# Salome Aguilar Llanes

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**PRINCIPAL INTERESTS**

Economics of Education, Development Economics, Behavioral Economics and Machine Learning

**ACADEMIC BACKGROUND**

*Ph.D., Economics* 2020-present
Massachusetts Institute of Technology, MIT
- Advisors: Prof. Sendhil Mullainathan, Prof. Esther Duflo and Prof. Frank Schilbach

*M.A. International Education Policy Analysis* 2019-2020
Stanford University
- Thesis: I Want You to Teach My Children: The Effect of Changing the Teacher Hiring Process on Parental School Choice in the Mexican State of Zacatecas.

*B.A. Economics* 2015-2019
Instituto Tecnológico Autónomo de México, ITAM
- Thesis: The Effect of Universal Scholarships on High School Dropout Rates. Evidence from Mexico.
- Graduated with highest honors

**EMPLOYMENT HISTORY**

*Co-Founder* 2025 - Present
Intendere SAPI
- Digital tool that allows institutions to set up large-scale tutoring programs: with presence in Mexico and Peru.
- Co-founders: Fernanda Albo, Hans Ramírez.

*Co-Founder* 2021 - Present
Jovenes Ayudando a Ninas y Ninos AC (Tutoring nonprofit)
- Free online math tutoring for children in primary and middle schools in Mexico.
- Incorporated as a nonprofit organization in 2023.
- Co-founders: Fernanda Albo, Bernardo García, Sebastián Guevara.

*Research assistant for Prof. Joshua Angrist and Prof. Parag Pathak* 2022 - 2023
Blueprint labs

*Research assistant for Prof. Eric Bettinger* 2019 - 2020
Stanford Center for Education Policy Analysis (CEPA)

*Research assistant for Prof. Enrique Seira* 2017 - 2019
Centro de Investigación Económica (CIE)

**GRANTS AND FELLOWSHIPS**

*Research grants*
- *The Weiss Fund for Research in Development Economics 2024*
- *J-WEL Grant in pK-12 Education Innovation 2022*
- *The Weiss Fund for Research in Development Economics 2022*

- *PPE Initiative Pilot Grant JPAL 2021*
- *Schultz Fund at MIT*

*Fellowships*

- *Global Math Talent (NBER) 2023-2024*
- *The Institute for Humane Studies Fellowship 2023 and 2024*
- *Emma Krob Castle Graduate Fellow (MIT) 2021-2022*
- *Mexico Fellowship (MIT) 2020-2021*
- *Claudio X. Gonzalez Fellowship (Stanford University)2019-2020*
- *CONACYT/FUNED Scholarship (Stanford University) 2019-2020*

*Entrepreneurship*

- *MIT Sandbox 2022-2025*
- *MIT deltav 2024*
- *Legatum Center for Development and Entrepreneurship (MIT) 2023-2024*

**TEACHING (at MIT)**

– TA 14.75 Political Economy and Economic Development 2023

– TA 14.01 Principles of Microeconomics 2022 and 2024

**PUBLISHED PAPERS**

– **Expanding Access to Tutoring: A Scalable Platform for Personalized Learning and Data-Driven Research** Joint work with Fernanda Albo, Bernardo Garcia and Sebastián Guevara *Proceedings of the 2025 AIED 26th International Conference on Artificial Intelligence in Education*

Expanding access to high-quality tutoring is critical for reducing educational disparities, yet scaling effective programs remains a challenge. We developed a platform that automates key logistical aspects of online tutoring, enabling large-scale implementation. Our system includes a real-time monitoring framework that tracks tutor activities. Prior research on online tutoring has shown positive effects on student learning. Building on this, we conducted a randomized controlled trial (RCT) in Mexico. We find that students assigned to tutoring improved their math scores by 0.14 standard deviations. Beyond tutoring delivery, the platform serves as a tool for research. Participating tutors upload class recordings. While this paper focuses on the tutoring intervention, we provide an overview of the platform's potential to facilitate large-scale RCTs. We also show some basic applications of machine learning tools to our data with the aim to analyze student-tutor interactions at scale, bridging the gap between quantitative and qualitative research in education.

