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Working Paper

Expanding Horizons A Randomized Controlled Trial on Adolescents' Career Information Acquisition

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**Expanding Horizons –
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on Adolescents' Career
Information Acquisition**

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Expanding Horizons

A Randomized Controlled Trial on Adolescents' Career Information Acquisition

Abstract

We implement a randomized controlled trial to investigate whether students in lower-secondary school more effectively acquire information about potential career paths if this information is preceded by a task that allows students to explore their own interests and the career information is presented in personalized order. We find that self-exploration in combination with the personalized display increases students' information acquisition. Students also read about more diverse career paths and shift their focus from occupations that require university education towards those that require a high-school degree.

JEL-Codes: C930, D830, D910, I210, O150.

Keywords: information acquisition, career guidance, education, field experiment.

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1 Introduction

Students’ educational decisions —while immensely consequential for adult-life economic outcomes and well-being— are often based on incomplete or incorrect information.¹ Information provision interventions represent, in principle, a cheap and scalable solution to these problems, and as such have received considerable attention in the literature (see Lavecchia et al. 2016, Damgaard and Nielsen 2018 and Escueta et al. 2020 for recent reviews). This literature suggests that personalized feedback has more pronounced effects on information uptake and educational decisions than generic information, potentially because personalized feedback can de-bias students’ beliefs about their preferences or ability, or because it increases the perceived relevance of information.²

In low- and middle-income countries, where students often receive limited guidance from parents and teachers (Sultana and Watts, 2007), such information interventions are urgently needed, yet subject to tight budget constraints. As a result, most personalized interventions in these countries have been limited to information about students’ academic preparedness for different educational tracks (see for example Tran and Zeckhauser, 2012; Katreniakova, 2014; Cabrera and Cid, 2017; Bobba et al., 2023). This is clearly not the only type of information relevant to students’ decision-making: A growing literature points to the importance of comprehensive career guidance for long-run economic outcomes (Bettinger et al., 2012; Cunha et al., 2018; Renée, 2023). However, such tailored interventions are costly and time-consuming, leaving it an open question how career-guidance can be personalized in a way that ensures adequate information acquisition in a cost-effective way.

To close this gap, we design a low-cost, app-based intervention in which we provide students with career information. We then study whether personalizing the career information —by first having students explore their interests and preferences, and then displaying career options ordered by the congruence with their interests— improves students’ information acquisition. The experimental design allows us to disentangle to which extent the results are driven by the students’ self-exploration vis-à-vis the fact that the feedback they receive is personalized.

The intervention is part of a larger career-guidance workshop we implemented in 18

¹Such information frictions have been documented to concern, for example, the costs and the returns to schooling (Jensen, 2010; Bettinger et al., 2012; Loyalka et al., 2013; Wiswall and Zafar, 2015a; Abbiati et al., 2018), the students’ own abilities, the extent to which they are qualified to attend any given educational track (Stinebrickner and Stinebrickner, 2012, 2014; Goulas and Megalokonomou, 2021; Dobrescu et al., 2021), and the type of careers students can pursue with any given degree (Borghans and Golsteyn, 2007).

²Wiswall and Zafar (2015a), for example, provide information on returns to education based on students’ gender and major, compared to average returns. Doss et al. (2019) test this in the context of parental investments, comparing the effect of text messages tailored to children’ literacy level with texts phrased generally.

lower secondary schools in rural Cambodia, targeting ninth-graders (in their last year of compulsory schooling).³ These students have a very limited horizon of potential careers. In a pre-study, we find that more than 85% are interested in only three occupations: doctor, teacher, or police officer.⁴

To study the implications of personalizing career options for information acquisition, we randomly assigned 628 students to one of two treatment arms. The first group of students worked through an “Interest and Career Exploration Tool” (ICET), a digital application designed by the research team. The ICET allows students to explore their own interests and receive feedback on their personality types, after which students are shown that these interests can map into interesting career opportunities: Students are provided with detailed information on 18 careers, ordered by their congruence with their personality types. These occupations are relevant to the context and represent a substantial improvement, in terms of career outlook, over the professions of their parents.⁵ The second group worked through a placebo application with a similar structure but without any interest- or personality-related content (its statements relate to gender norms and climate change). Students are also provided with detailed information on the same 18 careers, but in random order.

We find that self-exploration and personalized feedback increases information acquisition. Students actively read more job descriptions, spend more time reading about occupations that are beyond their usual focus, and shift their reading time from careers that require a university degree towards careers that require a high school diploma. We show that this effect is driven at least in part by mere self-exploration. ICET students express interest in a more diverse set of occupations compared to the placebo group even before receiving feedback on which occupations fit their personality.

We then analyze who is particularly responsive to the treatment. We do not find any differences by the students’ socio-economic background, proxied by parental occupation, parental education, and family wealth. Instead, we find heterogeneities driven by academic ability: Students with lower grades at baseline become more interested in occupation descriptions that do not require a university education. We argue that personalizing information through a self-exploration task is especially beneficial for these students. Given their current

³We study the impact of the overall workshop on adolescents’ occupational aspirations and their educational investments in Gehrke et al. (2023a).

⁴This pattern is not unique to Cambodia. A recent OECD report (Mann et al., 2020), based on PISA data from 41 countries, finds that occupational interests of young people are concentrated in few occupations. Nearly half of the 15-year-olds interviewed report expecting to work in one of ten jobs, with this concentration being stronger for adolescents with a disadvantaged background and weaker academic achievements, and in low- to middle- income countries.

⁵59% of working parents are farmers, 16% are small-scale informal traders, and another 11% are construction workers (Gehrke et al., 2023b).

performance, they are the most likely to struggle in university, thus also the most likely to benefit from diversifying their information acquisition towards careers that require relatively lower levels of education. Interestingly, we observe this outcome even though students are not provided with feedback on their ability or school performance.

With this paper, we contribute to the literature on career-guidance interventions in education. This literature mainly focuses on increasing college attendance in high-income settings (see Dynarski et al. 2023) and often uses costly "bundled interventions" targeting multiple aspects of educational choice, including career exploration (e.g., Renée 2023). An exception is Loyalka et al. (2013), who study career advice in a low-income context. Similarly, we focus on a low-cost, scalable intervention, adding to the literature by examining how students acquire career information and showing that even light-touch content tailoring can expand students' career horizons.

Furthermore, we contribute to a broader literature studying how people search and process information in the lab and in the field (see the reviews by Haaland et al. 2023 and Capozza et al. 2021) and how these processes can be affected by (personalized) feedback or advice (see for example Eil and Rao 2011; Möbius et al. 2022; Fuster et al. 2022; Grohmann et al. 2022, and Bobba and Frisanchi 2022 in the context of education). We show that students' information acquisition on prospective careers is highly selective, and biased towards high-education careers in the absence of additional incentives. Moreover, we show that introducing moments of self-reflection before content delivery can increase the diversity of information that students acquire.

Finally, we contribute to the literature on the effectiveness of information interventions to improve educational choice. This literature is often concerned with correcting (mis)perceptions over the costs and/or the returns to education (Jensen, 2010; Bettinger et al., 2012; Dinkelman and Martínez A., 2014; Wiswall and Zafar, 2015a,b; Abbiati et al., 2018), especially among socially disadvantaged students. We focus on expanding occupational interests, and document heterogeneous responses to personalization, which allow low-performing students to reorient their attention towards more achievable career paths.

The remainder of this paper is organized as follows. Section 2 explains the structure and content of the intervention, while Section 3 provides information on the experimental design (sampling, implementation of the intervention, and data collection). The empirical approach and results are discussed in section 4. Section 5 concludes.

2 Intervention

As part of a career-guidance workshop, we implement an Interest and Career Exploration Tool (ICET), delivered in the form of a self-guided application on a tablet.⁶ In the design of the application, we build on Holland’s (1959; 1997) theory of vocational interest, also known as “hexagonal model.” Holland’s theory maps people’s interests into six different personality types (visualized in Figure A.1),⁷ namely realistic (doers), investigative (thinkers), artistic (creators), social (helpers), enterprising (persuaders), and conventional (organizers). The three strongest personality types form the Holland Code of an individual. Holland’s theory posits that these personality types can be matched to occupations, and that individuals display higher job satisfaction if working in an occupation that matches their interests. A large literature provides evidence in support of the generalizability of Holland’s theory (Meireles and Primi, 2015), its cross-cultural transportability beyond the North-American and European context (Aljojo and Saifuddin, 2017; Morgan and de Bruin, 2018), as well as on the positive association between vocational identity and work-related outcomes, such as job satisfaction, performance, and full-time employment (van Iddekinge et al., 2011; Stoll et al., 2017; Hoff et al., 2020).

The ICET is designed to incorporate these insights, as well as elements from a related literature that stresses the importance of self-exploration in the career-decision making process (Van Esbroeck et al., 2005; Germeijs and Verschueren, 2006)⁸ It consists of two parts: an interest exploration tool (IET) and a career exploration tool (CET). The purpose of the IET is to help students reflect on their personal interests, and to identify students’ dominant personality types. The CET is dedicated to exploring career options, which are linked to the IET results. More details about the structure of the IET and CET is given below and in Appendix B.

