Highlights

Replicating at Scale: Effects of Smart Matching Platforms for School Choice in Ecuador and Peru

Felipe Arteaga, Gregory Elacqua, Thomas Krussig, Carolina Méndez, Christopher A. Neilson

- Personalized risk feedback reduces non-placement in Peru.
- Large-scale implementation replicates findings from previous experiments in Chile and New Haven.
- WhatsApp warnings amplify behavior change in school choice applications.
- Families often overestimate admission chances and under-search for schools.

Replicating at Scale: Effects of Smart Matching Platforms for School Choice in Ecuador and Peru[†]

Felipe Arteaga, *UC Berkeley*

Gregory Elacqua, *Inter-American Development Bank*

Thomas Krussig, *UC Berkeley*

Carolina Méndez, *Inter-American Development Bank*

Christopher A. Neilson, *Yale University*

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Abstract

This paper evaluates how new information influences families' applications and assignment outcomes in elementary school choice settings. Specifically, using a multi-country RCT based in Tacna, Peru and Manta, Ecuador, we examine the effect of providing personalized information on available schooling options and associated placement risks. We find that applicants who received feedback on placement risk and a suggestion of new schools add more schools to their applications, reducing the non-placement probability, and were more likely to include recommended schools than other alternatives available. Interestingly, the project implemented in Manta, Ecuador, showed only marginal effects across all outcomes. The main difference across implementations was the inclusion of outreach and information provision through an additional WhatsApp "warning" in Peru, which was not realized in Ecuador. A lower school density seems to have also been a contributing factor to the results observed in the Ecuadorian context.

Keywords: School Choice, Smart Matching Platforms, Application Behavior, Placement Risk

JEL Classification: I21, I28, D83

[†] We thank the implementation team of data scientists and developers at ConsiliumBots for their help throughout

1 Introduction

Access to education in developing countries is increasingly being determined through digital platforms where families submit ranked applications and algorithms determine assignments. While a recent review by Neilson (2019) showed that more than 50 developing countries use this type of system, there is scarce research on how to best design them, especially in the context of developing countries. A recent study by Arteaga et al. (2022) provide evidence at scale from Chile's national school assignment platform, showing that families are often incorrect about their admissions chances. Based on a model of the costly search for schools, Arteaga et al. (2022) show that over-optimism about placement chances can lead to insufficient searching for options, potentially reducing the probability of finding a placement. They further demonstrate that a platform that predicts the equilibrium results of the assignment and provides families with live feedback on their personalized admissions chances helps families adjust their applications and gain access to more preferred and higher-quality schools.

This study replicates and expands the intervention from Arteaga et al. (2022) at scale in Manta, Ecuador, and for two years in Tacna, Peru. We partnered with the Ministry of Education (MoE) in Ecuador and Peru to collect survey data documenting families' beliefs and understanding of the system and to evaluate the effectiveness of sending families "feedback reports" on their applications that include their current predicted probability of being assigned given all the information available at the time. Following the intervention used in Chile, these feedback reports were given to families with high chances of not being assigned to any school option on their list.[1] We extended this intervention to include an additional treatment arm that provides a list of alternative schools based on distance to their home. We study the effect of these interventions on the families' subsequent application and enrollment decisions.

Our survey documents three key findings. First, families have limited informa-

the project. We also thank JPAL-LAC for the support in coordinating the project. Our gratitude also goes to the government partners that made this study possible, in particular Daniel Arivarte and Jadira Sanchez in Peru and Doris Guaman and Eduardo Moreno in Ecuador. Arteaga: fharteaga@berkeley.edu. Elacqua: gregorye@iadb.org. Krussig: tkrussig@consiliumbots.com. Méndez: caroliname@iadb.org. Neilson: christopher.neilson@yale.edu.

[1]The Inter-American Development Bank (IADB) and the tech NGO ConsiliumBots provided technical support for the information interventions, as well as for the design and implementation of the centralized school choice and assignment pilots.

tion about their options during the application, with respondents knowing only 30% of the schools within two miles of their home. Second, families are overly optimistic about their chances of placement, with 67% of applicants overestimating their likelihood of being admitted to an option on their list by more than 10%. Third, non-placement is much less desirable than being placed in their lowest-ranked (or any) option, which suggests large welfare stakes are at play.

We tested the effects of information about the available options and replicated the feedback mechanism developed in Arteaga et al. (2022), who documented how providing applicants in Chile and New Haven with feedback on their chances of admission helped them to search more effectively and ultimately increased their placement chances.

We designed three report cards to test the effect of different levels of detail. The first feedback report only included the current application, a warning about the placement risk being high, and a general recommendation to add more schools. On the second feedback report, we added a personalized list of 10 schools that the student did not consider in their initial portfolio. The third feedback report differed between the 2021 and 2022 implementations: in 2021, we included a personalized list of 10 schools plus information about the popularity and congestion of each school, the most comprehensive report card we delivered. In 2022, this report card only included three schools with no extra information on popularity or congestion. By testing different versions, we aim to examine the trade-off between providing more information and overwhelming users with too much information, an issue that has received little attention in the literature (Gabaix, 2019).

We randomly assigned applicants to one of the three treatment arms. Between 4 and 7 days before the last day of the application process, we identified the students with a positive non-placement probability—i.e., risky applicants—and sent them a link to the feedback by email and through WhatsApp. In Peru, we implemented the intervention during the 2021 and 2022 intake years, and applicants also received an additional WhatsApp message with a non-placement warning. In Ecuador, the intervention was conducted only during the 2021 admission process, and we did not send the non-placement warning via WhatsApp.

Our results in Peru show that providing feedback about placement risk significantly helps families adjust their applications, improving their chances of getting

admitted to a school they want. This replicates the results from Chile; in fact, the point estimates for adjusting applications—0.35 in Peru 2022, and Chile 2020 0.34—are all very similar.

Our results show that applicants who received the treatment with school suggestions were more likely to add those schools compared to applicants who received the report card with no suggestion list. They were also more likely to add more schools to their list. All feedback reports included a non-placement warning but varied in the suggestions and the extra information on popularity and congestion. The RCT design allowed us to estimate the causal effect of the additional information since we generated a list of suggested schools for every applicant but did not show it to students who received the basic report card. In Peru, the proportion of students adding a school from the suggestion list increased by between 52% and 120%, depending on the year and treatment. Meanwhile, adding additional information on popularity and congestion did not affect the probability of adding a school. In the Ecuadorian context, we cannot rule out a zero effect on the shifting of preferences.

Our study makes several contributions to the literature. First, it evaluates a replication of Arteaga et al. (2022) in two other countries through an at-scale, pre-registered RCT. The second contribution is to the literature on information provision policies in educational markets in developing countries. By integrating information within the centralized school choice process, we test new channels that can potentially help distribute the information at scale (Allende et al., 2019; Hastings and Weinstein, 2008; Andrabi et al., 2017; Borger et al., 2024). We also build on an emerging strand of empirical market design work focused on educational markets [2] (Arteaga et al., 2022; Kapor et al., 2020; Ajayi and Sidibe, 2020), by assessing how new information can affect search in a context with incomplete information about all the options. As digital platforms become increasingly prevalent as the way families access education, it is crucial to continue testing how to better help families navigate school assignment systems and make access to education services more equitable and efficient globally.

The rest of the paper is organized as follows. Section 2 describes the Ecuadorian and Peruvian schooling context and provides details on the intervention,

[2] See Agarwal and Budish (2021) for a recent review.

sample, and survey design. Section 3 discusses the results of the post-application survey. Section 4 expands on the details of the intervention design. In Section 5, we present the findings from the information intervention on choice behavior and beliefs. Finally, Section 6 concludes.

2 Setting: Cities in Two Countries

We study the effect of information provision in the regions of Manta, Ecuador and Tacna, Peru, both of which were implementing a centralized school choice system for the first time. These pilots offered a unique opportunity to test the same policy design in different contexts. In both pilots, parents applied to schools using an online platform, and the educational authorities then assigned students to schools using a deferred acceptance (DA) assignment mechanism. We applied similar information treatments in both pilots.

We were granted access to the applications and enrollment outcomes, and complemented our dataset with a parent-participant survey. We can therefore observe the universe of applicants, the history of their applications, and information related to the options available on the platform as well as off-platform alternatives. We also have information on the family's final enrollment decision for the 2021 academic year.

The IADB supported the pilots in both countries, but their origins were quite different. In Ecuador, the government wanted to introduce parental choice to improve efficiency and equity in school access. The country had previously used a centralized system that assigned students to schools based on the applicant's location, which parents reported through their electricity account code (CUEN). This process was costly and time-consuming as it required considerable effort to ensure that the assignment results were consistent with existing transportation options, and that routes to school were not blocked by hills, rivers, or other geographic barriers. The reporting system also created incentives to obtain electricity bills from areas near the most selective schools. These challenges reduced the overall transparency and predictability of the assignment system.[3]

[3]See Elacqua et al. (2022a) for details on the distance-centric algorithm used in Ecuador and qualitative evidence for distortions in the electricity bill registration process.

In Peru, the government's objective in introducing centralized assignments was instead to improve the transparency of the school system. There were many reported cases of parents paying fees or bribes to ensure their children received admission to certain oversubscribed schools. Parents also often waited in long lines for days to apply for a vacancy in a selective school (Elacqua et al., 2022b).

2.1 Ecuador

As mentioned above, families in Ecuador have historically been assigned to the closest public school based on household location as reported through the family's electricity bill code, a process that was costly, inefficient, and inequitable. In an effort to improve the system, the government partnered with IADB and ConsiliumBots to introduce parental choice through a centralized process. The region of Manta was chosen for the pilot, where local authorities supported the policy change.[4]

For the 2021 admission, the Ministry of Education (MoE) collected applications to national public preschools (ages 3-5) in Manta through the new centralized online platform. Based on families' submitted rank-order lists (ROL), students were assigned to one of their options using the deferred acceptance algorithm (also employed in Peru). The system covered three districts (namely, Manta, Jaramijó, and Montecristi) or area representing 2.5% of the national school enrollment.

The application process consisted of a single round. The online platform opened at the beginning of February 2021 and families had three weeks to complete their applications, with no limits on the number of schools they could include on their lists. They could furthermore modify their rank-order list multiple times.

Applicants could also apply to three types of institutions providing preschool education that were not listed on the online platform. These were municipal public schools, subsidized private schools, and private schools, with different ownership and management characteristics. Schools outside the national public network represented 45% of the possible options, and defined their own application processes.

The universe of applicants assessed here consists of around 4,000 children aged 3-5, with a balanced number of boys and girls. Column 1 of Table 1 shows that

[4]See Elacqua et al. (2022b) for further information on the Ministry of Education's rationale for choosing the region of Manta.

3,984 applicants submitted a rank-order list for the 2021 admission process. The average length of the final portfolios was 1.9 schools, and around 66% of the families applied to schools in Manta, the largest district. 43% percent of the applicants requested a place in "pre-pre-kindergarten" (three-year-olds), and 43% in "pre-kindergarten" (four-year-olds). If we count the schooling options within 2 kilometers of each household, we observe that, on average, there are slightly more off-platform options (municipal public schools, subsidized private schools, and private schools) than on-platform options (national public ones).

Table 1: Descriptive Statistics for Applicants

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ecuador 2021			Peru 2021			Peru 2022		
	All	RCT Sample	Pre Placement Survey Sample	All	RCT Sample	Pre Placement Survey Sample	All	RCT Sample	Pre Placement Survey Sample
Female	0.49	0.50	0.50	0.49	0.48	0.50	0.50	0.54	0.50
From largest district	0.66	0.71	0.70	0.43	0.58	0.49	0.40	0.65	0.44
Length pre-treatment portfolio	1.83	1.79	1.96	3.14	2.97	3.24	3.16	2.85	3.30
Length final portfolio	1.90	1.91	2.05	3.34	3.81	3.50	3.22	3.09	3.39
In-platform opts in 2 km radio	11.32	13.10	12.46	16.33	18.55	17.01	16.66	19.90	17.46
Off-platform opts in 2 km radio	12.11	13.94	13.37	19.28	27.98	21.05	20.30	29.58	22.26
Grade									
PPK (3 yrs old)	0.43	0.43	0.43	0.35	0.37	0.38	0.35	0.28	0.37
PK (4 yrs old)	0.43	0.45	0.44	0.10	0.00	0.09	0.12	0.11	0.11
K (5 yrs old)	0.14	0.12	0.13	0.06	0.00	0.06	0.04	0.03	0.04
1st (6 yrs old)	0.00	0.00	0.00	0.49	0.63	0.48	0.49	0.58	0.48
N	3,984	2,021	1,872	6,876	1,708	1,721	4,856	1,140	1,501

Notes. All statistics are means in the population defined by the column header. Largest district is Manta for Ecuador and Tacna for Peru.

2.2 Peru

In Peru, families have historically applied directly to each school. In 2021 and 2022, in an effort to improve transparency and efficiency in student assignment, the government worked with IADB and ConsiliumBots to introduce a centralized student assignment pilot in the region of Tacna—one of the objectives being to eventually scale this reform up to more regions.[5] The government chose Tacna

[5]This process has been delayed due to the Covid-19 pandemic. In 2023, the government will begin introducing the reform in two additional regions: Arequipa and Madre de Dios.

because it was a small region with a significant concentration of schooling options. Additionally, the local government was a strong proponent of the reform.[6] For the 2021 and 2022 admission processes, all applications to public schools in Tacna were submitted on the new centralized online platform using a rank-order list (ROL), following which families potentially received a placement offer from the Ministry of Education (MoE).

The system covered 10 districts,[7] representing close to 1% of the national school enrollment, and was specific to placement in preschool through grade 1 (ages 3-6). As in Ecuador, students were assigned to one of their options using the deferred acceptance algorithm. The application process consisted of three rounds. We focus on the first round, as that is when our information intervention was implemented. Specifically, the online platform opened at the beginning of December in both study years. Families then had seven weeks to complete their application, with no limits on the number of schools they could include on their lists. For the 2021 intake, applicants had only one chance to submit their rank-order list, and were not permitted to modify the latter unless the system authorized additional access. This restriction was relaxed in 2022, allowing applicants to adjust their application multiple times.

