EDUCATE GIRLS DEVELOPMENT IMPACT BOND

IMPROVING EDUCATION FOR 18,000 CHILDREN IN RAJASTHAN

May 20th, 2015

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ABOUT THE AUTHOR

Instiglio is a non-profit that improves the impact of social programs in developing countries by tying funding to impact. By focusing funding on results, Instiglio incentivizes high-quality services and improved delivery methods that ultimately improve social outcomes.

At the center of Instiglio's efforts are the design, structuring, and implementation of results-based financing mechanisms, in particular impact bonds. Beyond implementation of results-based finance, Instiglio is also working with international organizations to develop and disseminate best practices in the design and implementation of impact bonds while developing a market for social outcomes through the use of these instruments.

ACKNOWLEDGEMENTS

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1. Executive summary

The Educate Girls Development Impact Bond (the "EG DIB" or the "DIB") is a joint project between the Children's Investment Fund Foundation ("CIFF"), Educate Girls ("EG"), the UBS Optimus Foundation ("UBS Optimus" or "UBS Optimus"), IDinsight, and Instiglio (collectively, the "Working Group") to provide and improve education for girls in rural India. At the heart of the program is Educate Girls' intervention to increase enrollment for girls and learning for girls and boys in the district of Bhilwara in rural Rajasthan, India. The project will run for three years from mid-2015 until mid-2018. UBS Optimus will act as the investor, financing the project implementation, while CIFF will pay for enrollment and learning outcomes as ascertained by IDinsight, an independent evaluator. Instiglio is the manager for the project and will provide performance management services to Educate Girls. This document outlines the individual components of the project.

Goals

The goal of the EG DIB is to test a new model for improving social outcomes in international development, and, more specifically, to test the application of DIBs to improving educational outcomes in India. Girls' education in India is a pressing issue that has motivated the Working Group and Instiglio to pursue the rigorous and collaborative approach offered by a DIB to improve the educational experience girls in Rajasthan receive.

Outcomes

The main outcome of the design process summarized in this design memo is a DIB that adheres to the principles outlined below. A set of contracts among Working Group members specify the main terms that will govern the DIB. In addition, a Process Evaluator has been hired to document the process of creating the deal and create lessons for future deals.

Principles

The following principles have guided the Working Group's design of the DIB:

The DIB must:

- create the largest possible impact on girls' education in the treatment population;

- allow Educate Girls, CIFF, UBS Optimus, and Instiglio each to play the role that they are best positioned to play;

- maximize the replicability of the design process and the replicability of the DIB, especially in education;

- allow Educate Girls staff, from field staff in Rajasthan to upper management in Mumbai, to easily understand payment metrics and payment design, and how they translate into their work; and

- avoid perverse incentives in the design for any participant in the program, especially protecting the program's beneficiaries.

Development Impact Bonds (DIBs)

A DIB is a business model for achieving social outcomes in international development. In this model, an outcome payer, which can be a development agency or a foundation, enters into a pay for success contract to compensate a service provider for social outcomes. The service provider, which can be for-profit or not-for-profit, gets up-front

working capital from socially-motivated investors to deliver services. Investors get repaid by the outcome payer only if outcomes are achieved.

This model differs from standard contracts for social programs because of its focus on tying financial returns and payments to rigorously measured social outcomes and because of the involvement of socially-motivated investors in funding social service delivery. As such, it holds potential to sustain long-term, results-focused partnerships among nonprofits, donors, and investors that address important social issues. In a DIB, performance incentives and private sector rigor motivate service providers to maximize their impact and their value for money. Furthermore, the measurement of social outcomes generates an evidence base for future efforts.

A detailed description of DIBs is available in the report *Investing in Social Outcomes: Development Impact Bonds*, published by the Center for Global Development and Social Finance in October 2013. That report outlines three potential advantages of DIBs over existing funding mechanisms:

> DIBs transform social problems into "investible" opportunities by monetizing the benefits of tackling social problems, so attracting private sector investors wanting to bring their resources and skills to development.

> DIBs create incentives for investors to put in place (typically through intermediaries) the necessary feedback loops, data collection and performance management systems required to achieve desired outcomes, resulting in a bottom-up, client-centred, and generally more effective, approach to service delivery.

> Because investors provide funding - and assume risk - for interventions expected to lead to improved social outcomes, DIBs could attract funding for interventions that donor agencies and governments might not be willing or able to fund directly.

2. Participants

This section describes the roles of the main participants in the Educate Girls DIB, the structure of the project, the main agreements into which the participants will enter, and the key milestones of the program.

Participants

Service Provider: Educate Girls. Educate Girls is a nonprofit organization based in Mumbai that delivers an educational program in Rajasthan. In this contract, it will deliver enrollment and learning services to approximately 18,000 boys and girls in Rajasthan, India. A service delivery contract between Educate Girls and UBS Optimus will specify high-level activities Educate Girls should deliver as part of the contract and will clearly define the desired outcomes.

Investor: UBS Optimus Foundation. UBS Optimus is the Zurich-based foundation arm of UBS, which will make a project-specific investment to finance Educate Girls' program. UBS Optimus will also oversee its investment with the help of Instiglio, the project manager. At the end of the project, UBS Optimus will receive a payment from CIFF based on the measured outcomes of its investment.

Outcome Payer: Children's Investment Fund Foundation. CIFF is a London-based foundation, which will pay for enrollment and learning outcomes achieved for the selected population of students in Rajasthan, India. As part of this contract, CIFF will disburse payments only for successfully achieved outcomes.

Project Manager: Instiglio. Instiglio is a nonprofit intermediary based in Bogota, Colombia with operations globally. Instiglio provides technical assistance in the design, structuring and performance management of results-based financing programs in developing countries. Instiglio has also played a leading role in creating market infrastructure and awareness around the importance of tying funding to results. Instiglio has been managing the design of this DIB and will deliver performance management services to Educate Girls over the three years of the contract.

Outcome Evaluator: IDinsight. IDinsight is an impact evaluation firm headquartered in San Francisco with offices in India, Uganda, and Zambia. It will design and implement the outcome evaluation that will determine the amount of enrollment and learning outcomes achieved by Educate Girls over the contract period. IDinsight will deliver data and outcomes reports to the Working Group as needed throughout the contract period.

Process Evaluator: Dalberg Global Development Advisors. Dalberg is an international development consulting firm. It will document the process of designing the DIB, and follow implementation, with the goal of disseminating lessons learned about the design and implementation phase.

Drafting Counsel: Linklaters. Linklaters is an international law firm, which serves as drafting counsel for the contracts that constitute this transaction.

Review counsel: Reed Smith. Reed Smith is an international law firm, which serves as review counsel for the contracts that constitute this transaction.