To identify students’ personality types, the IET combines responses from three different tests, all based on the hexagonal model (Holland, 1997). The first test follows Athanasou (2000, 2007) and consists of 30 pairs of opposing statements, two for each combination of personality types. For each pair, students have to pick one statement (no skip is allowed). The statements cover a broad range of interests, are context-specific, relevant for ninth-graders, and exclusively activity-based (e.g., “negotiating prices at a local market”). The second test is a widely used and internationally validated implementation of Holland’s

⁶The tablets were generously provided by the NGO GoAhead: <http://www.goahead-ngo.org/> for the time of the intervention.

⁷Figures A.1 to A.3, B.1 to B.6, well as Tables A.1 to A.7 are available in the Online Appendix.

⁸For a review of various career-decision making models available in the literature see Gati and Kulcsár (2021).

personality test, developed through a cooperation between the Hawaii Department of Education and the Occupation Information Network (O*NET) (Hawaii Department of Education, 2020). It contains 42 statements (seven per personality type), with which students can agree or disagree (unlimited selections allowed). The third test, created by the authors with the support of local experts, involves descriptions of five situations in which students are asked to select their preferred activities. These situational descriptions depict activities familiar to or accessible by adolescents in rural Cambodia (e.g., a wedding). In each of these situations, the student is given a number of potential activities they would be performing (e.g., during a wedding: managing the guest list, performing on stage, decorating). Students can freely allocate three points between these six activities.

The three tests differ in format to limit students' fatigue, maximize the potential for self-exploration, and prevent that the results depend on the design of one particular test. To enhance test comprehension, tests one and three also include pictures drawn by a local artist reflecting the content of the statements. These pictures are gender-neutral to avoid inadvertently influencing students' choices: Either the gender cannot be inferred or both female and male individuals are displayed (see Figures B.1-B.3 for examples).

From the responses across all three tests, the application computes scores that indicate the degree of alignment between the students' choices and each of the six personality types. The IET concludes with a personalized display of the personality types, highlighting the three with the highest scores (the Holland Code), as shown in Figure B.4. Students have the option to click on each personality type to access brief descriptions outlining the main traits and interests specific to that type (adapted from the Career Compass published by the Delaware Department of Labor 2019).

The second part of our electronic application, the CET, is dedicated to the exploration of potential careers. For this purpose, we compile 18 occupations which are relevant for ninth-graders in rural Cambodia, and can be grouped by the personality types in the model of Holland and by the three levels of educational attainment realistic in this sample: lower-secondary (grade 9), high school (grade 12), or university degree (as outlined in Table A.1). In a highly powered pre-study in 2019, we found that 85% of students in the target group aspire to the three following occupations: teacher, doctor, police officer (see Table A.2). To increase relevance of the application for students, we therefore include these three occupations in the CET list.

The CET starts with a single page, on which all 18 occupations are listed in random order and without additional explanation (Figure B.5). Students are asked to select up to three occupations they find potentially interesting. This unframed selection is followed by a more detailed page on (framed) career options, in which the same 18 occupations are shown

again but this time grouped by personality types and, within a personality type, ordered by educational level. The occupations are displayed in personalized order: The order of occupation groups (three occupations per personality type) follows the order in which the IET personality types are shown to the student (see Figure B.6 for an example). Each occupation also comes with a detailed description of the job’s tasks, responsibilities, societal value, and educational requirements, which can be accessed through a pop-up window.

Students can decide how much time they want to allocate to reading the descriptions. They can log out immediately or spend up to 17 minutes reading. Data from the pilots suggest that it take students around two minutes to read one description. In 17 minutes, students should hence be able to read at least eight of them.

To ensure comprehension and adherence to instructions, research assistants were available to guide students through the tests at the time of the intervention, and breaks were implemented between tests. Students could work independently once they understood the procedures, with the option to ask questions or access a pop-up window for additional instructions.

3 Experimental Design

3.1 Sample

We implemented our career-guidance workshop in 18 schools in Northwest Cambodia between February 17 and March 16, 2020.⁹ These schools represent a non-random subset of lower-secondary schools in rural Cambodia. However, a comparison with national statistics (Ministry of Education, Youth and Sport, 2019) suggests that the sample schools are broadly similar to rural schools (baseline administrative data on sample schools was collected by the project team before the intervention took place). The size of Grade 9 in the selected sample is nearly identical to the average rural school, with 89 students distributed across 1.89 classes in the selected sample and 90 students distributed across 1.99 classes in rural schools. Examining class size and composition, both the average number of students (47) and the percentage of female students (54%) per class are remarkably similar between the selected sample and the rural average.

⁹More details on how these schools were selected, and their location can be found in Gehrke et al. (2023a)

3.2 Treatment Arms and Timeline

Out of the 862 students invited to participate in the career-guidance workshop, 783 actively took part.¹⁰ On the day of the workshop, students were randomly allocated to one of three treatment arms: the main treatment arm (ICET), a placebo arm (placebo), and an information-only arm (control), by blindly drawing numbered badges from a box.

Out of the 783 students, 315 were allocated to the ICET arm, 311 to the placebo arm, and 157 to the control arm (the control arm will not be studied in this paper). Students assigned to the three arms took part in different activities (as summarized in Table A.3). First, all students took part in a baseline survey. The questionnaire was filled by students individually on a tablet, with support from enumerators where necessary. This baseline questionnaire covered basic socio-economic characteristics, and questions related to expected high school distance and costs.

Afterwards, students in the ICET arm worked through the main application, students in the placebo arm worked through a different application, and students in the control arm participated in a group-based game outdoors. The placebo app had a setup similar to the ICET, but asked questions on gender norms and climate change awareness instead of questions on the students' interests, thus students did not receive feedback on their personality types. In the career exploration part of the placebo application, the same occupations are shown and are also grouped by personality type as in the ICET, but the groups are displayed in random order. Following the app-based intervention, all students took a midline survey. The midline survey contained questions about perceived constraints to attending high school, and asked students to interpret a graph about high school-related costs.

All students were then invited to participate in an information session about higher education. The information session had three key components: essential facts about the Cambodian education system, detailed insights into nearby high schools and vocational schools suitable for students' transition after completing grade 9, and details on available scholarships for students to pursue. School-specific information included student numbers, proximity to the nearest school along with time and travel expenses, details about admission procedures, living costs, school-related expenses, and information on accessible scholarships. Although the overall structure of the information remained consistent across schools, it was customized to suit the specific location of each school.

Finally, in the endline survey we again elicited expectations about high school-related costs, as well as educational and occupational aspirations.

¹⁰Students received advance notice about the workshop and were informed that participation was voluntary.

3.3 Baseline Balance

In the remainder of this paper, we focus on the 625 students that were allocated either to the main treatment arm (ICET) or to the placebo arm.¹¹ Summary statistics of baseline characteristics (as shown in Table A.4). We focus on student age, gender, and grades, on parental background, and on student answers in the baseline questionnaire (specifically, their expectations regarding high school costs). The results of balance checks show that the randomization was largely successful: Out of the 14 variables that were tested, only one displays differences that are statistically significant at the 10% level. Reassuringly, the inclusion of this variable in the estimation does not affect the results.

The sample consists of slightly more female than male students, who are on average 15 years old at the time of the interview. Students have 2.5 siblings on average and state to be relatively poor: Their self-reported financial worries range around eight on a scale from one to ten. When asked how wealthy their families are relative to others in the village, most students report that their families are generally worse off. Students in our sample live an average of four kilometers from the school and about ten kilometers from the district town and the next closest high school.

4 Empirical Approach

4.1 Estimation Strategy

Our intervention is designed to encourage students to explore their own interests, and to show them that these interests can map into interesting careers. We ask whether this changes how students acquire information that is made available to them. To do so, we consider three groups of outcomes.

With the first group of outcomes, we test if students in the ICET arm acquire more information on potential careers compared to students in the placebo group. We focus on students' reading behavior in the career exploration tool. In particular, we consider (i) how many pages containing occupation descriptions the student opened, (ii) the total time spent reading such occupation descriptions (maximum is 17 minutes), (iii) the average reading time per page, and (iv) how many job descriptions the student actively read.¹²

¹¹The control arm is excluded for two reasons: First, we cannot study information acquisition for these students, as they did not receive career information. Second, the control arm displays statistically significant differences along 4 out of the 14 tested characteristics.

¹²For this last outcome, we only count the number of pages on which the student spends any time between 0.67 minutes (50th percentile of reading time per page) and 3.85 minutes (95th percentile of reading time per page). We use an upper limit to the time per page because we observed during the intervention that a

With the second group of outcomes, we test whether ICET students acquire information on a more diverse set of potential careers compared to students in the placebo group. We focus on the fraction of the overall reading time that is spent on occupations requiring (i) a lower-secondary degree, (ii) a high school degree, and (iii) a university degree. Moreover, since 85% of students in our pre-study see themselves working in the same three occupations, we are particularly interested in whether the intervention made students read outside this reference window. Therefore, we include as additional outcome the fraction of reading time spent on occupations outside this 85% reference window.