Applicants could also apply to private schools that were not listed on the online platform. In Peru, private schools compete in the provision of PK-11 education,[8] and interested families can apply directly to each school, following a decentralized process that is not coordinated with the public school choice process. In Tacna, the largest district participating in the pilot, private schools represent 40% of the available options. These schools charge tuition fees, do not receive funding from the government, and since a reform in 2012, are not allowed to engage in active selection or discrimination of students.[9]

[6] See Elacqua et al. (2022b) for more details on the government's rationale for choosing the region of Tacna.

[7] Namely, Alto de la Alianza, Calana, Ciudad Nueva, Gregorio Albarracín, Inclán, La Yarada los Palos, Pachía, Pocollay, Sama, and Tacna.

[8] Ages 3-17; see Allende (2019) for an in-depth discussion of the Peruvian school system.

[9] For details, refer to *Directiva N 014-2012-MINEDU/VMGP "Normas y Orientaciones para el Desarrollo de Año Escolar 2013 en la Educación Básica."* However, recent evidence shows that private schools continue to use different instruments to screen students and families, including cognitive tests and interviews (Balarin et al., 2019).

The universe of assessed applicants in Peru for both years includes around 11,700 families with children aged 3-6, with a balanced gender ratio. Columns 4 and 7 of Table 1 show that 6,876 applicants submitted an ROL in the 2021 intake, while 4,856 applicants did so in 2022. The average length of the ROLs submitted was 3.3 schools, and around 40% of the families applied to schools in the largest district. 49% percent of applications were for a grade 1 seat and 35% for "pre-pre-kindergarten" (three-year olds). If we count the schooling options within 2 kilometers of each household, we observe that, on average, there are more private options (off-platform), than public ones (on-platform).

2.3 Differences Between Manta and Tacna

The regions in Ecuador and Peru where the pilots were implemented differently in several observed aspects. Consideration of these differences is important for understanding potential disparities in the behavioral response to our intervention. Specifically, local cultural attitudes toward school admissions, the availability of on-platform options, and rurality could all affect the application strategies and placement results.

In Ecuador, families had not been able to choose schools prior to the pilot, while a decentralized choice system already existed in Peru. As described above, applicants in Ecuador were assigned to the closest schools using the address on their electricity bill as a proxy of home location. Peru meanwhile had a decentralized system in which families applied directly to individual schools, with no coordination between institutions. This difference in school choice culture could help explain, for example, the number of schools included on each list. While the average length of the ROLs on the initial applications (pre-intervention) was 3.15 schools in Peru, it was only 1.83 in Ecuador (see Table 1). The market's underlying characteristics may partly explain why the ROLs were 65% longer in Peru.

Second, the density of schools is lower in the Ecuadorian context. Table 1 shows that an average applicant from Peru had 19 off-platform options and 16 on-platform ones. In Ecuador, in contrast, families had an average of 12 off-platform and 11 on-platform options. Furthermore, Figure A1 in Appendix A

provides an example of the market concentration for both Manta and Tacna, the largest districts in each region. A student living in the city center of Tacna has access to a broader set of school options compared to peers in Manta.

Finally, the interventions were not exactly identical in both countries—arguably the likely cause of most of the differences in the outcomes. In Ecuador, the warning related to placement risk was not sent as a separate message via WhatsApp; it was only included on the report card. Applicants in Peru received a specific WhatsApp warning message, which was also included in the report card. We provide further details on the intervention in Section 4.

3 Survey

We conducted an online survey to elicit participants' beliefs about placement probabilities, their level of knowledge about schooling options, and the difficulty of the application process. The MoEs distributed the surveys once the application processes had been closed, but before the placement results were made public. The evidence shows limited awareness and biased beliefs, suggesting that information interventions such as ours may prove beneficial.

3.1 Survey Design and Implementation

Our questionnaire aims to gain a better understanding of participants' knowledge and beliefs relating to the application process.[10] We included novel questions on parents' understanding of the mechanism, interpretation of school popularity, and awareness of private (off-platform) options. We distributed links to the survey (on the Qualtrics platform) through WhatsApp messages. 32% percent of families completed the survey. They are more likely to come from the largest urban areas and are representative in terms of grades and gender.

The survey covered five aspects of the application process and was personalized for each applicant, taking into account the ROL submitted and the family's home location. Specifically, questions were asked about the (1) perception of the application platform, (2) application strategy, (3) level of awareness of ranked and

[10]The content of the survey is based on the questionnaire of Arteaga et al. (2022).

non-ranked schooling options, including on- and off-platform alternatives in the applicant's neighborhood, (4) beliefs on assignment probabilities, and (5) satisfaction relative to hypothetical placement alternatives.

As mentioned, the online survey was implemented just after the application process and before the results were made public, to avoid potential changes in beliefs based on placements. Parents with two or more applicants were surveyed only once, choosing randomly between the associated students. The survey was not incentivized in any way, though we did send a reminder to parents who did not answer on the first day.

Survey completion rates were higher in Ecuador than in Peru, and the populations in the largest districts were more likely to answer. Columns 3, 6, and 9 of Table 1 show that the completion rate in Peru was respectively 25% and 39% in the two years of the study, and 47% in Ecuador. Families that responded to the survey tended to reside in zones with a slightly higher density of schools and, on average, applied to more schools.

3.2 Survey Results

Our survey results show that applicants are overly optimistic in terms of placement probabilities and that their awareness of the available options is very limited. We also observe that families have a strong desire to be placed, and that finding out more about a given school is hard.[11] Generally, respondents have an imperfect notion of the optimal strategy and the signal of popularity does not correlate with school quality for everybody.

Applicants with a positive probability of non-placement hold a belief about their admission chances that is around 30pp higher than the actual probability, i.e., a considerable optimism bias. In Ecuador, the average applicant thinks that their child's chances of being placed in at least one of the options in their ROL are 37pp higher than the true likelihood (Panel 1a). In Peru, this optimism is 29pp and 20pp in 2021 and 2022, respectively (Panels 1b and 1c). In Panel 1a we observe that a significant number of applicants in Ecuador have virtually no chance of being assigned to one of their options while simultaneously indicating their

[11] Our survey results are consistent with the main survey findings of Arteaga et al. (2022).

complete confidence that they are going to be placed: around 20% of Ecuadorians at high risk of non-placement have an optimism bias of over 80%. In contrast, in Peru, this group represents less than 2% of the risky applicants.[12]

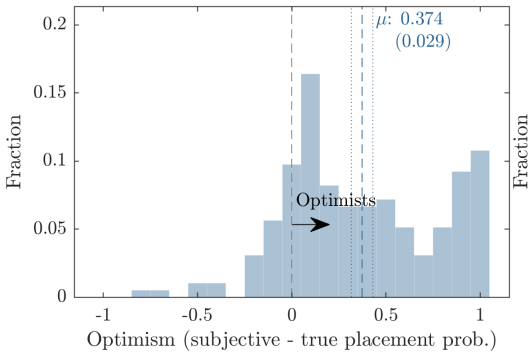
Biased beliefs on admission chances affect application strategies. Panels 1d, 1e, and 1f show that the two most common reasons why applicants did not add more schools are optimism and a lack of options. Respondents from the two countries differ in terms of the modal reason. In Ecuador, the most common reason is the availability of schools, which makes sense given the lower density of education establishments. Meanwhile, in Peru, optimism bias appears to be the most common reason for not adding more schools to the application.

The responses to a satisfaction question concerning different placement scenarios suggest that a non-assignment outcome has relevant welfare implications for participants. Panels 1g and 1h indicate that "not being placed" is a scenario that most families dislike. More than 90% of families give a failing grade to the scenario of non-placement, while 90% give an excellent grade to placement in first preference. There is also a considerable decline in satisfaction in the hypothetical scenario where a participant is moved from their first to their last option.

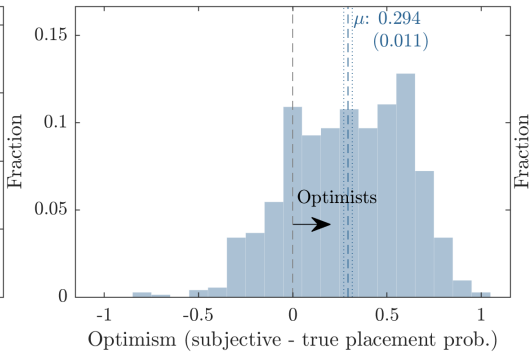
[12]This is likely related to the context. In Peru, families were used to a competitive school admission process, albeit a decentralized one. In Ecuador, the previous admission system assigned students to the closest school, a less useful experience for forming beliefs on centralized admissions processes.

Figure 1: Main survey evidence: Applicant Optimism, Reasons for Limited School Selection, and Satisfaction with Placement Scenarios

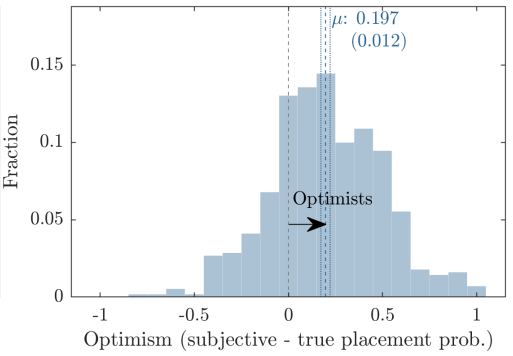
(a) Optimism on placement probability - Ecuador



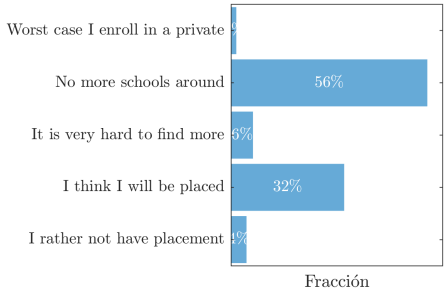
(b) Optimism on placement probability - Peru 2021



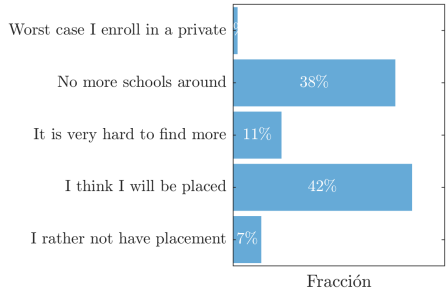
(c) Optimism on placement probability - Peru 2022



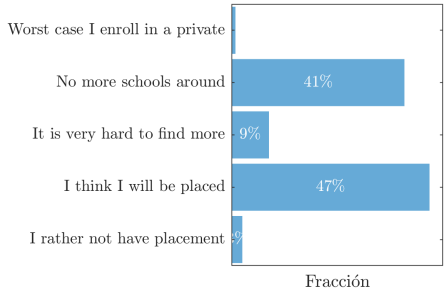
(d) Stated reason for not adding more schools - Ecuador



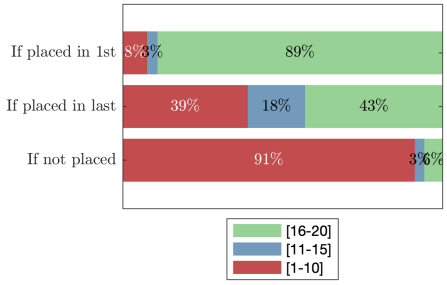
(e) Stated reason for not adding more schools - Peru 2021



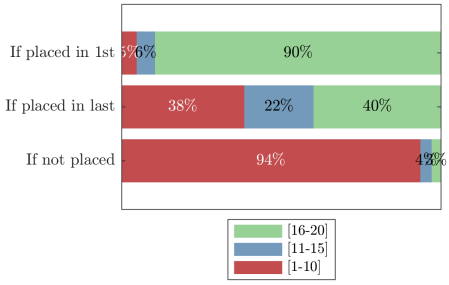
(f) Stated reason for not adding more schools - Peru 2022



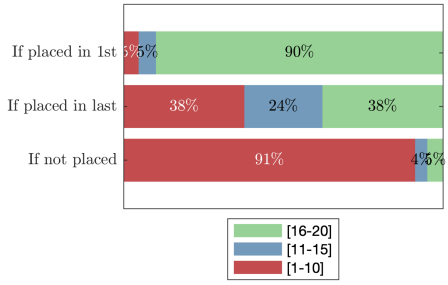
(g) Satisfaction with placement by rank - Ecuador



(h) Satisfaction with placement by rank - Peru 2021



(i) Satisfaction with placement by rank - Peru 2022



Notes: Panels (a), (b), and (c) show the differences between the subjective and true placement probabilities for the subset of applicants with placement risk>0.01. The subjective placement probability comes from the question "On a scale from 0 to 100, with what probability do you think that [applicant name] will obtain a spot in at least one of the [number of schools in ranking] schools in the ranking? Panels (d), (e) and (f) represent the answer to the question "Why didn't you add more schools to your application? (select the main reason)" for applicants with placement risk>0.01. Panels (g), (h), and (i) asked about the level of satisfaction for three scenarios: placed in first choice, last choice, and no placement ("If [applicant name] gets a spot in the following schools, from 1 to 20, how satisfied would you be?"). See Appendix Section E for details on the survey questions.

We added three survey components geared toward understanding the results of the information intervention. The first provides a sense of applicants' sophistication in a setting with a strategy-proof mechanism. Panels 2a to 2c show the proportion of respondents who answered correctly from the perspective of a user who knows how deferred acceptance works and reports his ranking truthfully. The first question asks "Imagine that you find a school that you like very much, even more than your first preference, but it has 100 applicants and 30 seats. What would you do?" The correct answer is to rank the school in first place, but most families (73% in Ecuador and 78% in Peru) answered they would add it below the current first preference or would not include it on their list. The second and third questions relate to the effect of adding more schools to the list. Seventy-nine percent and 75% of the applicants in Peru and Ecuador mistakenly said that this will decrease the chance of being placed in their first preference, while 55% and 54% answered correctly that it reduces overall placement risk.