Structure
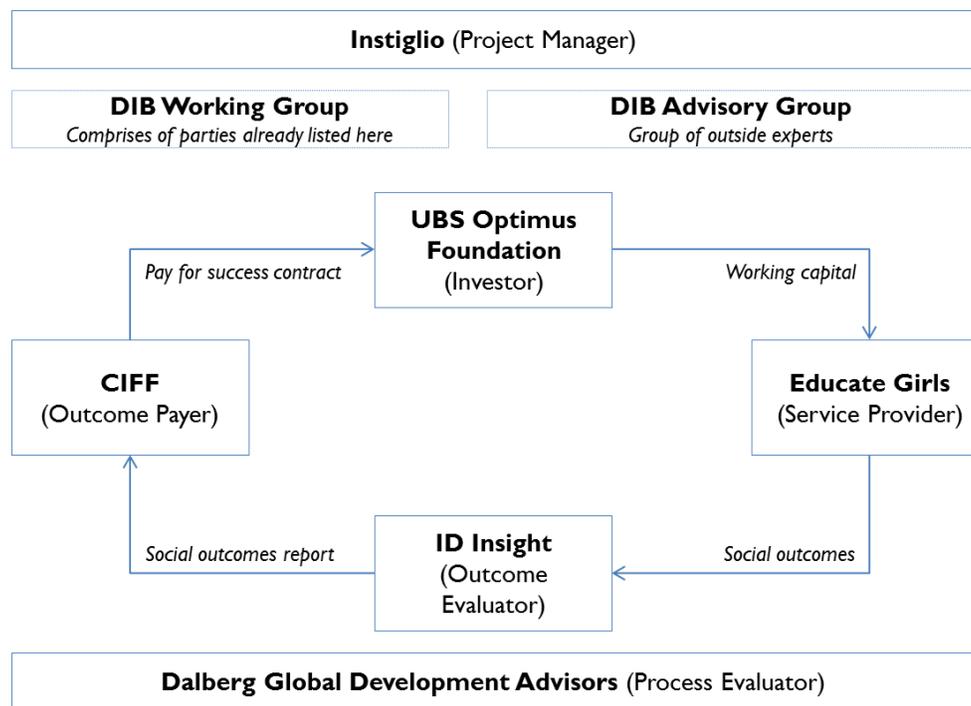
As shown in the diagram above, Educate Girls will receive working capital from UBS Optimus to carry out its three-year intervention. IDinsight will assess the progress that Educate Girls has made in improving enrollment and learning outcomes. After the program concludes in 2018, IDinsight will deliver an outcomes evaluation report to CIFF, UBS Optimus, and Educate Girls, which will show the measured impact of Educate Girls on enrollment and learning for the target population. CIFF will disburse payments to UBS Optimus according to the level of enrollment and learning outcomes measured for the program. Instiglio has managed the design of the DIB and will deliver performance management services to Educate Girls throughout the program.

The DIB Working Group was created to advance the design of the project. It comprises CIFF, Educate Girls, Instiglio, and UBS Optimus.

The DIB Advisory Group was created to provide governance and oversight of the project during the design and implementation phases. The Advisory Group comprises of the following individuals.

- Paul Atherton, UK Department for International Development

- Owen Barder, Center for Global Development

- Nicholas Burnett, Results for Development

- Catalina Geib, Center for Global Development

- Nicole Goldstein, UK Department for International Development

- Susan McAdams, The World Bank Group

- Gul Mukhey, Mentor Growth Capital

- Rita Perakis, Center for Global Development

- Darren Pigg, PwC

- Paul Simon, Earth Capital Partners

Contracts

The obligations of the parties to each other with respect to the DIB are described in the following set of contracts.

Framework Agreement: This agreement is the overarching agreement that lays out the basic relationships and responsibilities of the DIB between the Investor, the Service Provider, the Outcome Payer, the Intermediary, and the Outcome Evaluator.

Grants and Services Agreement: This agreement is between the Investor and the Service Provider and describes the Service Provider's service delivery obligations and the Investor's working capital payments to the Service Provider.

Outcomes Agreement: This agreement describes the Outcome Payer's payment obligations to the Investor and sets out the financial terms of the deal.

Outcomes Evaluation Agreement: This agreement is between the Outcome Payer and the Outcome Evaluator, and describes the evaluation methodology and the work plan.

Project Management Agreement: This agreement is between the Investor and the Project Manager, and describes project management, deal structuring and performance management services during implementation.

Key terms

This table outlines the key terms of the agreement. The details of these terms are described in subsequent sections.

Target area and population	- The program will be implemented in the Mandalgarh and Jahajpur blocks in the Bhilwara district - Educate Girls will deliver services in 140 villages, which contain 166 government schools - Educate Girls is expected to reach approximately 18,000 children
Govt. relationship	- IDinsight and Educate Girls will each enter into a memorandum of understanding with the Rajasthan government - IDinsight will sign an evaluation memorandum, and Educate Girls will sign an implementation memorandum

Pricing and payment schedule	• Service provision will cost INR 17,332,967 • Maximum outcome payment will be USD 422,000 • UBS Optimus will disburse to Educate Girls in two payments: 40% of the working capital requirement in the Spring of 2015, and 60% of the requirement in the Spring of 2016 • Enrollment and learning are the payment outcomes • CIFF will make one outcome payment to UBS Optimus in 2018, based fully on outcomes • Price per outcome will be constant in CHF • UBS Optimus' return on investment will be 10% expected IRR, 15% maximum IRR (before incentive payments to Educate Girls)
Learning outcome	• 80% of the total outcome payment is allocated to this outcome • The target population is made up of girls and boys in grades 3-5 • Learning will be measured using the ASER test, administered by IDinsight
Enrollment outcome	• 20% of the total outcome payment is allocated to this outcome • The target population is made up of girls ages 7-14 that would are eligible for enrollment into grades 2-8 • Enrollment will be measured by calculating the percentage of out of school girls who are enrolled into government schools, as verified by IDinsight
Educate Girls incentives	• UBS Optimus will pass on an incentive payment to Educate Girls equal to 32% of UBS Optimus' payment above principal

3. The Intervention

Social issue

This project focuses on providing and improving education for girls in rural India. India has made substantial commitments to education. Yet it still has the largest illiterate population in the world and opportunities for improving educational outcomes remain. Specifically, substantially differential access and educational outcomes exist for boys and girls throughout the country. By focusing on educational outcomes for girls, this project aims to close the gender gap in an area where that gap is especially prevalent.

India has made substantial commitments to education with the 2009 Right of Children to Free and Compulsory Education Act. The Act provides free and compulsory education for all children aged 6-14. In addition, India has made progress toward universalizing access over the past 15 years through the District Primary Education Programme and its successor Sarva Shiksha Abhiyan (The Education for All Movement).

Yet opportunities for improving educational outcomes remain. For girls, the problem of education in India involves poverty, hygiene, and safety. Girls often must stay home to care for younger children or spend hours a day on household chores. Girls aged 6-14 spend an average of 6 hours each day in the house caring for their siblings.[1] When girls do attend, they face additional problems: only 55% of schools in India have girls' toilets and only 42% of teachers are female.[2] In 2005, 23% of teachers were absent from government primary schools in Rajasthan (and 25% nationally) and only half were teaching during unannounced visits.[3]

Low quality of education and shortage of teachers creates a disincentive for parents in rural areas to send their daughters to school. In a 2008 survey, 42% of girls said they dropped out of school because they had been told to quit by their parents.[4] As a result, learning outcomes are poor: 47% of children in grade five cannot read a paragraph in their own language and 30% cannot solve simple subtractions.

These problems have created substantial gender gaps in education. These manifest themselves in terms of the country as whole, marked regional variations, and an urban rural dichotomy. More than 60% of out-of-school children are girls.[5] The female literacy rate is 44%, compared to 76% for males.[6] The situation is starker in rural areas: for every 100 rural girls, only 40 complete class five and only one reaches class 12.[7] There are also social dimensions of marginalization. Where parents can afford to send only one of their children to a private school, typically that will be a boy.

The gender gap is particularly significant in Rajasthan, where nine of the 26 districts with the worst gender indicators in India are located. The other options for educational access in rural Rajasthan include private schools and NGO run, formal and non-formal schools. Private schools often fail to attract the girl child population and some NGO run

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[1]   National Commission for Protection of Children's Rights (NCPCR), accessed on <http://www.time.com/time/world/article/0,8599,1985026,00.html>

[2] http://www.un.org/womenwatch/feature/idrw

[3] Michael Kremer et al., "Teacher Absence in India: A Snapshot," *Journal of the European Economic Association*, Vol. 3, Issue 2-3, pp. 658–667, April-May 2005

[4] Bhowmick, N. (2010, 04 29). School is a right, but will Indian girls be able to go? *TIME*, Retrieved from http://www.time.com/time/world/article/0,8599,1985026,00.html

[5] Census of India (2001)

[6] Hunt, Frances (2008) *Dropping Out of School: A cross country review of literature*. Create Pathways to Access, Research Monograph, No. 16, MY.

