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15 September 2026

Dear Professors,

I am writing to apply to the Workshop on Development Economics and Networks for Early-Career Researchers, to be held in Cambridge on 5 December 2026.

I am an Assistant Professor in Economics at the University of Exeter and an academic visitor at the University of Oxford. I completed my PhD in Economics at Oxford on 30th August 2021. After my PhD, I spent three years as a Junior Research Fellow at Merton College, Oxford. This was a research-fellowship and not a faculty position. I took up my first assistant professorship in 2024 and have just started the third year on the tenure track. I wanted to flag this explicitly because I am outside the stated five-year window by about a fortnight at the time of this application. I hope this still falls within the spirit of the workshop's eligibility criteria, but I would understand if the five-year rule is applied strictly.

My research focuses on social and economic networks and their applications in development and behavioural economics, combining field experiments with structural and theoretical work. I would like to present ongoing work titled **"Joint Learning by Doing"** (with Juni Singh), in which we implement a field experiment cross-randomising access to a technology with meetings among randomly assigned peers in rural Nepal. We find that pairs in which both women own the technology interact the most but learn the least. The attached draft is very preliminary, as follow-up fieldwork begins later this year and the analysis is not complete. This is why it would benefit from comments and feedback at this stage. A one-page statement of motivation and research interests, and my CV, are also enclosed.

Should my application be shortlisted, a recommendation can be provided by:

> Prof. Simon Quinn, Associate Professor, Department of Economics and Public Policy, Imperial College Business School simon.quinn@imperial.ac.uk

Thank you for considering my application. I would be glad to provide any further material.

Yours sincerely,

Vatsal Khandelwal

Vatsal Khandelwal

Contact Information

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Employment

Assistant Professor (Lecturer), Department of Economics
University of Exeter, 2024–present

Education

University of Oxford
Doctor of Philosophy (DPhil) in Economics (2017-2021)
Supervisors: Prof. Stefan Dercon, Prof. Alexander Teytelboym

University of Oxford
M.Sc., Economics for Development (2016-2017)
Awarded distinction. Luca D'Agliano Prize for Best Dissertation. George Webb Medley Prize (proxime accessit) for Best Overall Performance.

St. Xavier's College, Mumbai
B.A., Economics (2012-2015)
Awarded distinction. Batch Valedictorian (Arts) for highest CGPA.

Fellowships/ Visiting Appointments

University of Oxford
Academic Visitor, Department of Economics (2024-present)
Peter J. Braam Junior Research Fellow in Global Wellbeing, Merton College (2021–2024)

Stanford University
Visiting Scholar, King Center on Global Development (Summer 2023)

Harvard University
Visiting Fellow (Spring 2021)

Publications

"Learning in Networks with Idiosyncratic Agents." *Games and Economic Behaviour*, 2024. [Paper]

Working Papers

"Spatial Inequality and Informality in Kenya's Firm Network" (with Verena Wiedemann, Peter Wankuru Chacha, and Benard Kipyegon Kirui). [Draft] ***Revise and Resubmit, Economic Journal***

"Caring Until It Costs: Teacher Responses to Student Mental Well-being" (with Minahil Asim and Preetham Rodrigues). ***Revise and Resubmit, World Bank Economic Review***

"Afraid to Talk? Misperceived Norms and Informal Safety Nets" (with Ronak Jain; previously titled "Silent Networks: The Role of Inaccurate Beliefs in Reducing Useful Social Interactions"). [Draft]

Awarded the Economics Job Market Best Paper Award, European Economic Association and UniCredit Foundation.

Coverage: VoxDev, Ideas of India Podcast at the Mercatus Centre.

"Personalized Teacher Attention and Student Achievement" (with Ronak Jain and Minahil Asim). [Draft] [Submitted]

Coverage: VoxDev

"Peer Effects in Social Networks: Evidence from an Entrepreneurship Experiment" (with Juni Singh). [Draft] [Submitted]

Grants

BA/Leverhulme Small Research Grant (£9,954), 2026.

Joint PEDL and STEG Small Grant (£24,954), 2025. "Financial Frictions and Supply Chain Linkages in Kenya" with Verena Wiedemann, Peter Wankuru Chacha, and Benard Kirui.

CSAE Top up Research Grant (£6,440), 2022. "Silent Networks: The Role of Inaccurate Beliefs in Reducing Useful Social Interactions" with Ronak Jain.

JPAL Post Primary Education Grant ($20,548), 2020. "Great Expectations: Experimental Evidence from Schools in Pakistan" with Ronak Jain and Minahil Asim.

Research on Improving Systems of Education (RISE) Grant ($40,000), 2019. "Great Expectations: Experimental Evidence from Schools in Pakistan" with Ronak Jain and Minahil Asim.

Centre for the Study of African Economies Research Grant (£4,030), 2019. "Silent Networks: The Role of Inaccurate Beliefs in Reducing Useful Social Interactions" with Ronak Jain.

Scholarships and Prizes

Economics Job Market Best Paper Award, European Economic Association and UniCredit Foundation (2023)

Final Year Doctoral Bursary, Department of Economics, University of Oxford (2020)

Two Year Doctoral Bursary, Department of Economics, University of Oxford (2018)

Hicks Scholarship in Economics, Linacre College, University of Oxford (2017)

Luca D'Agliano Prize for Best Dissertation, MSc in Economics for Development, University of Oxford (2017). Awarded for "Social Networks, Risk Sharing and Circular Migration: Evidence from Rural India".

George Webb Medley Prize (proxime accessit), Best Overall Performance in the MSc in Economics for Development, University of Oxford (2017)

Queen Elizabeth House Departmental Scholarship for the MSc in Economics for Development (2016).

Dr. Edgar DaSilva Memorial Prize and Mr. Badi C Tyabjee, J.J & B.J Lalwani, and Billoo scholarship for highest aggregate in B.A. examinations, St. Xavier's College, Mumbai (2015)

Fredie A. Mehta Scholarship for highest marks in Economics in First and Second Year, St. Xavier's College, Mumbai (2014)

Certificate Of Merit by the Central Board of Secondary Education "*for reasons of outstanding academic performance and for being among the top 0.1% of successful candidates*" of the All India Senior School Certificate Examinations in Mathematics (2012).

Teaching

University of Exeter

Lecturer, Development Economics, undergraduate (2025–26)

Lecturer, Introduction to Econometrics, undergraduate (2024–25)

University of Oxford

Lecturer, MSc in Economics for Development

- Microeconomic Theory (2023–24): discrete and continuous games, hidden action, signalling, auctions

- Applications of Behavioural Economics to the Developing World (2022–23)

Graduate Teaching Assistant

- Microeconomics, MPhil in Economics (2020–21)

- Microeconomics, Game Theory & Quantitative Economics, Pembroke College (2018–20)

Refereeing

American Economic Review, Journal of the European Economic Association, Economic Development and Cultural Change, International Economic Review, Oxford Economic Papers

Other Activities

Organiser, Behind-the-Scenes Seminar Series (with Séverine Toussaert), an online series promoting transparency in the research process. (2025–)

Affiliated Researcher at Lab^2 — a metascience lab for experimentation in science. (2023-)

Managed CSAE's Coders' Corner – a repository of advice around coding.(2020-2021)

Courses Completed during PhD

Econometrics, Microeconomics, Advanced Microeconomics I and II, Advanced Metrics

Software

Matlab, Stata, Mathematica, Gephi, LaTeX, Qualtrics

Statement of Motivation and Research Interests

My research studies social and economic networks and their applications to development and behavioural economics, combining field experiments with structural and theoretical work. Opportunities that bring together researchers working on the intersection of networks and development are rare. I would like to attend the workshop because several of my current projects are at a stage where feedback from researchers working specifically on networks would be useful. I would also value the opportunity to meet other researchers in the area and discuss possible collaborations.

The first strand of my work focuses on when networks fail to function as we expect. In **Afraid to Talk? Misperceived Norms and Informal Safety Nets** (with Ronak Jain), we study informal workers in Delhi and combine a field experiment, survey experiments, and a structural model to show how misperceptions about peers' willingness to discuss mental and financial concerns can trap communities in an inefficient low-support equilibrium. The paper I hope to present, **Joint Learning by Doing** (with Juni Singh), is also in this category. We study peer learning around a new household technology in rural Nepal. Preliminary results suggest that joint access to a technology increases social interactions, including across caste lines, but does not improve learning. Instead, when both women have access, asking questions becomes more socially costly, reducing information-seeking and belief updating.

In a second strand of my research, I measure peer effects in various settings. In **Peer Effects in Social Networks** (with Juni Singh), we use a randomized entrepreneurship program in rural Nepal to study how peer effects depend on the identity and network position of the assigned peer. We find that socially close and more connected peers generate short-term motivational gains, while close but less connected peers generate long-term benefits, and bridging fails under high homophily. In **Personalized Teacher Attention and Student Achievement** (with Minahil Asim and Ronak Jain), we study students in schools in Pakistan and randomize information, teacher-set expectations, and peer pairing. We find that peer pairing only improves outcomes when students are similar.

In a final strand, I focus on production networks and trade. In **Spatial Inequality and Informality in Kenya's Firm Network** (with Verena Wiedemann, Peter Wankuru Chacha, and Benard Kipyegon Kirui), we predict a counterfactual network that accounts for informal firms and find that formal sector data overstates the spatial concentration of aggregate trade flows and under-accounts for trade across regions with stronger social ties. In ongoing work with Benard Kirui and Verena Wiedemann, we study the financial frictions that prevent small informal firms from linking to larger formal ones.

During my DPhil I also worked on theory. In **Learning in Networks with Idiosyncratic Agents** (*Games and Economic Behaviour*, 2024), I show that an individual's under-reaction, over-reaction, or frustration can have spillover effects and adversely affect the long-run beliefs of society.

Other ongoing projects study social isolation and loneliness in India, including measuring women’s demand for social connections (with Sonia Bhalotra and Manuela Angelucci) and the impact of an intervention designed to reduce social isolation among older adults (with Alison Andrew, Anandi Mani, and Sanchari Roy).

Joint Learning by Doing

Vatsal Khandelwal* Juni Singh†

Preliminary Draft. Please do not cite or circulate.

Abstract

We study the adoption of a household technology whose benefits are not directly observable to peers. We cross-randomize a three-month cookstove trial with regular meetings between randomly assigned peers, generating three pair compositions: neither woman has access to the technology, one does, or both do. Technology access alone increases usage and knowledge and shifts beliefs about its benefits by 0.36 standard deviations. However, when both women have access to the technology, they learn less: their attention is more concentrated on specific dimensions of the technology and their beliefs do not shift, even though they attend significantly more meetings. Survey evidence along with a vignette experiment suggest that social costs reduce information seeking: joint ownership increases expected judgement when asking for help, while close friendship increases willingness to ask. Finally, we find that joint technology use generates social returns, significantly increasing engagement across castes and reducing loneliness.

Keywords: technology adoption, learning-by-doing, peer effects, social networks, disclosure costs, caste, field experiment.

JEL codes: O12, O33, D83, D85, C93, I12, Z13.