Finally, with the third group of outcomes, we test whether the combination of engaging with their own interests and learning about their personality type affects students' mindsets towards their career trajectories, beyond affecting solely the information they acquire. In doing so, we are also able to disentangle the extent to which the effect of the ICET is driven by the students' self-exploration alone vis-à-vis the fact that they receive personalized feedback. To identify the role of self-exploration alone, we focus on outcomes we elicited before showing the students the list of occupations in personalized order. We estimate treatment effects on (i) the number of jobs (out of three) a student clicks on when presented with the unframed list of 18 jobs and asked "Which of these jobs do you think could be interesting to you?" (first page of CET, see Table A.3), (ii) how many of those are outside the 85% reference window, and (iii) which fraction of these are associated with different levels of education.

We estimate the following equation:

$$Y_{is} = \beta_0 + \beta_1 ICET_i + \beta_2' X_i + \lambda_s + \varepsilon_{is}. \quad (1)$$

Outcomes of interest Y_{is} for student i in school s as listed above. $ICET_i$ is a dummy indicating whether the student worked with the ICET application (=1) or the placebo application (=0). X_i is a vector of student characteristics, in particular, gender, age, and the baseline grade (sum over the three main subjects and averaged over the months December and January). λ_s are school fixed effects. ε_{is} is the error term.

We adjust test statistics for multiple hypothesis testing by computing Romano-Wolf p-values. For the purpose of this analysis, we will group outcome variables per table, and perform the analysis separately for each group.

number of students were un-engaged with the app, and simply stopped reading midway, but did not close the page or log out of the app.

4.2 Main Results

Results for the first group of outcomes are presented in Table 1. We include controls stepwise to gauge the robustness of our findings, and report heteroskedasticity-robust standard errors, as well as Romano-Wolf p-values throughout.

We find that ICET students do acquire more information on potential careers than students in the placebo group (first group of outcomes). Students in the ICET arm do not open more pages containing occupational descriptions—if anything, they open slightly fewer pages ($\beta = -.20$ over a placebo group mean of 6.52, not statistically significant). The total reading time also does not seem to be higher on average, while the average reading time per page is lower (by 0.28 minutes over a placebo group mean of 1.96, result statistically significant at the 5% level).¹³ However, the ICET affects the number of pages that students actively read (rather than just open the page and close it right away). The median reading time per page is 40 seconds, which should be the very minimum time students need to process the full content of the page according to the piloting results. The 95th percentile of reading time per page is 3.85 minutes, which should be more than sufficient to read through the full text, even for students with low literacy.¹⁴ When counting pages that students read in this time range (between 40 seconds and 3.85 minutes), we find that students in the ICET read about 0.3 more pages (12% gain over the placebo mean of 2.5). This result is statistically significant at the 10% level and suggests that, compared to students in the placebo arm, ICET students did not necessarily engage with more information in terms of absolute time, but rather that students read in a more focused way, and were thus able to acquire information about more careers.

Next, we examine the type of occupation-related information that students acquire (second group of outcomes). To do so, we restrict our attention to the 601 students that read at least one occupation description—as noted above, this outcome is not affected by the ICET. We find considerable differences between students in the two arms (*c.f.* Table 2), with ICET students being more likely to acquire information on jobs beyond their usual focus. In the placebo arm, students spend 38% of the total reading time on occupations that require lower-secondary education, 16% of their reading time on occupations that require high school, and 46% of their time on occupations that require a university degree. These percentages are shifted in the ICET arm, with students spending (6pp) more time on occupations that require a high school degree, and (8pp) less time on occupations that require

¹³This analysis excludes 25 students who did not open any occupational descriptions. This outcome is balanced between the ICET and placebo arm, see table A.5.

¹⁴We exclude the top 5% in reading time because in practice a number of students left the last page open instead of logging out of the application.

a university degree. Both results are statistically significant at the 1% level. Importantly, reading time also shifts away from the three occupations that are in the 85% reference window and featured in the app. While students in the placebo arm spend 47% of their time reading just about these three occupations, this fraction falls by 9pp (19% decline over the placebo group mean) in the ICET arm.

We further investigate whether the shift is consistent with the order in which occupations are displayed, and hence aligns with the students' personality types. In Figure 1 (panel a), we plot the distribution of the personality types in our sample.¹⁵ The most common personality type in this group of students is social, followed by conventional, and investigative. The three least common personality types are enterprising, artistic, and realistic. Both ICET and placebo students spend most of their time reading about occupations that are associated the social and the realistic types (Figure 1, panel b). We find statistically significant differences in reading time between ICET and placebo for three of the six personality types. For all personality types, the allocation of reading time in ICET moves closer to how the types are distributed in this sample (i.e., less reading time for social and realistic, more reading time for all other types).

With the third (and final) set of outcomes we aim to uncover if the observed effects on information acquisition are accompanied by a shift in students' personal mindset regarding their careers trajectories. We examine the effect of the self-exploration task alone on stated occupational interest, as elicited in the first page of the CET (see Table 3). We find that students in the ICET arm are already interested in more diverse occupations even before these are presented in personalized order. Students express interest in a higher number of listed occupations, and in a higher number of occupations outside the 85% reference window. Since the maximum number of occupations that can be selected is three, this effect is not purely mechanical. ICET students also tend to select occupations that only require a high school degree, rather than university.

This result shows that self-exploration alone can explain a substantial share of the observed effects on reading behavior, and that our results are not merely driven by the fact that students who are shown career options in personalized order perceive this information to be more relevant. It also speaks of the robustness of our design, given that the personalized feedback may be exposed to errors in how students' personality types are mapped or linked to different occupations.

¹⁵We take the average over the strongest three personality types, and only include the 311 students for which the application properly recorded their choices. For four students the application malfunctioned either while taking the tests or while reading the occupational descriptions. In either case, the application had to be restarted and students were allowed to jump right back to where they left (but with the disadvantage that the order of the occupations were not personalized anymore and that previous choices were overwritten).

4.3 Treatment Effect Heterogeneity

We next explore for whom the ICET shifts the focus away from occupations requiring university. While interest-based feedback is less prone to equity concerns than feedback based on ability,¹⁶ exploring heterogeneous effects is important to ensure that the intervention does not discourage qualified students with relatively low socio-economic backgrounds from attending university, which would have negative welfare implications.

We find that neither gender, nor parental background (in terms of wealth, education, or occupation) can explain the shift in reading behavior, yet there is a clear differential effect by academic ability (Table 4). Students with lower grades, measured by their total grade in the three main subjects (Khmer, Math, and English) averaged over the two months before the intervention, are more likely to focus on occupations requiring high school graduation only, thus occupations that are potentially a better match for students with lower academic ability.

These heterogeneities are also evident when plotting the non-parametric association between reading time and baseline grades for ICET and placebo students separately (*c.f.* Figure A.2). We find that, compared to the placebo, ICET students who have lower-than-average grades spend less time on occupations requiring a university education, and more time on occupations requiring only a high school diploma. The difference tends to be more pronounced the lower the student’s baseline grade is, while it disappears for students with average or above-average performance. There are no meaningful differences between both groups in the acquisition of information concerning occupations that require only a lower-secondary degree.

This finding is particularly striking, as the career-guidance workshop did not provide any feedback on the students’ academic ability. The ICET intentionally focused on students’ interest, not their ability. By design, this effect is also not driven by the ICET’s framed job selection page, as occupations are grouped by personality type and educational requirement both in the ICET and in the placebo. The only difference is that ICET students see an ordering by personality types based on their test results, while the ordering is random in the placebo arm.

We argue that this differential effect by ability is due to the fact that the ICET broadens the students’ mindsets regarding career trajectories in the self-exploration task. By allowing

¹⁶The latter is controversial because of methodological and equity concerns. Measuring and scaling students’ achievement is a non-trivial task, and can lead to a biased assessment of true ability (Jacob and Rothstein, 2016). Furthermore, Goulas and Megalokonomou (2021) show that feedback on relative performance can generate asymmetric effects, boasting the performances of high-achievers while depressing those of low-achievers. This result generalizes to situations where feedback can be interpreted as good news or bad news (Eil and Rao, 2011).

students to discover that their interests can be mapped into interesting careers, the intervention helped all student diversify their information acquisition. The fact that students with relatively low baseline grades are more likely to acquire information about occupations with lower educational requirements underscores the information gaps prevalent in rural areas. It also highlights the importance of offering students tools for self-exploration early on, especially those who may later struggle in university (based on their current academic performance) and might have difficulty admitting this to themselves.

4.4 High-school Information Processing

At the time of designing the intervention, we hypothesized that shifting students’ information acquisition towards a more diverse set of occupations may in turn affect their rationale to learn about paths to higher education—for example, because students become more interested in jobs that require a high school degree. However, we find no evidence that students in the ICET arm are more likely to see themselves as being able to go to high school (*c.f.* Table A.6). In the midline survey, students in the ICET arm do express the same amount of concerns regarding their ability to attend high school, and they also do not interpret a graph depicting high school costs in a more favorable way.