– **TutorUp: What If Your Students Were Simulated? Training Tutors to Address Engagement Challenges in Online Learning** Joint work with Sitong Pan, Robin Schmucker, Bernardo García, Fernanda Albo, Hangxiao Zhu, Adam Teo, Meng Xia *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems*

With the rise of online learning, many novice tutors lack experience engaging students remotely. We introduce TutorUp, a Large Language Model

(LLM)-based system that enables novice tutors to practice engagement strategies with simulated students through scenario-based training. Based on a formative study involving two surveys (N1 = 86, N2 = 102) on student engagement challenges, we summarize scenarios that mimic real teaching situations. To enhance immersion and realism, we employ a prompting strategy that simulates dynamic online learning dialogues. TutorUp provides immediate and asynchronous feedback by referencing tutor-students online session dialogues and evidence-based teaching strategies from learning science literature. In a within-subject evaluation (N = 16), participants rated TutorUp significantly higher than a baseline system without simulation capabilities regarding effectiveness and usability. Our findings suggest that TutorUp provides novice tutors with more effective training to learn and apply teaching strategies to address online student engagement challenges.

**WORKING PAPERS**

– **Recording the Impact: Unpacking the Mechanisms of Social and Emotional Learning in Online Tutoring Sessions** Joint work with Fernanda Albo, Bernardo García *Working paper*

As education systems worldwide integrate Social and Emotional Learning (SEL) into curricula, interest in its impact is growing. While qualitative research highlights SEL's benefits for students' soft skills and classroom dynamics, quantitative evidence of the latter remains scarce due to data limitations. Leveraging two randomised experiments embedded in a tutoring platform in Mexico, we study the impact of an SEL intervention. A unique feature of our study is the collection of class recordings from the tutoring program, providing rich behavioral data. We study whether social and emotional learning (SEL) can be taught cost-effectively in fully online settings and how its benefits compare with allocating the same time to additional academic instruction. Delivering an eight-hour SEL module into the online math tutoring program raised students' social and emotional skills and deepened tutor-student rapport, according to end-of-course surveys. Those stronger relationships spilled over into more participative math class sessions that showed a more positive emotional climate. These changes did more than cultivate soft skills: they also translated into measurable gains in students' subsequent math learning, underscoring that a reallocation of tutoring time toward SEL can simultaneously build noncognitive capital and reinforce academic progress. A comparison between the SEL group and a pure math-only control shows no evidence that reallocating instructional time to SEL harms academic outcomes, although the estimate is imprecise. By applying a machine-learning–based causal-inference method to our rich audio and text recordings, we seek to further unpack how SEL reshapes a multidimensional classroom environment.

– **Good Vibes in Class: A Tool to Detect Which Emotions Lead to More Learning** Joint work with Fernanda Albo, Bernardo García and Tobin South, *Working paper*

We present a method to characterize the classroom environment through emotion detection from audio recordings. Using machine learning tools we build an emotion classifier using MFCC features of labeled voice clips and apply it to slices of more than 1,500 online class session records. We find that higher measurements of high-intensity emotions were significantly correlated with higher Teacher Value Added (TVA) estimates, determined using Math test scores of students before and after receiving tutoring. Secondly, we found that attendance metrics in the second class were highly

correlated to the class environment in the first class. Finally, we found that higher-skilled tutors progressively increased high-intensity emotions as they had more sessions with their students.

– **Can Single Gender Classrooms Counteract Traditional Gender Beliefs? Evidence From a Tutoring RCT.** Joint work with Bernardo García *Working paper*

  This paper explores how group composition moderates the negative impact of traditional gender beliefs (TGB) on girls' learning. While prior research has documented the detrimental effects of gender-biased attitudes, the mechanisms driving these outcomes remain poorly understood. We conducted a randomized controlled trial (RCT) in which students were assigned to either single-gender or mixed-gender tutoring groups, and tutors' gender beliefs were independently measured. We find that girls placed in mixed-gender groups learned significantly less when their tutor held traditional gender beliefs. In contrast, girls in single-gender groups were not negatively affected by tutors with TGB. These findings suggest that differential treatment of boys and girls may underlie the observed learning gap, and point toward group composition as a key lever for mitigating the effects of gender bias in educational interventions.