NBER Innovation Research Boot Camp 2023

Application

Saloni Gupta
Ph.D. Candidate, Economics and Education, Columbia University

February 2, 2023

1 Cover Letter

Dear Reviewing Panel,

I am writing to apply for attending the NBER Innovation Research Bootcamp 2023. At present, I am a PhD candidate in Economics and Education at Columbia University.

My interest in innovation research is from the lens of human capital development. In this essay below, I present to you motivation behind my research, a brief overview of my dissertation project, and a brief description of my interest in the bootcamp.

My relationship with innovation started as a founding teams' member in two education start-ups in India. But today, as an education economist, and taking the policy lens, I see that the biggest challenge to skilling for innovation is a deeply rooted model of schooling. That model, characterized by traditional teacher-dominated classrooms and strong emphasis on rote learning, determines practices inside and outside the education community. The second challenge is almost a universal emphasis on high technology as a distinguishing criterion for innovation. For developing countries, using frontier technology can be more important than producing it. At the same time, low-technology developments and the exploitation of indigenous knowledge can lead to significant economic growth and improve welfare. Therefore, aiming for high instead of low technology may not be useful when developing countries design innovation education programs.

In my research, I have been focusing on innovation education programs that claim to develop higher-order skills and teaching innovation using low technology. I understand the limitations of my research that it focuses on one developing country where implementing innovation policy is usually a lesser priority than basic skilling. I also acknowledge that I will be attending the lectures from the faculty who majorly focus on the innovation policies in advanced economies that are well-equipped to pursue innovation at the frontier of technology. But by attending this boot camp, I hope to have a deeper understanding of the innovation frontier suited for developing countries.

By immersing in innovation research during the boot camp, I also wish to grasp programs and initiatives that can foster long-term innovation careers for students after they have undergone innovation and entrepreneurship education programs. I also hope to contribute to classroom discussions around measures of innovation which I have developed with the help of highly successful innovators and graduate students working in incubation centers. My dissertation project is an experimental research of an innovation education program in disadvantaged schools in India which is an adaptation of the innovation and design thinking curriculum taught at Stanford University. I hope to engage with other scholars who are also similarly interested in the human capital aspect of innovation.

Thank you for taking the time to consider my application; I welcome any questions you might have.

Sincerely,
Saloni Gupta
3333 Broadway Apt B10J, New York, NY 10031, US
sg3735@tc.columbia.edu

2 Essay

Globally, unemployment among young people is more than three times more common than among adults. In developing countries, youth unemployment remains extremely high for both women and men, averaging above 30%. Governments can address this challenge in two ways - by skilling young people to meet the labor demand and by training youth as entrepreneurs who can help expand labor demand by creating new firms. Many observers believe that young people are especially likely to produce the most successful new firms. Research also suggests that exposure to innovation at an early age increases the likelihood of becoming an innovator later in life bell2019becomes. Despite the challenge of youth unemployment and the importance of early exposure to innovation and entrepreneurship, governments rarely invest in youth-specific programs that target entrepreneurship and innovation education.

In India, the national government has launched its flagship initiative, Atal Innovation Mission, with the vision of creating one million school children as "next generation innovators" (aimabout2022). The mission has built 10,000 Atal tinkering labs in schools across all states in India and has recently renewed the mission to build 10,000 additional labs in the next two years (aim2022). So far, the central government has allocated US$400 million of taxpayers' money to the program. India's latest National Education Policy (nep2020) also put skills like innovation and creativity at the top of the list of "21st-century skills" for the focus of school education.

In my research, I specifically evaluate innovation and entrepreneurship education programs in partnership with the state education departments of Telangana and Delhi, respectively. The innovation program in Telangana was launched four years ago, targeting students from the most socially disadvantaged and isolated communities. The government believes that these communities will benefit the most if their youth can be equipped to become grassroots innovators, considering that the overwhelming majority of these students lack alternative opportunities and face severe labor market discrimination (munshi2019caste). The curriculum is designed to help students create low-technology innovations that benefit the poorest in their communities to encourage more inclusive economic growth.