We also find no evidence of differential information processing over the costs of attending high school between ICET and placebo students (as elicited in the endline survey and shown in Table A.7 and Figure A.3). Students in the ICET arm do not report more accurate educational costs nor are they better able to recall the information on high school scholarship opportunities provided in the information session. They also do not update their beliefs more strongly. This null result is likely explained by the fact that the high-school related information was perceived as relevant by a similar proportion of students in both groups. After all, information acquisition in the ICET arm shifted away from occupations requiring university education, but not away from those that require at least high school.

5 Conclusions

In this paper, we develop an application for career guidance that gives students the opportunity to explore their own interests and provides them with personalized feedback on career opportunities. We conduct a randomized controlled trial in schools in rural Cambodia to study whether deploying the app changes how students acquire information about potential careers.

When students receive career information without room for self-reflection or personalized

feedback, their information acquisition is highly selective and biased towards careers requiring higher education levels and those in their reference window. Our results show that students who work through the ICET app, rather than through the placebo application, acquire more information about occupations outside their reference window, and about occupations that require only a high school degree rather than a university degree. We find similar shifts in students' stated occupational interests before the information is ordered by personality types. This suggests that at least part of the effect on information acquisition can be attributed to a change in the students' mindsets as they engaged with their personal interests.

In the very policy-relevant context of adolescents' occupational choice, this paper identifies channels that help overcome the students' narrow search for information. Given the evidence that children tend to choose the profession of their parents, with potentially large consequences for inter-generational mobility, our intervention can be an important step to address inequalities and reduce the misallocation of talent.

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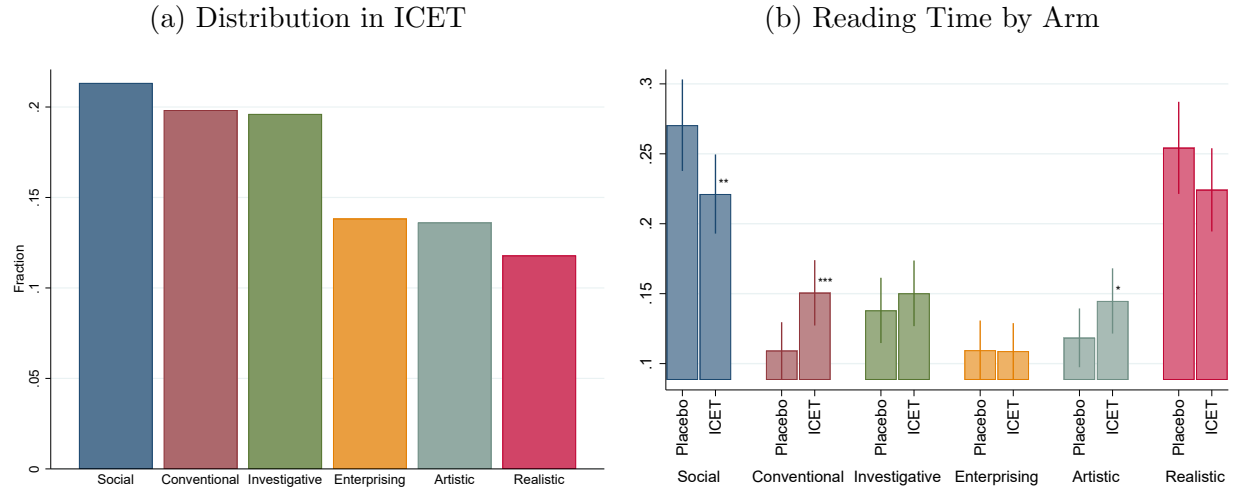
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Figures

Figure 1: Holland Code



Notes: Panel (a) shows the distribution of the personality types (Holland Code) in the ICET arm, based on students answers to the personality tests. We take the average over the three strongest personality types. Panel (b) shows the relative reading time by Holland Code of the occupation in the ICET and Placebo arms.

Tables

Table 1: Engagement with Career Exploration tool

	No. of pages opened		Total reading time		Av time p/page		No. of pages read	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ICET	-0.285 (0.395) [0.701]	-0.158 (0.394) [0.882]	-0.216 (0.341) [0.701]	-0.145 (0.345) [0.882]	-0.283 (0.102)*** [0.020]	-0.282 (0.101)*** [0.019]	0.299 (0.162)* [0.141]	0.337 (0.161)** [0.086]
School fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
Individual controls		✓		✓		✓		✓
Placebo Mean		6.52		8.64		1.96		2.54
Observations		626		626		601		626

Notes: OLS estimates. Number of pages opened is the total number of job descriptions that were opened. Total is the total time the students spent reading job descriptions. Av time p/page is the average time spent on a job description page, conditional on opening it. Pages read is the number of pages a student spent on long enough to read through the text (between 0.7 minutes and 3.85 minutes, i.e. the 50th and 95th percentiles of reading time per page). Individual controls include gender, age, baseline grade in main subjects. Robust standard errors are depicted in parentheses. Romano-Wolf p-values adjusted for multiple hypothesis testing are in brackets. */**/** denote significance levels at 10/5/1 percent respectively.

Table 2: Information Acquisition - Career Exploration Tool

	Occupations' educational requirements						Occupations are outside 85% ref window	
	lower secondary		high school		university			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ICET	0.023 (0.024) [0.334]	0.015 (0.024) [0.524]	0.062 (0.017)*** [0.001]	0.062 (0.017)*** [0.001]	-0.085 (0.025)*** [0.001]	-0.078 (0.025)*** [0.003]	0.096 (0.026)*** [0.001]	0.090 (0.026)*** [0.001]
School fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
Individual controls		✓		✓		✓		✓
Placebo Mean		0.38		0.16		0.46		0.53
Observations		601		601		601		601

Notes: OLS estimates. The outcome variable is the fraction of reading time dedicated to occupations that require at least lower-secondary education (cols. 1-2), high school (cols. 3-4), a university degree (cols. 5-6), and the fraction of reading time dedicated to occupations outside the 85% reference window (cols. 7-8) or 90% reference window (cols 9-10). Individual controls include gender, age, baseline grade in main subjects. Robust standard errors are depicted in parentheses. Romano-Wolf p-values adjusted for multiple hypothesis testing are in brackets. */**/** denote significance levels at 10/5/1 percent respectively.

Table 3: Stated Occupational Interests

	Total occup. selected		No. of occup. outside 85% ref window		lower secondary		Fraction of selected jobs requiring high school		university	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ICET	0.250 (0.080)*** [0.009]	0.250 (0.080)*** [0.011]	0.197 (0.072)*** [0.017]	0.178 (0.073)** [0.042]	0.014 (0.027) [0.592]	0.010 (0.027) [0.711]	0.055 (0.019)*** [0.015]	0.053 (0.019)*** [0.029]	-0.070 (0.029)** [0.027]	-0.063 (0.029)** [0.051]
School fixed effects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Individual controls		✓		✓		✓		✓		✓
Placebo Mean		2.04		0.97		0.32		0.13		0.55
Observations		626		626		577		577		577

Notes: OLS estimates reported. This table compares students' choices in the unframed job selection between students in ICET compared to students in the placebo. Individual controls include gender, age, and baseline grade in main subjects. Robust standard errors are in parentheses. Romano-Wolf p-values adjusted for multiple hypothesis testing in brackets. */**/***/ denote significance levels at 10/5/1 percent respectively.

Table 4: Treatment Effect Heterogeneity - Reading Time Dedicated to Occupations Requiring High School