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1 Introduction

Technology adoption is often slow even when new technologies are accessible and affordable (Kremer et al., 2019; Chandrasekhar et al., 2022). Social interactions can facilitate adoption by allowing individuals to learn from the experiences of others (Conley and Udry, 2010; Bandiera and Rasul, 2006; Banerjee et al., 2013; Beaman et al., 2021; Cai et al., 2015). Learning from others can occur either through information that is available without exerting much effort (such as observing how well a farmer's crop performs), or through information that must be actively elicited from peers (such as asking whether a new fertilizer was worth using). The second channel is particularly important for technologies where peer outcomes are not easily observed. However, eliciting information can itself be costly: asking questions can reveal ignorance and affect reputation (Chandrasekhar et al., 2019).

This paper studies how distinct channels of social learning affect the adoption of a private-use experience good. We also study the reverse relationship: whether access to a technology can itself affect social interactions. Joint access to a technology may create a shared purpose that increases social engagement, including among individuals who would otherwise interact little. To answer both questions, we implement a field experiment with 1,555 women across 40 villages in rural Nepal where we cross-randomize access to a temporary trial of a technology and one-to-one meetings with a randomly chosen peer. The technology is an electric induction cookstove, a private-use experience good whose use is largely opaque to neighbors. We eliminate selection by assigning exogenously chosen peers. The cross-randomization generates four pair compositions: neither peer has the technology, the respondent has it but the peer does not, the peer has it but the respondent does not, or both have it. This allows us to compare learning from signals generated privately through own use with learning from signals transmitted by a peer or generated jointly through shared use.

Several features of our context make this an informative setting to answer these questions. Firewood is the primary cooking fuel for 52% of households and imposes substantial health costs: among firewood users, 85% report eye irritation from smoke, 63% report coughing or choking, and 63% report headaches. While 48% of households use LPG as their primary fuel, only 7% of respondents know how to operate an electric cookstove. 86% report they would be more likely to adopt if a friend adopts first, most often because a friend's adoption would encourage them to use the stove (57%) or make them confident that it works. At the same time, 76% rarely or never ask a friend for advice on a kitchen matter such as buying or using an appliance.

Women in our study are allocated to one of four intervention arms: control, technology trial only, peer exposure only, or technology and peer exposure. Respondents in the trial group are informed at the outset that they will have to return it at the end of the three-month period, but that they will be offered the option to purchase it. Half of technology recipients are additionally randomized to an air-quality demonstration, in which they are shown the

reading from an air-quality monitor while cooking with firewood and again while cooking with the electric stove. Respondents in the peer exposure group are invited to share meals with a randomly chosen peer in either their or their partner's house. They are asked to meet every two weeks over three months. The first meeting is enumerator-verified and subsequent meetings are incentivized but unsupervised. We collect data in a three-month endline as well as a six-month follow-up with a subset of participants. A one-year follow-up is due to begin in November, 2026.

First, we find that access to the technology increases adoption. Relative to within-village controls, technology access alone increases incentivized willingness to pay for it, expenditure on household electricity, and the probability of a wiring upgrade, which is a complementary investment. It also increases self-reported three-month use of the stove by 66 percentage points. However, exposure to a peer has no statistically detectable effect on the harder measures of adoption even though self-reported use is 11 percentage points higher in the combined arm than under technology access alone ($p = 0.03$).

The absence of effects on most adoption measures cannot be attributed to low meeting participation. Relative to pairs in which neither partner receives the technology, pairs where both receive the technology ("both-stove") attend 1.9 additional meetings, are 53 percentage points more likely to cook together, and are 20 percentage points more likely to meet outside the scheduled sessions. However, this additional engagement does not increase most measures of adoption and does not further improve knowledge or beliefs. Technology access increases reported knowledge of operating a stove by 63 percentage points, but exposure to a peer produces no further increase. Technology access alone also shifts the belief index, which combines the improvements respondents expect from the stove in health, cooking time, affordability, taste, and indoor air quality, by 0.36σ.

At the same time, the effect on the beliefs of both-stove peers is significantly lower. Those who meet a peer concentrate their attention on a significantly narrower set of cooking dimensions (e.g., taste, smoke, cooking time, cost, and safety) than those who use the technology alone. Both-stove pairs are also 18 percentage points less likely than pairs with no technology to rank "asking questions and getting help" among the three most helpful aspects of the meetings ($p < 0.10$). In a separate vignette experiment, we find that joint ownership increases participants' expected embarrassment and judgement. These estimates are consistent with joint ownership increasing the perceived social cost of eliciting information. In the same experiment, describing the peer as a close friend significantly increases willingness to ask for help. An alternative mechanism is shared ignorance: 73 percent of respondents state that someone might not ask her partner a question because she expects the partner not to know the answer, so limited elicitation does not reflect disclosure costs alone. Consistent with familiarity lowering the cost of asking, women who already knew their assigned peer engage more with her, and, among pairs in which both have the technology, report more frequent use and are more likely to know how to operate the stove.

We rationalize these results using a model in which joint use raises the ambient information available from a peer but also raises the cost of eliciting signals, so that more contact need not produce more learning. Randomizing the air-quality demonstration provides a further test of this mechanism. If the learning penalty arises because asking reveals ignorance, it should disappear when the peer holds information the respondent could not have been expected to know herself. We find that, among technology recipients, receiving an air quality reading has no effect on outcomes. However, among those assigned to a peer meeting, meeting a stove-owning peer ("both-stoves") who did not receive the reading reduces the belief and knowledge indices by 0.48σ and 0.39σ, respectively. In contrast, when the peer received the reading, these penalties disappear, leaving net effects close to zero. Consequently, discussion of the cookstove within the pair also rises by 23 percentage points.

Despite the absence of gains in social learning, joint use of the technology has positive effects on social interaction. Both-stove pairs report 0.29σ lower loneliness than control ($p < 0.05$), including a 20-percentage-point reduction in lacking companionship relative to a control mean of 42 percent. Individuals who received the stove and were assigned to peer meetings also have significantly higher social interactions than the meeting-only arm ($p = 0.04$), measured using an index that combines house visits, shared meals, and the numbers of friends, advice contacts, and borrowing or lending contacts. Finally, joint access to the technology reduces the cross-caste gap in engagement: cross-caste pairs attend significantly fewer of the six sessions than same-caste pairs ($p = 0.001$) and are 20 percentage points less likely to meet outside the scheduled sessions. However, when both partners have the technology these gaps close: among cross-caste pairs, joint access raises attendance by 3.1 sessions and the probability of meeting outside the sessions by 43 percentage points (both $p < 0.001$). Further, six months later, 68 percent of pairs report contact at least sometimes and contact frequency is 0.32 points higher on a four-point scale among both-stove pairs than among pairs with no technology ($p < 0.10$).

We make two contributions to the existing literature. First, we contribute to research on social learning and technology adoption (Foster and Rosenzweig, 2010, 1995; Jovanovic and Nyarko, 1994; Bandiera and Rasul, 2006; Conley and Udry, 2010; Miller and Mobarak, 2015; Beaman et al., 2021; BenYishay and Mobarak, 2019; Banerjee et al., 2013; Cai et al., 2015; Kremer et al., 2019; Mobius and Rosenblat, 2014), which studies how individuals learn from peers' choices, outcomes, and information. We study social learning for a private-use technology by experimentally separating learning by doing, observational learning, information exchange, and joint learning by doing. We also build on Chandrasekhar et al. (2019), who show that seeking information can be socially costly, and Chandrasekhar et al. (2022), who show how reputational concerns can affect information transmission. Our results suggest that more interaction need not generate more learning when information-seeking itself imposes a social cost.

Second, we contribute to a growing literature on the formation of social networks and how

policy interventions affect network interactions (e.g., Banerjee et al., 2024; Fleischman, 2025). Existing literature on technology adoption has largely treated networks as a primitive (e.g., Conley and Udry, 2010; Banerjee et al., 2013; Beaman et al., 2021). When an intervention changes the network itself, ignoring these network changes can lead to biased estimates of treatment effects (Comola and Prina, 2021). We show that a jointly used *technology* can also encourage network interactions: joint use reduces loneliness, and reduces the cross-caste gap in engagement. In doing so, we relate the two strands of literature on technology-adoption and network-formation by showing that encouraging joint use of a technology can potentially sustain social interaction. Our findings are particularly relevant for caste-segregated settings, where cross-group interactions are difficult to engineer through standard contact interventions. For example, Lowe (2021) shows that collaborative contact, in which individuals share a task, reduces cross-caste barriers while adversarial contact does not. We show that joint access to a technology can incentivize cross-group contact.

The rest of the paper proceeds as follows. Section 2 describes the setting and the experimental design. Section 3 provides a conceptual framework that rationalises the results. Section 4 reports effects on technology adoption and mechanisms underlying the observed effects. Section 5 reports effects on social interactions three months and six months after the intervention.

2 Context and Design

2.1 Setting and Sample

Our study covers 40 villages in rural Nepal and 1,555 women, all of whom completed a baseline survey before randomization. Table 1 reports their demographic characteristics. The median respondent is 43 years old and lives in a household of four with a monthly income of NPR 20,000 (about USD 130). Agriculture is the main source of income for 59 percent of households, remittances for 13 percent and government employment for 7 percent. Schooling is limited: 51 percent have at most primary education and a further 32 percent completed grades 6–10. In 53 percent of households, at least one member has migrated out of the village. Ninety percent of respondents do most of the household cooking, so they are the relevant decision makers for the technology we study. Caste composition is concentrated: 56 percent of respondents are Tamang and 23 percent Chettri, with Dalit, Newar, Brahmin and Rai households making up the remainder.

2.2 Social Interaction and Networks

We measure respondent social networks in the baseline survey. Table 2 reports the baseline measures. Respondents name 3 people in the village as friends i.e. people they borrow from or lend to, exchange advice with, or would contact in an emergency. 40 percent report

Table 1: Sample Characteristics at Baseline

	Mean	SD	N
Panel A. Demographics and household			
Age (years)	43.9	13.6	1,555
Household size	4.0	1.7	1,555
At least one household member has migrated out of the village	0.527	0.499	1,489
Respondent does most of the household cooking	0.898	0.302	1,555
Panel B. Household income			
Monthly household income (NPR)	22768.6	18528.3	1,555
Main income source: agriculture	0.588	0.492	1,555
Main income source: remittances	0.133	0.340	1,555
Main income source: government employment	0.070	0.255	1,555
Main income source: shop	0.051	0.220	1,555
Main income source: trade	0.047	0.212	1,555
Main income source: agro-business	0.047	0.212	1,555
Main income source: other	0.081	0.273	1,555
Panel C. Education			
Schooling: none, informal, or primary	0.508	0.500	1,555
Schooling: grades 6–10	0.322	0.467	1,555
Schooling: grades 11–12	0.121	0.326	1,555
Schooling: university	0.049	0.216	1,555
Panel D. Caste			
Caste: Tamang	0.563	0.496	1,555
Caste: Chettri	0.232	0.422	1,555
Caste: Dalit	0.065	0.247	1,555
Caste: Newar	0.063	0.243	1,555
Caste: Brahmin	0.044	0.205	1,555
Caste: Rai or other	0.034	0.182	1,555

Notes: All 1,555 women in the experimental sample, measured at baseline.

lacking companionship sometimes or often. In the month before the survey, 52 percent of respondents rarely or never visited or were visited by another household in the village, and 63 percent rarely or never shared a meal or tea with someone in their own or another home. This affects their ability to observe the use of a hidden technology. Moreover, 76 percent rarely or never asked a friend for advice on a kitchen-related topic such as buying an appliance, using cooking equipment or trying a new method.