I develop a new innovation scale for measuring the innovativeness of students' developed projects using a survey of successful innovators from around the world. Using an experimental research in government schools, I measure whether training makes a difference in the innovativeness of students' projects using four measures - scores on the novel innovation scale, a lab game to measure innovative ability in students, funding raised by students' at year-end innovation challenge, and feedback from the community for which students have developed these products. I also measure other associated skills such as collaboration, risk-taking, Big 5 personality traits, and mathematics and science scores.

As an education economist, however, my focus has remained on only one pillar of an effective innovation policy: formal skilling. My exposure to other areas, such as, investment in incentives and schemes for fostering innovation, conducive institutional capacity required for implementing a well-rounded innovation policy, business and governance environment, and technology advancement, have remained limited in my academic training. I also seek to understand how talent allocation to innovation can be made more inclusive using public finance or urban economics policy tools. This is my primary goal in applying for NBER Innovation boot camp 2023 and I hope I can be endowed with much needed training and immersion in innovation research that I have been missing deeply.

3 Curriculum Vitae

Saloni Gupta

3333 Broadway, Apt B10J, NY 10031 Country of Citizenship: India
(+1) 332-201-9385 website: www.guptasaloni.com sg3735@tc.columbia.edu

Office Contact Information

Address: Department of Education Policy and Social Analysis
Teachers College, Columbia University
525 W 120th St, New York, NY 10027
Office Phone: +1 212-678-7478

Education

Columbia University (NY, USA)	Ph.D. Candidate (ABD, Econ and Ed)	Aug, 2019 - Present
Columbia University (NY, USA)	M.Phil.	Oct, 2022
Stanford University (CA, USA)	M.A. (Education Policy), 3.87/4	Sep, 2017 - Aug, 2018
Thapar University (Patiala, IN)	B.E. (Electrical Engineering), 7.58/10	Jul, 2003 - Jun, 2007

Employment

CUNY Research Foundation (NY)	Research Fellow	July, 2022 - Present
Central Square Foundation (Delhi, IN)	Senior Program Manager	Sep, 2018 - Jul, 2019
UNICEF (Remote NYHQ, USA)	Education Data and Analysis Intern	Jun, 2018 - Aug, 2018
TalentSprint (Hyderabad, IN)	Associate Director, Graduates Careers	Jul, 2016 - Mar, 2017
	Senior Manager, Teachers Training	Feb, 2015 - Jun, 2016
SEED Schools (Hyderabad, IN)	Program Manager, K-10 Education	Jul, 2013 - Dec, 2014
Teach For India (Delhi, IN)	Teacher, Grade 9, Juvenile Home	May, 2012 - Jun, 2013
	Teacher, Grade 2, Low-cost Pvt. School	Mar, 2011 - Apr, 2012
Fidelity Investments (Bangalore, IN)	Senior Software Engineer	Jul, 2007 - Feb, 2011

Research Papers in Progress

Can innovation be taught in schools? experimental evidence from India (Job Market Paper)

Higher-order skills, such as innovation and collaboration, are now a common feature of many countries' national curricula, yet there is little consensus on our ability to successfully impart these skills in students. I am currently conducting a randomized evaluation of a program, called "Think and Make" (TM), which is implemented in India among eighth-grade students from marginalized communities. Students participating in the TM program work in teams to identify local community problems in the health, agriculture, and education sectors, develop prototypes of their ideas, and build potential solutions.

I use four methods to measure innovation skills in these children. First, I use a novel measure of innovation developed with input from entrepreneurs, scientists, and inventors. Second, I use three additional methods: a competition for investment funds, user feedback, and a laboratory game for measuring innovation skills. I also measure gains in other higher-order skills, such as team skills, risk-taking, fluid intelligence, and Big 5 Personality traits. I measure two academic skills - Mathematics and Science - using the state curriculum. All these skills are shown to be closely associated with innovation.

The baseline results show that the students in treatment and comparison students have comparable skills, and these student groups are similar at the start of the program. The mid-line is scheduled in December 2022 and the end-line in February 2023.

Can phone-based assessments be used for measuring foundational skills?