A second novel insight comes from the (declared) inference that families make from schools that are "popular", an attribute we highlight in one of the treatment arms. It seems that there is no consensus on the signal that generates high demand. We asked "If you find out that there is a school that many other families are applying to, but that you have not added to your list, you would say that:" Panels 2d to 2f show that Ecuadorian parents are more likely to answer "I don't know," and that in both cases, the proportion of parents who chose another option increases with the mother's education. Less than a third of respondents said that a popular school is probably a good school, while a similar proportion answered that its popularity provides no insights into the quality of the school.

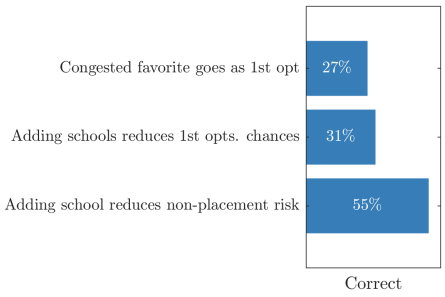
Finally, the survey reveals that families are not well-informed about the private options in their neighborhood. Panels 2h and 2g show that close to 40% of applicants have never heard of the largest private school within a radius of 1.86 miles (or 3 km) of their home address. This proportion is around 60% when we asked about the closest private school. A random private school in the area is less known than either of the latter two, as expected. Our benchmark of a high level of awareness is provided by the same respondents. Figure A2 shows that only 4% and 9% of the applicants have no knowledge of the first option on their ROL in Peru and Ecuador, while 9% and 30% have no knowledge of the third school.

We also asked about a fake school, to check the quality of the responses. Around 90% of applicants stated that they did not know about the school, and only 1% declared themselves to be familiar with it.

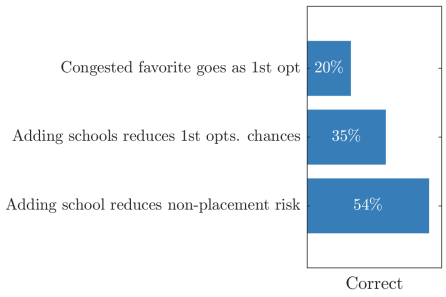
Families have an imperfect understanding of the deferred acceptance assignment mechanism. This is reflected in their declared strategies, which neither benefit their application nor the stated effects on their beliefs from hypothetical strategies. This is unsurprising given that 2021 was the first year in which the centralized mechanism was implemented. Applicants do not necessarily infer that a popular school is a good school, and have very limited knowledge about private options.

Figure 2: New Survey Evidence: Understanding of Mechanism, Perceptions of Popular Schools, and Awareness of Local Private Options

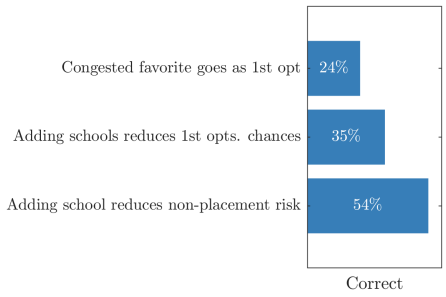
(a) Understanding of the Mechanism - Ecuador



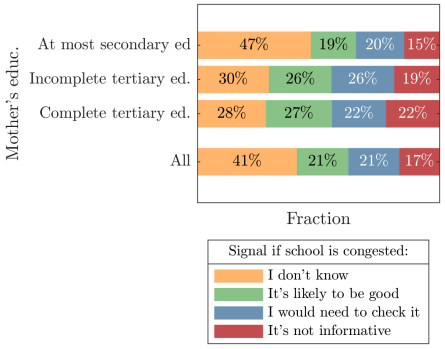
(b) Understanding of the Mechanism - Peru 2021



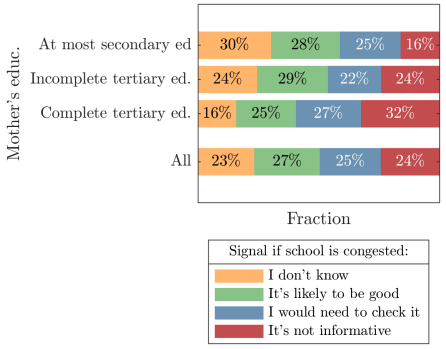
(c) Understanding of the Mechanism - Peru 2022



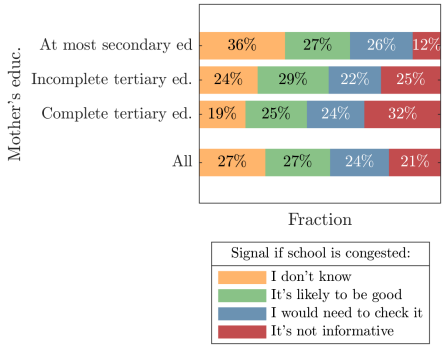
(d) Inference From a Popular School - Ecuador



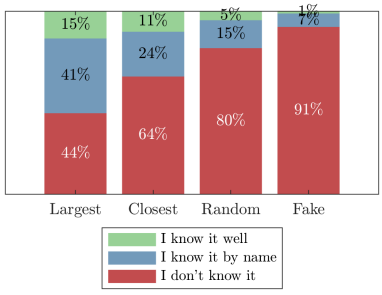
(e) Inference From a Popular School - Peru 2021



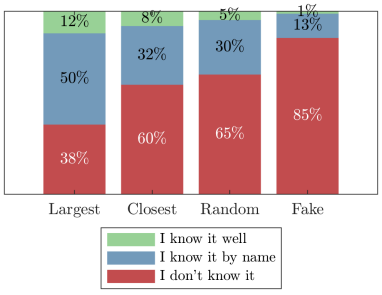
(f) Inference From a Popular School - Peru 2022



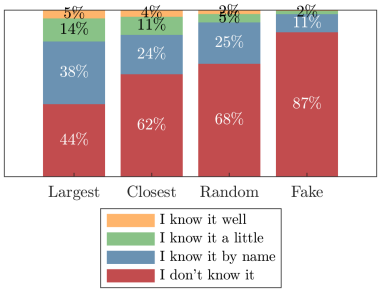
(g) Knowledge About Private Options - Ecuador



(h) Knowledge About Private Options - Peru 2021



(i) Knowledge About Private Options - Peru 2022



Notes: Panels (a), (b), and (c) show responses to three questions on mechanism understanding. The first bar represents the response "I add it to my list in 1st preference" to "Imagine you find a school you like more than your first choice, but it has 100 applicants and 30 seats. What would you do?" The second bar represents "No" to "If you add more schools, do you think the chance of being assigned to your first preference decreases?" The third bar represents "Yes" to "If you add more schools, does the non-placement probability decrease?" Panels (d), (e), and (f) show responses to "If there's a school that many families apply to, but you haven't listed, what would you say about its quality that..." Panels (g), (h), and (i) indicate familiarity with four private schools within 3 km of home (not on the platform). See Appendix Section E for details on the survey questions.

4 Intervention Design

The survey evidence suggests that there is scope for helping parents to form more accurate beliefs about their children's chances of admission, and to become informed about neighborhood schooling options.[13] We designed an information intervention that included feedback on admission chances following Arteaga et al. (2022), to which we also added a suggested list of schools that was tailored to each applicant based on their current application, grade, and geographic location.

Our intervention included a warning to applicants with a positive chance of non-assignment along with a list of suggested schools that parents could potentially add to the application. The implementation team drew best practices from previous experiences in order to maximize the probability of success of the process. One relevant aspect was the need to tackle the optimism bias over placement chances. The process of warning families about the risk of non-placement created a communication channel where we could innovate. Based on the same costly search framework in Arteaga et al. (2022), we complemented the warning with information about alternatives that were not considered in the families' initial ranking. This new information was intended to lower the search cost, potentially affecting the conformation of the final portfolio.

In practical terms, our research team worked with the MoE in both countries to identify applicants with a predicted probability of non-placement higher than 1% in 2021 for Ecuador and Peru, and 30% or higher for Peru in 2022. Before the end of the application process, we sent a communication—or what we call a warning—to these parents about the chance that their child might not being assigned to any of their choices.[14] In addition to the warning, we randomly assigned one of three different report cards that contained the following information:

T_1**:** Only warning

T_2**:** Warning + list with 10 suggestions

[13] Survey evidence also shows the need to educate applicants on the consequences of a strategy-proof mechanism. Though beyond the scope of our intervention, future research might explore this topic.

[14] In Tacna, the warning was given four days before the end of the process, while in Manta, it was sent six days beforehand.

T_{3-2021}**:** Warning + list with 10 suggestions + information on popularity and congestion

T_{3-2022}**:** Warning + list with 3 suggestions

In theory, providing information about the available options ($T2$ and both $T3$) would reduce the application cost, inducing marginal applicants to add schools to their lists. Survey evidence shows that gathering information about a school is costly. Panels (a) to (c) of Appendix Figure A3 document that at least 84% of the respondents value information about a school's academic performance, extracurricular activities, and infrastructure. Close to two-thirds also value references from other people about the schools, interviews with staff, and information on the school's website or Facebook page. We also asked participants about how important they feel it is to have information on the families that attend the school. Around 45% of Peruvian and 60% of Ecuadorian respondents agreed that it is important.

Our intervention does not eliminate search costs entirely, but rather aims to facilitate the search process for families that marginally stopped looking for alternatives. The additional information in T_{3-2021} works in at least two potential ways. The popularity was designed to signal what other families like, which could potentially focus the search, or simply be used as an additional school attribute to consider. Congestion information could be employed as a tool to evaluate which schools would be safer to apply to, but also as a proxy for popularity. Since we did not randomize the allocation of popularity or congestion information, we are not able to differentiate their particular effects.

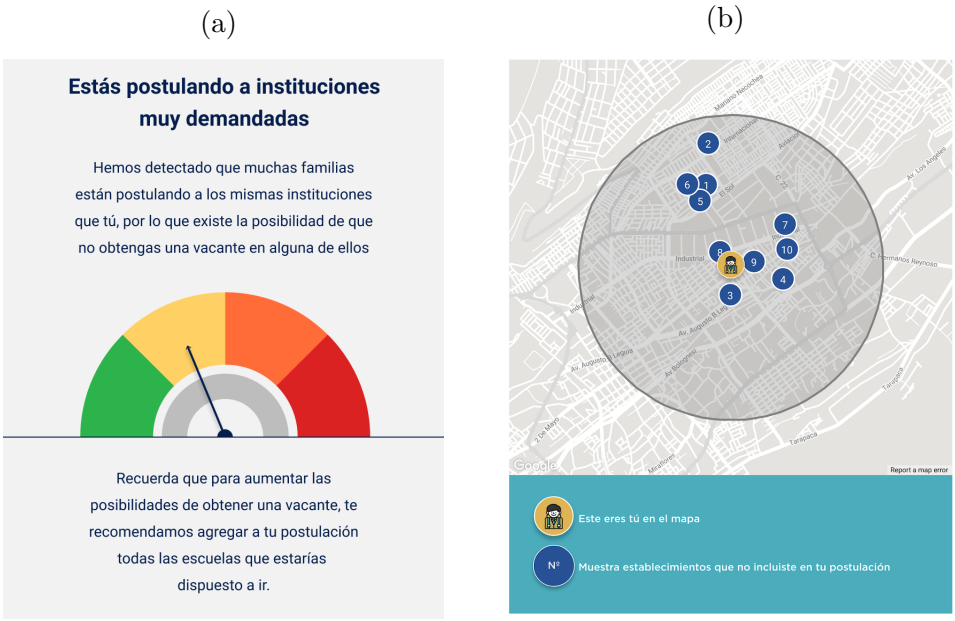
4.1 Details on Inputs and Construction

For the warning, we used the same message as Arteaga et al. (2022), adding a "fire rating" symbol to show the level of risk. Figure 3a shows the warning included in the report card. It displayed the following message (all treatment arms):

> We have detected that many families are applying to the same schools as you, so there is the possibility that you will not be granted a spot in any of them.

Remember that to increase the chances of obtaining a spot, we recommend adding all the schools that you would be willing to attend to your application.

Figure 3: Report Card Extracts



Notes: Both panels are extracts from a report card sent to applicants with positive placement risk that were assigned to T_2 (warning + suggestion list). Panel (a) displays the non-placement warning, while panel (b) presents a map of the 10 suggested schools not initially included in the applicant's ranking. The full report card is presented in Figure A4 in Appendix A.

The school suggestions for T_2 and T_{3-2021} consisted of a list of 10 schools that the student did not include in their initial ROL, while T_{3-2022} included only three schools. We built each personalized list by adding alternatives located as far as 3 km from the declared home address. The 10 schools sent in T_{3-2021} included at least one popular *under*subscribed school, one popular *over*subscribed school, two non-popular *under*subscribed schools with at least 5 applicants, and two non-popular *over*subscribed schools with at least 5 applicants. To round out the 10 schools, we added random schools from the student's neighborhood.

To create proxies of popularity, we used the applications collected at the time of the intervention. We classified schools according to the number of applications.

The minimum number to be considered "popular" was the number of applications received by the most demanded school with some available seats. This definition allowed us to classify at least one school as *under*subscribed within the set of popular schools and, potentially, many oversubscribed schools.[15] The process was conducted at a district level, meaning that only applicants from the district were considered for the definition of popularity within each specific geographic zone.

The information provided to families who received lists of suggested schools included the school's name, the distance from the applicant's address on the application form, and the levels of education offered.[16] The Peruvian report card also included whether the school was single-sex or co-ed.

The information on popularity and congestion provided in T_{3-2021} incorporates two additional pieces of information for each of the 10 schools on the personalized suggestions list. The first was a discrete category called "popular", which was based on the number of applications from the same district, as explained above. We displayed this on the report card as "High" or "Low" demand. The second additional component was the number of applicants and open seats available.[17] Extracts of the report cards are shown in Figures 3a and 3b. The full report card is presented in Figure A4 in Appendix A.