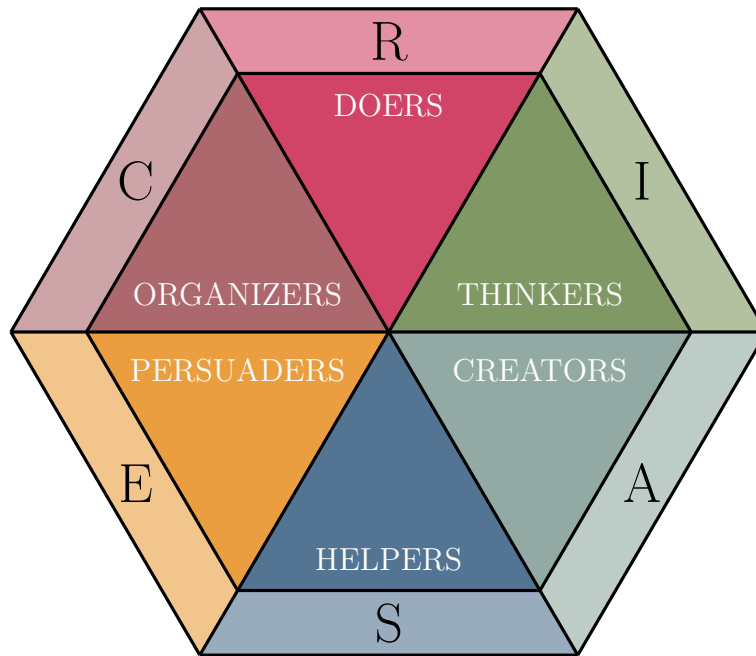
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ICET	0.067 (0.025)***	0.055 (0.017)***	0.047 (0.021)**	0.092 (0.097)	0.017 (0.089)	0.061 (0.035)*	0.061 (0.018)***
ICET $\times$ Female	-0.009 (0.035)						
ICET $\times$ Baseline Grade (main subjects, std.)		-0.034 (0.016)**					
ICET $\times$ Baseline Absence (Dec&Jan)			0.010 (0.010)				
ICET $\times$ Wealth (reported by teacher)				-0.011 (0.033)			
ICET $\times$ Self-reported wealth (rel. to others)					0.014 (0.026)		
ICET $\times$ Parents are farmers						0.002 (0.040)	
ICET $\times$ Any parent has high educ job							0.024 (0.056)
Female	0.054 (0.023)**	0.053 (0.017)***	0.052 (0.017)***	0.050 (0.017)***	0.050 (0.017)***	0.050 (0.017)***	0.050 (0.017)***
Age	0.006 (0.008)	0.006 (0.008)	0.004 (0.008)	0.007 (0.008)	0.007 (0.008)	0.006 (0.008)	0.006 (0.008)
Baseline Grade (main subjects, std.)	0.001 (0.009)	0.016 (0.012)	0.006 (0.009)	0.001 (0.010)	-0.000 (0.009)	0.001 (0.009)	0.001 (0.010)
Baseline Absence (Dec&Jan)			0.004 (0.006)				
Wealth (reported by teacher)				0.003 (0.022)			
Self-reported wealth (rel. to others)					-0.012 (0.020)		
Parents are farmers						-0.020 (0.026)	
Any parent has high educ job							-0.027 (0.031)
Observations	601	601	601	598	600	601	601

Notes: OLS estimates. The outcome variable is the fraction of reading time dedicated to occupations that require a high school degree. Each regression controls for gender, age, baseline grade in main subjects, and for school fixed effects. Robust standard errors are depicted in parentheses. */**/** denote significance levels at 10/5/1 percent respectively.

ONLINE APPENDIX

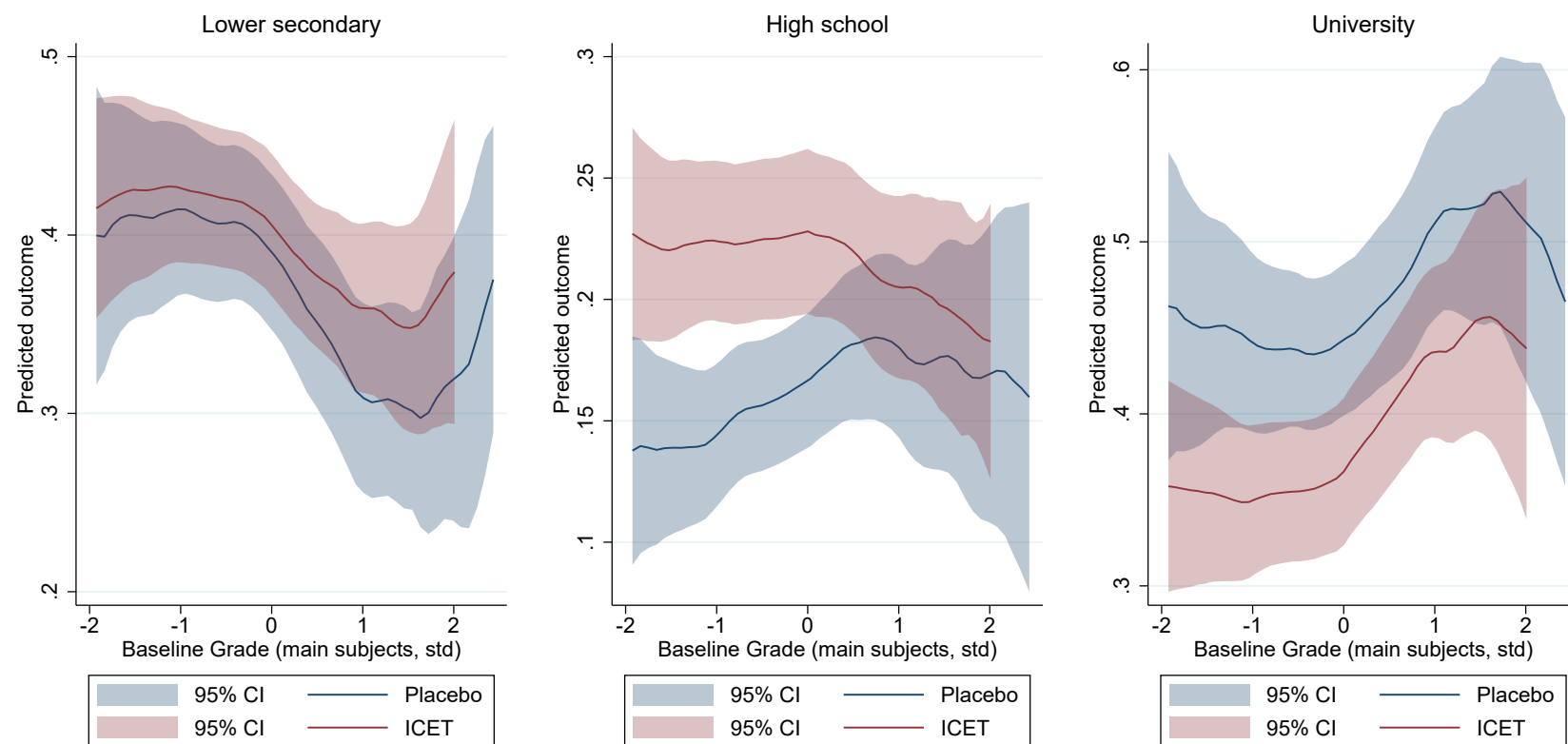
A Supplementary Figures and Tables

Figure A.1: Holland's Hexagonal Model



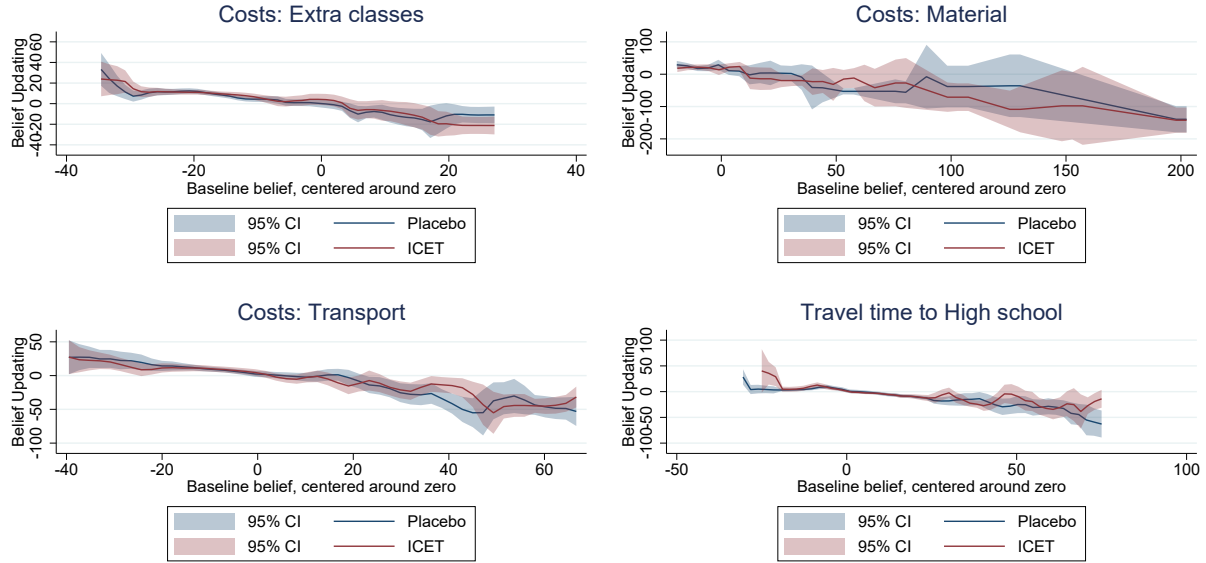
Notes: Own illustration based on common visualizations of the Holland model found online. R stands for realistic, I for investigative, A for artistic, S for social, E for enterprising, and C for conventional.

Figure A.2: Predicted Reading Time by Occupations' Educational Requirement and Baseline Grades



Notes: Baseline grade is the total grade in the three main subjects (Khmer, Mathematics, English), averaged over the months December and January.

Figure A.3: Belief Updating about High School



Notes: The graphs show local linear regressions of belief updating on baseline beliefs, with 95% confidence intervals. Belief updating is the difference between a student's endline and baseline estimates wrt the outcome, which is (i) the cost of extra classes (i.e. informal tuition) per month, (ii) the annual expenses for school material when going to high school, (iii) the costs of transportation per month when going to high school (e.g., by motorbike), and (iv) the travel time to high school by motorbike (in minutes). Baseline beliefs are all centered around the (school-specific) true value, as reported in the information session.