Using a crossover randomized design with 1603 government primary school students in Uttar Pradesh, I report three key results about phone-based assessments (PBA) for measuring foundational literacy and numeracy skills. First, PBA are valid and reliable i.e. they measure the same outcomes and constructs as currently prevalent in-person assessments (IPA). Second, the performance on individual skills on PBA is similar to IPA. Third, individual performance on phone- and in-person assessments is also similar, with both modes suffering from measurement errors. Finally, in the specific case of literacy assessments, reliability on WhatsApp for sending literacy prompts is better than using students' school textbooks. Consider these results along with two other important possibilities - PBA are more cost-effective and operationally easy and they are better representative of the student population today due to accelerated penetration of phones and internet in the rural areas. These outcomes offer policymakers an additional assessment mode to measure students' learning outcomes for formative purposes. This could also potentially address the principal-agent problem in reporting of learning outcomes data that is currently prevalent and leads to huge distortion in reporting.

Gender Bias in Classrooms: Experimental Evidence from India

Gupta, S. (2018). Gender Bias in Classrooms: Results from Experimental Research in India (Master Thesis, Stanford University).

Fellowship and Awards

NAEd Spencer Dissertation Fellowship Semi-Finalist	2022-2023
Education Policy and Social Analysis Dissertation Award, Columbia University	2022-2023
Winnifred & Paul Pemberton Endowed Scholarship,Columbia University	2021-22
Provost Grant for Conference Presentation and Professional Development, Columbia University	2021-22
Teachers College General Scholarship, Columbia University	2019-2022
Teachers College Doctoral Fellowship, Columbia University	2019-Present
Graduate School of Education Fellowship, Stanford University	2017-18
Lady Meherabai D Tata Education Trust Scholarship, Tata Trusts	2017-18

Teaching Assistant

Health Economics, Columbia University (BA)	2021-2022
Intermediate Microeconomics, Columbia University (BA)	2020-2021
Econometrics, Columbia University (BA) , Columbia University	2020-2022
Intermediate Macroeconomics (BA), Columbia University	2020-2021
Education and Economic Development (MA), Columbia University	2020-21
Microeconomic Theory with Applications to Education (MA), Columbia University	2020-21

Presentations

Advances in Field Experiments, University of Chicago	2022
Graduate Students for Economics and Education Seminars	2022
Association for Education Finance and Policy	2022
Development Colloquium, Columbia University	2022
Applied Microeconomics Methods Colloquium, Columbia University	2022
Interdisciplinary Center for Innovative Theory and Empirics, Columbia University	2022
Economics and Education Student Colloquium, Columbia University	2020-2022

Referee Services

Journal of Policy Analysis and Management

Research Experience

City University of New York Research Foundation

Research Fellow working on policy briefs, research evidence, presentations, and data analysis for various initiatives at CUNY's community colleges

Teachers College, Columbia University

Digitization Research Assistant for Messages, Identity, and Inclusion in Education Project (https://www.miielab.com/)

Central Square Foundation

Reliability of Tablet-based assessments: • Led tablet-based large scale assessments for Grade 4 students in 2300 government and private schools for School Education Department of Andhra Pradesh. See the research paper here

UNICEF

Education Data & Analysis Internship: Analysis of literature on experimental design and quasi-experimental design impact evaluation interventions such as conditional cash transfers, health, income support.

Program Management and Leadership Experience

TalentSprint

EdTech: Led a ten members team to implement personalized adaptive data-driven learning in online programs for over 30,000+ graduate students who are preparing for their first jobs in banking and information technology sectors

Capacity Building: Rolled-out online careers readiness program in 23 engineering colleges with over 9000 students and in the inaugural learning centers in ten cities

Program Head, Government of India funded project: • Founder of the teacher training program that served over 50000 new and in-service teachers through 39 online courses and in-person workshops • Trained and led a team of 17 trainers and instructional designers in the areas of child development and of pedagogy for Mathematics, Science, English, and Social Sciences.

SEED Schools

Education Management: Managed scholastics and co-scholastics programs in two low-cost private K-10 schools. Achieved 83% improvement in scores of 700 students in annual tests conducted by Australian Council of Education Research

Curriculum and Assessments Design: Academic director and architect of mathematics curriculum for Grade 1 to Grade 10. Used by 300 teachers for 9000 students.