4.1.1 Sample

Four days before the end of the process in Peru and six days in Ecuador, we used the total sample of filed applications accumulated up to that time to estimate the probability of non-placement for each participant. We randomly assigned applicants with a predicted non-placement probability of higher than 1% (in 2021) or

[15] We define a school as "*over*subscribed" if the probability of a regular applicant being placed there is less than 100%, which is equivalent to having more demand than seats. A school is "*under*subscribed" if every potential applicant to the school can be placed there. We follow the same procedure as in Arteaga et al. (2022) to obtain the placement probabilities for each school.

[16] For Ecuador, the report card explicitly showed which educational levels were offered at the school (Inicial, EGB, and Bachillerato, which correspond to preschool, elementary, and high school, respectively). For Peru, this information was limited to whether or not the school was classified as integrated (integrado), meaning that it offered both preschool and some higher levels of education (e.g., preschool + elementary or preschool + elementary + high school).

[17] The number of applicants corresponds to the mean of the number of admitted plus waitlisted students from 500 simulations of the assignment based on the current demand. In this case, we did not differentiate from the applicant's geographic origin, we included all applicants.

30% (in 2022) to one of the three treatments. We then sent a message through the WhatsApp mobile application that included a link to the report card containing the warning and, for T_2 and T_{3-2021}, the list of suggested schools.[18] In Peru 2021 and 2022, we also sent a separate WhatsApp message related only to the warning right before the link to the report card.

In Peru in 2021, the online platform allowed only one submission attempt per applicant. The authorities provided families assigned to the treatment group with additional access to log in and modify their applications.

Columns 2, 5, and 8 of Table 1 describe the RCT sample population for Ecuador and Peru, with all choice participants exhibiting some level of placement risk. We intended to treat 51% of the applicants in Ecuador, 25% in 2021 Peru and 39% in 2022 Peru, reflecting a more congested pre-intervention scenario in the first setting. The lower proportion of intended recipients of the treatment in Peru in 2021 vs. 2022 is partially explained by the fact that in 2021 we treated only students applying to PPK and grade 1.[19] Compared to the average student, applicants assigned to the treatment group filed shorter pre-intervention portfolios and were likelier to belong to the largest districts, namely Tacna in Peru and Manta in Ecuador.

4.2 Delivery of Information and Treatment Take-up

We used the WhatsApp messaging app to distribute the links to the report cards with the information for each treatment arm.[20] In our first message, we told parents that we had information about the application to share with them, and asked if they were interested. For those that answered positively, in Peru, we sent a warning about the chances of non-placement followed by a link to the personalized report card. In Ecuador, we only sent the link.[21]

[18] In Ecuador 2021 and Peru 2021, we also sent the link to the report card by email. A full description of outreach strategies is presented in Table A1 in Appendix B.

[19] PK and K both had low congestion levels in Peru across both years. Since the number of potentially treated applicants was small, we decided not to implement the intervention in those grades.

[20] In both countries in 2021, we also sent the information by email. Table A1 contains a summary of the interventions and channels.

[21] The warning message was included in the report card in both countries. The difference was that in Peru, we also sent it as a separate WhatsApp message. For more details on the messages,

Table 2 presents the main statistics on the intention to treat and messaging reception. Panel B shows that WhatsApp messaging was more effective in Peru. We sent an introductory message to 100% of the applicants assigned to the treatment, and 89% of them read it in the 2021 version and 92% in the 2022 version.[22] In Ecuador, we sent WhatsApp messages to only 22% of the targeted population, and 90% read them.[23]

All applicants who replied to the initial message were sent a link to the report card (panel D), which was preceded by an initial warning message in the case of Peru (panel C). Panels B and C of Table 2 reveals that 69% and 86% of the 2021 and 2022 Peruvian applicants assigned to the treatment received the warning message and a link to the report card, while only 19% of Ecuadorian applicants received the message with the link. The proportion of parents who read the report card message closely matched the sent rate, as this group had already responded to our introductory message.

In the 2021 Peru and Ecuador admission processes, we also sent the link to the report card by email (panel A), a strategy that we did not use in Peru in 2022. The last row of Panel D in Table 2 shows that the proportion of the population that viewed the report card was 43, 63, and 53% for 2021 Ecuador, 2021 Peru, and 2022 Peru, respectively. In the case of Ecuador, this outreach would not have been possible without the outreach by email, as clearly seen in the second row of Panel D in Table 2, which shows the mean proportion of applicants who did not receive the WhatsApp message but still opened the report card: 36% and 46% in 2021 Ecuador and Peru and just 5% in 2022 Peru.

5 Choice Behavior and Choice Outcomes

Survey evidence shows that applicants have imperfect knowledge about nearby options, and are overly optimistic about their admission chances. An information intervention could therefore play a potentially relevant role in this setting. In

the original text, and translations to English, see Appendix C

[22] A particular feature of the WhatsApp messaging app is that it provides insights into message status since it distinguishes between messages that have been sent, delivered, and read.

[23] The low rate of messaging in the Ecuadorian context was not by design but rather the result of implementation difficulties.

Table 2: Take-up of WhatsApp Messages and Report Card

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Ecuador 2021				Peru 2021				Peru 2022			
	In RCT	Treatment			In RCT	Treatment			In RCT	Treatment		
		T_1	T_2	T_3		T_1	T_2	T_3		T_1	T_2	T_3
A. Email with link to report card												
Sent	1	1	1	1	1	1	1	1	0	0	0	0
B. WhatsApp introduction												
Sent	0.22	0.21	0.21	0.25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Deliverd	0.21	0.20	0.19	0.25	0.92	0.94	0.93	0.91	0.96	0.96	0.96	0.96
Read	0.20	0.19	0.18	0.23	0.89	0.90	0.88	0.88	0.92	0.92	0.92	0.92
C. WhatsApp warning												
Sent	0.00	0.00	0.00	0.00	0.69	0.68	0.72	0.67	0.86	0.85	0.88	0.86
Deliverd	0.00	0.00	0.00	0.00	0.69	0.68	0.72	0.67	0.86	0.85	0.88	0.86
Read	0.00	0.00	0.00	0.00	0.66	0.66	0.68	0.65	0.83	0.83	0.84	0.81
D. WhatsApp with link to report card												
Sent	0.19	0.18	0.16	0.22	0.69	0.68	0.72	0.67	0.86	0.85	0.88	0.86
Deliverd	0.19	0.18	0.16	0.22	0.69	0.68	0.72	0.67	0.86	0.85	0.88	0.86
Read	0.17	0.17	0.14	0.19	0.66	0.66	0.68	0.65	0.83	0.83	0.84	0.81
E. Opened link of report card (Google Analytics)												
Obs. with link sent by WhatsApp	0.76	0.73	0.79	0.77	0.71	0.66	0.72	0.75	0.53	0.56	0.48	0.53
Obs. without link sent by WhatsApp	0.36	0.32	0.35	0.41	0.46	0.48	0.44	0.46	0.05	0.04	0.04	0.07
All	0.43	0.39	0.42	0.49	0.63	0.60	0.64	0.65	0.46	0.48	0.43	0.47
N	2,021	676	673	672	1,708	568	572	568	1,140	377	380	383

Notes. All statistics are proportion in the population defined by the column header. Panels A to C show the mean of the status for the three WhatsApp messages. "Sent" means that we tried to reach the applicant, "Delivered" that the applicant received the message on his app, while "Read" that the applicant saw the message. Every message that is read is also delivered and sent, and every message that is delivered is also sent. "WhatsApp introduction" (Panel A) is the first message we sent to families, asking if they want to receive information about the application. "WhatsApp introduction" is the message in which we invited the families to recieve more information about their application. We sent additional messages only to applicants who answered positively to the initial message. "WhatsApp warning" (Panel B) is the message that contained the alert about the placement risk and a recommendation to add more schools. "WhatsApp with link to the report card" (Panel C) was sent after the previous one, and had the hyperlink to the personalized information treatment. Panel D shows the proportion of students that opened the link. The first row ("Link sent by WhatsApp") is conditional on the report card link being delivered through WhatsApp, the second on not being delivered, while the third row is unconditional. The link was also sent by email in Ecuador 2021 and Peru 2022, but we do not have data on recepection status.

theory, a non-placement warning reduces the under-search behavior by correcting the biased beliefs on admission probabilities. Meanwhile, providing alternative options reduces the search cost. Both interventions should affect the construction of the rank-ordered list. In this section, we present the results from warning messages and the randomly assigned information intervention (T_2 and T_{3-2021} and T_{3-2022}), compared to the basic report card (T_1), which does not contain the suggestion list.

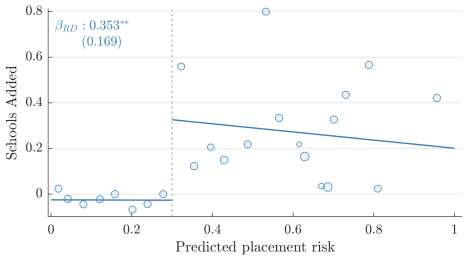
Our survey evidence also suggests a channel that can potentially reduce the response to our intervention. A meaningful proportion of families have incorrect beliefs about the impact of adding a new school on the placement probabilities of alternatives they have already considered, which could lead to them not adding more schools to the list. Furthermore, many families do not make inferences regarding a school's quality based on its popularity, potentially making the information provided in T_{3-2021} less useful.

First, we document that the warning affects parent behavior. Figure 4 shows the regression discontinuity plots for 2022 Peru and for Arteaga et al. (2022) Chilean pooled sample from 2018 to 2020 (Figure 5b in their paper). The horizontal axis represents the predicted placement risk (probability of non-placement), the metric used to assign the warning message in both contexts. Only applicants with a risk level higher than 30% received a warning. We observe a discontinuous behavior, reflected in applicants to the right of the threshold adding more schools.[24]

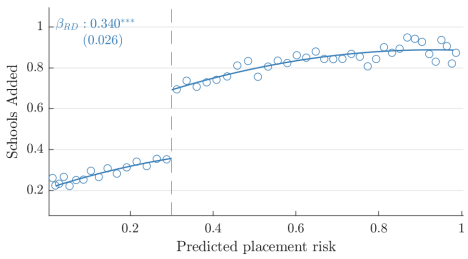
[24]There are differences between the two studies in terms of the channel used to deliver the non-placement warning. The plot from Arteaga et al. (2022) represents a message shown in a pop-up on the application platform, displayed as families prepared to submit their applications, while in the case of 2022 Peru, the warning took the form of a WhatsApp message. The levels of precision in Figure 4 also obviously differ. Figure 5b from Arteaga et al. (2022) was built using considerably more observations.

Figure 4: Schools Added RD

(a) Peru 2022



(b) Chile 2018-2020 (Figure 5b from Arteaga et al., 2022)



Notes: Binned means and global fits of schools added after the information campaign by predicted risk for the pre-campaign application. The non-placement warning was assigned only to applicants with a predicted risk higher than 0.3 (30%), as indicated by the vertical dashed line.

Second, we test the causal effect of providing school suggestions on a sample that is restricted in two ways relative to the universe of applicants. First, the sample includes only applicants with positive placement risk,[25] ensuring that all treated applicants received a report card with a non-placement warning. Second, we limit our sample analysis to applicants who opened the report card. We define this group as the compliers to the information campaign. This approach is feasible because all applicants received a link to a report card, regardless of whether they were assigned to the additional treatment that included a suggestion list. We do not find evidence of differential selection into the analysis sample between T_1 – our "control" – and the other treatments.

We focus our analysis on the differential behavioral response between applicants who received the suggestion list of ten schools (T_2) and those who did not see such a list on the report card (T_1). Since we implemented T_2 in all contexts, we pool the individual samples in two ways to calculate aggregate results: (i) across all three contexts, and (ii) using only the Peru 2021 and Peru 2022 samples, where we also sent a placement risk warning via WhatsApp. In columns 1 and 3 of Table 3, we compare the pre-treatment and post-treatment ROLs for the sub-sample assigned to the basic version of the report card with no suggested schools (T_1).[26]

[25] That is, applicants with predicted placement risk > 0 for the 2021 school choice processes and applicants with predicted risk > 0.3 for the 2022 Peru admission process.

[26] This is not an estimated causal effect of the warning. However, our primary interest lies in

Columns 2 and 4 report the differential impact of the additional information provided in treatment T_2 (the suggestion list of ten schools) on changes in the pre- and post-intervention ROLs relative to T_1.

When we analyze the pooled sample from the three contexts (columns 1 and 2 of Table 3), we observe a marginally significant effect on the number of schools added. Applicants who received the suggestion list added, on average, 23% more schools to their list. Students assigned to T_2 were more likely to include schools from the list. When the list was not shown, 12% of families added a school that could have been on their list. When it was shown, 19% of applicants added at least one suggested school.

When restricting the analysis to the Peru 2021 and 2022 implementations (columns 3 and 4 of Table 3), we observe that the magnitude of our estimates for adding a school from the list is between 38% and 79% greater. Additionally, applicants who received T_2 faced an 8% lower placement risk, and the probability of being placed in a school from the list increased from 4% to 7%.

We also evaluate the probability of adding each specific school from the list when it is shown (T_2) versus when it is not (T_1). Columns (1) and (3) of Table 4 reflect the fraction of schools from the list added by applicants assigned to T_1, while columns (2) and (4) show the differential fraction when the list is provided (T_2). On average, families add 1.7% of the schools to their portfolio when the list is not shown, increasing to 3.2% when it is available. Restricting the analysis to Peru, this fraction increases from 1.6% to 3.6%. Schools with high popularity are more likely to be added (4% without the list), and these suggestions have the largest impact: +3.1pp in the aggregated setting and +4.3pp in Peru. Families are less likely to add low-popularity schools, and suggesting them leads to smaller behavioral changes, although still significant in the Peruvian context.