Table A.1: Job Categorization in the CET

Type	Required educational degree		
	grade 9	grade 12	university
Realistic	police officer	agric. technician	civil engineer
Investigative	carpenter	journalist	general practitioner
Artistic	photographer	clothes designer	architect
Social	tour guide	social worker	sec.-level teacher
Enterprising	chef	real-estate agent	sales manager
Conventional	receptionist	office administrator	software developer

Notes: Each occupation is assigned to one of the six personality types and to one of three educational degrees. The former categorization relies on the classification by the NEA (see Appendix B), the latter is categorized by the research team (in consultation with local partners).

Table A.2: Occupational Aspirations among Grade 9 Students

Occupation	Freq.	Percent	Cum. Percent
Teacher	102	57.95	57.95
Doctor	31	17.61	75.56
Police officer	19	10.80	86.36
Soldier	8	4.55	90.91
Farmer	3	1.70	92.61
Government staff	3	1.70	94.32
Other	10	5.68	100.00
Total	176	100.00	

Notes: Data collected during preliminary study in 2019. Survey question: When you are about 25 years old, what job would you like to be doing? (open ended).

Table A.3: Outline of the Intervention

	A1: ICET	A2: Placebo	A3: Control
Baseline survey	Background information on student('s family); beliefs about costs of attending high school		
IET	(a) three tests on personal interests and preferences (b) personality types	(a) three tests on gender attitudes and climate change (b) —	game outdoors
CET	(a) list of 18 jobs; students indicate most interesting ones(s) (b) list of 18 jobs (ordered by personality types), students can click on each job to read more detail	(a) list of 18 jobs; students indicate most interesting one(s) (b) list of 18 jobs (ordered randomly), students can click on each job to read more detail	game outdoors
Midline survey	Perceived constraints of attending high school; quizz: interpreting graph with costs of education		
SCHOOL INFORMATION SESSION	Detailed information on high schools and vocational training, including costs involved and available scholarships		
Endline survey	Questions capturing information retention; aspirations and expectations on education and career path		

Table A.4: Balance Table

Variable	(1) Mean ICET	(2) Mean Placebo	(3) ICET - Plac
Female	0.54 (0.50)	0.53 (0.50)	0.00 (0.95)
Age	15.37 (1.05)	15.37 (1.21)	-0.00 (0.96)
Num siblings	2.50 (2.06)	2.58 (1.69)	-0.08 (0.60)
Financial worries 0-10	7.75 (2.86)	7.94 (2.82)	-0.19 (0.40)
Self-reported wealth (rel. to others)	3.30 (0.70)	3.30 (0.59)	-0.00 (0.96)
Distance to school (km)	3.98 (3.86)	3.99 (4.02)	-0.01 (0.99)
Distance to district town (km)	9.96 (6.47)	9.74 (6.45)	0.22 (0.68)
Distance to high school (km)	9.33 (6.59)	9.27 (6.37)	0.06 (0.90)
Baseline Grade (main subjects, std.)	-0.31 (0.90)	-0.15 (0.96)	-0.16** (0.03)
Baseline Absence (Dec&Jan)	1.63 (1.88)	1.59 (1.96)	0.05 (0.76)
Expected costs high school: total	291.52 (369.41)	274.86 (331.81)	16.65 (0.55)
Expected costs high school: extra classes	15.39 (14.28)	16.41 (13.86)	-1.02 (0.37)
Expected costs high school: transport	22.96 (22.09)	22.19 (19.94)	0.77 (0.65)
Expected costs high school: material	35.80 (54.90)	35.57 (53.75)	0.23 (0.96)
Observations	315	311	626

Notes: (1) and (2): standard deviations in parentheses; (3): derived by regressing variable of interest on treatment dummy, robust p-values reported in parentheses. */**/** denote significance levels at 10/5/1 percent respectively. The baseline grade is the sum of Math, Khmer and English (averaged over the months December and January and standardized). The highest achievable points in Khmer, English, and Math are 100, 50 and 100, respectively. Absences are absent days per month (note that for one school this information is missing).

Table A.5: Robustness checks: Apps Engagement at the Extensive Margin

	Selected Any		Read Any	
	(1)	(2)	(3)	(4)
ICET	-0.002 (0.021)	-0.002 (0.021)	-0.016 (0.015)	-0.016 (0.016)
School fixed effects	✓	✓	✓	✓
Individual controls		✓		✓
Placebo Mean	0.92		0.97	
Observations	626		626	

Notes: OLS estimates. Outcome variables are whether the student selected any occupation as potentially interesting in cols (1) and (2), and whether student read any occupational description in cols. (3) and (4). Individual controls include gender, age, and baseline grade in main subjects. Robust standard errors are depicted in parentheses. */**/** denote significance levels at 10/5/1 percent respectively.

Table A.6: Student Perception of High School Feasibility

	Constraints to high school		Cost of grade 10	
	(1)	(2)	(3)	(4)
ICET	-0.026 (0.140) [0.854]	-0.112 (0.137) [0.623]	51.492 (79.329) [0.767]	69.751 (79.787) [0.623]
School fixed effects	✓	✓	✓	✓
Individual controls		✓		✓
Placebo Mean		5.74		150.37
Observations		626		626

Notes: OLS estimates. The constraints index is the average rating over five statements on a scale from zero to ten: (i) I never want to move far from my home village, (ii) I think I would be able to graduate high school within the three years if I went to high school, (iii) For the jobs that I would like to do the necessary/required education is likely too costly for me and my family, (iv) I think my grades are not good enough to go to high school, and (v) It will be difficult to persuade my parents to allow me to go to high school. Cost estimates are obtained by showing students a bar graph that depicts average educational expenditures per grade in Cambodia from grade 6 to grade 10. Grades 6 to 9 included the actual amount in KHR displayed on top of the bar. Students were then asked to guess the absolute value (in KHR) of the educational expenditure corresponding to grade 10. Their answer is centered around true value (1405). Both outcomes are elicited in the midline survey. Individual controls include gender, age, and baseline grade in main subjects. Robust standard errors are depicted in parentheses. Romano-Wolf p-values adjusted for multiple hypothesis testing in brackets. */**/** denote significance levels at 10/5/1 percent respectively.

Table A.7: Costs and Distance Beliefs about High School, Scholarship Knowledge

	Absolute Difference between Students' Endline Estimates and Truth in								Names correct	
	Distance to HS		Transportation Cost		Cost Extra Classes		Material Cost		Scholarship	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ICET	0.895 (1.383) [0.930]	0.199 (1.352) [0.992]	1.702 (1.323) [0.661]	1.738 (1.330) [0.646]	0.352 (0.840) [0.930]	0.112 (0.826) [0.992]	-2.655 (3.857) [0.930]	-3.289 (3.893) [0.857]	-0.019 (0.037) [0.930]	-0.009 (0.037) [0.992]
School fixed effects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Individual controls		✓		✓		✓		✓		✓
Placebo Mean	11.81		13.69		12.88		26.25		0.45	
Observations	623		623		623		623		623	

Notes: OLS estimates. Outcome variables are students' expectations over (i) the travel time to high school by motorbike (in minutes), (ii) the costs of transportation per month when going to high school (e.g., by motorbike), (iii) the cost of extra classes (i.e. informal tuition) per month, (iv) the annual expenses for school material when going to high school, and (v) the accuracy of students' responses when asked about the non-governmental organizations that provide scholarships for the nearest high school. The time and cost variables are centered around the (school-specific) true value (in absolute terms), i.e. a negative coefficient indicates that estimate is closer to the truth. Cost estimates converted to US-\$. All estimates are winsorized at 95th percentile. Sample size is adjusted for three students who left during the information session (one student from the ICET arm, two from the placebo arm). Individual controls include gender, age, baseline grade in main subjects. Robust standard errors are depicted in parentheses. Romano-Wolf p-values adjusted for multiple hypothesis testing are in brackets. */**/** denote significance levels at 10/5/1 percent respectively.

B Composition of ICET

The Interest and Career Exploration Tool (ICET) was developed together with a Cambodian consultant and implemented by a Cambodian programmer. It heavily borrows from Holland’s hexagonal model of personality types (Holland, 1959, 1997). The model, visualized in Figure A.1, consists of six personality types: realistic (R) or “doer”, investigative (I) or “thinker”, artistic (A) or “creator”, social (S) or “helper”, enterprising (E) or “persuader”, and finally conventional (C) or “organizer”. Other personality models and personality tests that build on Holland (1959) propose additional personality types. For example, Tracey and Rounds (1995) argue to use between six and eight types, while (Athanasou, 2007) uses ten types. We decided to use the original classification proposed by Holland because any set larger than six types is usually a combination of Holland’s six.

A typical personality test based on Holland (1959, 1997) requires the test takers to indicate how much they agree or disagree with several statements related to their own interests, for example, whether they enjoy performing certain activities. These answers are used to identify the test takers’ three most dominant types (or “Holland’s code”). A fundamental assumption in the theory of occupation interest Holland (1959, 1997) is that that occupations can also be classified based on these six personality types, and that individuals working in occupations that match their personality display higher job satisfaction than individuals who do not.