[7] www.unesco.org/education/efa/.../children_out_of_school.pdf

educational establishments are intermittent and provide services in an ad hoc manner failing to reach the scattered communities of marginalized girls.

For many individuals, and especially girls and women, the lack of a quality education is one of the key barriers to playing a role in, and benefiting from, economic development. The gap between India's poor and growing middle classes is widening. The socio-economic implications of reducing gender gaps are major. Evidence suggests that, for each additional year a female is educated, household incomes rise 10-25%. Educated girls are also three times less likely to be HIV positive, will marry three years later, have healthier and fewer children, and educate their daughters.[8]

Service Provider

Educate Girls is an eight-year-old Indian nonprofit organization that focuses on enrollment, retention and learning of marginalized girls by leveraging existing government and community infrastructure. Its program model resides on top of the India's 2009 Right to Education Act. Educate Girls is currently present in six critical gender gap districts in Rajasthan. With a staff of 552 full time employees and 4,500 community volunteers, Educate Girls operates in more than 4,400 villages and more than 8,000 schools.

Problems	Barriers	Solutions
Lack of ownership	• Bureaucratically run Schools • Lack of parental involvement	• Recruit village-based youth leaders to work as champions for girl's education and catalyst for school reform
Rigid societal norms	• Gender bias • Child marriage	• Increase awareness about gender equity and girls education • Door-to-door surveys to identify out-of school girls • Enhance motivation, leadership and life skills for marginalized girls
Lack of girl friendly infrastructure in schools	• Schools do not have separate toilets for girls • No boundary walls around the school	• Formalize and train School Management Committees on Right to Educate Act and how to access available • Funding for their school from SSA
Dismal learning outcomes	• Low quality (teachers & curriculum) of education • Shortage of teachers	• Train government teachers in child-centric activity-based pedagogy (Creative Learning & Teaching)

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[8] http://www.dise.in/Downloads/Publications/Publicatoin%202008 09/Elementary%20Education%20Under%20Gvoernment%20Managements%20.pdf

Intervention

Enrollment

Educate Girls delivers a comprehensive community intervention to enroll girls into school. This intervention includes identification of out-of-school girls through door-to-door surveys, explanation of the value of schooling to the parents and to the community, and multi-channel engagement with the household where a girl is out of school. Educate Girls also uses multiple different interventions to improve school attendance and prevent drop-outs. For example, it works with the School Management Committee to improve school infrastructure. It also identifies girls who have dropped out and works with the community to re-enroll them into school.

Learning

Educate Girls has young female volunteers deliver a child-centric curriculum, called Creative Learning and Teaching, three times weekly to boys and girls in grades 3-5. The volunteers are often selected from the villages where they will be working. They are incentivized with a small number of career-development opportunities, such as free English classes and the possibility of being hired by Educate Girls in the future.

Target population

This project will cover about 18,260 total beneficiaries, of whom about 9,000 will be beneficiaries of the learning intervention. These estimates are based on government data for Bhilwara. Educate Girls will update these estimates by conducting household surveys in the treatment area in June-July 2015.[9]

Service delivery will take place in 166 schools that are located in 140 villages in the Jahajpur and Mandalgarh blocks in Bhilwara district of Rajasthan. Of those schools, most are primary-only and the rest have primary and upper-primary students.

Government relationship

IDinsight and Educate Girls will each enter into a memorandum of understanding with the Rajasthan government. IDinsight will sign an evaluation memorandum, and Educate Girls will sign an implementation memorandum. Execution of both of these memorandums within one year of implementation starting is a condition precedent for the continuation of the DIB.

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[9] The evaluation section describes the methodology for selecting schools into the treatment group.

4. Payment structure

This section describes the overall structure of payment from CIFF to UBS Optimus and from UBS Optimus to Educate Girls. Sections 5 and 6 provide details for the calculation of learning and enrollment payments.

General payment formula

CIFF will pay UBS Optimus for gains made by Educate Girls in enrollment and learning. CIFF will make just one payment after conclusion of the program in 2018 for performance against these outcomes as defined in Sections 5 and 6.

UBS Optimus will make two program disbursements to Educate Girls to cover the costs of Educate Girls' program. The first payment will be in June 2015. This payment will be conditioned on the signing of all contracts among all parties. The second payment will be in June 2016. This payment will be conditioned on Educate Girls delivering performance reports to UBS Optimus and reaching certain performance milestones. UBS Optimus will also make a potential incentive payment to Educate Girls in December 2018. This payment will be based on Educate Girls' performance against the target outcomes and is described in section 4.7.

CIFF's payment to UBS Optimus will be made using the formula described in the following table.

Payment formula
$$P = P_E \times E + P_L \times L = 910.14 \times E + 43.16 \times L$$ - *P* is the total payment that CIFF will make to UBS Optimus after the conclusion of the program.   - P_E is the payment per unit of outcome for enrollment in Swiss francs. This is defined in section 0.   - *E* is enrollment outcomes, defined as the percentage of all eligible girls enrolled. Section 6 defines this outcome in greater detail.   - P_L is the payment per unit of outcome for learning in Swiss francs. This is defined in section 5.   - *L* is learning outcomes, defined as one unit of improvement on the ASER test. Section 0 defines this outcome in greater detail.

Examples of potential payment scenarios

(USD)

	% of expected performance	Outcome payments			Return over principal	IRR	ROI
		Enrolment	Learning	Total			
Very good	143%	$92,911	$419,429	$422,000	$144,085	15%	52%
	129%	92,911	377,486	422,000	144,085	15%	52%
	114%	83,886	335,543	419,429	141,514	15%	51%
Expected	100%	73,400	293,600	367,000	89,085	10%	32%
Fair	86%	62,914	251,657	314,571	36,657	4%	13%
	71%	52,429	209,714	262,143	–	(2%)	(6%)
	57%	41,943	167,771	209,714	–	(9%)	(25%)
Poor	43%	31,457	125,829	157,286	–	(18%)	(43%)
	29%	20,971	83,886	104,857	–	(29%)	(62%)
	14%	10,486	41,943	52,429	–	0%	(81%)
No impact	–	–	–	–	–	NM	(100%)

The table above describes a range of potential outcomes and the corresponding payments from CIFF to UBS Optimus, as well as the corresponding return for UBS Optimus. The expected level of outcome payments was based on Educate Girls' historical performance on enrollment and learning.

The range of outcomes listed in the table is illustrative. IDinsight will determine enrollment and learning outcomes and use the payment formula shown above to determine the corresponding outcome payment.

Outcome Pricing

Design. This design uses the historical cost of delivering outcomes for estimating outcome prices. Each outcome metric is priced as follows:

1. **Set the expected outcome payment**. The expected outcome payment from CIFF to UBS Optimus is set such that UBS Optimus earns 10% IRR. Currently, expected payment is set at $367,000, or 87% of CIFF's total outcome payment.

2. **Allocate total payment to the target outcomes.** The expected outcome payment is allocated to enrollment and learning "payment buckets." Each bucket contains the expected payment from CIFF to UBS Optimus for that outcome. Of the total outcome payment, 80% has been assigned to learning and 20% to enrollment.

3. **Estimate expected performance for each target outcome.** Instiglio used Educate Girls' historical performance and characteristics of the new area where Educate Girls will deliver services to estimate Educate Girls' expected performance on enrollment and learning.

4. **Calculate price per unit of outcome.** The price per unit of outcome is the expected total payment for that outcome divided by Educate Girls' expected performance for that outcome.