Table 2: Social Interaction and Networks at Baseline

	Mean	SD	N
Panel A. Frequency of interaction (share rarely or never)			
Visited or was visited by other households rarely or never	0.515	0.500	1,555
Shared a meal or tea rarely or never	0.630	0.483	1,555
Cooked a meal together with someone else rarely or never	0.683	0.465	1,487
Asked a friend for kitchen-related advice rarely or never	0.756	0.430	1,555
Panel B. Network size			
Number of friends named	3.0	0.7	1,516
Number of friends named who are not family	2.5	1.1	1,516
Number of households visited in the last month	2.3	1.0	1,511
Panel C. Loneliness and openness to strangers			
Lacks companionship sometimes or often	0.400	0.490	1,555
Willing (4 or 5 of 5) to share a meal with a randomly chosen woman	0.745	0.436	1,555
Comfortable (4 or 5 of 5) hosting a randomly chosen woman	0.648	0.478	1,555

2.3 The Technology

The technology we focus on is an electric induction cookstove. It is a private-use experience good as its benefits are realized through continued use and are largely invisible to neighbors. It is also close to new in this setting. Only 7 percent of respondents know how to operate an electric cookstove at baseline, firewood is the primary cooking fuel for 52 percent of households and LPG for 48 percent. 77 percent use firewood as a primary or secondary fuel.

Health is a primary reason why a cleaner technology could improve outcomes. Half of respondents rate wood smoke as harmful to health, giving it a 4 or 5 on a five-point scale. Among firewood users, 85 percent report tearing eyes from smoke, 63 percent report coughing or choking and 63 percent report headaches. 10 percent of all households have a member with a respiratory illness. The leading perceived disadvantage of the technology is the electricity supply, listed by 74 percent, followed by costs as well as difficulty of learning how to use it at 29 percent each, and device fragility at 24 percent.[1] The leading perceived advantages include saving time on cooking, named by 75 percent, and health benefits, named by 59 percent.

Latent demand for the technology is high. We first elicit willingness to pay for a stove at baseline using an unincentivized price ladder running up until NPR 5,000 (about USD 33). The mean willingness to pay is NPR 3,108 (USD 20) and the median NPR 3,000 (USD 20). 23 percent accept the highest price and only 3 percent reject every price. Compared to their

[1]Running an induction stove requires reliable electrical power: 96 percent report frequent electricity outages at baseline and adoption could require a wiring upgrade.

Table 3: Cooking, Fuel, Health and Perceptions at Baseline

	Mean	SD	N
Panel A. Cooking and fuel use			
Primary cooking fuel: firewood	0.515	0.500	1,555
Primary cooking fuel: gas cylinder (LPG)	0.482	0.500	1,555
Uses firewood as primary or secondary fuel	0.767	0.423	1,555
Share of weekly cooking done on primary fuel (percent)	82.0	17.8	1,555
Knows how to operate an electric cookstove	0.069	0.254	1,550
Panel B. Smoke and health			
Woodsmoke rated harmful to health (4 or 5 of 5)	0.508	0.500	1,555
Tearing eyes from smoke (firewood users)	0.850	0.357	801
Coughing or choking from smoke (firewood users)	0.633	0.482	801
Headaches from smoke (firewood users)	0.630	0.483	801
Backaches (firewood users)	0.154	0.361	801
Someone in the household suffers from respiratory illness	0.096	0.294	1,555
Panel C. Perceived advantages			
Advantage: saves time	0.749	0.434	1,555
Advantage: health benefits	0.587	0.493	1,555
Advantage: environmental benefits	0.239	0.426	1,555
Advantage: more convenient	0.239	0.427	1,555
Panel D. Perceived drawbacks			
Drawback: depends on electricity	0.736	0.441	1,555
Drawback: expensive relative to other methods	0.293	0.455	1,555
Drawback: difficult to learn to use	0.288	0.453	1,555
Drawback: fragile or prone to breaking	0.244	0.430	1,555
Drawback: hard to repair locally	0.102	0.303	1,555

income, 78 percent would pay at least a tenth of their monthly income for a stove.

The role of peers in increasing adoption: Respondents also expect peers to matter for adoption: 86 percent say they would be likely or very likely to adopt if a friend adopted first. When asked why, the most common reason is motivation: 57 percent say a friend would encourage them to use it. Belief updating comes next: about half say a friend's adoption would make them confident the technology works. Direct learning is less commonly reported, with only under a third expecting a friend to teach them. At the same time, few peers are available to learn from at baseline in the first place. Of their ten closest friends, respondents think 0.8 have ever used an electric cookstove.

Table 4: Perceived Benefits, Demand and Electricity Access at Baseline

	Mean	SD	N
Panel A. Beliefs and willingness to pay			
Believed air-quality improvement from switching (percent)	68.0	22.4	1,555
Maximum willingness to pay for a cookstove (NPR)	3107.5	1317.2	1,511
Accepts the top price of NPR 5,000 (censored from above)	0.228	0.420	1,511
Rejects every price on the ladder	0.028	0.166	1,555
Willing to pay at least a tenth of own monthly income	0.784	0.411	1,511
Panel B. Expected role of peers in adoption			
Likely or very likely to adopt if a friend adopts	0.857	0.350	1,555
Reason: a friend would motivate me to use it	0.567	0.496	1,333
Reason: seeing a friend use it makes me confident it works	0.529	0.499	1,333
Reason: a friend adopting shows the stove is useful	0.440	0.497	1,333
Reason: a friend could teach me how to use it	0.292	0.455	1,333
Reason: a friend could share the cost	0.116	0.320	1,333
Of 10 closest friends, number thought to have used a cookstove	0.8	1.5	1,480
Panel C. Electricity access			
Frequent power cuts in the household	0.961	0.194	1,555
Monthly electricity bill (NPR)	222.1	441.0	1,551
Electricity connection capacity (amperes)	7.8	4.5	1,555

2.4 Experimental Design and Treatment Arms

We implement a two-stage randomization design. First, villages are randomized into pure control or treatment. Pure control villages receive no intervention and allow us to measure spillover effects by comparing with control households in treated villages. Within treatment villages then we cross-randomize two interventions at the individual level: a three month long trial of the technology along with a short initial demonstration, and peer exposure through meal-sharing meetings with a randomly matched peer. Importantly, because peer matching is random, 47 percent of assigned pairs are cross-caste pairs.

Because peers are randomly matched and the technology access is randomized within each pair, we observe four pair compositions where neither peer has the technology, only the respondent has it, only the peer has it, and both have it. Half of the recipients of the technology trial are additionally randomized to an air-quality demonstration: they are shown the reading from an air-quality monitor while cooking with firewood and again while cooking with the electric stove, aiming to demonstrate the reduction in indoor air pollution directly. Importantly, we exclude all individuals from the baseline who report having used a cookstove already from the experiment.

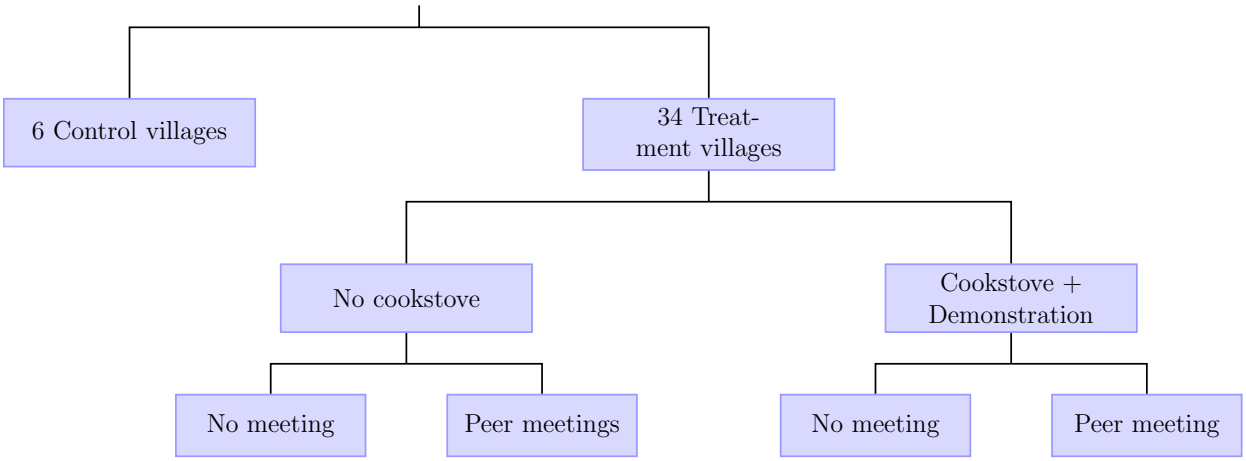


Figure 1: Experimental Design

2.5 Meeting Structure

Peers are randomly matched and asked to meet every two weeks for three months. The first meeting is verified by an enumerator, who helps the pair set a meal plan and schedule future meetings. Subsequent meetings are unsupervised and incentivized, with a chance of a cash reward if both peers are present when the enumerator calls. When the technology is available to either or both, peers are invited to share a meal aiming to facilitate observational and joint learning by doing respectively. Pairs where neither have the technology are invited to meet to discuss any topic of their choice, aiming to facilitate information exchange.

2.6 Randomization and Balance

We check baseline balance for each of the three randomized assignments. Appendix B reports the tables. None of the 31 baseline covariates differs significantly between the meeting and no-meeting groups or between the technology-access and no-access groups. Among the 334 cookstove recipients, three covariates differ across the two air-quality reading groups at the 5 percent level: maximum willingness to pay, having completed primary schooling, and the number of friends named at baseline. We show robustness while studying the effect of the AQI reading using post-double-selection lasso (Belloni et al., 2014).

2.7 Empirical Specification

We report results from three intent-to-treat (ITT) specifications, estimated using endline respondents in treatment villages, with robust standard errors.

The first specification compares the four arms. Tech_i is an indicator for technology access without a meeting, Meet_i an indicator for a meeting without the technology and TechMeet_i

for both, with respondents assigned neither treatment included as the omitted category,

$$Y_i \;=\; \alpha + \beta_1 \text{Tech}_i + \beta_2 \text{Meet}_i + \beta_3 \text{TechMeet}_i + \varepsilon_i.$$

Because the three indicators are mutually exclusive cells, each coefficient shows the effect of that arm against the within-village control.

The second specification decomposes the meeting arm using own and peer ownership of the technology. We construct Both_i, OwnOnly_i, PeerOnly_i and Neither_i as the four pair compositions depending on technology access, and compare against the same omitted category,

$$Y_i \;=\; \alpha + \beta_1 \text{Tech}_i + \beta_2 \text{Both}_i + \beta_3 \text{OwnOnly}_i + \beta_4 \text{PeerOnly}_i + \beta_5 \text{Neither}_i + \varepsilon_i.$$

We implement four additional tests, each isolating one channel of social learning. The test $\beta_4 = \beta_5$ isolates observational learning: both cells hold a meeting without own access, and they differ only in whether there is a technology to observe in the partner's hands. The test $\beta_3 = \beta_1$ isolates information exchange: respondents in both cells use the technology themselves, and the meeting adds a partner to talk to but nothing to observe, since she does not have the technology. The tests $\beta_2 = \beta_1$ and $\beta_2 = \beta_3$ isolate joint learning by doing: the first asks whether using the technology alongside an owning partner improves on using it alone, and the second asks, holding the meeting fixed, whether it matters that the partner also has the technology.