The National Employment Agency (NEA) of Cambodia has already used the Holland’s model for high school students’ career counseling, producing a paper-based booklet with limited outreach. We refrained from using the NEA’s personality tests and instead opted for a version better tailored to our context and age-group. We created three tests to determine the students’ dominant personality types, consisting of statements which are activity-based (e.g. “I like hiking”) and related to students’ life in rural areas. Nonetheless, when linking the test results to potential occupations, we took advantage of the fact that the NEA already provided an extensive list on many occupations and their associated personality type(s). For the occupations the NEA did not classify, we used international classifications of occupations with respect to their personality types.

We chose three jobs per type, depending on the required educational level from low to high: completing grade 9, completing high school, or completing a university degree. The 18 jobs we selected are shown in Table A.1. Inclusion criteria were that the occupations actually exist in these provinces (cross-checked with the Cambodia Socio-Economic survey). Moreover, we included the most common jobs students chose in our pre-study conducted in July 2019: police officer is the job with the lowest educational requirement for the realistic

type, secondary-level teacher is the job with the highest educational requirement for the social type, and general practitioner is the job with the highest educational requirement for the investigative type.

We ran two pre-tests and two pilots to make sure students understood the statements, as well as agreed with the link between their answers and the test results. To enhance the students' comprehension, we added gender-neutral pictures painted by a Cambodian artist to the test statements where possible. Moreover, at the time of the intervention, students were supported by research assistants in the completion of the application. They were also instructed to click on a robot icon that appeared on all relevant pages whenever they had doubts on how to proceed. Clicking on the icon displayed detailed instructions on what students had to do in each part of the application.

The structure of the ICET is summarized in the second column of Table A.3. The ICET starts with the Interest Exploration Tool (IET) and has two parts: a) the three personality tests we developed and b) personalized test results for each student. The IET is followed by the Career Exploration Tool (CET), in which students are shown the 18 occupations from Table A.1 twice in two different designs: a) a pure list in random order from which students can choose up to three and b) an ordered and personalized overview with detailed information about each occupation once students click on it.

The application starts with a login screen and a short introduction. Then, students access the first page of the first test, as shown in Figure B.1. As the application was only programmed in Khmer, all the screenshots we provide are in Khmer.

The first test is based on the work of Athanasou (2000, 2007) and consists of five pages with the same layout, displaying a total of 30 items. Each item consists of two opposing statements, each corresponding, in turn, to a specific personality type. Throughout the test, every personality type is contrasted with all other types twice. For example, when contrasting the artistic type with the social type, the statements were “Designing an original or new equipment that my school needs such as new colorful rubbish bins or desks” versus “Tutoring students who have problems in their studies”. Students are required choose one statement over the other for each item and cannot change their selection once they proceed to the next page. Consistently choosing one particular personality type over the others results in a maximum score of ten points for that type.

The second test consists of 42 activity-based statements related to one of the six types, displayed across two pages with the same layout. Students check the box to select a statement and are allowed to deselect their choice if needed. A type receives points whenever students check its related box, with a maximum of seven points. The template for this test is the result of a collaboration between the Hawaii Department of Education and the Occupation

Information Network (O*NET) (Hawaii Department of Education, 2020) and it has been in use worldwide for at least a decade, although most users are located in Hawaii or in the United States. We include this test because it has been internationally validated (although not for Cambodia).

To the best of our knowledge, the format of the third test has not been implemented prior to this study. We designed it after discussing what would be appropriate for ninth-graders with local experts. It consists of five different scenarios, on five separate pages with the same layout. Each scenario starts with a half-sentence describing a particular situation (see Figure B.3 for an example). Students are then shown six different options of how the sentence could be completed. Each option is related to a specific personality type and can be assigned up to three points by the students. Students can (1) choose three different options, thus giving one option one point each, or 2) choose two options such that one receives two points and the other only one point, or 3) choose a single option by allocating three points to it. Based on five different scenarios, the maximum number of points awarded for the same personality type is 15. Students are not allowed to change their choices once they proceed to the next page.

The students' choices in all tests are used to compute the final score for each personality type. In aggregating the results from the three tests, our goal was to maximize variation across types and to minimize differences in results between tests. Based on data from two pilots, we set the scoring algorithm as follows: the third test is given the highest weight, entering the formula with half of its score. The second test is divided by a factor of 2.5, while first test by a factor of 20.

After completing the three tests, the students are forwarded to a result page, which displays all six personality types. Students see their three strongest personality types in bright colors from left to right in the first row, while the three weakest types are displayed in muted colors in the second row (see Figure B.4). Furthermore, students are presented with bars showing their final score for each personality type. The highest score is normalized to 100, and the scores for the other types are given as percentages of the highest score. For each type, the corresponding keyword (e.g., “realistic”) and a brief description inspired by the Delaware Department of Labor (2019) (but adapted to the rural Cambodian context) are displayed on the results page. Students can click on any of the six personality types to read more detailed descriptions. This screen concludes the IET section of the app.

The next section of the app (named CET) focuses on occupations. First, students are shown the 18 jobs from Table A.1 in random order, together with pictures (Figure B.5). Student can choose to click on any given occupation. We refer to this element as “unframed selection”, as no information on personality types or educational level is disclosed. Students

are instructed to choose up to three jobs which seem attractive to them, with an opt-out option in case they do not find any job to be interesting.

The application concludes with an overview of the same jobs, this time ordered by the students' strongest personality types (see Figure B.6a). The first row shows the students' best occupational matches based on their Holland Code, arranged from left to right starting with the job that requires the least education and ending with the job that requires the most education. All 18 jobs are displayed on the same page, and students can click on any occupation to open a pop-up window with a detailed description. Each description outlines the job's activities, key tasks and responsibilities, societal value, and educational requirements (see B.6b for an example, in this case agricultural technician). Students are free to read any job description, including those that do not relate to their strongest personality types, within a 17-minutes limit. A timer, shown as a green bar that turns yellow and red towards the end, tracks the time. They can also log out anytime before the timer runs out.

Figure B.1: Screenshot of Test 1

ផ្នែកទី 1 ផ្នែកទី 2 ផ្នែកទី 3

(សូមចុចលើប្រអប់ដើម្បីអានការណែនាំក្នុងការឆ្លើយម្តងទៀត)

7. ☐ ចរចាតម្លៃដើម្បីទិញឥវ៉ាន់នៅក្នុងផ្សារ		ឬ	☐ សរសេររាយបញ្ជីអំពីការងារដែលត្រូវធ្វើ	
8. ☐ គូរគំនូរទេសភាព អាគារល្បីៗ ផ្ទះ ឬមនុស្ស		ឬ	☐ ការប្រកួតប្រជែងខ្លួនឯងជាមួយនឹងមុខវិជ្ជាថ្មីៗនៅសាលា	
9. ☐ តាមដានការចំណាយគ្រួសារ និងត្រួតពិនិត្យឲ្យប្រាកដថាវាជារឿយៗដែលត្រូវបានបង់		ឬ	☐ ការចិញ្ចឹម (អោយចំណី និងមើលថែរក្សា) សត្វ	
10. ☐ ស្វែងយល់ពីមូលហេតុដែលបាក់របស់អ្វីមួយនៅសាលា		ឬ	☐ ផ្តល់បទបង្ហាញអំពីកិច្ចការសាលាណាមួយរបស់ខ្ញុំទៅសិស្សទាំងអស់ក្នុងថ្នាក់	
11. ☐ រៀនពីរបៀបពន្យារអត្ថប្រយោជន៍ (ឧ: ភ្លើងឆេះផ្ទះ ឆេះវាលស្រែ ។ល។)		ឬ	☐ រចនាអ្វីម្យ៉ាងដែលមនុស្សផ្សេងទៀតមិនធ្លាប់បានគិតឃើញពីមុនមក	
12. ☐ សហការជាមួយមិត្តរួម ថ្នាក់ដើម្បីពិភាក្សាពីវិធីធ្វើឱ្យថ្នាក់រៀនមានសភាពល្អ (ឧ: ស្អាតនិងមានអនាម័យ)		ឬ	☐ រៀបចំបន្ទប់, ផ្ទះ ឬថ្នាក់រៀនរបស់ខ្ញុំមានឲ្យសណ្តាប់ធ្នាប់និងអនាម័យ	

20 %

2/5
ទំព័របន្ទាប់ →

Notes: The application was programmed only in Khmer.