Discussion. There are multiple approaches to pricing outcomes. The approach described here is most appropriate considering the high quality, rigorous data that Educate Girls has regarding the cost and impact of their program.[10] Other SIBs have priced outcomes on the basis of budgetary savings to the government, or on the basis of averted societal cost.

Payment caps

Design. The overall outcome payment from CIFF to UBS Optimus will be capped at USD 422,000. Payments for enrollment and learning will not be capped individually, but will be subject to the overall cap.

Discussion. The following factors affecting caps were considered. On the one hand, leaving individual outcomes uncapped may allow Educate Girls to focus on one outcome while ignoring the other one. On the other hand, a cap on an individual outcome increases the risk that Educate Girls delivers outstanding results but Educate Girls and UBS Optimus do not receive compensation for those results. Caps on individual outcome payments also introduce additional investment risk because the investor loses the ability to pool performance risk across payment metrics.

Foreign exchange provisions

The exchange rate risk associated with the DIB's cash flows is split up into different components, as shown below.

Exchange rate risk on disbursements to Educate Girls. UBS Optimus' investment in the program, which will be disbursed to Educate Girls in two initial tranches, are fixed in Indian Rupees to protect Educate Girls from exchange rate fluctuations and ensure that the program is fully funded. All program expenses are in Indian Rupees.

Exchange rate risk on outcome payment. CIFF's outcome payment to UBS Optimus, which will occur after the release of the evaluation report, is fixed in Swiss Francs per outcome, relieving UBS Optimus of some exchange rate risk. However, the total payment is capped at USD 422,000, since CIFF's currency is US Dollars.

Service provider incentive payment

Design. UBS Optimus will incentivize Educate Girls to perform above expected milestones by giving it an incentive payment out of the payment it receives from CIFF.

UBS Optimus will calculate the incentive payment as 32% of the amount by which the Outcomes Payment exceeds the initial investment principal.

Discussion. In some SIB structures providers receive payments linked to the results they achieve. Providers may face downside risk (where they fail to recoup some of the cost of service delivery if they don't achieve outcomes) or upside risk (where they stand to gain unrestricted funds for meeting or exceeding outcomes). For example in the Massachusetts Juvenile Justice SIB, the provider (ROCA) is deferring 15% of its service fees. It stands both to recover that 15% and to be rewarded with additional money, based on the success of its program.[11] This exposes ROCA to both upside and downside risk. Passing risk and potential reward onto the provider can create financial incentives for the provider to deliver to outcomes.

The choice of whether to have a financial incentive for the provider and, if so, how to structure that incentive depends on a number of factors including the risk appetite of the provider, the ability to manage that risk, the broader

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[10] For a more thorough discussion of the various different approaches in pricing outcomes see, Center for Global Development and Social Finance, "Investing in Social Outcomes: Development Impact Bonds" October 2013.

[11] See, "Fact Sheet: The Massachusetts Juvenile Justice Pay for Success Initiative", Available at http://www.thirdsectorcap.org/wp-content/uploads/2015/03/MA-JJ-PFS-Fact-Sheet-Revised-Final.pdf

financial and non-financial incentive environment of the provider and the ability of the provider to self-finance a portion of their program.[12]

After considering these factors, and consultations between Education Girls and UBS Optimus Foundation, it was decided to pass upside, but not downside risk to Educate Girls. This financial incentive is in addition to other non-financial risks, such as reputational risks, that Educate Girls' is exposed to through this SIB. CIFF, the outcome payer, was not involved in this aspect of the design.

Other design components

Two design components for this deal were considered but ultimately rejected: tariffs and thresholds.

Tariffs

Tariffs are defined here as different prices on outcomes achieved among different population subgroups. Tariffs may be placed on outcomes because it is more costly to achieve a given outcome with that subgroup, or because achieving a given outcome for a subgroup might be valued more than achieving that outcome in the general population. For example, girls who come from scheduled castes (historically disadvantaged groups) in India are more marginalized than the general population. Educate Girls reports that it is more difficult to enroll these girls. Outcome payers may value outcomes for more marginalized populations higher for reasons of equity.

This deal initially contained tariffs, but they were removed to simplify the design of the program and increase the ability of IDinsight's evaluation to detect statistically significant impact.

On the one hand, tariffs could be used to incentivize Educate Girls to target difficult-to-reach beneficiaries, such as scheduled caste girls or children who have a low initial performance on the ASER test. Higher payments for outcomes achieved in these subgroups may incentivize Educate Girls to exert additional effort in working with these populations and potentially create new ways of improving their enrollment and learning.

On the other hand, tariffs add complexity to an already complicated payment design. This added complexity may create too many goals for Educate Girls and reduce their ability to focus on the end result. In addition, dividing the targeted population into subgroups would reduce an evaluation's ability to detect statistically significant changes in the measured outcomes.

Thresholds

Threshold are defined here as levels of outcomes below which no payments are made. Thresholds can be defined in at least three ways:

- A minimum level of individual outcomes (each student must achieve at least two learning outcomes before payment begins)

- A minimum level of aggregate outcomes (Educate Girls must achieve 1000 learning outcomes before payment begins)

- Above a specific outcome level (payments are only made for students who achieve at least a B or higher)

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[12] There is a lengthy literature and many lessons learned on provider incentives for service delivery. For examples in high income countries, see, Beeck Center at Georgetown Univeristy, "Funding for Results: A Review of Government Outcomes-based Agreements," Nov 2014. For examples in developing countries see, Fritsche, Soeters, and Meessen. *Performance-based financing toolkit*. World Bank Publications, 2014.

Thresholds are created for various reasons. For example, some SIBs have set thresholds at levels where cashable savings are achieved (e.g., avoiding enough incarcerations to be able to shut down a wing of a prison), while other SIBs have set thresholds at levels above which there is enough confidence in the data that it is statistically distinguishable from zero.

On the one hand, thresholds help to communicate outcome payer preferences for minimum required impact. If one unit of learning is not deemed to be of sufficient value, a threshold can communicate that.

On the other hand, thresholds alter the risk-return profile of the investment and, when they are poorly designed, may create perverse incentives. Thresholds on individual outcomes can incentivize cream-skimming (only working with beneficiaries the provider believes will cross the threshold), whereas thresholds on aggregate outcomes may induce efficient breach (if beliefs form that thresholds will not be reached, providers may stop expending costly effort). In SIBs, thresholds also exacerbate the risk-return profile for the investor increasing the downside risk of the investment.

This design does not use thresholds. Instead it links outcome payments to each additional unit of outcome that Educate Girls achieves. The proposed payment formula does not include a level of outcomes that should be observed before payment begins. This simplifies the payment formula.

5. Learning payment metric

This section describes how learning is defined, measured, and priced.

Definition

The learning payment metric is measured using the students' performance on the ASER test in a randomized controlled trial.

Measurement

The ASER test is a widely used test of basic numeracy and literacy that was developed by Pratham and ASER Centre.[13] The ASER test measures three proficiencies: basic literacy in Hindi, basic literacy in English, and basic numeracy. Scores range from A to E on each of the three subjects (English, Hindi, and math). Tests are administered in the classroom before and after Educate Girls' intervention.

There are multiple ways to measure basic literacy and numeracy. The ASER test was chosen for three principal reasons. First, the ASER test is a widely-known instrument in India and is administered nationally, allowing for regional and programmatic comparisons. Second, Educate Girls has significant experience and familiarity with the ASER test. Third, a randomized evaluation of Educate Girls' program uses the ASER test to measure its impact. The randomized evaluation provides high-quality data on Educate Girls' ability to improve outcomes measured by this test and helps price outcomes.

For this program, the ASER test was modified by introducing an A+ score to the Hindi subject. This was done because there was evidence of a ceiling effect in student performance on that subject in the previous randomized evaluation of Educate Girls. In other words, Educate Girls was creating learning gains that this test could not capture.