Teach For India

At-risk Youth: Teacher for 20 boys, 16-18 years old rescued from streets in a juvenile boys' residential school. Rehabilitate them from their difficult pasts of streets, drugs abuse, dysfunctional families, and crime. Currently, they are attending college or working in respectable organizations

Competencies

Disciplines:	Labor Economics, Psychometrics, Human Capital Development, Education Policy, Causal Inference, Econometrics, Bayesian Statistics, Machine Learning
Research:	R, Stata, Python, LaTeX, Qualtrics, Survey Design, Stan (basic), BRMS (basic)
Business:	Business Development, Digital Marketing, Grant proposals, Budgeting
Technology:	Open edX, Git, PL/SQL, HTML, Javascript, MATLAB, C/C++ , MS Office
Teaching & Education:	Curriculum and Instructional Design, Online and In-person Training
Language:	Hindi
Interests:	Certified Yoga Teacher (RYS200), regular Vipassana meditator

References

Alex Eble Ph.D.
Assistant Professor of Economics and Education
Teachers College – Columbia University
e-mail: eble@columbia.edu

Judith Scott-Clayton Ph.D.
Professor in Economics and Education
Teachers College – Columbia University
e-mail: scott-clayton@tc.columbia.edu

Prashant Loyalka Ph.D.
Associate Professor, Graduate School of Education
Stanford University
e-mail: loyalka@stanford.edu

4 List of Courses

Course Title	Instructor
Advanced Microeconomic Theory in Education Research	Peter Bergman
Appl Microeconmics Methods Colloquium	Wojtek Kopczuk
Economics Of Labor I	Sandra Black
Labor Economics	Judith Scott-Clayton
Expermental Research Design in Educational Research	Eric Bettinger
Conducting Field Experiments	Peter Bergman
Education & Economic Develpment:Advanced Topics	Alex Eble
Colloquium In Development	Eric Voughen
Bayesian Stats For The Social Science	Benjamin Goodrich
Econom tric Methds for Policy Research	Jordan Matsudaira
Applied Regression and Causal Inference	Andrew Gelman
Workshop in Economics in Education	Alex Eble
Machine Learning for Social Science	Michael Parrott
Psychological Measurement	Alejandro Ganimian
Data Description in Social Science Research	Sean Reardon
Evaluation of Education Privatization and School Choice	Sam Abrams
Dissertation Design & Preparation	Alex Eble
Applied Research Methods in International and Comparative Education	Christine Min Wotipka
Applied Methods International Comparative Education II	Christine Min Wotipka
International Education Policy Workshop	Rie Kijima
Introduction to Comparative and International Education	Patricia Bromley
Internship Economics & Educ	CUNY Resaerch Foundation
Total Credits	75

e·p·s·a
Department of Education Policy and Social Analysis
Teachers College, Columbia University

February 1, 2023

From: Alex Eble
Assistant Professor of Economics and Education
Department of Education Policy and Social Analysis
Teachers College, Columbia University

To: The NBER Innovation Research Boot Camp Selection Committee:

I am very happy to recommend my student, Saloni Gupta, in support of her application for a spot in the NBER Innovation Research Boot Camp. Saloni is doing brilliant, creative dissertation work on the economics of innovation. Her main dissertation project answers an important and understudied question – can we teach children of historically marginalized groups the key skills to entrepreneurial innovation? To do so, she has conceived, designed, and is now implementing a randomized controlled trial (RCT) evaluating a school-based curriculum that aims to teach children these skills. She studies a creative and ambitious program, and has worked tirelessly to refract it through the lens of rigorous quantitative social science. Saloni's work in putting this project together also demonstrates her intelligence and maturity as a scholar. The project is now in the field and will be complete by the time she goes on the market this fall. Participation in the bootcamp would accelerate the work, its framing, and maximize its impact, and I highly recommend she be selected for the bootcamp. If there remain any questions about Saloni's excellent candidacy or my letter, please do not hesitate to contact me.

Sincerely,

Alex Eble
Assistant Professor of Economics and Education, Teachers College, Columbia University
Email: eble@tc.columbia.edu; Phone: 212-678-7478