The third specification restricts attention to the meeting arm, where the outcomes are meeting-specific and only pairs that met can report them. Neither_i is the omitted category.

$$Y_i \;=\; \alpha + \beta_1 \text{Both}_i + \beta_2 \text{OwnOnly}_i + \beta_3 \text{PeerOnly}_i + \varepsilon_i.$$

3 Conceptual Framework

We model learning about a technology whose benefits are uncertain along multiple dimensions. The technology delivers benefits along K dimensions such as smoke, cooking time, safety, and taste. Let θ_k denote its benefit on dimension k and $\gamma_k \geq 0$ the weight the household places on that dimension, so that total benefit is $f(\boldsymbol{\theta}) = \boldsymbol{\gamma}'\boldsymbol{\theta}$. The household does not know $\boldsymbol{\theta}$. It has independent priors $\theta_k \sim \mathcal{N}(\mu_{0k}, \sigma_{0k}^2)$, where σ_{0k}^2 measures its initial uncertainty about dimension k.

Using the technology generates signals $s_k = \theta_k + \varepsilon_k$ with $\varepsilon_k \sim \mathcal{N}(0, \tau_k^{-1})$, independent across dimensions, so τ_k is the precision of what the household learns about dimension k. After observing $\mathbf{s} = (s_1, \ldots, s_K)$ the household may buy at price p, and adopts if and only if $\mathbb{E}[f(\boldsymbol{\theta}) \mid \mathbf{s}] \geq p$.

Bayesian updating gives a posterior mean on dimension k of $\mu_{0k}+\frac{\sigma_{0k}^2\tau_k}{1+\sigma_{0k}^2\tau_k}(s_k-\mu_{0k})$. Evaluated before signals arrive, the posterior mean of overall benefit is therefore normal with mean $\boldsymbol{\gamma}'\boldsymbol{\mu}_0$ and variance

$$\sigma_M^2 \;=\; \sum_k \gamma_k^2 \,\frac{\sigma_{0k}^4\,\tau_k}{1+\sigma_{0k}^2\tau_k}. \tag{1}$$

σ_M measures how far beliefs are expected to move. Since the household buys only when the signals are favourable, the expected payoff from learning is

$$G \;=\; \mathbb{E}\big[\,\max\{\mathbb{E}[f\mid \mathbf{s}]-p,\,0\}\big] \;=\; \sigma_M\,h(d), \qquad d\equiv\frac{\boldsymbol{\gamma}'\boldsymbol{\mu}_0-p}{\sigma_M}, \qquad h(d)=\phi(d)+d\,\Phi(d), \tag{2}$$

where ϕ and Φ are the standard normal density and distribution. The term d compares how good the technology is as per prior beliefs, $\boldsymbol{\gamma}'\boldsymbol{\mu}_0-p$, with how far beliefs are likely to move, σ_M. When d is large the household expects to adopt no matter what it observes, and when it is very negative it expects not to adopt in either case. Learning changes the decision only when d is close to zero. The following derivatives show that more precise signals always raise the value of learning.

$$\frac{\partial G}{\partial \sigma_M}=\phi(d)>0, \qquad \frac{\partial \sigma_M^2}{\partial \tau_k}=\frac{\gamma_k^2\sigma_{0k}^4}{(1+\sigma_{0k}^2\tau_k)^2}>0. \tag{3}$$

Let $z\in\{S,J\}$ index the learning environment: solo use or joint use with a peer. Then,

$$\tau_k \;=\; \underbrace{\alpha_k\,\rho(e)}_{\text{active}} \;+\; \underbrace{\kappa_k(z)}_{\text{ambient}}. \tag{4}$$

The active channel is what the household choices affect. The household chooses elicitation effort $e\geq 0$—asking questions, trying dishes, watching for outcomes—converted into precision by ρ, increasing and concave with $\rho(0)=0$. The household also chooses an attention allocation $\boldsymbol{\alpha}$ on the simplex, $\sum_k \alpha_k=1$, which divides that effort across dimensions. Attention is scarce i.e. effort spent monitoring cooking time is not spent noticing smoke. The ambient channel $\kappa_k(z)\geq 0$ is precision that is generated without effort and without being attended to. The household chooses $(e,\boldsymbol{\alpha})$ to maximise the value of learning net of its costs,

$$V^*(z) \;=\; \max_{e\geq 0,\,\boldsymbol{\alpha}} \;\sigma_M(e,\boldsymbol{\alpha};z)\,h(d) \;-\; \tfrac{c_z}{2}e^2 \;-\; \big[\psi(\boldsymbol{\alpha})-\lambda\,\alpha_m\mathbf{1}\{z=J\}\big], \tag{5}$$

where $c_z>0$ is the marginal cost of elicitation, ψ is a strictly convex and symmetric cost of attention, m indexes a dimension made salient by peer conversation, and $\lambda\geq 0$ is the strength of that salience.

Joint use changes three things. First, **ambient learning**: cooking alongside a peer generates signals the household need not seek, so $\kappa_k(J)>0$. Second, a **higher elicitation cost**:

asking a question reveals that one does not already know the answer, and when both partners own the technology and both are presumed to have learned it, the question is more face-threatening (Goffman, 1967), so $c_J \geq c_S$. Third, **attention distortion**: conversation makes some dimensions salient—what to cook, what tastes good, so $\lambda > 0$ (Hanna et al., 2014).

These yield three predictions. First, when asking is more costly, the household exerts less effort to elicit signals and consequently learns less on every dimension. Joint ownership therefore lowers active learning.

Second, salience draws attention toward whatever the conversation focuses on. Because attention is scarce, this comes at the expense of other dimensions, and when those are weighted more or less well understood, learning reduces even as discussion of the technology rises.

Finally, joint use raises the value of learning only if the ambient gain outweighs these two losses. The net effect is theoretically ambiguous.

4 Effect on Technology Use

4.1 Adoption

We first measure adoption using six pre-specified outcomes including whether the respondent used the stove in the past three months, how often she used it, and for how many minutes a day as well as incentivized willingness to pay, their monthly household electricity bill, and whether the household upgraded its wiring. Table 5 reports effects by treatment arm and Table 6 decomposes the meeting arm by pair composition.

Table 5: Adoption by Treatment Arm

	Used (3m)	Freq	Min/day	WTP	Elec. bill	Wiring
Technology only	0.662***	3.582***	21.540***	616.144***	128.369***	0.082***
	(0.038)	(0.220)	(1.846)	(116.461)	(37.417)	(0.030)
Meeting only	0.005	0.017	0.125	-199.514*	-13.531	0.022
	(0.010)	(0.050)	(0.340)	(110.011)	(27.605)	(0.018)
Technology and meeting	0.769***	3.991***	23.273***	428.571***	84.650**	0.131***
	(0.032)	(0.190)	(1.631)	(119.626)	(36.368)	(0.032)
Technology and meeting = Technology only	[0.028]	[0.153]	[0.478]	[0.130]	[0.323]	[0.232]
Technology and meeting = Meeting only	[0.000]	[0.000]	[0.000]	[0.000]	[0.007]	[0.001]
Meeting only = 0	[0.574]	[0.738]	[0.714]	[0.070]	[0.624]	[0.232]
Control mean	0.016	0.083	0.517	2428.571	230.013	0.057
Observations	1103	1103	1103	1023	1101	1103
R^2	0.606	0.562	0.393	0.039	0.018	0.026

We find that the technology trial increases three-month use by 66 percentage points against a control mean of 1.6 percent, and also increases usage frequency, minutes of daily use,

incentivized willingness to pay (NPR 616, USD 4), the monthly electricity bill (NPR 128, USD 0.8), and wiring upgrades (8 percentage points). Meeting, without technology access, has no significant effect on any of these outcomes. The coefficient, on willingness to pay, is negative (NPR −200, USD −1.3, $p = 0.07$). The combined arm exceeds technology alone only on self-reported use, by 11 percentage points ($p = 0.03$). This suggests that peer meetings had no incremental effect across most outcomes around adoption.

Table 6: Adoption by Pair Composition

	Used (3m)	Freq	Min/day	WTP	Elec. bill	Wiring
Technology, no meeting	0.662***	3.582***	21.540***	616.144***	128.369***	0.082***
	(0.038)	(0.220)	(1.848)	(116.575)	(37.452)	(0.030)
Meeting: neither	-0.002	-0.010	-0.099	-151.568	-26.710	0.016
	(0.009)	(0.050)	(0.310)	(116.041)	(29.278)	(0.019)
Meeting: peer only	0.027	0.096	0.799	-344.361*	26.282	0.038
	(0.022)	(0.104)	(0.825)	(186.967)	(46.654)	(0.032)
Meeting: respondent only	0.726***	3.908***	21.778***	447.899***	78.050*	0.104***
	(0.042)	(0.245)	(1.994)	(134.549)	(43.981)	(0.037)
Meeting: both	0.844***	4.136***	25.889***	394.345**	96.384*	0.178***
	(0.044)	(0.292)	(2.760)	(176.210)	(52.351)	(0.054)
Peer only = Neither	[0.196]	[0.311]	[0.275]	[0.309]	[0.266]	[0.524]
Respondent only = Technology, no meeting	[0.253]	[0.316]	[0.930]	[0.224]	[0.321]	[0.629]
Both = Technology, no meeting	[0.002]	[0.126]	[0.189]	[0.216]	[0.582]	[0.112]
Both = Respondent only	[0.050]	[0.547]	[0.225]	[0.780]	[0.769]	[0.246]
Control mean	0.016	0.083	0.517	2428.571	230.013	0.057
Observations	1103	1103	1103	1023	1101	1103
R^2	0.609	0.562	0.395	0.041	0.020	0.028

Table 6 further decomposes the meeting arm by pair composition. Pairs in which both partners have the technology report higher use than respondents who have it alone, by 18 percentage points relative to the technology-only arm ($p = 0.002$) and 12 points relative to pairs in which only the respondent has it ($p = 0.05$). This difference appears only in self-reported use and not along other outcomes.

Table 7 reports whether the partner's use of technology affects the respondent's own outcomes. We instrument the partner's use with the partner's random technology assignment. We find that the peer effect on self-reported use is positive and precisely estimated: an additional percentage point of partner use raises own use by 0.08 percentage points ($p < 0.05$), with a first-stage F-statistic above 500.