The exhibit below provides an example of the math and English parts of the ASER test.

Source: ASER Centre

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[13] For more information about the ASER test, please see http://www.asercentre.org/.

The learning intervention will affect five cohorts of students, as shown below.

	Grade 3	Grade 4	Grade 5
Year 1	A	B	C
Year 2	X	A	B
Year 3	Y	X	A

Learning outcomes

IDinsight will measure the causal impact of the Educate Girls program on learning, which is defined as the difference in aggregate student learning gains (as measured by repeated ASER assessments) for students in grades 3-5 between the treatment group and the control group over the course of the evaluation, censored at zero.

Due to budget constraints, IDinsight plans to conduct four rounds of assessment rather than six: Year 1 baseline of students in grades 1-5,[14] Year 1 endline of students in grades 3-5, Year 2 endline of students in grades 3-5, and Year 3 endline of students in grades 3-5 (no Year 2 baseline or Year 3 baseline).

Pricing

CIFF will pay UBS Optimus 43.16 Swiss francs for each learning gain among boys and girls in grades 3-5. The process for calculating price per outcome is as follows:

Step	Calculation
1. Set the expected outcome payment	$367,000
2. Allocate total payment to the target outcomes	$367,000 * 80% = $293,600
3. Estimate expected performance for learning	6,664 learning gains
4. Calculate price per unit of outcome	$293,600 / 6664 = $44.06
5. Convert to Swiss francs	$44.06 * 0.98 = CHF 43.16

Discussion

This design does not tariff outcomes, although a number of tariffing designs were considered. We considered tariffing on an absolute cutoff (e.g., for students with a score of D and E) and on a relative cutoff (e.g., for students in the bottom 20% of the test distribution). While the absolute cutoff option has operational relevance to Educate Girls, it poorly targets low performers because it conflates grade level maturity with actual performance (e.g., students in grade 1 are much more likely to score a D or E than students in grade 5).

We could have also assigned different prices for each baseline performance level, rather than for just two categories of students (bottom 20% vs top 80%). Alternatively, we could have assigned different prices for each step from E to

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[14] Grades 1 and 2 will be included in this assessment round in order to obtain baseline scores for these students without conducting Y2 and Y3 baseline assessments.

D, D to C, and so on. We chose not to pursue either of these options for two reasons: to maintain the simplicity of the model and for reasons of operational relevance. Field staff will be able to identify which student in their class will be tariffed (either because they scored in the lowest 20% or because they are newly enrolled). Field staff cannot as easily identify when students cross each learning level as they make progress throughout the year.

6. Enrollment payment metric

This section describes how enrollment is defined, measured, and priced.

Definition

Enrollment is defined as the number of girls on school rosters in grades 2-8 in the treatment group over three years. One unit of enrollment, therefore, is one girl whose enrollment can be attributed to the efforts of Educate Girls.

Enrollment is measured among girls in grades 2-8 in government primary and upper primary schools, since Educate Girls considers enrollment into grade 1 to be the government's obligation.

Formula

The Evaluator shall evaluate the level of success in achieving the Enrolment Outcome (provided that, if the Enrolled Girls List Verification results in a discrepancy greater than 15 per cent., the enrolment results shall be discounted by the percentage amount of the discrepancy) using the formula set out below (the "**Enrolment Outcome Metric**"), the outcome of such calculation being the "**Enrolment Results**":

$$\sum_{y=1}^{3} E_{ty} \times (1 - Discrepancy\ Factor)$$

Where:

"E_{ty}" means the proportion of girls aged 7 to 14 from the Out-of-School Girls List who are enrolled in grade 2 to grade 8 and verified by headmasters' signatures in Treatment Schools ("**t**") in the year "**y**", measured in percentage points with a lower limit of zero (0) and an upper limit of one hundred (100); and

Discrepancy Factor

Discrepancy Factor means the discrepancy, if any, identified during the final Enrolled Girls List Verification between the Evaluator's findings and the final Enrolled Girls List, and shall be:

    i.   if the discrepancy in the final Enrolled Girls List Verification results is 15 per cent. or less, zero; and

    ii.   in all other cases, the percentage value of such discrepancy.

Process

Enrollment will be measured according to the following process:

1. Before the Year 1 baseline, the WG will define what constitutes an eligible OOSG for the study (e.g. should mentally disabled OOSGs be excluded if there are no special education facilities or schools nearby? etc.).

2. Before the Year 1 baseline, Educate Girls will conduct a census of households in treatment villages to compile village lists of eligible OOSGs.[15] Educate Girls and the WG will agree on the 'enlisting process' before the start of field activities. IDinsight staff will join Educate Girls staff during training and part of the enlisting process to ensure that IDinsight follows the same protocol during validation.

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[15] Although the Government of Rajasthan conducts a Child Tracking Survey (CTS) to enumerate out-of-school children, it has been found have a large number of errors ([reference](#)). EG has stated that it would be less costly to conduct a full household census than to attempt validating the CTS.

3. Before the Year 1 baseline, IDinsight will audit Educate Girls' lists of OOSGs, which will include the following activities:

   a. To check for *exclusion error* (eligible girls erroneously omitted from Educate Girls' lists), IDinsight will merge Educate Girls' lists with the CTS[16] and randomly sample 20% of girls who are on the CTS but not on Educate Girls' lists. IDinsight will calculate an exclusion error rate using the following process:

      1) IDinsight staff will visit the households of randomly-selected girls to verify their eligibility status. IDinsight will mark whether a girl is eligible or ineligible to be included on Educate Girls' lists.

      2) IDinsight and Educate Girls will go through the list of eligible girls and 'reconcile' discrepancies by jointly determining whether the girl should in fact be included on the Educate Girls list. This may involve contacting heads of households, contacting local administrators, or physically returning to a village to verify a girl's status.

      3) After removing girls from this list that are a result of IDinsight's error, IDinsight will calculate the exclusion error rate by dividing the number of remaining discrepancies by the number of girls in IDinsight's original random sample. If this number exceeds 10% (i.e. 10% of the 20% of girls randomly selected by IDinsight), then Educate Girls will conduct the census again. This process will be repeated until the number of discrepancies do not exceed the threshold.

   b. To check for *inclusion error* (ineligible girls erroneously included on Educate Girls' lists), IDinsight will merge Educate Girls' lists with the CTS and randomly sample 20% of girls who are on Educate Girls' lists but not on the CTS. IDinsight will calculate an inclusion error rate using the same process as for calculating the exclusion error rate. If this number exceeds 10% (i.e. 10% of the 20% of girls randomly selected by IDinsight), then Educate Girls will conduct the census again. This process will be repeated until the number of discrepancies do not exceed the threshold.

   c. As an additional *process check*, IDinsight staff will conduct random spot-checks of Educate Girls teams as they create OOSG lists. IDinsight will conduct spot-checks in at least 10% of treated villages (~17 villages) and use checklists (developed from Educate Girls protocol) to determine whether Educate Girls teams are following protocol. If IDinsight finds egregious errors in a subset of these villages[17], then Educate Girls will conduct the census again.

4. Before the Year 1 endline, Educate Girls will demonstrate performance by submitting signatures from headmasters for each girl enrolled on the list to IDinsight.

5. During the Year 1 endline, IDinsight will validate Educate Girls' performance by selecting a random sample of 20% of OOSGs on the outcomes lists and confirming their enrollment with the headmaster and with the girls' families. IDinsight will calculate an inclusion error rate using the same process as for calculating error rates for the OOSG lists. If this number exceeds 10% (i.e. 10% of the 20% of girls randomly selected by IDinsight), then Educate Girls will submit new outcomes lists. This process will be repeated until the number of discrepancies do not exceed the threshold.