Figure B.2: Screenshot of Test 2

ផ្នែកទី 1
ផ្នែកទី 2
ផ្នែកទី 3

(សូមចុចលើប្រអប់ដើម្បីអានការណែនាំក្នុងការឆ្លើយ)

1. ☐ ខ្ញុំចូលចិត្តពិនិត្យទៅលើស្វែងយល់ ជួសជុលម៉ូតូ
2. ☐ ខ្ញុំចូលចិត្តលេងល្បែងផ្លូវប
3. ☐ ខ្ញុំពូកែធ្វើការដោយឯករាជ្យខ្លួនឯង មិនចាំបាច់មានការណែនាំច្រើន
4. ☐ ខ្ញុំចូលចិត្តធ្វើការជាក្រុម
5. ☐ ខ្ញុំជាមនុស្សមានមហិច្ឆតាខ្ពស់ ហើយខ្ញុំកំណត់គោលដៅសម្រាប់ខ្លួនឯង
6. ☐ ខ្ញុំចូលចិត្តរៀបចំរបស់ផ្សេងៗ (ឯកសារ កុ ឬ បន្ទប់ការិយាល័យ)
7. ☐ ខ្ញុំចូលចិត្តការសាងសង់ (ឧ៖ ធ្វើទ្រូងមាន់ទា របងថ្ម ឬរបងព័ទ្ធជុំវិញសាលារៀន)
8. ☐ ខ្ញុំចូលចិត្តអានអំពីសិល្បៈ និងកម្រៃ
9. ☐ ខ្ញុំចូលចិត្តមានការណែនាំច្បាស់លាស់ក្នុងការឆ្លើយ
10. ☐ ខ្ញុំចូលចិត្តព្យាយាមឲ្យខ្លួនឯងមានឥទ្ធិពល ឬអាចបញ្ចុះបញ្ចូលមនុស្សដទៃឲ្យឆ្លើយ
11. ☐ ខ្ញុំចូលចិត្តធ្វើការពិសោធន៍
12. ☐ ខ្ញុំចូលចិត្តបង្រៀន ឬបណ្តុះបណ្តាលមនុស្ស
13. ☐ ខ្ញុំចូលចិត្តជួយមនុស្សក្នុងការដោះស្រាយបញ្ហារបស់ពួកគេ
14. ☐ ខ្ញុំចូលចិត្តទើលថែរក្សាសត្វ
15. ☐ ខ្ញុំអាចធ្វើការ ៨ ម៉ោងក្នុងមួយថ្ងៃ នៅក្នុងការិយាល័យបាន
16. ☐ ខ្ញុំចូលចិត្តលក់របស់របរ
17. ☐ ខ្ញុំចូលចិត្តការសរសេរលក្ខណៈមានការច្នៃប្រឌិត
18. ☐ ខ្ញុំចូលចិត្តវិទ្យាសាស្ត្រ
19. ☐ ខ្ញុំចង់និងឆាប់ទទួលយកកូនាទី ឬទំនួលខុសត្រូវក្នុងការងារអ្វីមួយ
20. ☐ ខ្ញុំចាប់អារម្មណ៍ក្នុងការព្យាបាលមនុស្សឲ្យធូរស្បើយ
21. ☐ ខ្ញុំចូលចិត្តស្វែងយល់ពីរបៀបក្នុងការធ្វើឲ្យអ្វីមួយដំណើរការ

1/2
ទំព័របន្ទាប់ →

Notes: The application was programmed only in Khmer.

Figure B.3: Screenshot of Test 3

ផ្នែកទី 1 ផ្នែកទី 2 ផ្នែកទី 3

(សូមចុចលើប្រអប់ដើម្បីអានការណែនាំក្នុងការឆ្លើយ)

ព្រឹត្តិការណ៍ទី១៖

គ្រូបស់ប្អូនកំពុងស្វែងរកសិស្សមួយក្រុមដើម្បីជួយគាត់ក្នុងការសម្តែងរឿងមួយ (ឧទាហរណ៍ ទុំទាវ) ដោយសមាជិកក្រុមត្រូវសម្តែងជាតួអង្គផ្សេងៗនៃសាច់រឿង និងមានតែងខ្លួនស្លៀកសម្លៀកបំពាក់ឲ្យដូចតួអង្គជាដើម។ តើប្អូនគិតយ៉ាងណាដែរ?

1. ☐ ☐ ☐ ខ្ញុំស្រលាញ់ការសម្តែង។ ខ្ញុំចង់សម្តែងជាតួអង្គមួយនៅក្នុងរឿង!
2. ☐ ☐ ☐ ដោយសារការខិតខំប្រឹងប្រែងរបស់យើង, ខ្ញុំគិតថាយើងគួរតែបង្ហាញការសម្តែងនេះ មិនត្រឹមតែនៅក្នុងសាលារៀនប៉ុណ្ណោះទេប៉ុន្តែថែមទាំងនៅទីប្រជុំជនផងដែរ។
3. ☐ ☐ ☐ ការសម្តែងនៅក្នុងសាលាគឺជាសមិទ្ធផលរបស់មនុស្សជាច្រើនដែលធ្វើការជាមួយគ្នា ហើយនេះគឺជាអ្វីដែលខ្ញុំចូលចិត្តបំផុត។
4. ☐ ☐ ☐ ខ្ញុំមិនឃើញចំណុចសំខាន់ក្នុងការចូលរួមសកម្មភាពនេះទេ។ ខ្ញុំចង់រៀនសម្រាប់ត្រៀមប្រលងវិញ។
5. ☐ ☐ ☐ ខ្ញុំនឹងសូមឲ្យគ្រូបស់ខ្ញុំជួយផ្តល់សៀវភៅរឿង ដើម្បីឲ្យខ្ញុំបានអាន និងស្វែងរកសាច់រឿងល្អៗផ្សេងៗដែលគួរឱ្យចាប់អារម្មណ៍ដើម្បីបានជាគំនិត។
6. ☐ ☐ ☐ ខ្ញុំចាប់អារម្មណ៍បំផុតក្នុងការរៀបចំឆាកនិងត្រៀមសម្ភារៈផ្សេងៗ។

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ទំព័របន្ទាប់ →

Notes: The application was programmed only in Khmer.

Figure B.4: Screenshot of the Test Results



Notes: The application was programmed only in Khmer.

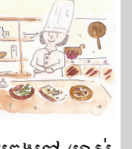
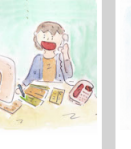
Figure B.5: Screenshot of the Job List

ផ្នែកការងារ



នៅផ្នែកនេះ ប្អូននឹងឃើញមានជម្រើសនៃការងារ ដែលសិស្សទាំងឡាយដូចជាប្អូនជាដើម អាចមាន
ចំណាប់អារម្មណ៍។ តើការងារណាខ្លះ ដែលប្អូនគិតថាគួរឲ្យចាប់អារម្មណ៍? ប្អូនអាចជ្រើសរើស
ដោយចុចលើរូបភាព ឬឈ្មោះការងារខាងក្រោមចាប់ពី ០ ទៅ ៣ ការងារ។

អានបន្ត

 វិស្វករសំណង់ ស៊ីវិល	 អ្នកបំរើការងារ សង្គម (ធ្វើការ ជាមួយអង្គការ ក្រៅរដ្ឋាភិបាល - NGO)	 អ្នកសារព័ត៌មាន	 គ្រូពេទ្យបង្អែក	 មន្ត្រីថ្មីលីស	 ជាងឈើ
 ភ្នាក់ងារអចលន ទ្រព្យ	 មេចុងភៅ (ម្ចាស់ ភោជនីយដ្ឋាន)	 ស្ថាបត្យករ	 អ្នកទទួលភ្ញៀវ	 មគ្គុទេសក៍ ទេសចរណ៍	 អ្នកបច្ចេកទេស កសិកម្ម
 អ្នកថ្លែងដល់សម្លៀក បំពាក់	 គ្រូ កម្រិតអនុវិទ្យាល័យ	 អ្នកថតរូប	 អ្នករដ្ឋបាល ការិយាល័យ	 អ្នកគ្រប់គ្រងផ្នែក លក់	 អ្នកបង្កើតកម្មវិធីកុំ ពូជ័រ

☐ គ្មានការងារណាដែលខ្ញុំចាប់អារម្មណ៍ទេ

ទំព័របន្ទាប់

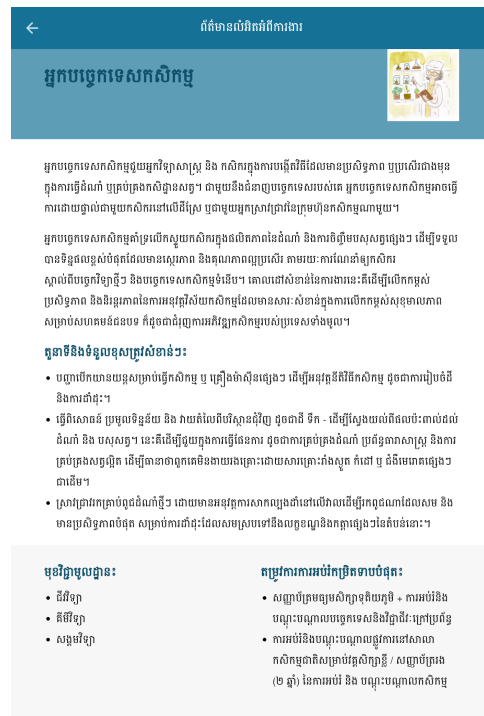
Notes: The application was programmed only in Khmer.

Figure B.6: Screenshots of the Career Options

(a) Overall Job page



(b) Example of one Job Description



Notes: The application was programmed only in Khmer.