4.2 Peer Take-up and Engagement

Next, to understand the lack of effects on adoption due to peer exposure, we first ask whether the peer meeting assignment translated into actual meetings. We measure engagement with

Table 7: Peer Effects in the Meeting Arm

	Used (3m)	WTP	Elec. bill	Wiring	Beliefs	Checklist	Breadth
Panel A. OLS							
Peer's outcome	0.037	0.086*	0.073**	0.083	0.051	0.066	-0.085*
	(0.028)	(0.048)	(0.036)	(0.053)	(0.040)	(0.111)	(0.048)
Own technology	0.764***	505.510***	80.437**	0.109***	0.239**	-0.285	-0.129
	(0.034)	(127.192)	(36.941)	(0.035)	(0.097)	(0.629)	(0.128)
Observations	514	448	512	514	514	92	514
R^2	0.658	0.033	0.015	0.033	0.015	0.007	0.009
Panel B. 2SLS, peer outcome instrumented by peer assignment							
Peer's outcome	0.075**	-0.015	0.604	0.321	0.066	-0.571	-0.682
	(0.035)	(0.308)	(0.550)	(0.307)	(0.405)	(2.641)	(1.040)
Own technology	0.758***	513.119***	49.914	0.097**	0.239**	-0.180	-0.080
	(0.035)	(130.608)	(55.617)	(0.038)	(0.100)	(0.788)	(0.168)
First-stage F	503.2	15.3	4.4	9.8	5.8	0.2	1.3
Observations	514	448	512	514	514	92	514

Notes: Each column regresses the respondent's outcome on the partner's value of the same outcome, controlling for the respondent's own technology assignment. Panel B instruments the partner's outcome with the partner's random technology assignment. The first-stage F is the Kleibergen-Paap statistic.

the number of sessions attended out of six, whether the pair cooked together, whether they met outside the scheduled sessions, the change in their meeting frequency, and the amount donated to the partner in a dictator game. Table 8 reports these by pair composition (Panel A) and by caste (Panel B).

Panel A reports engagement by pair composition. Pairs in which both partners have the technology attend 1.9 more of the six sessions than pairs in which neither does ($p < 0.01$), are 53 percentage points more likely to have cooked together, and are 20 points more likely to have met outside the scheduled sessions. Pairs in which only the respondent has the technology attend no more often than pairs with no technology, which suggests that it is joint access rather than own access that leads to sustained attendance. Donations are large in every cell, averaging NPR 391 (USD 2.5) out of an endowment of NPR 1,000 (USD 6.5) in pairs where neither has the technology, and do not differ by composition.

Panel B reports engagement by caste composition of the pair. We find that cross-caste pairs engage less than same-caste pairs: they attend 0.67 fewer sessions ($p = 0.001$), are 13 percentage points less likely to have cooked together, and are 20 points less likely to have met outside the sessions. Joint access reverses this pattern along two margins. Among cross-caste pairs, joint access raises attendance by 3.1 of the six sessions ($p < 0.001$) and the probability of meeting outside the sessions by 43 percentage points ($p < 0.001$). As a result, the cross-

Table 8: Engagement in the Meeting Arm

	Sessions	Cooked together	Met outside	Freq. change	Donation
Panel A. Pair composition					
Meeting: peer only	0.353	0.257***	0.062	0.082	47.396
	(0.279)	(0.068)	(0.058)	(0.069)	(39.181)
Meeting: respondent only	0.236	0.494***	0.081	0.207***	-44.529
	(0.260)	(0.071)	(0.055)	(0.064)	(32.959)
Meeting: both	1.895***	0.531***	0.204***	0.216***	36.032
	(0.341)	(0.076)	(0.071)	(0.077)	(43.072)
Both = Peer only	[0.000]	[0.006]	[0.085]	[0.144]	[0.825]
Both = Respondent only	[0.000]	[0.715]	[0.125]	[0.924]	[0.085]
Neither mean	1.505	0.034	0.330	1.918	390.735
Observations	543	263	543	543	543
R^2	0.058	0.268	0.017	0.026	0.009
Panel B. Caste composition					
Cross-caste pair	-0.673***	-0.130**	-0.201***	-0.089*	-64.596**
	(0.206)	(0.054)	(0.043)	(0.053)	(28.822)
Meeting: both	0.741*	0.273**	-0.026	0.034	1.671
	(0.418)	(0.110)	(0.090)	(0.079)	(58.212)
Cross-caste × Meeting: both	2.387***	0.179	0.452***	0.272*	76.996
	(0.625)	(0.157)	(0.133)	(0.157)	(80.215)
Cross-caste, without joint access	-0.673 [0.001]	-0.130 [0.017]	-0.201 [0.000]	-0.089 [0.093]	-64.596 [0.025]
Cross-caste, with joint access	1.714 [0.004]	0.049 [0.738]	0.251 [0.046]	0.183 [0.217]	12.400 [0.868]
Joint access, among cross-caste pairs	3.128 [0.000]	0.453 [0.000]	0.426 [0.000]	0.306 [0.025]	78.667 [0.155]
Same-caste, not both mean	1.945	0.268	0.455	2.024	419.929
Observations	543	263	543	543	543
R^2	0.086	0.108	0.058	0.015	0.011

Notes: Meeting arm only. Panel A uses the engagement specification of Section 2.7, with pairs where neither partner has the technology as the omitted category. Panel B replaces pair composition with a cross-caste indicator, an indicator for both partners having the technology, and their interaction. The three rows below the coefficients report the cross-caste gap without joint access (β_1), the cross-caste gap with joint access ($\beta_1 + \beta_3$), and the effect of joint access among cross-caste pairs ($\beta_2 + \beta_3$); p-values in brackets. Cooking together is asked only of respondents who attended at least one session, which is why that column has fewer observations.

caste gap not only closes but reverses on attendance: with joint access, cross-caste pairs attend 1.7 more sessions than same-caste pairs at the same level of access ($p = 0.004$). This suggests that a shared activity can substitute for shared identity in sustaining engagement across caste boundaries. We will return to this in Section 5.

Table 9 reports what the pairs discussed during the meetings. Joint-access pairs discuss how to use the technology more than pairs with no technology (0.45, $p < 0.01$) and discuss foods and cooking problems more as well. Pairs in which only the peer owns the technology instead emphasize the comparison with firewood and LPG (0.22, $p < 0.01$) and safety. Discussion of technology-relevant content was therefore substantial, which suggests that limited engagement does not explain the learning results that follow.

Table 9: Session Topics

	Use	Foods	Problems	Safety	Benefits	vs FW/LPG	Experience	Future use
Meeting: peer only	0.145*	0.111	-0.027	0.140*	0.015	0.215***	0.014	-0.091
	(0.086)	(0.083)	(0.062)	(0.076)	(0.067)	(0.080)	(0.047)	(0.062)
Meeting: respondent only	0.302***	0.036	0.073	-0.040	-0.021	0.064	0.007	0.011
	(0.078)	(0.077)	(0.069)	(0.059)	(0.061)	(0.070)	(0.044)	(0.070)
Meeting: both	0.451***	0.150*	0.132*	0.045	0.067	0.102	0.061	-0.063
	(0.070)	(0.085)	(0.077)	(0.071)	(0.073)	(0.076)	(0.055)	(0.066)
Neither mean	0.397	0.284	0.172	0.172	0.172	0.181	0.069	0.216
Respondent only = Peer only	[0.106]	[0.435]	[0.207]	[0.029]	[0.628]	[0.106]	[0.885]	[0.179]
Both = Peer only	[0.001]	[0.704]	[0.065]	[0.298]	[0.545]	[0.247]	[0.464]	[0.706]
Both = Respondent only	[0.072]	[0.246]	[0.515]	[0.270]	[0.274]	[0.677]	[0.376]	[0.347]
Observations	263	263	263	263	263	263	263	263
R^2	0.123	0.016	0.019	0.023	0.005	0.033	0.006	0.010

However, when respondents are asked to rank what they found most helpful about the meetings, pairs in which both partners have the technology are 18 percentage points less likely than pairs with no technology to rank "asking questions and getting help" among the three most helpful aspects ($p < 0.10$), and 23 points less likely than pairs in which only the peer has it ($p = 0.05$). This anticipates the mechanism we discuss in more detail in Section 4.5.

4.3 Knowledge and Beliefs

To further understand why peer interactions did not translate into improved adoption, we measure outcomes around knowledge and beliefs. We measure knowledge using three items. The first asks whether the respondent can operate the stove. The second asks how confident she is in operating it and is asked only of those who report being able to. The third is an enumerator-administered checklist that scores whether she performs the correct operating steps.

Technology access increases the share who can operate the stove by 63 percentage points. The combined arm increases it by 68 points, and the two are statistically indistinguishable. In the pair-composition decomposition shown in the table, the effect on being able to operate the stove is not statistically different across compositions, so joint access adds no operating knowledge beyond access itself. Confidence in operating the stove follows the same pattern. However, joint-access pairs score 1.25 points below the technology-only arm on the checklist ($p < 0.001$) and 0.30σ below it on the index ($p = 0.005$), though we read this as suggestive given the restricted sample.[2]

Table 11 reports effects on beliefs about the technology's benefits. The belief index is a

[2]The enumerator checklist and the index built from it are recorded only for the 397 respondents who had used or been shown a stove.

Table 10: Knowledge

	Knows operation	Confidence	Checklist	Index
Technology, no meeting	0.626***	0.239**	0.630	0.377***
	(0.038)	(0.112)	(0.460)	(0.141)
Meeting: neither	-0.010	-0.095	0.210	0.035
	(0.027)	(0.160)	(0.619)	(0.206)
Meeting: peer only	0.060	0.043	-0.127	-0.021
	(0.045)	(0.175)	(0.745)	(0.222)
Meeting: respondent only	0.664***	0.204	-0.066	0.175
	(0.042)	(0.125)	(0.477)	(0.154)
Meeting: both	0.704***	0.278**	-0.621	0.074
	(0.049)	(0.113)	(0.466)	(0.149)
Peer only = Neither	[0.125]	[0.484]	[0.668]	[0.820]
Respondent only = Technology, no meeting	[0.456]	[0.733]	[0.043]	[0.074]
Both = Technology, no meeting	[0.169]	[0.667]	[0.000]	[0.005]
Both = Respondent only	[0.496]	[0.482]	[0.114]	[0.409]
Control mean	0.140	2.852	4.692	-0.000
Observations	1101	375	397	397
R^2	0.400	0.031	0.025	0.032

standardized combination of what respondents expect the stove to do along five dimensions: its effect on their health, on the time they spend cooking, on how affordable cooking is, and on the taste of traditional foods, together with the improvement in indoor air quality they expect from switching away from firewood, which is elicited with an incentivized question. We find that the technology trial increases the index by 0.36σ ($p < 0.01$), with gains on each dimension. Meeting a peer without access does not move the index, and the combined arm lies between the two at 0.18σ (Panel A).

Panel B decomposes the meeting arm and asks whether meeting a peer adds to the belief gain from access. Pairs in which both partners have the technology have significantly lower beliefs (i.e. 0.32σ) compared to the technology-only arm ($p = 0.04$). Respondents who meet a peer with access but do not have it themselves update their beliefs about traditional foods and air quality, so some updating takes place through observation. Peer-access-only pairs are also the most likely to rank asking questions and getting help among the most helpful aspects of the meetings (Table 20). This suggests that meetings as such do not reduce learning and is specific to the configuration in which both partners own the technology.