6. Before Year 2, Educate Girls will update the lists of OOSGs to include girls who are now eligible for enrollment (e.g. because they recently migrated to the village or because they are now eligible to enroll in grade 2). Girls who were previously eligible but are now ineligible will remain on these lists whether or not they were enrolled. Previous OOSGs who enrolled but subsequently dropped out are not eligible to be added to these lists a second time (thus, Educate Girls does not have a monetary incentive to re-enroll

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[16] IDinsight will remove as many ineligible girls from the CTS as possible before merging it with the EG list, depending on the data available in the CTS.

[17] The WG and EG will determine the precise requirements of these process audits after agreeing on the details of the enlistment process.

these girls based on the enrollment payments; however, Educate Girls does have a monetary incentive to re-enroll these girls because doing so will increase their learning impact).

7. Before Year 2, IDinsight will audit Educate Girls' updates to the lists of OOSGs, which will include activities 3(a) and 3(b) as described above. IDinsight will only sample girls who are newly-added to the lists for conducting exclusion and inclusion error checks.

8. Steps (4) – (5) will be repeated for Year 2.

9. Steps (6) – (8) will be repeated for Year 3.

10. IDinsight will add up the number of girls on Educate Girls' lists who were found to be enrolled at least once during the evaluation and divide by the number of girls on Educate Girls' lists (including girls added in Years 2 and 3). **Table 9** illustrates how enrollment will be calculated:

Enrolment measurement example

Enrolment will be measured as the percentage of out-of-school girls who are enrolled at least once off validated lists in treatment villages over the course of the evaluation. The following tables illustrate how enrolment will be calculated with and without a discrepancy factor:

Enrolment Results without discrepancy adjustment

School Year	Y1 Jan	Y2 Jan	Y3 Jan	Enrolled according to Educate Girls	Validated by IDinsight
OOSG 1	(E)nrolled	(E)	(E)	Yes	Yes
OOSG 2			(E)	Yes	Yes
OOSG 3				No	N/A
Total eligible OOSG					3
Total eligible OOSG enrolled					2
Enrolment results					66%
Discrepancy factor (greater than 15%?)					0 (No)
Enrolment Results adjusted for discrepancy					**66%**

Enrolment Results with discrepancy adjustment

School Year	Y1 Jan	Y2 Jan	Y3 Jan	Enrolled according to Educate Girls	Validated by IDinsight
OOSG 1	(E)nrolled	(E)	(E)	Yes	Yes
OOSG 2			(E)	Yes	No
OOSG 3				No	N/A
Total eligible OOSG					3
Total eligible OOSG enrolled					2
Enrolment results					66%
Discrepancy factor (greater than 15%?)					50% (Yes)
Enrolment Results adjusted for discrepancy					**33%**

Pricing

CIFF will pay UBS Optimus CHF 910.53 for each percentage point of girls enrolled off of an out-of-school girls list.[18] If Educate Girls achieves its expected performance on enrollment, CIFF will pay UBS Optimus a total of $73,400.

This payment will not be tariffed, which means that CIFF will not pay different prices for enrollment in different sub-groups of the target population.

The process for calculating price per outcome is as follows:

Step	Calculation
Set the expected outcome payment	$367,000
Allocate total payment to the target outcomes	$367,000 * 20% = $73,400
Estimate expected performance for enrollment	79% of all eligible girls
Calculate price per unit of outcome	$73,400 / (79% * 100) = $929.11
Convert to Swiss francs	$929.11 * 0.98 = CHF 910.14

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[18] Due to data limitations, the total number of out of school girls in each village is not known until Educate Girls starts its enrollment intervention. Therefore, instead of contracting on price per girl enrolled, the contracted enrollment metric is defined as the price per percentage point enrolled off of an out of school girls list.

7. Evaluation Design

IDinsight will evaluate learning gains through a clustered randomized control trial. This section describes the sampling frame, the randomization design, and the proposed approach to estimating causal outcomes.

Constructing the sample

Given sampling constraints, IDinsight will use all eligible schools for the evaluation, rather than selecting a random sample of schools from the sampling frame. The sample will consist of 396 schools in 338 villages.

Within eligible villages, all OOSGs (based on Educate Girls' verified lists) will be included in the sample. Within eligible schools and learning outcomes will be measured by using data on all students in grades 1-5 at baseline (as well as newly-enrolled students).

To construct the sample, IDinsight will use school-level data for the two selected blocks in Bhilwara district, Jahajpur and Mandalgarh, collected by the District Information System for Education (DISE).

DISE lists

IDinsight will rely primarily on the 2014-15 unpublished list to determine school eligibility, with a few schools removed based on the 2013-14 published list (found here). Based on emails with Educate Girls and scrutiny of the two lists, IDinsight has found that the 2014-15 list is more reliable, since schools that are eligible on the 2013-14 list but ineligible on the 2014-15 list have either merged with other schools, have too many or too few students, or are not under the management of the DoE or local bodies (there appears to be a coding error in the 2013-14 list that does not account for Sanskrit schools). However, IDinsight will also remove schools from the 2014-15 list that do not exist in the 2013-14 list or are listed as 'urban' in the 2013-14 list, since there is reasonable risk of these schools turning out to be ineligible (since this only applies to a handful of schools, this extra safeguard will not lead to large numbers of eligible schools being unnecessarily excluded).

Village and school eligibility

The following criteria will be used to identify all eligible villages and schools in Jahajpur and Mandalgarh blocks.

Village eligibility criteria (based on the 2014-15 DISE database):

- Has at least 1 eligible school and no more than 4 eligible schools

- In a rural area (where all schools in the village are listed as 'rural' in the DISE database)

School eligibility criteria (based on the 2014-15 DISE database):

- Includes grades 1-5 (Includes schools that are 'primary only' and 'primary with upper primary'. Excludes schools that are 'primary with upper primary and secondary' and 'primary with upper primary and secondary and higher secondary')

- Under the management of the Department of Education or Local Bodies. (Excludes private schools, madrasas, Sanskrit schools and Shisksha Karmi schools)

- Has at least 10 and no more than 60 primary enrolled students in grades 3-5

- Medium of instruction is Hindi

- Operationally feasible (Excludes schools that Educate Girls says are not possible to deliver services to)

Other criteria:

- The school exists in the 2013-14 DISE database

- The school is not listed as 'urban' in the 2013-14 DISE database

Randomizing treatment assignment

IDinsight will randomly select 169 (out of 338) villages to be in the treatment group. In order to maximize balance on key pre-study characteristics (i.e., maximize the probability that randomization actually produces comparable treatment and control groups), IDinsight will identify pairs of villages within the sample that are most similar to each other on variables described below and randomly assign one village in each pair to receive the Educate Girls program.

Pairwise matching

Two villages will be paired with each other if they:

- Are in the same block

- Have the same number of eligible schools

- Given constraints (a) and (b), are most similar to each other in terms of (i) total enrollment of primary school students, (ii) the presence of an upper primary school, (iii) percent of enrolled primary school students who are female, and (iv) student-to-teacher ratio. "Similarity" is defined as having the closest scores on the first component of a principal component analysis (PCA) that includes characteristics (i)-(iv)[19].

Criteria (a) and (b) define 8 strata: villages in either Jahajpur or Mandalgarh with either 1, 2, 3, or 4 eligible schools. Since there are an odd number of villages in a few of the strata (e.g. only 7 villages in Mandalgarh block with 3 eligible schools), a small number of villages cannot be paired and will be dropped from the evaluation (6 villages and 17 schools). Although these villages could be included in the evaluation, they would not have paired 'counterpart' villages, and so including them may reduce balance between treatment and control groups.

Randomization

For each village pair, IDinsight will randomly assign one village to receive the Educate Girls program. The resulting treatment and control groups will have exactly the same number of villages (169) and exactly the same number of schools (198).