Next, we examine results by implementation country and year, considering the effect of treatments T_3 specific to each implementation year. Columns 1, 4, and 7 of Table A2 in Appendix B compare the pre-treatment and post-treatment ROLs for the sub-sample assigned to the basic report card (T_1). Columns 2, 3,

the impact of the list of suggested schools. We compare subgroups that were *all* exposed to the warning but were randomly assigned different levels of information (T_2 and T_3). See Arteaga et al. (2022) for experimental and quasi-experimental evidence on the effect of the warning.

Table 3: RCT Aggregate Results: Effect of Suggestions on Application Outcomes

Context	(1)	(2)	(3)	(4)
	All		Peru 2021 and 2022	
Intervention	T_1 Warning	T_2 Warning + list (10)	T_1 Warning	T_2 Warning + list (10)
	(base)	(diff.)	(base)	(diff.)
A. Choice behavior				
Add any school	0.207	0.028	0.271	0.037
		(0.020)		(0.027)
Number of schools added	0.540	0.124*	0.711	0.123
		(0.075)		(0.097)
Add popular	0.153	0.026	0.210	0.038
		(0.018)		(0.025)
Add congested	0.192	0.017	0.253	0.025
		(0.019)		(0.027)
B. Add schools from list				
Add from list (10)	0.117	0.069***	0.139	0.099***
		(0.017)		(0.023)
Add outside list (10)	0.180	-0.028	0.245	-0.040
		(0.018)		(0.025)
Add popular from list (10)	0.046	0.024**	0.054	0.033**
		(0.012)		(0.016)
Add congested from list (10)	0.094	0.039**	0.109	0.070***
		(0.016)		(0.021)
C. Assignment and Enrollment Outcomes				
Placement risk	0.326	-0.012	0.376	-0.030**
		(0.010)		(0.013)
Placed in list (10)	0.111	0.007	0.040	0.026*
		(0.015)		(0.014)
Enrolled in list (10)	0.234	-0.003	0.143	0.031
		(0.023)		(0.027)

Notes. This table shows the aggregate effect of the information intervention on the applicants for the three settings combined (columns 1 and 2) and only interventions in Peru (columns 3 and 4). Columns (1) and (3) compare the portfolios before and after treatment for all applicants that were assigned to T_1: warning message but no suggestion's list. Columns (2) and (4) show estimates of the differential effect of showing a list of 10 suggested schools in addition to the warning (T_2) compared to only showing the warning (T_1). "list (10)" is the list of 10 suggestions. The sample considers only applicants that opened the link to the report card. Estimates are from a linear regression model that includes controls for grade, district, placement risk, and gender. For details on the regression specification refer to section D.1 in Appendix D. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: RCT Results: Effect of Suggesting a School on the Probability of Adding it

Context	(1)	(2)	(3)	(4)
	All		Peru 2021 and 2022	
	T_1	T_2	T_1	T_2
Intervention	Warning	Warning + list (10)	Warning	Warning + list (10)
	(base)	(diff.)	(base)	(diff.)
Adding a schools	0.017	0.015***	0.016	0.020***
		(0.003)		(0.004)
Adding a risky school	0.026	0.022***	0.025	0.033***
		(0.006)		(0.007)
Adding a high popularity school	0.040	0.031***	0.044	0.043***
		(0.009)		(0.011)
Adding a low popularity school	0.005	0.003	0.001	0.004**
		(0.002)		(0.002)

Notes. This table shows predicted probability of adding a school from the personalized list for the three settings combined (columns 1 and 2) and only interventions in Peru (columns 3 and 4). Before the treatment, we selected a set of 10 schools to suggest to each applicant. We showed this list to a randomly selected sample. Columns (1) and (3) shows estimates of the probability of adding a school from the list conditional on not showing the list (T_1). Columns (2) and (3) show estimates of the causal effect of showing a school in the report card (T_2) on the probability of adding it. All the applicants in the sample also received a recommendation to add more schools, what the call the warning. Estimates of the probabilities come from a linear probability model where the dependent variable is an indicator if the school was added to the portfolio, see Section D.2 in Appendix D for details on the model. *** p<0.01, ** p<0.05, * p<0.1.

5, 6, 8, and 9 report the differential effect of the additional information provided in treatments T_2, T_{3-2021}, and T_{3-2022} on changes in pre- and post-intervention ROLs relative to T_1.

Columns 1 to 3 show the effect in Ecuador. The first column indicates that 10% of applicants who opened a report card with a non-placement warning added at least one school to their list, extending their portfolios by an average of 2.4 schools. Columns 2 and 3 show no statistically significant effect of providing school suggestions in Ecuador.[27]

Columns 4 to 6 present results for Peru 2021. One-third of families that opened the report card link added a school to their application. Here, we observe a statistically significant differential effect between T_1 and treatments with suggestion lists. Applicants who received a school suggestion list (T_2 and T_{3-2021}) were more likely to add a school from the list. Columns 5 and 6 indicate that the list also shifted preferences toward suggested schools, increasing the proportion of applicants adding schools from the list by 68% (+13pp) for T_2 and 51% (+10pp) for T_3.

If we examine the types of schools added, we find no significant differential effect between T_2 and T_{3-2021} in Peru 2021.[28] This suggests that additional information on congestion and popularity may not be a critical input for families or that they are already aware of these characteristics.

For Peru 2022 (columns 8 and 9), families who received suggestion lists added more schools than those without the list, though our estimates lack precision to reject a zero effect. This difference can be partially explained by the fact that in 2022, T_1 did not include a warning message on the report card, unlike T_2 and T_{3-2022}. Suggestion lists of varying lengths (3 or 10 schools) had a similar effect: T_2 increased the proportion of families adding schools from the list by 120% (+5pp), the same absolute effect as T_{3-2022}. Additionally, the short suggestion list had a marginally significant effect on the probability of adding at least one school, increasing by 49% (+7pp) relative to not receiving a suggestion list.[29]

[27]There are two marginally significant results. First, applicants assigned to T_{3-2021} added fewer schools, suggesting a potential negative effect of excessive information. Second, the same group was less likely to add schools that were not on the list.

[28]Table A4 in Appendix B presents estimates for the differential effect of T_3 versus T_2.

[29]Treatments T_{3-2022} and T_1 also differed in that the former included a warning message,

5.1 Discussion

Despite being relatively similar interventions, the results from the three contexts (2021 Ecuador and Peru and 2022 Peru) somewhat differ. Four factors may help to understand these differences. First, the implementation of the information campaigns and the application systems were not identical. Second, the availability of options may have also played a role. Third, the underlying cultural differences between Peru and Ecuador could shape the behavioral response, as noted in Section 2. Finally, a minor change was made to the school choice process in Peru between 2021 and 2022.

Our intervention in Ecuador differed in two key respects. First, the WhatsApp conversation did not include a separate warning on the placement risk (see Table 2). While the warning message was included in the report card in every context, it was arguably more salient to families who received it as a separate WhatsApp message, as was the case for both years in Peru. The report card contained information about the current application, the warning, and the suggested list, which may have been an overload of information for many applicants.[30] Second, implementation issues meant that we were only able to reach around 22% of families on WhatsApp, which may have affected the precision of our estimates.

Another difference between the two countries that may have shaped the results is the density of schooling options. As discussed in Section 2, Ecuadorian applicants had a lower density of local schooling options to choose from (see Table 1 or Figure 3b). Thus, information about all available local options may have been easier to collect. Table A2 shows that, among the participants who added a school and were assigned to T_1 (the treatment without the suggestion list), 86% of the Ecuadorian applicants added a school from our list, a figure that was 55% and 33% for 2021 and 2022 Peru. Since Ecuadorian applicants were already choosing schools from the list without us revealing this information to them, the potential effect of showing the list was constrained to a much smaller population than in Peru.

while the latter did not; see Table A1 in Appendix B for details on each intervention.

[30]There is an emerging literature on people's limited capacity to pay attention to all the potential attributes in the choice process, and efforts have been made to incorporate this into economic models. See Gabaix (2019) for a review.

There are also significant differences in the choice culture in Ecuador and Peru. Families in Ecuador have historically had no choice as to where their children go to school. Rather, the latter are centrally assigned to the nearest establishment. We do observe baseline differences in application behavior. The first portfolio that families submitted (i.e., before our intervention) was 42% shorter in Ecuador. In contrast, Peru has historically had a decentralized choice system in which families need to apply directly to schools, such that they are already accustomed to searching for schools. In our model, this could be interpreted as the population has a lower search cost, which would make them more likely to react to changes in their beliefs.

Lastly, one detail may help to understand the differences between years in Peru. The application process changed subtly between 2021 and 2022: in the first year, applicants could only apply once, with no opportunity to modify their application. When we sent our report cards, the platform granted special access to the families we reached with our intervention. In the 2022 version, all applicants could return to the platform and modify their respective lists of schools.

5.2 Survey Results

We evaluated whether the additional suggestion lists (in T_2, T_{3-2021} and T_{3-2022}) and the information on popularity and congestion (T_{3-2021}) impacted subjective measures captured by our survey of applicants. We find evidence related to the perception of the application process: applicants who received suggestion lists in 2021 Peru were less likely to say that it was hard to search for schools. In 2022 Peru, students assigned to T_2 or T_{3-2022} were more likely to declare that they received the warning message. This is consistent with the implementation, since families in T_1 only received the warning through WhatsApp, and not in the report card.[31]

Applicants in Ecuador assigned to T_2 rated the quality of the "Information about schools available on the application platform" lower than other groups. We interpret this result with caution. First, the treatment is not directly related to the information available on the platform. Second, the result does not hold for

[31] See Table A1 for details on the contents of each treatment.

T_{3-2021}. Third, we are testing 16 hypotheses in Table A5, meaning there are high chances of a type I error.

The treatments had no effect on the declared satisfaction with hypothetical placement results (Panel B). Our intervention did not aim to promote changes in the first preference, but we did expect to affect the lowest-ranked option since the invitation was to "add more schools to the list." Applicants who received the suggestion lists did not declare a lower level of satisfaction with the schools chosen at the bottom of the rank order list.

Our treatment affected participants' level of knowledge of the schools. We asked them to rate their knowledge of five schools out of the ten listed in the report card. Peruvian applicants in 2021 who did not receive the list (T_1) declared that they were aware of 36% of the schools. For students assigned to T_2, this proportion increases by 14pp, equivalent to being aware of 0.7 more schools listed on the report card. There is an opposite effect in Ecuador, but with half the magnitude: students assigned to T_2 are less likely to declare that they are aware of the schools.[32]

6 Conclusions

This study studies the potential of "Smart Matching Platforms" to enhance access to education by helping families participate effectively in school choice process in coordinated systems. Building on the findings of Arteaga et al. (2022), our first contribution of this study is to use linked surveys and administrative data to show that families in Peru and Ecuador are unaware of many potential schools they could choose and, more importantly, hold inaccurate beliefs about admission probabilities. These misconceptions lead to higher rates of non-assignment and fewer opportunities for families to access their preferred schools. Our findings align with earlier results from Chile, highlighting similar frictions in the school choice process in Peru and Ecuador. The consistency of families' lack of information and optimistic biases about admission probabilities across these diverse contexts suggests that these issues could be widespread in developing countries.

The second contribution is to replicate Arteaga et al. (2022) and test whether

[32]For further details, see Panel C of Table A5.

providing live assignment risk feedback to families can help them navigate the application process in new contexts. The intervention was pre-registered and implemented in Peru in a very similar way to that of Chile and was repeated over two years. Providing information on the risk of non-assignment led families to adjust their applications, increasing their chances of being assigned to their preferred options. This replicates the results previously found in Chile. Indeed, the point estimates are almost exactly the same across two years of replications as those in the published results from Chile.

The third contribution is to provide new evidence on how to assist families with high levels of non-assignment risk in adding more options to their application lists. We implemented a treatment arm that complements the feedback on non-assignment risk with a list of additional school recommendations and a limited set of characteristics. The theoretical framework suggests that providing recommendations could increase applications by making families aware of new alternatives at a low cost. This type of intervention could also influence the type of schools added, based on the attributes provided in the recommendations.

In the context of Peru, we find that providing additional options leads families to add significantly more schools to their applications, thereby reducing their risk of non-assignment. The options added are more likely to come from the list of recommendations provided, suggesting that the recommendations led to both extensive margin effects (more applications) and intensive margin effects (more likely to mention schools from the list). However, while listing an option increased the likelihood of it being added, none of the school attributes, such as size and distance, were found to be correlated with the likelihood of being added across different treatments. These results suggest that search costs are important and that providing information about alternative options could improve the effectiveness of "Smart Matching Platforms" in aiding families navigate the school choice process.

Although the results in Peru replicate the findings in Chile, none of the feedback interventions in Ecuador resulted in significant changes in application behavior. Implementation challenges, particularly related to the delivery of information via WhatsApp, likely contributed to this null result. Our inability to properly follow up and measure how much of the information reached families

or not at the location where the results differed limits how much we can learn from the null result in Ecuador. Overall, our results emphasize the context- and implementation-dependency of policy effects.

As digital platforms become increasingly prevalent as the way families get access to education, it is crucial to continue exploring ways to assist families navigate school assignment systems and find ways to make access to education services more equitable and efficient globally.