Table 11: Beliefs

	Index	Health	Time	Affordability	Trad. foods	AQI belief
Panel A. Treatment arms						
Technology only	0.356***	0.077*	0.137***	0.147***	0.127**	8.013
	(0.110)	(0.044)	(0.051)	(0.048)	(0.057)	(6.199)
Meeting only	-0.068	0.071**	0.003	-0.029	0.076*	2.488
	(0.070)	(0.032)	(0.033)	(0.036)	(0.042)	(2.039)
Technology and meeting	0.180*	0.097**	0.105**	0.065	0.110**	6.089**
	(0.092)	(0.041)	(0.044)	(0.044)	(0.050)	(2.914)
Technology and meeting = Technology only	[0.159]	[0.710]	[0.589]	[0.143]	[0.793]	[0.770]
Technology and meeting = Meeting only	[0.007]	[0.546]	[0.028]	[0.042]	[0.516]	[0.234]
Meeting only = 0	[0.336]	[0.024]	[0.921]	[0.421]	[0.071]	[0.223]
Control mean	0.000	3.181	3.124	3.011	3.009	80.468
Observations	1103	1073	1002	1020	923	1103
R^2	0.020	0.008	0.014	0.016	0.008	0.005
Panel B. Pair composition						
Technology, no meeting	0.356***	0.077*	0.137***	0.147***	0.127**	8.013
	(0.110)	(0.044)	(0.051)	(0.048)	(0.057)	(6.205)
Meeting: neither	-0.115	0.069**	-0.013	-0.039	0.053	1.605
	(0.074)	(0.034)	(0.037)	(0.039)	(0.046)	(2.362)
Meeting: peer only	0.075	0.077	0.052	0.000	0.145**	5.153**
	(0.117)	(0.052)	(0.052)	(0.057)	(0.067)	(2.387)
Meeting: respondent only	0.265**	0.146***	0.137**	0.080	0.113*	7.479**
	(0.111)	(0.050)	(0.055)	(0.052)	(0.060)	(3.506)
Meeting: both	0.033	0.010	0.050	0.037	0.104	3.657
	(0.132)	(0.058)	(0.061)	(0.067)	(0.075)	(4.515)
Peer only = Neither	[0.110]	[0.883]	[0.249]	[0.526]	[0.198]	[0.203]
Respondent only = Technology, no meeting	[0.512]	[0.243]	[0.999]	[0.288]	[0.848]	[0.938]
Both = Technology, no meeting	[0.038]	[0.312]	[0.238]	[0.145]	[0.786]	[0.558]
Both = Respondent only	[0.137]	[0.053]	[0.255]	[0.576]	[0.915]	[0.479]
Control mean	0.000	3.181	3.124	3.011	3.009	80.468
Observations	1103	1073	1002	1020	923	1103
R^2	0.025	0.011	0.017	0.016	0.010	0.006

4.4 Attention and Exploration

The pairs that engage most are the pairs that learn least, which points to joint use potentially changing how women attend to the technology. If meeting a peer who also has the technology draws attention onto a narrow set of uses, women in joint-access pairs should end up exploring fewer of its dimensions. Table 12 reports breadth, the number of cooking dimensions a respondent attends to, and concentration, a Herfindahl index across them.

Panel A reports the arm-level estimates. The technology on its own spreads out attention to various dimensions, reducing concentration by 0.05 relative to control ($p < 0.05$). This effect disappears once a meeting is added: concentration in the combined arm is zero and

Table 12: Attention Across Technology Dimensions

	Breadth	Concentration
Panel A. Treatment arms		
Technology only	0.135	-0.049**
	(0.147)	(0.020)
Meeting only	0.097	-0.012
	(0.098)	(0.016)
Technology and meeting	-0.084	-0.000
	(0.118)	(0.020)
Technology and meeting = Technology only	[0.180]	[0.038]
Technology and meeting = Meeting only	[0.136]	[0.557]
Meeting only = 0	[0.320]	[0.453]
Control mean	3.010	0.550
Observations	1103	1103
R^2	0.003	0.006
Panel B. Pair composition		
Technology, no meeting	0.135	-0.049**
	(0.147)	(0.020)
Meeting: neither	0.052	-0.012
	(0.104)	(0.017)
Meeting: peer only	0.232	-0.013
	(0.171)	(0.027)
Meeting: respondent only	-0.082	-0.003
	(0.145)	(0.023)
Meeting: both	-0.088	0.004
	(0.162)	(0.029)
Peer only = Neither	[0.311]	[0.961]
Respondent only = Technology, no meeting	[0.238]	[0.082]
Both = Technology, no meeting	[0.257]	[0.099]
Both = Respondent only	[0.973]	[0.848]
Control mean	3.010	0.550
Observations	1103	1103
R^2	0.004	0.006

Notes: Breadth is the number of cooking dimensions a respondent says she pays attention to; concentration is the Herfindahl index across those dimensions, so a higher value means attention is more concentrated on fewer dimensions. Panel A is the arm-level specification and Panel B the pair-composition specification of Section 2.7.

significantly higher than in the technology-only arm ($p = 0.04$). Breadth moves in the same direction as it is narrower in the combined arm than under technology alone. Panel B shows that these patterns particularly hold among pairs where both partners have the technology, though the individual pair cells are imprecisely estimated.

4.5 Mechanisms

4.5.1 The Cost of Asking: Vignette Experiment

We implement a survey experiment to understand the mechanism further, particularly focusing on the reluctance to ask questions among joint-access pairs, mentioned earlier. In a phone follow-up we asked meeting-arm respondents to predict, in hypothetical scenarios, how likely a person would be to ask a peer for help. The scenarios independently vary three attributes in a $2 \times 2 \times 2$ design: whether both people own the technology, whether the peer is a central advisor in the village, and whether the peer is a close friend. Joint ownership increases expected embarrassment to ask questions by 0.10 points on the four-point scale ($p < 0.05$) and expected judgement by 0.16 points ($p < 0.01$), but has no statistically detectable effect on stated willingness to ask. Describing the peer as a close friend increases the perceived likelihood of asking by 0.85 points and stated willingness to ask by 0.35 points (both $p < 0.01$). Describing the peer as a central advisor reduces the perceived likelihood of asking ($p < 0.10$).

Table 13: Vignette Experiment: Willingness to Ask

	Likely to ask	Not embarrassed	No judgement	Would ask
Both own the technology	-0.049	-0.097**	-0.163***	0.002
	(0.041)	(0.038)	(0.040)	(0.033)
Peer is a central advisor	-0.063*	-0.055	-0.014	-0.039
	(0.037)	(0.036)	(0.042)	(0.029)
Peer is a close friend	0.851***	0.557***	0.478***	0.350***
	(0.044)	(0.040)	(0.042)	(0.034)
Respondents	480	480	480	480
Observations	960	960	960	960
R^2	0.321	0.188	0.135	0.109

Notes: Respondent-by-scenario data from the phone follow-up: 480 respondents each evaluated two of eight scenarios, giving 960 observations. Scenario attributes are randomly assigned and independent. Outcomes are coded so that a higher value is the more favourable response. Standard errors are clustered by respondent.

These vignette estimates are consistent with an elicitation cost: joint access increases expected embarrassment and judgement to ask questions.

4.5.2 Stated Reasons and the Shared-Ignorance Alternative

Table 14 reports how respondents describe the barriers to asking, first about themselves and then about people in general.

Responses to the third-person questions identify prevalent barriers: 62 percent state that

Table 14: Comfort Asking the Peer and Barriers to Asking

	Mean	SD	N
Comfort asking the peer a question (1 = very, 4 = not at all)	1.74	0.79	232
Wanted to ask the peer something and did not	0.03	0.16	232
Didn't ask: felt should already know	0.00	0.00	6
Didn't ask: didn't want to seem ignorant	0.17	0.41	6
Didn't ask: thought partner wouldn't know either	0.83	0.41	6
Didn't ask: conversation moved on	0.33	0.52	6
Didn't ask: not comfortable enough with partner	0.00	0.00	6
Uncomfortable: feel should already know	0.25	0.44	226
Uncomfortable: don't want to seem ignorant	0.62	0.49	226
Uncomfortable: think partner wouldn't know	0.73	0.45	226
Uncomfortable: conversation moves on	0.17	0.38	226
Uncomfortable: not comfortable with partner	0.07	0.26	226

Notes: Phone follow-up including 232 respondents who attended at least one meeting session. The first block is asked directly and in the first person; the second is asked about people in general.

she might not want to appear ignorant. Twenty-five percent state that she might believe she should already know the answer. At the same time, 73 percent state that someone might not ask because she expects her partner not to know. This response supports shared ignorance as a possible constraint on learning in addition to elicitation costs.

4.5.3 Prior Relationships

We now explore whether prior acquaintance reduces elicitation costs. Table 15 estimates treatment-cell coefficients separately by prior acquaintance with the matched peer (Panel A) and, within the meeting arm, estimates its association with engagement outcomes (Panel B).

Women who knew their peer attended 0.9 more sessions and were 20 percentage points more likely both to cook with the peer and to meet her outside the scheduled sessions (Panel B; all $p < 0.01$). Among women assigned both the technology and a meeting, those who knew their peer report a higher use frequency (4.85 versus 3.89; $p = 0.022$) and are 11 percentage points more likely to know how to operate the stove (0.82 versus 0.71; $p = 0.099$). This is consistent with the vignette result that describing the peer as a close friend increases the perceived likelihood of asking by 0.85 points.

4.6 Reducing the Cost of Information: The Air-Quality Reading

The disclosure-cost mechanism makes a further testable prediction. If belief updating in joint-access pairs is lower because asking a peer who also has access is embarrassing, then supplying the pair with information that is not embarrassing to elicit (as information pro-

Table 15: Meeting Effects by Prior Relationship with the Peer

	Used (3m)	Freq	Min/day	Knows oper.	Network index
Panel A. Treatment cells split by prior relationship					
Technology only	0.662***	3.582***	21.540***	0.626***	-0.133
	(0.038)	(0.220)	(1.849)	(0.038)	(0.095)
Meeting only, did not know peer	0.022	0.106	0.427	-0.045	-0.274
	(0.027)	(0.136)	(0.707)	(0.044)	(0.168)
Meeting only, knew peer	0.007	0.012	0.154	0.023	-0.164*
	(0.013)	(0.063)	(0.466)	(0.033)	(0.092)
Technology and meeting, did not know peer	0.894***	3.887***	22.210***	0.709***	-0.240
	(0.051)	(0.378)	(2.771)	(0.065)	(0.185)
Technology and meeting, knew peer	0.889***	4.848***	28.240***	0.817***	0.145
	(0.028)	(0.184)	(2.041)	(0.026)	(0.105)
Knew = Did not, meeting only	[0.589]	[0.508]	[0.728]	[0.161]	[0.534]
Knew = Did not, technology and meeting	[0.934]	[0.022]	[0.079]	[0.099]	[0.055]
Control mean	0.016	0.083	0.517	0.140	0.000
Observations	1103	1103	1103	1101	1103
R^2	0.673	0.628	0.435	0.449	0.012
Panel B. Within the meeting arm					
	Sessions	Cooked together	Met outside	Knows oper.	Network index
Knew peer (friend, relative or neighbour)	0.908***	0.199***	0.195***	0.077*	0.202
	(0.265)	(0.066)	(0.057)	(0.040)	(0.135)
Mean, did not know peer	1.410	0.147	0.277	0.384	-0.261
Observations	369	202	369	379	380
R^2	0.088	0.325	0.047	0.599	0.023

vision is randomized) should not involve these costs. The air-quality reading provides this variation: half of technology recipients, chosen at random, were shown the reading from an air-quality monitor while cooking with firewood and again while cooking with the electric stove.