In order to ensure that stratification and pairwise matching 'worked', IDinsight will conduct t-tests on the average differences between treatment and control groups for the four PCA characteristics and other variables in the DISE data that were not included in the PCA. This step will provide some assurance that the protocol successfully

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[19] Ideally IDinsight would also match on baseline outcomes (enrollment and learning outcomes), but given the program implementation timeline, this is not an option.

produced balanced treatment and control groups. If an unexpectedly large number of t-tests (>20%) find significant differences at the 5% level between treatment and control groups, then IDinsight will re-randomize.

Summary of sampling and randomization

- Prepare the sampling frame

  - Select blocks.

  - Filter out ineligible schools.

  - The remaining villages and schools (and all OOSGs and students in applicable grades in eligible schools) comprise the sample.

- Assign treatment status

  - Create strata defined by block and number of schools in each village. For strata with an odd number of villages, randomly select one village to be dropped.

  - Match pairs of similar villages within strata based on similarity in scores from the first component of a principal components analysis on the following characteristics: (i) total enrollment of primary school students, (ii) the presence of an upper primary school, (iii) percent of enrolled primary school students who are female, and (iv) student-to-teacher ratio.

  - Randomly assign one village in each matched pair in the sample to treatment.

  - Conduct t-tests on matching variables and other attributes to check that treatment and control groups are balanced. If an unexpectedly large number of t-tests (>20%) find significant differences at the 5% level between treatment and control groups, then re-randomize

Sample size calculations

IDinsight conducted sample size calculations to determine the minimum detectable effect size of learning gains based on a sample size of 396 schools in 338 villages. Based on these calculations, the current design can detect an average treatment effect of approximately 0.2 standard deviations, or an additional gain of 0.47 points between baseline and endline assessments (i.e. if the average gain in ASER scores over time in the control group is 2.67 points and the average gain in the treatment group is 3.14 points, using the 15-point aggregate ASER scale). In other words, if the true treatment effect (the difference in the change in ASER scores between treatment and control groups) is 0.47 points, then this evaluation will have a 20% chance of failing to distinguish the treatment effect from 0 (a 'false negative'). If the true treatment effect is larger than 0.47 points, then the probability of a false negative is less than 20%; if the true treatment effect is smaller than 0.47 points, then the probability of a false negative is greater than 20%.

The outcome used in these calculations is the *average* difference in learning gains between treatment and control students, whereas the outcome in the DIB will be the *aggregate* difference, and payments will be made on the point estimate of the aggregate treatment effect rather than on the level statistical uncertainty. However, these calculations are instructive as they show that the design is well-powered by academic standards, and that sampling error will likely have only a modest distortionary effect on outcome payments.

These calculations are based on the following inputs:

Input	Description
Data source used for effect sizes, variance in outcomes, and intracluster correlation	Jalore RCT dataset
Outcome mean in the control group	+2.67 points change in ASER scores • Defined as the change in scores between baseline and endline using the 15-point scale for each assessment • Extrapolates 1-year gains among control students in the Jalore dataset to 2 and 3 years • Assumes 2/5 of students will be in the program for 1 year, 2/5 of students will be in the program for 2 years, and 1/5 of students will be in the program for 3 years.
Outcome standard deviation in the control group	2.34 points change in ASER scores • Extrapolates 1-year standard deviation in gains in the Jalore dataset to 2 and 3 years. • Assumes that the covariance between gains across years is negligible (as evidenced by comparing gains in Y1 and Y2 in the Jalore dataset)
Number of clusters (villages)	338 • Based on the maximum number of eligible villages in the two selected blocks
Number of students per cluster	60 • Based on the average number of students in grades 1-5 in eligible villages
Intracluster correlation	0.39 • Based on the ICC of one-year learning gains in control villages in the Jalore dataset
alpha (statistical significance)	0.1
power	0.8
Stata syntax	clustersampsi, detectabledifference mu1(`mu') sd1(`sd') m(`cluster_size') k(`clusters_per_arm') rho(`icc') alpha(0.1) beta(0.8)

These calculations yield an MDES of 0.17 SD (0.40 points above a gain of 2.67 points in the control group). This MDES is inflated to 0.2 SD (and 0.47 points) due to several conservative assumptions in the sample size calculations model, including the following:

- This model does not account for the fact that baseline scores will not be available for a subset of students (Type IV and Type V students).

- This model does not account for attrition of students and resampling/reweighting of outcomes for Type II and Type V students.

- This model does not account for non-compliance, spillovers, or other threats to the validity of the evaluation.

- This model does not account for the risk that treatment effects are smaller or more variable in Bhilwara than they were in Jalore.

Estimating causal outcomes

Table 1: Calculating learning outcomes for different types of students

Type of student	Description of student type	Strategy for obtaining estimates of the treatment effect for this type of student

I	Enrolled in grades 1-5 at baseline, present for baseline, present at endline	$$Learning\ gains\ of\ Type\ I\ students = \sum_{i_t}^{I_t}(S_{i,E_Z} - S_{i,B}) - \sum_{i_c}^{I_c}(S_{i,E_Z} - S_{i,B})$$ where
		• S is the score obtained on the ASER assessment (calculated by summing the scores from the 3 individual components of the assessment, for a total number of possible points between 3-15)
		• i is a Type I student in a treatment (control) school and I is the total number of Type I students in treatment (control) schools
		• t denotes students in treatment schools and c denotes students in control schools
		• E_Z denotes the applicable endline:
		  o Y1 for students in grade 5 at baseline
		  o Y2 for students in grade 4 at baseline
		  o Y3 for students in grades 1-3 at baseline
		• B denotes the Y1 baseline

II	Enrolled in grades 1-5 at baseline, present for baseline, enrolled but missing at endline	$Learning\ gains\ of\ Type\ II\ students$ $$= \sum_{ii_t}^{II_t}W(S_{ii,E_Z} - S_{ii,B}) - \sum_{ii_c}^{II_c}W(S_{ii,E_Z} - S_{ii,B})$$ where • All variables defined as above • ii is a student randomly selected to be in the sub-sample II of Type II students who receive follow-up surveys at home[20] • W is the sampling weight applied according to the fraction of Type II students selected for follow-up out of all Type II students.
III	Enrolled in grades 1-5 at baseline, present for	$Learning\ gains\ of\ Type\ III\ students$ $$= \sum_{iii_t}^{III_t}(S_{iii,E_L} - S_{iii,B}) - \sum_{iii_c}^{III_c}(S_{iii,E_L} - S_{iii,B})$$

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[20] The size of the random sub-sample will be determined based on budget considerations and the fraction of total students with missing scores. The same fraction of missing students in each grade and in each school will be selected for follow-up at home.

