *[f'D{i}' for i in range(1,7)],
               *[f'E{i}' for i in range(1,9)]]

# Conservar solo las columnas que existan
likert_cols = [c for c in likert_cols if c in df.columns]
dat = df[likert_cols].apply(pd.to_numeric, errors='coerce')

# === 3) Inversión de ítems (según instrumento) ===
```

```

# Reversed: D3, E5, E6 (escala 1-5)
def reverse_1_5(s):
    return 6 - s

for rev in ['D3','E5','E6']:
    if rev in dat.columns:
        dat[rev] = reverse_1_5(dat[rev])

# === 4) Índices por constructo ===
blocks = {
    'Governance_X1': [f'A{i}' for i in range(1,8)],
    'Access_X2': [f'B{i}' for i in range(1,7)],
    'Ethics_X3': [f'C{i}' for i in range(1,7)],
    'Culture_X4': [f'D{i}' for i in range(1,7)],
    'Impact_Y': [f'E{i}' for i in range(1,9)]
}
for k in list(blocks.keys()):
    blocks[k] = [c for c in blocks[k] if c in dat.columns]

indices = {k: dat[v].mean(axis=1) for k,v in blocks.items()}
idx = pd.DataFrame(indices)

# === 5) Alfa de Cronbach (por bloque y total) ===
def cronbach_alpha(df_block: pd.DataFrame):
    df_block = df_block.dropna()
    k = df_block.shape[1]
    if k < 2:
        return np.nan
    variances = df_block.var(axis=0, ddof=1)
    total_var = df_block.sum(axis=1).var(ddof=1)
    return (k / (k - 1)) * (1 - variances.sum() / total_var)

alphas = {}
for name, cols in blocks.items():
    if len(cols) >= 2:
        alphas[name] = cronbach_alpha(dat[cols])
    else:
        alphas[name] = np.nan

```

```

alphas['All_Items'] = cronbach_alpha(dat[likert_cols])
print("Cronbach's alpha by block and total:")
for k,v in alphas.items():
    print(f"{k}: {v:.3f}")

# === 6) Correlación ítem-total corregida (por bloque) ===
def item_total_corr(df_block):
    res = {}
    for col in df_block.columns:
        total_minus = df_block.drop(columns=[col]).sum(axis=1)
        res[col] = stats.pearsonr(df_block[col], total_minus)[0]
    return pd.Series(res)

itc = {}
for name, cols in blocks.items():
    if len(cols) >= 2:
        itc[name] = item_total_corr(dat[cols])
item_total_df = pd.concat(itc, axis=1)
print("\nCorrected item-total correlations (by block):")
print(item_total_df.round(3))

# === 7) KMO y Bartlett (adecuación para análisis factorial) ===
kmo_all, kmo_model = calculate_kmo(dat.dropna())
chi_sq, p_val = calculate_bartlett_sphericity(dat.dropna())
print(f"\nKMO overall: {kmo_model:.3f} | Bartlett Chi2: {chi_sq:.1f}, p={p_val:.4g}")

# === 8) AFE (Exploratory Factor Analysis) opcional: 4 factores predictivos + 1 de resultado (5 en total)
fa = FactorAnalyzer(n_factors=5, rotation='oblimin')
fa.fit(dat.dropna())
loadings = pd.DataFrame(fa.loadings_, index=dat.columns, columns=[f'F{i+1}' for i in range(5)])
print("\nEFA loadings (oblimin):")
print(loadings.round(3))

# === 9) CFA (Confirmatory Factor Analysis) con semopy ===

```

```

# Modelo: 5 factores latentes (X1..X4, Y) según el instrumento
# Asegúrate que las variables existan antes de correr
def present(cols):
    return [c for c in cols if c in dat.columns]

A = present([f'A{i}' for i in range(1,8)])
B = present([f'B{i}' for i in range(1,7)])
C = present([f'C{i}' for i in range(1,7)])
D = present([f'D{i}' for i in range(1,7)])
E = present([f'E{i}' for i in range(1,9)])

model_spec = f"""
X1 =~ {' + '.join(A)}
X2 =~ {' + '.join(B)}
X3 =~ {' + '.join(C)}
X4 =~ {' + '.join(D)}
Y  =~ {' + '.join(E)}
"""

print("\nCFA model:")
print(model_spec)

m = Model(model_spec)
opt = Optimizer(m)
opt.optimize(dat.dropna())
print("\nCFA fit indices:")
print(m.calc_stats())

# === 10) Regresión múltiple:  $Y \sim X_1 + X_2 + X_3 + X_4$  ===
# Usamos los índices (promedios) por bloque (como en el artículo)
reg_df = idx.dropna()
X = reg_df[['Governance_X1','Access_X2','Ethics_X3','Culture_X4']]
X = sm.add_constant(X)
y = reg_df['Impact_Y']
ols = sm.OLS(y, X).fit()
print("\nMultiple Regression Results:")
print(ols.summary())

```

```
# === 11) Reportes listos ===
# Guardar tablas clave
item_total_df.to_csv('/content/item_total_correlations.csv', index=True)
loadings.round(3).to_csv('/content/efa_loadings.csv')
idx.join(df[[c for c in df.columns if c.startswith('F')]], how='left').to_csv('/content/
indices_with_controls.csv', index=False)
with open('/content/cronbach_alpha.txt','w') as f:
    for k,v in alphas.items():
        f.write(f"{k}: {v:.3f}\n")

print("\nFiles saved:")
print(" - /content/item_total_correlations.csv")
print(" - /content/efa_loadings.csv")
print(" - /content/indices_with_controls.csv")
print(" - /content/cronbach_alpha.txt")
```