Table 16 reports the result, estimated on the technology recipients. The reading on its own has no effects. Meeting a peer with access to the technology lowers the belief index by 0.48σ ($p < 0.01$) and the knowledge index by 0.39σ ($p < 0.01$). This is the "joint-access" effect on beliefs and knowledge discussed in Section 4. However, when the peer also received the AQI reading, the penalty is offset, by 0.41σ on beliefs ($p < 0.10$) and 0.35σ on knowledge ($p < 0.05$), leaving net effects close to zero. The pair becomes 23 percentage points more likely to discuss the technology ($p < 0.05$; Appendix C). This effect appears in the air-quality items as well: confidence in the air-quality belief rises by 0.39 points ($p < 0.10$).

Table 16: The Peer's Air-Quality Reading, Beliefs and Knowledge

	Belief Idx	% AQI Improve	AQI Conf.	Health Belief	Knowledge Idx	Know Operate
Own AQI reading	0.055	-5.809	-0.005	-0.027	-0.020	0.030
	(0.123)	(6.422)	(0.103)	(0.052)	(0.093)	(0.045)
Met peer w/ stove, no reading	-0.481***	-8.090	-0.251	-0.137*	-0.390***	0.038
	(0.146)	(6.873)	(0.194)	(0.081)	(0.111)	(0.072)
Peer also received reading	0.406*	7.935	0.389*	0.083	0.345**	0.051
	(0.241)	(8.633)	(0.230)	(0.108)	(0.159)	(0.091)
Control Mean	0.291	90.410	4.299	3.267	0.275	0.761
Observations	334	334	334	328	268	334
R^2	0.017	0.004	0.009	0.009	0.024	0.006

Notes: Technology recipients, among whom the air-quality reading was randomized; robust standard errors in parentheses. The two peer rows are additive: "Met peer with access, no reading" is the effect of being in a meeting pair whose partner also has the technology, relative to all other technology recipients, and "Peer also received reading" is the additional effect of that partner having been assigned the AQI reading. The control mean is taken over technology recipients with no reading who did not meet a peer with access to the technology.

5 Effect on Social Interactions

5.1 Social Networks

We measure social interaction at the endline using outcomes including: whether the respondent often visits or is visited by another household, whether she often shares a meal or tea with someone, the number of people she names as friends, the number she exchanges advice with, and the number she borrows from or lends to. The index is a standardized inverse-covariance weighted combination of these outcomes. Table 17 reports the arm-level estimates (Panel A) and the pair-composition decomposition (Panel B).

Panel A reports the arm-level estimates. Neither treatment increases network interactions on its own. Peer exposure without technology access in fact lowers it: the index falls by 0.17σ ($p < 0.05$), with 0.29 fewer advice contacts ($p < 0.01$) and fewer house visits. The combined meeting and technology access arm does not increase interaction above baseline levels, but it is significantly higher than the meeting-only arm ($p = 0.04$). It is also significantly higher than the control group on borrowing and lending, with respondents reporting 0.20 more people they borrow from or lend to ($p < 0.10$).

Panel B reports the pair-composition decomposition. The reduction in network interactions is concentrated in pairs where neither partner has the technology. Pairs in which both partners have it are indistinguishable from control.

5.2 Loneliness

Next, Table 18 reports effects on the UCLA loneliness index and its components.

Panel A shows that individuals in the technology access and peer exposure arm have sig-

Table 17: Network Interaction

	Index	House visits	Shared meals	Friends	Advice	Borrow/lend
Panel A. Treatment arms						
Technology only	-0.133	0.005	-0.044	0.004	-0.303**	-0.073
	(0.094)	(0.038)	(0.045)	(0.087)	(0.119)	(0.119)
Meeting only	-0.173**	-0.052*	-0.023	-0.023	-0.288***	-0.106
	(0.073)	(0.030)	(0.034)	(0.064)	(0.089)	(0.086)
Technology and meeting	0.018	0.008	-0.018	0.099	-0.122	0.200*
	(0.091)	(0.036)	(0.043)	(0.080)	(0.117)	(0.111)
Technology and meeting = Technology only	[0.170]	[0.945]	[0.618]	[0.336]	[0.197]	[0.050]
Technology and meeting = Meeting only	[0.039]	[0.103]	[0.915]	[0.127]	[0.152]	[0.006]
Meeting only = 0	[0.019]	[0.084]	[0.508]	[0.718]	[0.001]	[0.216]
Control mean	0.000	0.798	0.677	3.623	2.759	2.787
Observations	1103	1103	1103	1103	1033	1031
R^2	0.007	0.004	0.001	0.002	0.012	0.008
Panel B. Pair composition						
Technology, no meeting	-0.133	0.005	-0.044	0.004	-0.303**	-0.073
	(0.094)	(0.038)	(0.045)	(0.087)	(0.119)	(0.119)
Meeting: neither	-0.179**	-0.056*	-0.022	-0.013	-0.292***	-0.126
	(0.079)	(0.033)	(0.037)	(0.069)	(0.097)	(0.094)
Meeting: peer only	-0.155	-0.041	-0.024	-0.054	-0.275**	-0.046
	(0.124)	(0.049)	(0.054)	(0.109)	(0.135)	(0.130)
Meeting: respondent only	0.053	0.023	0.002	0.092	-0.099	0.260**
	(0.103)	(0.042)	(0.050)	(0.089)	(0.136)	(0.126)
Meeting: both	-0.044	-0.017	-0.052	0.112	-0.166	0.090
	(0.146)	(0.056)	(0.065)	(0.130)	(0.183)	(0.181)
Peer only = Neither	[0.852]	[0.758]	[0.966]	[0.710]	[0.905]	[0.557]
Respondent only = Technology, no meeting	[0.120]	[0.714]	[0.436]	[0.409]	[0.192]	[0.028]
Both = Technology, no meeting	[0.574]	[0.711]	[0.912]	[0.449]	[0.493]	[0.414]
Both = Respondent only	[0.552]	[0.525]	[0.476]	[0.889]	[0.746]	[0.403]
Control mean	0.000	0.798	0.677	3.623	2.759	2.787
Observations	1103	1103	1103	1103	1033	1031
R^2	0.007	0.005	0.001	0.002	0.012	0.009

nificantly lower loneliness: the treatment reduces lack of companionship by 0.09 ($p < 0.05$) and feeling left out by 0.08 ($p < 0.10$). Panel B shows where the effect is concentrated. Pairs where both partners have technology access report 0.29σ less loneliness ($p < 0.05$), driven by a 20 percentage point fall in lacking companionship ($p < 0.01$). No other cell drives the effects on loneliness. Joint-access pairs are significantly less lonely than both the technology-only arm ($p = 0.08$) and pairs where only the respondent has the technology ($p = 0.06$).

Table 18: Loneliness

	Index	Companionship	Left out	Isolated
Panel A. Treatment arms				
Technology only	-0.057	-0.035	-0.009	-0.024
	(0.091)	(0.046)	(0.044)	(0.042)
Meeting only	0.086	0.040	0.033	0.035
	(0.071)	(0.036)	(0.034)	(0.033)
Technology and meeting	-0.113	-0.086**	-0.076*	0.006
	(0.089)	(0.044)	(0.040)	(0.041)
Technology and meeting = Technology only	[0.601]	[0.335]	[0.179]	[0.548]
Technology and meeting = Meeting only	[0.025]	[0.004]	[0.008]	[0.488]
Meeting only = 0	[0.224]	[0.270]	[0.335]	[0.291]
Control mean	-0.000	0.421	0.326	0.289
Observations	1103	1103	1103	1103
R^2	0.005	0.008	0.006	0.002
Panel B. Pair composition				
Technology, no meeting	-0.057	-0.035	-0.009	-0.024
	(0.091)	(0.046)	(0.044)	(0.042)
Meeting: neither	0.109	0.042	0.040	0.052
	(0.077)	(0.039)	(0.037)	(0.036)
Meeting: peer only	0.018	0.031	0.011	-0.016
	(0.111)	(0.057)	(0.054)	(0.051)
Meeting: respondent only	-0.010	-0.019	-0.067	0.050
	(0.107)	(0.053)	(0.048)	(0.050)
Meeting: both	-0.292**	-0.202***	-0.091	-0.071
	(0.123)	(0.058)	(0.058)	(0.057)
Peer only = Neither	[0.430]	[0.855]	[0.607]	[0.208]
Respondent only = Technology, no meeting	[0.697]	[0.795]	[0.302]	[0.198]
Both = Technology, no meeting	[0.084]	[0.010]	[0.205]	[0.453]
Both = Respondent only	[0.055]	[0.009]	[0.716]	[0.079]
Control mean	-0.000	0.421	0.326	0.289
Observations	1103	1103	1103	1103
R^2	0.009	0.013	0.006	0.006

Notes: Panel A is the arm-level specification and Panel B the pair-composition specification of Section 2.7, on the three-item UCLA loneliness scale, coded so that a higher value means more lonely. Components are indicators for reporting the feeling sometimes or often.

5.3 Cross-Caste Interaction

Next, we find that joint access to the technology also narrows the cross-caste gap in interaction. Because pairs are matched at random and caste is not used in matching, 47 percent of pairs are cross-caste. Panel B of Table 8 showed that cross-caste pairs attend 0.67 fewer sessions and are 20 percentage points less likely to meet outside the scheduled sessions, and that both of these gaps close, and on attendance reverse, when both partners have the tech-

nology. A shared activity can substitute for shared identity in bringing individuals together, which matters in a setting where cross-group interaction is rare and difficult to engineer directly.

5.4 Persistence: Six-Month Follow-up

Table 19 reports contact between partners six months after the intervention.

Table 19: Six-Month Follow-up

	Continued contact	Contacted for advice	Advice topic
Meeting: peer only	0.203	0.055	0.068
	(0.160)	(0.074)	(0.063)
Meeting: respondent only	0.172	-0.062	0.021
	(0.140)	(0.057)	(0.052)
Meeting: both	0.323*	0.011	0.101
	(0.164)	(0.070)	(0.068)
Both = Respondent only	[0.399]	[0.318]	[0.293]
Neither mean	2.750	0.160	0.079
Observations	231	228	219
R^2	0.021	0.011	0.015

Notes: Phone follow-up six months after the intervention, meeting arm only, with pairs where neither partner has the technology as the omitted category.

Six months after the intervention, contact persists and remains highest where both partners have the technology. We asked how often respondents were still in touch with their assigned peer, on a four-point frequency running from never to weekly or more often. Joint-access pairs report 0.32 more on this scale than pairs where neither has the technology ($p < 0.10$), against a mean of 2.75 for the latter, which corresponds to being in touch a few times a month. When we asked what that contact involved, it was overwhelmingly social. Among those still in touch, 96 percent describe it as casual socializing and about half as sharing news (48 percent) or personal matters (48 percent), while only 11 percent describe it as giving or receiving advice.