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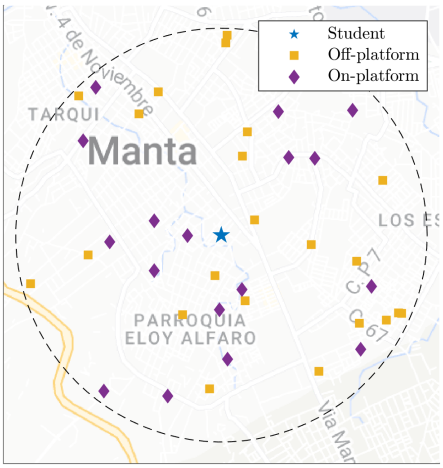
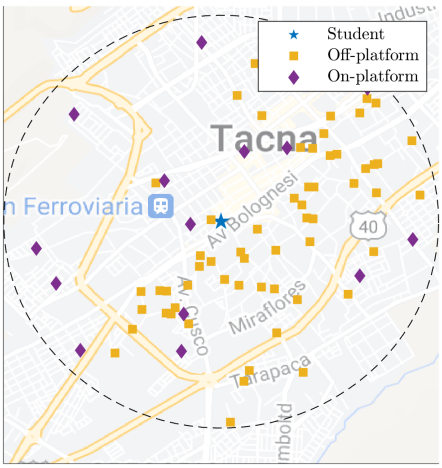
A Additional Figures

Figure A1: Schooling Options in a 2 km Radius of the City Center

(a) Manta, Ecuador



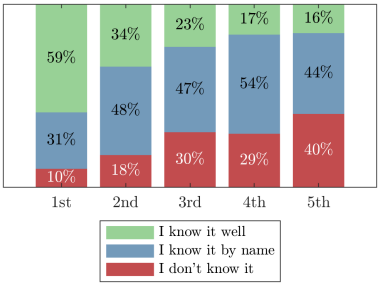
(b) Tacna, Peru



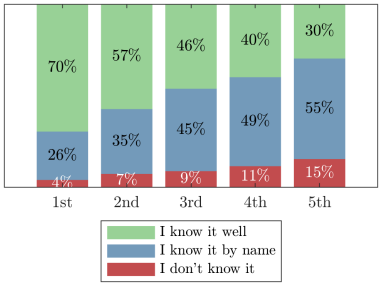
Notes: The star in Panels (a) and (b) reflect the location of the median student, around which the 2 km radius is drawn. The squares and diamonds represent the on-platform and off-platform schooling options within that radius.

Figure A2: Knowledge About Options in Application

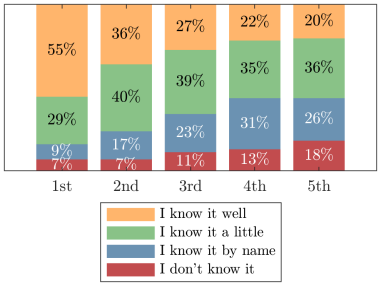
(a) Ecuador



(b) Peru 2021

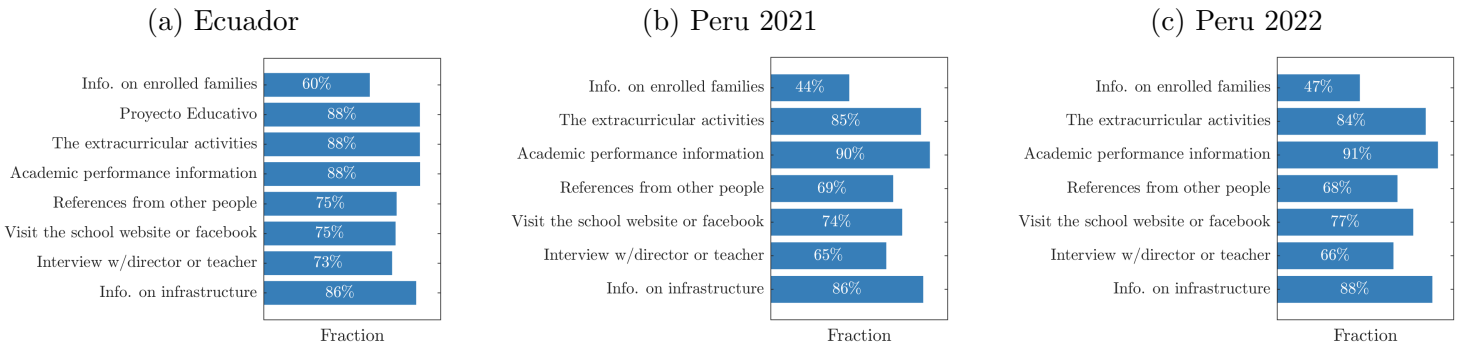


(c) Peru 2022



Notes: Panels (a) to (c) show the level of knowledge of the schools in the application (question 6 in appendix E.)

Figure A3: Necessary Steps for Learning about a School



Notes: Panels (a) to (c) show the answer to the question of the necessary steps for learning about a school (question 4 in appendix E.)

Figure A4: Report Card Example of T_2 for Peru 2022

Notes: The panels illustrate a report card sent to an applicant in the 2022 Peru application process who was assigned to T_2 (warning + suggestion list) based on their positive placement risk.

Figure A5: Information on the Number of Schools Nearby (Ecuador/Peru)

Figure A6: Treatments for Classifying Schools (Ecuador)

B Additional Tables

Table A1: Summary of Information Interventions

	Ecuador 2021			Peru 2021			Peru 2022		
	T_1	T_2	T_{3-2021}	T_1	T_2	T_{3-2021}	T_1	T_2	T_{3-2022}
Target population	Applicants with predicted placement risk greater than 0%			Applicants with predicted placement risk greater than 0%			Applicants with predicted placement risk greater than 30%		
A. Sent by email									
Link to report card	x	x	x	x	x	x			
B. Sent by WhatsApp									
Link to report card	x	x	x	x	x	x	x	x	x
Non-placement warning				x	x	x	x	x	x
C. Included on the report card									
Non-placement warning	x	x	x	x	x	x		x	x
Suggestion list of 10 schools		x			x			x	
Suggestion list of 10 schools w/info on popularity and congestion			x			x			
Suggestion list of 3 schools									x

Notes. This table shows the target populations and different contents of our information intervention depending on the context. "Placement risk" is equivalent to non-placement probability.

Table A2: RCT Results: Effect of Suggestions on Application Outcomes by Implementation Context

Context	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ecuador 2021			Peru 2021			Peru 2022		
Intervention	T_1 Warning	T_2 Warning + list (10)	T_{3-2021} Warning + list (10) + info pop/cong	T_1 Warning	T_2 Warning + list (10)	T_{3-2021} Warning + list (10) + info pop/cong	T_1 Warning	T_2 Warning + list (10)	T_{3-2022} Warning + list (3)
	(base)	(diff.)	(diff.)	(base)	(diff.)	(diff.)	(base)	(diff.)	(diff.)
A. Choice behavior									
Add any school	0.097	0.005	-0.011	0.337	0.048	0.034	0.134	0.011	0.066*
		(0.025)	(0.023)		(0.036)	(0.036)		(0.038)	(0.038)
Number of schools added	0.242	0.109	-0.112*	0.896	0.123	0.004	0.330	0.119	0.163
		(0.117)	(0.062)		(0.126)	(0.118)		(0.144)	(0.171)
Add popular	0.052	-0.001	-0.023	0.253	0.057*	-0.020	0.121	-0.008	0.037
		(0.019)	(0.016)		(0.034)	(0.033)		(0.035)	(0.036)
Add congested	0.086	-0.006	-0.021	0.311	0.034	0.014	0.134	0.004	0.049
		(0.023)	(0.022)		(0.035)	(0.035)		(0.037)	(0.038)
B. Add schools from list									
Add from list (10)	0.082	0.005	-0.009	0.186	0.126***	0.095***	0.039	0.047*	
		(0.024)	(0.022)		(0.032)	(0.032)		(0.026)	
Add from list (3)							0.011		0.050***
									(0.019)
Add outside list (10)	0.064	-0.012	-0.036**	0.303	-0.050	-0.069**	0.127	-0.022	
		(0.020)	(0.017)		(0.034)	(0.033)		(0.035)	
Add popular from list (10)	0.033	0.005	-0.011	0.071	0.031	0.005	0.018	0.038*	
		(0.016)	(0.014)		(0.021)	(0.020)		(0.020)	
Add congested from list (10)	0.071	-0.022	-0.021	0.145	0.085***	0.070**	0.034	0.039	
		(0.020)	(0.020)		(0.029)	(0.029)		(0.024)	
C. Assignment and Enrollment Outcomes									
Placement risk	0.235	0.016	0.018	0.388	-0.039**	-0.011	0.354	-0.017	-0.035**
		(0.013)	(0.013)		(0.017)	(0.017)		(0.018)	(0.018)
Placed in list (10)	0.241	-0.018	-0.018	0.055	0.030	0.010	0.006	0.018	0.016
		(0.035)	(0.034)		(0.019)	(0.018)		(0.013)	(0.012)
Enrolled in list (10)	0.376	-0.044	-0.046	0.138	0.031	0.012			
		(0.040)	(0.037)		(0.027)	(0.027)			

Notes. This table shows the effect of the information intervention on the applicants of Ecuador 2021 (columns 1 to 3) and Peru (columns 4 to 9). Columns 1, 4 and 7 compare the portfolios before and after treatment for all applicants that were assigned to T_1: warning message but no suggestion's list. Columns 2, 5 and 8 show estimates of the differential effect of showing a list of 10 suggested schools in addition to the warning (T_2) compared to only showing the warning (T_1). Columns 3 and 6 show estimates of the differential effect of showing a list of suggested schools with information on popularity and congestion in addition to the warning (T_{3-2021}) compared to only showing the warning (T_1). Column 9 show estimates of the differential effect of showing a list of 3 suggested schools in addition to the warning (T_{3-2022}) compared to only showing the warning (T_1). "list (10)" is the list of 10 suggestions, while "list (3)" is the list of 3 suggestions. "info pop/cong" refers to the additional information on popularity and congestion showed for each school in the list. The sample considers only applicants that opened the link to the report card. Estimates are from a linear regression model that includes controls for grade, district, placement risk, and gender. For details on the regression specification refer to section D.1 in Appendix D. *** p<0.01, ** p<0.05, * p<0.1

Table A3: RCT Results: Effect of Suggesting a School on the Probability of Adding it

Context	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ecuador 2021			Peru 2021			Peru 2022		
Intervention	T_1 Warning	T_2 Warning + list (10)	T_{3-2021} Warning + list (10) + info pop/cong	T_1 Warning	T_2 Warning + list (10)	T_{3-2021} Warning + list (10) + info pop/cong	T_1 Warning	T_2 Warning + list (10)	T_{3-2022} Warning + list (3)
	(base)	(diff.)	(diff.)	(base)	(diff.)	(diff.)	(base)	(diff.)	(diff.)
Adding a schools	0.018	0.003	-0.004	0.026	0.027***	0.020***	0.003	0.008**	0.018**
		(0.007)	(0.006)		(0.006)	(0.006)		(0.004)	(0.007)
Adding a risky school	0.028	-0.003	-0.005	0.039	0.040***	0.032***	0.007	0.019**	0.030**
		(0.010)	(0.009)		(0.010)	(0.009)		(0.009)	(0.013)
Adding a high popularity school	0.028	-0.001	-0.014	0.073	0.059***	0.028*	0.006	0.015**	0.030**
		(0.013)	(0.011)		(0.017)	(0.016)		(0.007)	(0.012)
Adding a low popularity school	0.012	0.001	-0.002	0.001	0.006**	0.005**	0.002	0.002	0.009
		(0.006)	(0.005)		(0.002)	(0.003)		(0.003)	(0.007)

Notes. This table shows predicted probability of adding a school from the personalized list for Ecuador 2021 (columns 1 to 3), Peru 2021 (columns 4 to 6), and Peru 2021 (columns 7 to 9). Before the treatment, we selected a set of 10 schools to suggest to each applicant. We showed this list to a randomly selected sample. Columns (1), (4), and (7) shows estimates of the probability of adding a school from the list conditional on not showing the list (T_1). Columns (2), (5), and (8) show estimates of the causal effect of showing a school in the report card (T_2) on the probability of adding it. Columns (3), (6), and (9) show estimates of the causal effect of T_3 on the probability of adding it. All the applicants in the sample also received a recommendation to add more schools, what the call the warning. Estimates of the probabilities come from a linear probability model where the dependent variable is an indicator if the school was added to the portfolio, see Section D.2 in Appendix D for details on the model. *** p<0.01, ** p<0.05, * p<0.1.

Table A4: RCT Results: Differences Between Treatment 2 and 3

Country	(1) Ecuador 2021	(2) Peru 2021	(3) Peru 2022
Intervention difference	$T_{3-2021} - T_2$ info pop/cong (diff.)	$T_{3-2021} - T_2$ info pop/cong (diff.)	$T_{3-2022} - T_2$ less schools (diff.)
A. Choice behavior			
Add any school	-0.018	-0.012	0.045
	(0.023)	(0.035)	(0.041)
Number of schools added	-0.225**	-0.116	0.023
	(0.112)	(0.121)	(0.184)
Add popular	-0.023	-0.076**	0.037
	(0.016)	(0.033)	(0.037)
Add congested	-0.017	-0.018	0.037
	(0.021)	(0.035)	(0.039)
B. Add schools from list			
Add from list (10)	-0.016	-0.028	-0.027
	(0.022)	(0.033)	(0.028)
Add outside list (10)	-0.025	-0.019	
	(0.016)	(0.032)	
Add popular from list (10)	-0.017	-0.026	
	(0.014)	(0.021)	
Add congested from list (10)	-0.001	-0.014	
	(0.017)	(0.031)	
C. Assignment and enrollment outcomes			
Placed in list (10)	-0.003	-0.020	
	(0.032)	(0.019)	
Enrolled in list (10)	-0.005	-0.017	
	(0.037)	(0.026)	

Notes. *** p<0.01, ** p<0.05, * p<0.1. This table shows the differential effect of treatments T_3 versus T_2 of Ecuador 2021 (columns 1) and Peru (columns 2 and 3). For Ecuador 2021 and Peru 2021 (columns 1 and 2) the difference between T_{3-2021} and T_2 is that the former included information in popularity and congestion for each school in the list. ("info pop/cong"). For Peru 2022 the difference between T_{3-2022} and T_2 is that the former included 3 schools and the latter 10 schools. The sample considers only applicants that opened the link to the report card.

