Salome Aguilar Llanes

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RESEARCH 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

EXPERIENCE

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 and Hans Ramírez

Co-Founder 2021 - Present
Jovenes Ayudando a Niñas y Niños 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 and 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 14.03 Microeconomic Theory and Public Policy 2025
- 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 of Social and Emotional Learning** Joint work with Fernanda Albo, Bernardo García

  Schools play a central role not only in teaching academic content but also in fostering social and emotional learning (SEL) skills. Despite widespread adoption of SEL programs, evidence on their effects on actual classroom behavior is limited, as most studies rely on self-reports and survey measures. We implement a randomized controlled trial (RCT) in an online setting where university students tutored elementary and middle-school students in math. We show SEL improved the reported rapport (affective relationship) between tutors and students, and also increased math learning by 0.0495 standard deviations (SD).

  To study how SEL impacts classroom interactions, we gathered thousands of detailed audio recordings of the tutoring sessions. We transcribed the recordings and adapted a novel hypothesis generation approach to our text data to identify interaction patterns that were systematically affected by SEL instruction. We find that math classes in the treated groups are characterized by more active listening, less formal and more casual interactions, the use of simpler language, greater encouragement from tutors, and the discussion of more personal topics at the beginning of class.

- Can Single'Gender Classrooms Counteract Traditional Gender Beliefs? Evidence from a Tutoring RCT Joint work with Bernardo Garcia

  This paper examines how group composition moderates the impact of tutors' traditional gender beliefs (TGB) on girls' learning. Although previous research has documented the negative effects of gender-biased attitudes on girls' academic outcomes, the mechanisms behind these effects remain unclear. We conducted a randomized controlled trial (RCT) in which students were assigned to either single-gender or mixed-gender tutoring groups, while tutors' gender beliefs were independently measured. We find that girls in mixed-gender groups learned significantly less when their tutor held TGB, whereas girls in single-gender groups were not negatively affected by TGB tutors. Interestingly, when tutors did not hold TGB, girls in single-gender groups underperformed relative to their peers in mixed-gender groups.

  These results suggest that single-gender groups can mitigate the negative effects of TGB tutors, likely because such tutors tend to favor boys in mixed-gender settings. At the same time, they indicate that single-gender grouping may be detrimental when tutors do not hold traditional gender beliefs, highlighting the need for careful consideration of tutor characteristics in designing gender-based classroom interventions.

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

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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.