A Appendix: Helpful Aspects of the Meetings

Table 20: What Peers Found Helpful in the Meetings

	Fun/time	Easier learn	Trusted	Ask help	Noticed	Safety	Motivated	Reminded
Meeting: peer only	0.018	0.055	0.023	0.057	-0.127	0.197*	-0.138***	-0.054
	(0.099)	(0.104)	(0.111)	(0.110)	(0.077)	(0.103)	(0.046)	(0.049)
Meeting: respondent only	0.120	0.126	0.135	-0.081	-0.068	-0.065	0.050	-0.086**
	(0.088)	(0.097)	(0.111)	(0.103)	(0.086)	(0.079)	(0.084)	(0.037)
Meeting: both	0.054	0.086	0.085	-0.177*	0.035	-0.004	-0.064	-0.049
	(0.101)	(0.106)	(0.117)	(0.099)	(0.102)	(0.092)	(0.069)	(0.052)
Neither mean	0.724	0.655	0.397	0.362	0.224	0.190	0.138	0.086
Respondent only = Peer only	[0.324]	[0.520]	[0.379]	[0.254]	[0.482]	[0.015]	[0.008]	[0.318]
Both = Peer only	[0.753]	[0.794]	[0.640]	[0.048]	[0.110]	[0.086]	[0.149]	[0.922]
Both = Respondent only	[0.527]	[0.721]	[0.707]	[0.387]	[0.339]	[0.533]	[0.192]	[0.316]
Observations	148	148	148	148	148	148	148	148
R^2	0.012	0.012	0.012	0.029	0.022	0.049	0.045	0.025

B Randomization and Balance

Table 21: Baseline Balance: Peer Meeting Assignment

	No meeting	Meeting	p-value
Monthly income (NPR, winsorized 1 percent)	23112.219	22356.646	0.509
Age (years)	44.004	43.787	0.788
Household size	4.029	4.065	0.744
Total cookstoves ever used	7.492	7.613	0.793
Frequent power cuts	0.961	0.961	0.939
Primary fuel: firewood	0.523	0.518	0.868
Primary fuel: gas	0.473	0.482	0.773
Primary fuel: other	0.004	0.004	0.981
Believed cookstove cooking time (minutes)	16.393	16.980	0.472
Believed firewood cooking time (minutes)	23.745	24.032	0.575
Believed cookstove electricity bill (NPR)	356.886	355.561	0.951
Believed AQI improvement from cookstove (percent)	68.523	68.297	0.870
Max willingness to pay (NPR)	3179.775	3069.444	0.168
WTP zero indicator	0.020	0.032	0.211
Education: none	0.161	0.176	0.530
Education: informal	0.196	0.188	0.731
Education: primary	0.127	0.143	0.416
Education: grades 6–10	0.327	0.326	0.988
Education: grades 11–12	0.134	0.118	0.434
Education: university	0.055	0.048	0.618
Caste: Tamang	0.543	0.539	0.902
Caste: Chettri	0.240	0.226	0.568
Caste: Newar	0.075	0.063	0.413
Caste: Brahmin	0.046	0.054	0.548
Caste: Dalit	0.055	0.079	0.114
Caste: other	0.033	0.032	0.943
Caste: Rai	0.007	0.007	0.973
Network degree: house visits	2.304	2.281	0.687
Network degree: non-family visits	1.798	1.814	0.812
Network degree: friends	3.096	3.044	0.231
Network degree: non-family friends	2.463	2.508	0.508

Notes: Each row reports the mean by assignment and the p-value from a regression of the covariate on meeting assignment.

Table 22: Baseline Balance: Cookstove Assignment

	No cookstove	Cookstove	p-value
Monthly income (NPR, winsorized 1 percent)	22565.215	23109.336	0.662
Age (years)	43.668	44.413	0.396
Household size	4.056	4.027	0.805
Total cookstoves ever used	7.399	7.907	0.312
Frequent power cuts	0.961	0.961	0.994
Primary fuel: firewood	0.525	0.509	0.617
Primary fuel: gas	0.472	0.491	0.563
Primary fuel: other	0.005	0.000	0.187
Believed cookstove cooking time (minutes)	16.490	17.150	0.458
Believed firewood cooking time (minutes)	23.905	23.856	0.930
Believed cookstove electricity bill (NPR)	356.554	355.437	0.962
Believed AQI improvement from cookstove (percent)	68.589	67.994	0.692
Max willingness to pay (NPR)	3111.111	3154.434	0.619
WTP zero indicator	0.029	0.021	0.466
Education: none	0.168	0.171	0.906
Education: informal	0.187	0.204	0.527
Education: primary	0.140	0.123	0.430
Education: grades 6–10	0.329	0.320	0.779
Education: grades 11–12	0.125	0.129	0.858
Education: university	0.051	0.054	0.827
Caste: Tamang	0.554	0.512	0.199
Caste: Chettri	0.231	0.237	0.855
Caste: Newar	0.069	0.069	0.997
Caste: Brahmin	0.046	0.060	0.314
Caste: Dalit	0.064	0.075	0.498
Caste: other	0.030	0.039	0.439
Caste: Rai	0.007	0.009	0.656
Network degree: house visits	2.281	2.319	0.551
Network degree: non-family visits	1.785	1.854	0.349
Network degree: friends	3.069	3.071	0.955
Network degree: non-family friends	2.480	2.500	0.788

Table 23: Baseline Balance: AQI Reading Assignment (Cookstove Recipients)

	No AQI reading	AQI reading	p-value
Monthly income (NPR, winsorized 1 percent)	22245.562	23973.107	0.428
Age (years)	43.892	44.934	0.472
Household size	4.060	3.994	0.734
Total cookstoves ever used	8.060	7.754	0.723
Frequent power cuts	0.958	0.964	0.778
Primary fuel: firewood	0.509	0.509	1.000
Primary fuel: gas	0.491	0.491	1.000
Primary fuel: other	0.000	0.000	.
Believed cookstove cooking time (minutes)	17.701	16.599	0.560
Believed firewood cooking time (minutes)	23.952	23.760	0.829
Believed cookstove electricity bill (NPR)	343.671	367.204	0.494
Believed AQI improvement from cookstove (percent)	65.892	70.096	0.091
Max willingness to pay (NPR)	3311.729	3000.000	0.031
WTP zero indicator	0.030	0.012	0.253
Education: none	0.138	0.204	0.110
Education: informal	0.222	0.186	0.416
Education: primary	0.186	0.060	0.000
Education: grades 6–10	0.281	0.359	0.128
Education: grades 11–12	0.138	0.120	0.625
Education: university	0.036	0.072	0.147
Caste: Tamang	0.533	0.491	0.445
Caste: Chettri	0.204	0.269	0.158
Caste: Newar	0.060	0.078	0.518
Caste: Brahmin	0.060	0.060	1.000
Caste: Dalit	0.090	0.060	0.300
Caste: other	0.042	0.036	0.778
Caste: Rai	0.012	0.006	0.563
Network degree: house visits	2.248	2.389	0.193
Network degree: non-family visits	1.839	1.870	0.808
Network degree: friends	2.994	3.148	0.046
Network degree: non-family friends	2.463	2.537	0.559

C Air-Quality Readings

Table 24: Own AQI Reading: Adoption and WTP

	Has CS	Used (3m)	Usage Idx	WTP New	WTP Used
AQI reading	-0.036	-0.006	-0.200	18.857	-104.126
	(0.039)	(0.049)	(0.269)	(158.063)	(78.444)
Control Mean (no AQI)	0.868	0.737	1.624	869.697	284.848
Observations	334	334	334	331	331
R^2	0.003	0.000	0.002	0.000	0.005

Table 25: Own AQI Reading: Beliefs and Knowledge

	Belief Idx	% AQI Improve	AQI Conf.	Health Belief	Knowledge Idx	Know Operate
AQI reading	0.063	-5.665	-0.000	-0.024	-0.013	0.030
	(0.124)	(6.350)	(0.103)	(0.052)	(0.094)	(0.044)
Control Mean (no AQI)	0.232	90.299	4.269	3.280	0.252	0.778
Observations	334	334	334	328	268	334
R^2	0.001	0.002	0.000	0.001	0.000	0.001

Table 26: Own AQI Reading: Health and Network

	Health Idx	Resp. Symp.	Eye Irrit.	Headache	Network Idx	House Visits	Discuss CS	Lonely Idx
AQI reading	-0.033	-0.054	0.072	0.054	0.094	-0.006	0.048	-0.033
	(0.096)	(0.043)	(0.056)	(0.058)	(0.110)	(0.043)	(0.050)	(0.106)
Control Mean (no AQI)	0.193	0.216	0.263	0.323	-0.101	0.808	0.671	-0.070
Observations	334	334	334	334	334	334	334	334
R^2	0.000	0.005	0.005	0.003	0.002	0.000	0.003	0.000

Table 27: Own vs Peer AQI Reading: Adoption and WTP

	Has CS	Used (3m)	Usage Idx	WTP New	WTP Used
Own AQI reading	-0.036	-0.004	-0.209	20.424	-106.465
	(0.039)	(0.048)	(0.268)	(159.061)	(79.270)
Met peer w/ stove, no reading	0.044	0.175***	-0.331	-21.379	-25.312
	(0.062)	(0.064)	(0.429)	(269.737)	(114.945)
Peer also received reading	0.091	-0.040	0.809	-160.291	173.745
	(0.065)	(0.088)	(0.578)	(345.748)	(172.198)
Control Mean	0.851	0.701	1.654	962.406	300.752
Observations	334	334	334	331	331
R^2	0.015	0.020	0.007	0.001	0.009

Table 28: Own vs Peer AQI Reading: Health and Network

	Health Idx	Resp. Symp.	Eye Irrit.	Headache	Network Idx	House Visits	Discuss CS	Lonely Idx
Own AQI reading	-0.030	-0.055	0.072	0.051	0.091	-0.008	0.046	-0.039
	(0.097)	(0.043)	(0.057)	(0.058)	(0.109)	(0.043)	(0.050)	(0.106)
Met peer w/ stove, no reading	0.174	-0.085	-0.031	-0.107	-0.151	-0.115	-0.005	-0.379**
	(0.165)	(0.063)	(0.103)	(0.092)	(0.187)	(0.084)	(0.087)	(0.157)
Peer also received reading	-0.146	0.011	-0.019	0.206	0.340	0.175*	0.234**	0.257
	(0.205)	(0.084)	(0.125)	(0.133)	(0.271)	(0.101)	(0.098)	(0.227)
Control Mean	0.141	0.239	0.299	0.336	-0.118	0.806	0.649	0.044
Observations	334	334	334	334	334	334	334	334
R^2	0.004	0.011	0.006	0.010	0.008	0.010	0.024	0.015

Table 29: Own AQI Reading by Baseline Air-Quality Beliefs: Beliefs and Knowledge

	Belief Idx	% AQI Improve	AQI Conf.	Health Belief	Knowledge Idx	Know Operate
AQI (at mean BL belief)	0.033	-6.587	-0.008	-0.023	-0.024	0.023
	(0.125)	(6.819)	(0.104)	(0.052)	(0.094)	(0.045)
Baseline belief (pp)	0.008*	0.372	0.000	-0.001	-0.001	0.002
	(0.004)	(0.283)	(0.003)	(0.002)	(0.003)	(0.002)
AQI × baseline belief	-0.001	-0.305	0.004	0.001	0.006	-0.001
	(0.006)	(0.298)	(0.005)	(0.002)	(0.005)	(0.002)
Control Mean (no AQI)	0.232	90.299	4.269	3.280	0.252	0.778
Observations	334	334	334	328	268	334
R^2	0.021	0.013	0.004	0.002	0.008	0.010

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