Table A5: RCT Results: Effect of Suggestions on Subjective Outcomes

Country	(1)	(2) Ecuador 2021	(3)	(4)	(5) Peru 2021	(6)	(7)	(8) Peru 2022	(9)
Intervention	T_1 Warning	T_2 + list (10)	T_3 + list (10) + info pop/cong	T_1 Warning	T_2 + list (10)	T_3 + list (10) + info pop/cong	T_1 Warning	T_2 + list (10)	T_3 + list (3)
	(base)	(diff.)	(diff.)	(base)	(diff.)	(diff.)	(base)	(diff.)	(diff.)
A. Application process									
Was it difficult to search for schools?	0.279	-0.056	-0.003	0.408	-0.155**	-0.182**	0.353	-0.031	0.001
	(0.041)	(0.056)	(0.054)	(0.057)	(0.076)	(0.073)	(0.067)	(0.091)	(0.090)
Evaluation of school info on platform [1 to 20]	17.913	-1.292***	-0.059	13.277	0.944	0.930	14.556	0.401	0.376
	(0.277)	(0.496)	(0.381)	(0.560)	(0.726)	(0.801)	(0.631)	(0.827)	(0.862)
General evaluation of process [1 to 20]	18.396	-0.534	-0.217	13.584	-0.336	0.199	14.143	0.973	-0.198
	(0.239)	(0.417)	(0.351)	(0.542)	(0.756)	(0.774)	(0.658)	(0.837)	(0.905)
Received warning	0.567	0.100	0.057	0.808	0.053	-0.008	0.451	0.216**	0.231**
	(0.044)	(0.061)	(0.059)	(0.045)	(0.060)	(0.063)	(0.070)	(0.093)	(0.091)
Do not plan to apply to private	0.548	0.040	0.045	0.772	0.009	0.001	0.745	-0.078	0.103
	(0.043)	(0.061)	(0.057)	(0.047)	(0.065)	(0.065)	(0.062)	(0.087)	(0.076)
B. Satisfaction									
Satisfaction if placed in 1st [1 to 20]	19.524	-0.260	-0.287	19.224	0.013	-0.306	19.137	-0.239	-0.106
	(0.194)	(0.315)	(0.297)	(0.187)	(0.340)	(0.379)	(0.320)	(0.445)	(0.462)
Satisfaction if placed in last [1 to 20]	13.729	-1.244	0.298	12.882	-0.763	0.142	14.000	-0.610	-1.431
	(0.706)	(1.086)	(0.952)	(0.713)	(0.980)	(0.981)	(0.784)	(1.041)	(1.050)
Satisfaction if no placement [1 to 20]	4.008	-0.438	0.479	2.053	0.816	0.289	3.137	-0.578	-0.953
	(0.449)	(0.579)	(0.604)	(0.276)	(0.559)	(0.469)	(0.602)	(0.754)	(0.695)
C. Knowledge and beliefs									
Proportion of schools from list (10) that know	0.355	-0.074**	-0.044	0.361	0.143**	0.075	0.208	0.022	
	(0.024)	(0.032)	(0.031)	(0.041)	(0.056)	(0.057)	(0.035)	(0.048)	
Proportion of schools from list (3) card that know							0.270		0.079
							(0.051)		(0.074)
Private schools that don't know (out of 5)	2.762	0.152	0.222	2.082	0.062	0.137	2.406	0.234	0.421
	(0.145)	(0.207)	(0.193)	(0.187)	(0.260)	(0.263)	(0.237)	(0.329)	(0.311)
Subjective risk	0.081	-0.010	0.010	0.120	-0.010	0.007	0.107	0.006	0.001
	(0.018)	(0.023)	(0.023)	(0.016)	(0.022)	(0.025)	(0.020)	(0.028)	(0.029)

Notes. *** p<0.01, ** p<0.05, * p<0.1. This table shows the effect of the information intervention on the applicants of Ecuador 2021 (columns 1 to 3) and Peru (columns 4 to 9). Columns 1, 4 and 7 compare the portfolios before and after treatment for all applicants that were assigned to T_1: warning message but no suggestions list. Columns 2, 5 and 8 show estimates of the differential effect of showing a list of 10 suggested schools in addition to the warning (T_2) compared to only showing the warning (T_1). Columns 3 and 6 show estimates of the differential effect of showing a list of suggested schools with information on popularity and congestion in addition to the warning (T_{3-2021}) compared to only showing the warning (T_1). Column 9 show estimates of the differential effect of showing a list of 3 suggested schools in addition to the warning (T_{3-2022}) compared to only showing the warning (T_1). "list (10)" is the list of 10 suggestions, while "list (3)" is the list of 3 suggestions. "info pop/cong" refers to the additional information on popularity and congestion showed for each school in the list. The sample considers only applicants that opened the link to the report card.

C Outreach and Treatment Details

The main channel of communication with families was through the messaging app WhatsApp. We used the cellphone numbers reported by the applicants in the registration process.

The messages we sent through the WhatsApp messaging app differed between the two contexts. In Peru, we sent a warning message about the possibility of not being assigned (WhatsApp warning), while in Ecuador we did not. In both settings, we sent reminders to check the link with the report card. An example of the messages we sent is displayed in Table A6.

Table A6: Example of WhatsApp Conversation from Peru 2022 - Translation to English

#	Name	Content
1	WhatsApp introduction	Hello [guardian name], we are writing to you since you are registered in the 2022 Digital School Enrollment System. We would like to share information with you regarding your application. Answer "Yes" to review it.
2	WhatsApp disclaimer	The answers you give us in this conversation are confidential and will not affect your application. Our aim is to help you to have more information so that you can submit a good application
3	WhatsApp warning	**We have detected that many families have chosen the same schools as you!** Many families are applying to the same schools as you, so there is a chance that you may not be placed at those schools. To increase your chances of being placed, **add all the schools you would be willing to attend to your application.**
4	WhatsApp with link to report card	In the following link, you will find **important information regarding your application.** [link to report card]
5	WhatsApp reminder	Remember that you can make changes to your application **until December 26 at [link to application platform]** The last application you send will be the valid application. If you change your mind, feel free to reflect this in your application.
6	WhatsApp closing	See you soon [guardian name], have a nice day

Notes. This table shows an example of the messages sent to applicants with an elevated placement risk. Messages 2 to 6 were sent only if the guardian answered positively to the first message (WhatsApp introduction). Applicants without an elevated placement risk received the same messages but no WhatsApp warning (message 2).

Table A7: Example of WhatsApp Conversation from Peru 2022 - Original Spanish

#	Name	Content
1	WhatsApp introduction	Hola [nombre apoderado], te escribimos dado que estás registrado en el Sistema de Matrícula Escolar Digital 2022. Quisiéramos compartir contigo información respecto a tu postulación. Contesta "Sí" para revisarla.
2	WhatsApp disclaimer	Las respuestas que nos entregues en esta conversación son confidenciales y no afectarán tu postulación. Buscamos ayudarte a que tengas más información para que realices una buena postulación
3	WhatsApp warning	**Hemos detectado que muchas familias han elegido los mismos colegios que tú!** Muchas familias estánn postulando a los mismos colegios que tu, por lo que existe la posibilidad de que no obtengas una vacante en ellos. Para aumentar las posibilidades de obtener una vacante, **agrega a tu postulación todos los colegios a los que estarías dispuesto a ir.**
4	WhatsApp with link to report card	En el siguiente enlace encontrarás **información importante respecto a tu postulación.** [link a cartilla]
5	WhatsApp reminder	Recuerda que puedes hacer cambios a tu postulación **hasta el 26 de diciembre en [link plataforma de postulación]** La última postulación que envíes será la postulación válida. Si cambias de opinión, no dudes en reflejarlo en tu postulación.
6	WhatsApp closing	Hasta pronto[nombre apoderado], que tengas un buen día

Notes. This table shows an example of the messages sent to applicants with an elevated placement risk. Messages 2 to 6 were sent only if the guardian answered positively to the first message (WhatsApp introduction). Applicants without an elevated placement risk received the same messages but no WhatsApp warning (message 3).

D Regression Model Details

D.1 Main Linear Regression Model

The estimates presented in Table 3 are obtained from the following regression model:

$$\begin{aligned} Y_i =& \alpha + \beta T2_i + \sum_g \gamma_g \mathbf{1}[\text{Grade}_i = g] + \sum_d \delta_d \mathbf{1}[\text{District}_i = d] \\ &+ \sum_r \lambda_r \mathbf{1}[\text{RiskBin}_i = r] + \phi \mathbf{1}[\text{Gender}_i] + \varepsilon_i, \end{aligned}$$

where Y_i is the outcome variable for individual i, $T2_i$ is an indicator for being assigned to T_2, and the model includes fixed effects for grade (γ_g), district (δ_d), and placement risk bin (λ_r), as well as a control for gender (ϕ).

The regression is estimated using heteroskedasticity-robust standard errors.

All controls are de-meaned, so α represents the mean of the outcome variable for the omitted group (applicants assigned to T_1), which is reported in columns (1) and (3) of Table 3. The coefficient β captures the differential effect of T_2 relative to T_1, as shown in columns (2) and (4) of Table 3.

The estimates in Table A2 (Appendix B) are obtained from a similar specification but include an additional term, $\theta T3_i$, on the right-hand side, where $T3_i$ is an indicator for assignment to T_3. The coefficient θ represents the differential effect of T_3 relative to T_1, as reported in columns (3), (6), and (9) of Table A2.

D.2 Linear Probability Model

The probability estimates in Table 4 are obtained from the following linear probability model:

$$\begin{aligned} Y_{ij} =& \beta_0 + \beta_1 T_{2i} + \beta_2 \text{Distance}_{ij} + \beta_3 (\text{Distance}_{ij} \times T2_i) \\ &+ \beta_4 \text{Risky}_i + \beta_5 (\text{Risky}_i \times T2_i) + \beta_6 \text{CatPop}_j + \beta_7 (\text{CatPop}_j \times T2_i) + \varepsilon_i. \end{aligned}$$

where:

- Y_{ij} equals 1 if applicant i added school j to their portfolio. School j is part of the personalized suggestions generated for applicant i, which were revealed only if the applicant was assigned to T_2 or T_3.
- Distance_{ij} is a continuous variable measuring the distance from applicant i's home to school j.
- Risky_j is a binary variable indicating whether the school has a non-placement risk greater than 0.
- CatPop_j represents a set of dummy variables for school popularity categories.
- Interaction terms allow for heterogeneous treatment effects based on distance, riskiness, and popularity category.
- Standard errors are clustered at the individual level.

After estimating this regression, we compute the average marginal effect of treatment T_2 on the probability of adding a school using the `margins` command in STATA. This effect, representing the differential impact of T_2 relative to T_1, is reported in columns (2) and (4) of Table 4.

All controls are de-meaned, so β_0 represents the mean outcome for the omitted group (applicants assigned to T_1), reported in columns (1) and (3) of Table 4.

The estimates in Table A3 (Appendix B) are based on a similar specification but include additional interaction terms for $T3_i$, where $T3_i$ is an indicator for assignment to T_3. The average marginal effect of T_3 relative to T_1 is reported in columns (3), (6), and (9) of Table A3.

E Survey Details

We distributed the survey by WhatsApp, but before families knew their placement results and after the application process was over. The WhatsApp message included a link to the Qualtrics platform. Each survey was personalized with information about the applicant that included their name, the rank-order list, and schools in the neighborhood that were not included in the application.

The original survey and a translation are provided below.

Survey's translation

1. Which score would you give the following aspects of the application process?
   [*Slider 1 to 20*]
   (a) Information about schools available on the platform
   (b) Information on the online application process (relevant dates, application's steps-, etc).
   (c) Ease to use the online application platform
   (d) In general, which score would you give the online application process?
2. How did you get information about the school choice process? Select all those that correspond
   [*Select multiple*]
   (a) Through the UGEL
   (b) Through the Municipality
   (c) Through the current school (or the initial)
   (d) Through the newspaper or radio
   (e) Through social networks (Facebook, Instagram, Twitter, YouTube)
   (f) Through friends or family
   (g) Through the Minedu website
   (h) I did not use any of the above
3. Through which social network?
   [*Select multiple*]
   (a) Facebook
   (b) Twitter
   (c) Instagram
   (d) Youtube
   (e) Snapchat

(f) Tiktok

4. In the process of creating your school preferences list. Which steps do you consider necessary in order to get to know a school well before adding it? [*Select multiple*]

   (a) The infrastructure

   (b) Interview with the director or a teacher

   (c) Visit the school website or facebook

   (d) Obtain references from other people

   (e) Obtain academic performance information

   (f) The extracurricular activities that it offers

   (g) The set of prioritized values

   (h) The Institutional Educational Project (PEI)

   (i) Know the families that go to the school

5. Is there any other relevant step for you that we have not included in the previous question?
   [*Open text*]

6. How well do you know the schools you chose on the online platform? [One question for each school ranked]
   [*Select one*]

   (a) I know it well

   (b) I know it a little (this option was only available in Peru 2022)

   (c) I do not know it

   (d) I know it by name

7. We notice that during the process you added schools to your initial list. Did you know these schools the application process began?
   [*Select one*]

   (a) I knew it well before applying

(b) I knew it by name only before applying

(c) I didn't even know it by name before applying.

8. To convince yourself to add these additional schools, Did you look for more information? [One question for each school that added]
[*Select one*]

   (a) It was not necessary to look for more information

   (b) Yes it was necessary to find out more about them

9. You chose the school [first preference] as the first preference for [applicant name]: on a scale from 0 to 100, with what probability do you think you will get a seat in that option?
[*Slider 0 to 100*]

10. Imagine that he would have selected your second option ([Second Colegio Preference]) as the first preference. On a scale from 0 to 100, with what probability do you think would get a seat in that option?
[*Slider 0 to 100*]

11. Imagine that you would have selected your third option [Third Preference]) as the first preference. On a scale from 0 to 100, with what probability do you think would get a seat in that option?
[*Slider 0 to 100*]

12. Some families fail to obtain a seat in any of the options they chose because there are not enough vacancies. Using the same range from 0 to 100, with what probability do you think that [applicant name] will not obtain a seat in any of the [number of schools in ranking] schools in the ranking?
[*Slider 0 to 100*]

13. Why didn't you add more schools to your application? (select the main reason)
[*Select one*]

   (a) I know the other schools well and I prefer to finish without a vacancy before adding those alternatives

(b) I think I will get a vacancy for sure in one of the schools I chose

(c) It is very difficult to find more schools

(d) There are no more public schools close enough

(e) If I don't get a vacancy I enroll in a private school

14. If you add more schools to your application, do you think any of these two things (or both) would happen?
[*Yes or No*]

(a) Decreases the overall probability of not being assigned to a school

(b) Decrease the possibility of obtaining a seat in my first preferences

15. Next we show you 5 public schools to which you did not apply. How well do you think you know these schools? [One question for each school]
[*Select one*]

(a) I know it well

(b) I know it a little (this option was only available in Peru 2022)

(c) I do not know it

(d) I know it by name

16. Here are 5 private schools. How well do you think you know these schools? [One question for each school]
[*Select one*]

(a) I know it well

(b) I know it a little (this option was only available in Peru 2022)

(c) I do not know it

(d) I know it by name

17. Did you apply or plan to apply to private schools?
[*Select one*]

(a) No

(b) I haven't decided

(c) Yes

18. Imagine that the platform also had private schools, how many private schools you know would have added to your list?
[*Select one*]

    (a) 1

    (b) 2

    (c) 3 or more

    (d) I don't know any private school

19. What would be the first private school that would add to your list?
[*Open text*]

20. What would be the second private school that would add to your list?
[*Open text*]

21. What would be the third private school that would add to your list?
[*Open text*]

22. We present below the list of public schools that you included in the application and the other schools you mentioned. Please order them by reflecting your preferences: above the most preferred and below the least preferred. (Drag schools to modify or confirm order)
[*Rank alternatives*]

23. During the application process, did you receive any recommendation about adding more schools to your list?
[*Select one*]

    (a) No

    (b) Yes

24. Through which channel did you receive the recommendation to add more schools? (Select all those who apply)
[*Select multiple*]

(a) SMS

(b) WhatsApp

(c) Email

(d) Web page

(e) Phone call

(f) Other

25. If you find out that there is a school that many other families are applying to, but that you have not added it to your list, you would say that:
[*Select one*]

(a) Doesn't tell me anything about the quality of the school

(b) I don't know

(c) It must be a good school.

(d) I would have to know it more, but I think it's good

26. Imagine that you are still looking for schools and find a new one that you like it a lot, even more than your first preference, but it has 100 applicants and 30 vacancies, what would you do?
[*Select one*]

(a) I add it to my list in 1st preference

(b) I add it to my list but a preference lower than the 1st

(c) I don't add it and I keep looking

(d) I don't know

27. If [applicant name] gets a seat in the following schools, from 1 to 20, how satisfied would you be?
[*Slider 1 to 20*]

(a) First preference: [first preference name]

(b) Last preference: [last name preference]

(c) If you don't get a seat at any school

28. Would you like to have had the following information about the schools that you did not have at the time of applying?
[*Select multiple*]

    (a) Information about your probability of obtaining a seat

    (b) Academic performance

    (c) Number of applicants

    (d) Seats available

    (e) Shift of the school

29. Select the contact channels that you have used to communicate with the MINEDU during the application process
[*Select multiple*]

    (a) SMS

    (b) Email

    (c) WhatsApp

    (d) Telephone

    (e) In-person

    (f) Other

30. Which channel do you prefer?
[*Select one*]

    (a) In-person

    (b) Email

    (c) Other

    (d) SMS

    (e) Telephone

    (f) WhatsApp

31. What steps of the application process were difficult? (You can select more than one option)
[*Select multiple*]

    (a) Creation of account
    (b) Filling guardian's personal information
    (c) Filling student's personal information
    (d) Search for schools
    (e) Registering siblings
    (f) Registration of special education certificate
    (g) Choice of schools for preferences
    (h) Application type selection
    (i) Filing the application
    (j) None

32. Only for registration purposes, what is the highest educational level attained by the mother of the applicant?
[*Select one*]

    (a) Complete vocational education
    (b) Incomplete vocational education
    (c) I did not study
    (d) Postgraduate (master's or doctorate)
    (e) Complete primary education
    (f) Incomplete primary education
    (g) Completed secondary education
    (h) Incomplete secondary education
    (i) Complete non-university tertiary education
    (j) Incomplete non-university tertiary education
    (k) Complete university tertiary education

(l) Incomplete university tertiary education

33. Do you have any other comment, claim or suggestion?
[*Open text*]

Original survey

1. ¿Qué nota le pondría a los siguientes aspectos del proceso de postulación?
   [*Slider 1 to 20*]
   (a) Información sobre los colegios disponibles en la plataforma
   (b) Información sobre el proceso de Matrícula Digital (fechas relevantes, pasos para postular, etc).
   (c) Facilidad para usar la plataforma de Matrícula Digital
   (d) En general, ¿qué nota le pondría al proceso de Matrícula Digital a través de la plataforma de matrícula digital?

2. ¿Cómo se informó sobre el proceso de Matrícula Digital? Selecciona todas las que correspondan
   [*Select multiple*]
   (a) A través de la UGEL
   (b) A través de la Municipalidad
   (c) A través del colegio actual (o la inicial)
   (d) A través del periódico o radio
   (e) A través de redes sociales (Facebook, Instagram, Twitter, Youtube)
   (f) A través de amigos o familiares
   (g) A través del sitio web del Minedu
   (h) No utilicé ninguna de las anteriores

3. ¿A través de qué red social se informó respecto de Matrícula Digital?
   [*Select multiple*]
   (a) Facebook
   (b) Twitter
   (c) Instagram
   (d) Youtube

(e) Snapchat

(f) TikTok

4. A la hora de armar su lista de preferencias de colegios en la plataforma de Matrícula Digital ¿Qué pasos considera necesarios para conocer bien un colegio antes de agregarlo?
[*Select multiple*]

   (a) Conocer su infraestructura

   (b) Entrevistarte con el director o algún profesor

   (c) Visitar la página web o facebook del colegio

   (d) Obtener referencias de algún conocido

   (e) Obtener información de rendimiento académico

   (f) Conocer las actividades extracurriculares que ofrece

   (g) Conocer el conjunto de valores priorizados

   (h) Conocer el proyecto educativo institucional (PEI)

   (i) Conocer sobre las familias que van al colegio

5. ¿Hay algún otro paso relevante para usted que no hayamos incluido en la pregunta anterior?
[*Open text*]

6. ¿Qué tan bien conoce a los colegios que eligió en la plataforma de Matrícula Digital? [Una pregunta por cada colegios del ranking]
[*Select one*]

   (a) Lo conozco bien

   (b) Lo conozco un poco

   (c) No lo conozco

   (d) Solo de nombre

7. Notamos que durante el proceso de Matrícula Digital agregó colegios a su listado inicial ¿Conocía estos colegios desde antes de que comenzara el proceso de matrícula?
   [*Select one*]

   (a) Lo conocía bien de antes de postular

   (b) Lo conocía sólo de nombre antes de postular

   (c) No lo conocía ni de nombre antes de postular

8. ¿Para convencerse a agregar estos colegios adicionales tuvo que buscar más información? [Una preguna por cada colegio que agregó]
   [*Select one*]

   (a) No fue necesario buscar más información

   (b) Sí fue necesario averiguar más de ellos

9. Usted eligió al colegio [colegio primera preferencia] en primera preferencia para [nombre postulante]: En una escala del 0 a 100, ¿con qué probabilidad o seguridad cree que va a obtener una vacante en esa opción?
   [*Slider 0 to 100*]

10. Imagine que hubiese puesto su segunda opción ([colegio segunda preferencia]) en su primera preferencia: En una escala del 0 a 100, ¿con qué probabilidad o seguridad cree que obtendría una vacante en esa opción?
    [*Slider 0 to 100*]

11. Imagine que hubiese puesto su tercera opción [colegio tercera preferencia]) en su primera preferencia: En una escala del 0 a 100, ¿con qué probabilidad o seguridad cree que obtendría una vacante en esa opción?
    [*Slider 0 to 100*]

12. Algunas familias no logran obtener una vacante en ninguna de las opciones que eligieron debido a que no hay vacantes suficientes. Usando el mismo rango de 0 a 100, ¿con qué probabilidad o seguridad cree que [nombre postulante] NO va a obtener una vacante en ninguno de los [numero de

colegios en ranking] colegios a los que postuló?
[*Slider 0 to 100*]

13. ¿Por qué no agregó más colegios a su postulación? (Marque la razón principal)
[*Select one*]

    (a) Conozco bien los otros colegios y prefiero terminar sin vacante antes de agregar esas alternativas

    (b) Creo que voy a obtener una vacante con toda seguridad en alguno de los colegios que elegí

    (c) Es muy difícil encontrar más colegios

    (d) No hay más colegios públicos lo suficientemente cerca

    (e) Si no obtengo una vacante me matriculo en un colegio privado

14. Disminuye la posibilidad de quedarme sin vacante
[*Select one*]

    (a) No

    (b) Sí

15. Disminuya la posibilidad de obtener una vacante en mis primeras preferencias
[*Select one*]

    (a) No

    (b) Sí

16. A continuación le mostramos 5 colegios públicos a los que no postuló. ¿Qué tan bien cree que conoce a estos colegios? [Una pregunta por cada colegio que le preguntamos]
[*Select one*]

    (a) Lo conozco bien

    (b) Lo conozco un poco

(c) No lo conozco

(d) Solo de nombre

17. A continuación le mostramos 5 colegios privados. ¿Qué tan bien cree que conoce a estos colegios? [Una pregunta por cada colegio que le preguntamos] [*Select one*]

    (a) Lo conozco bien

    (b) Lo conozco un poco

    (c) No lo conozco

    (d) Solo de nombre

18. ¿Postuló o tiene pensado postular a colegios privados?
    [*Select one*]

    (a) No

    (b) No lo he decidido

    (c) Sí

19. Imagine que la plataforma tuviera también colegios privados, ¿cuántos colegios privados que conoce hubiera agregado a su lista?
    [*Select one*]

    (a) 1

    (b) 2

    (c) 3 o más

    (d) No conozco ningún colegio privado

20. ¿Cuál sería el primer colegio privado que agregaría a su lista en la plataforma de Matrícula Digital?
    [*Open text*]

21. ¿Cuál sería el segundo colegio privado que agregaría a su lista en la plataforma de Matrícula Digital?
    [*Open text*]

22. ¿Cuál sería el tercer colegio privado que agregaría a su lista en la plataforma de Matrícula Digital?
[*Open text*]

23. Le presentamos a continuación la lista de colegios públicos que registró en su postulación y los privados que nos mencionó. Por favor ordénelos reflejando su preferencia: arriba el más preferido y abajo el menos preferido. (Arrastre los colegios para modificar o confirmar el orden)
[*Rank alternatives*]

24. Durante el proceso de postulación, ¿recibió alguna recomendación sobre agregar más colegios a su lista por parte del Minedu?
[*Select one*]

    (a) No

    (b) Sí

25. ¿A través de qué medio recibió la recomendación de agregar más colegios? (Seleccione todos los que apliquen) - Selected Choice
[*Select multiple*]

    (a) SMS

    (b) WhatsApp

    (c) Correo Electrónico

    (d) Pagina web

    (e) Llamada telefónica

    (f) Otro

26. Si se enterara que hay un colegio al que muchas otras familias están postulando, pero que usted no lo ha agregado a su lista, diría que:
[*Select one*]

    (a) No me dice nada sobre la calidad del colegio

    (b) No sé

(c) Seguramente es un buen colegio

(d) Tendría que conocerlo más, pero creo que es bueno

27. Imagine que sigue buscando colegios y encuentra uno nuevo que le gusta mucho, incluso más que su primera preferencia, pero tiene 100 postulantes y 30 vacantes, ¿qué haría?
[*Select one*]

(a) Lo agrego a mi lista en 1ra preferencia

(b) Lo agrego a mi lista pero una preferencia menor a la 1ra

(c) No lo agrego y sigo buscando

(d) No sé

28. Si [nombre postulante] obtiene una vacante en los siguientes colegios, del 1 al 20, ¿qué tan satisfecho(a) estaría?
[*Slider 1 to 20*]

(a) Primera preferencia: [nombre primera preferencia]

(b) Última Preferencia: [nombre última preferencia]

(c) Si no obtiene una vacante en ningún colegio

29. ¿Le gustaría haber tenido la siguiente información sobre los colegios que NO tuvo al momento de postular?
[*Select multiple*]

(a) Información sobre tu probabilidad de obtener una vacante

(b) Rendimiento académico

(c) Cantidad de postulantes

(d) Vacantes disponibles

(e) Turno

30. Marque los medios de contacto ha utilizado para comunicarse con el Minedu durante el proceso de postulación: - Selected Choice
[*Select multiple*]

(a) SMS

(b) Correo electrónico

(c) WhatsApp

(d) Teléfono

(e) Atención presencial

(f) Otro

31. Selected Choice
[*Select one*]

(a) Atención presencial

(b) Correo electrónico

(c) Otro

(d) SMS

(e) Teléfono

(f) WhatsApp

32. ¿Qué pasos del proceso de postulación le resultaron difíciles de realizar? (Puede marcar más de una opción)
[*Select multiple*]

(a) Creación de cuenta

(b) Registro de datos de apoderado

(c) Registro de datos del postulante

(d) Búsqueda de colegios

(e) Registro de datos de hermano

(f) Registro de NEE

(g) Elección de colegios para lista de preferencias

(h) Selección de tipo de postulación

(i) Envío de ficha de postulación

(j) Ninguno

33. Solo con fines de registro, ¿hasta qué nivel educativo llegó la madre (o apoderada) del postulante?
[*Select one*]

(a) Educación ocupacional completa

(b) Educación ocupacional incompleta

(c) No estudió

(d) Posgrado (maestría o doctorado)

(e) Primaria Completa

(f) Primaria Incompleta

(g) Secundaria Completa

(h) Secundaria Incompleta

(i) Superior no universitaria completa

(j) Superior no universitaria incompleta

(k) Superior universitaria completa

(l) Superior universitaria incompleta

34. ¿Tienes algún otro comentario, reclamo o sugerencia que nos quieras hacer?
[*Open text*]