	baseline, drop out early	where - All variables are defined as above - iii is a Type III student out and III is the total number of Type III students - E_L denotes the last endline for which a Type III student's scores are available (students who drop out before grade 3 will be dropped from the study). Note that this is not necessarily the last endline for which the student is enrolled (e.g. if the student is enrolled in Y1 and Y2 and drops out after Y2, but is absent for the Y2 endline). The reason for not following up with these students is because (1) IDinsight will not be able to anticipate when they will drop-out and (2) once they drop out they may be impossible to reach (because they may migrate out of the village, etc.). Hence, the treatment effect for these students might be underestimated if a large number of them are absent for their last assessment.
IV	Absent or unenrolled at baseline, present for endline	$$\text{Learning gains of Type IV students} = \sum_{iv_t}^{IV_t} (S_{iv,E_Z} - 3) - \sum_{iv_c}^{IV_c} (S_{iv,E_Z} - 3)$$ where - All variables are defined as above - iv is a Type IV student and IV is the total number of Type IV students (in treatment or control schools) - 3 points are subtracted from all scores since it is the lowest possible score on the assessment. - Note that this calculation will likely overestimate the effect of treatment for Type IV students since it includes students who enroll as a consequence of treatment (and the corresponding children in the control group will be unenrolled and not identifiable, and therefore untested, and so the implied assumption is that they would have obtained the lowest possible score on the assessment). This overestimation should be viewed as giving greater weight to the outcomes of newly-enrolled students than the outcomes of other students; since these students are of special interest in Educate Girls' theory of change, the WG may be amenable to paying more for their learning outcomes.
V	Absent or unenrolled at baseline, enrolled but missing at endline	$$\text{Learning gains} = \sum_{v_t}^{V_t} W * (S_{v,E_Z} - 3) - \sum_{v_c}^{V_c} W * (S_{v,E_Z} - 3)$$ where - All variables are defined as above - v is a student randomly selected to be in the sub-sample V of Type V students who receive follow-up surveys at home - 3 points are subtracted from all scores since it is the lowest possible score on the assessment. - W is the sampling weight applied according to the fraction of Type V students selected for follow-up out of all Type V students. - As with Type IV students, this calculation will likely overestimate the effect of treatment since it includes students who enroll as a consequence of treatment (and the corresponding children in the control group will be unenrolled and not identifiable, and therefore untested, and so the implied assumption is that they would have obtained the lowest possible score on the assessment). This

		overestimation should be viewed as weighting the outcomes of newly-enrolled students more than the outcomes of other students; since these students are of special interest in Educate Girls' theory of change, the WG may be amenable to paying more for their learning outcomes

Learning gains will be measured according to the following process:

1. During the Year 1 baseline, IDinsight will visit all treatment and control schools and administer an ASER assessment to all students in grades 1-5. The test day will be announced in advance in order to maximize student attendance. IDinsight teams will visit both treatment and control schools in the same geographic cluster on the same day. Students will receive a grade (out of 5 points) on each of the three sections of the assessment (English, Hindi, and Math), and their overall grade will be the sum of these grades (possible scores: 3-15).

2. During the Year 1 endline, IDinsight will administer new assessments to all students in grades 3-5 in **treatment** and control schools, including newly-enrolled students.

3. Some students who are enrolled in grade 5 may be absent on the day of the Year 1 endline. In order to obtain an unbiased estimate of the learning gains of these students, IDinsight will take a random sample of these students (to be determined based on budget constraints and the fraction of students with missing scores) and administer the assessment at their homes. The same fraction of missing students will be sampled in each school.

4. Steps (2) and (3) will be repeated during the Year 2 and Year 3 endlines. During the Year 3 endline, students enrolled in grades 3 and 4 who were absent for the assessment will also be sampled in order to obtain unbiased estimates of their learning gains (the same fraction of students with missing endline scores in each grade in each school will be sampled).

5. IDinsight will calculate learning gains for each student according to their type, as shown in **Table 1**. IDinsight will apply sampling weights to the learning gains of students who were missing for the endline assessment according to the fraction of total missing students who were sampled: For instance, if 20% of enrolled but absent students in grade 3 are administered assessments in their homes, then each of their learning gains will count 5 times when calculating aggregate learning gains. **Tables 2-6** illustrate how learning gains will be calculated for students a particular school.

The scores that are used to calculate learning gains are highlighted in grey. The aggregate treatment effect is the sum of all types of students' learning gains.

Learning measurement example

The Learning Outcome Metric will be calculated for different types of students (defined above) as follows (the scores that are used to calculate learning gains are highlighted in grey):

Learning gains of Type 1 Students

	Grade at baseline	Y1 Baseline	Y1 Endline	Y2 Endline	Y3 Endline	Subtotal
Student 1	1	8	-	-	10	+2
Student 2	2	5	-	9	11	+6
Student 3	3	4	6	6	5	+1
Student 4	4	11	12	11	-	0
Student 5	5	8	7	-	-	-1
					Learning gains	+8

Learning gains of Type II Students

Shown for students in Grade 3 at baseline, though the same exercise would be conducted for students in all grades at baseline.

Students highlighted in grey if they are randomly selected to be administered follow-up assessments at home. Assumes 1/3 of all missing students are selected for follow-up.

	Grade at baseline	Y1 Baseline	Y1 Endline	Y2 Endline	Y3 Endline (Re-surveys)	Subtotal
Student 1	3	8	8	11	-	-
Student 2	3	9	8	9	11	+2
Student 3	3	9	11	15	-	-
Student 4	3	4	6	8	7	+3
Student 5	3	6	5	5	-	-
Student 6	3	6	10	14	-	-
				Learning gains (with sampling weights)		(+2+3)*3 = +15

Learning gains of Type III Students

	Grade at baseline	Y1 Baseline	Y1 Endline	Y2 Endline	Y3 Endline	Subtotal
Student 1	1	2	-	-	-	-
Student 2	2	6	-	8	-	+2
Student 3	3	8	9	9	-	+1
Student 4	4	5	7	-	-	+2
Student 5	5	13	-	-	-	-
					Learning gains	+5

Learning gains of Type IV Students

	Grade at baseline	Y1 Baseline (imputed)	Y1 Endline	Y2 Endline	Y3 Endline	Subtotal
Student 1	1	3	-	-	5	+2
Student 2	2	3	-	5	7	+4
Student 3	3	3	4	6	7	+4
Student 4	4	3	6	9	-	+6
Student 5	5	3	9	-	-	+6
					Learning gains	+22

Learning gains of Type V Students

Shown for students in Grade 3 at baseline, though the same exercise would be conducted for students in all grades at baseline.

Students highlighted in grey if they are randomly selected to be administered follow-up assessments at home. Assumes 1/3 of all missing students are selected for follow-up.

	Grade at baseline	Y1 Baseline (imputed)	Y1 Endline	Y2 Endline	Y3 Endline (Re-surveys)	Subtotal
Student 1	3	3	5	8	-	-
Student 2	3	3	-	4	6	+3
Student 3	3	3	-	-	-	-
					Learning gains	**+3*3 = 9**

After calculating Learning Outcomes for every type of student, the total Learning Results will be measured as the difference in aggregate gains on the ASER assessments between students in the control group and the treatment group, as follows

Learning Results Calculation

	Type I Students	Type II Students	Type III Students	Type IV Students	Type V Students	Total
Treatment Students	1200	200	100	600	100	**2200**
Control Students	400	50	100	100	50	**700**
				Total Learning Results		*1500*

Timeline

Tasks	Deadlines	2015 Q1	Q2	Q3	Q4	2016 Q1	Q2	Q3	Q4	2017 Q1	Q2	Q3	Q4	2018 Q1	Q2
Evaluation design															
Treatment assignment	Feb 2015	■													
Finalize evaluation design	Mar 2015	■													
Prepare data collection instruments	Jul 2015		■	■											
Field work															
Validation of enrollment lists	Aug 2015			■											
Y1 baseline survey	Sept 2015			■											
Y1 endline survey and enrollment verification	Jan 2016					■									
Y2 validation of updates to enrollment lists	Aug 2016							■							
Y2 endline survey and enrollment verification	Jan 2017									■					
Y3 validation of updates to enrollment lists	Aug 2017												■		
Y3 endline survey and enrollment verification	Jan 2018													■	
Analysis and reporting															
Y1 interim report	Mar 2016						■								
Y2 interim report	Mar 2017										■				
Final evaluation report	Mar 2018													■	
Final presentation of results	Apr 2018														■

8. Potential issues for causal identification

Pre-post design to measure enrollment

The key assumption for this pre-post design to yield causal estimates of the impact of Educate Girls' program is that non-program factors have a negligible effect on changes in enrollment during the study period. If this assumption fails, then we will not be able to disentangle the effect of the Educate Girls program from other factors that affect outcomes, and the causal impact of Educate Girls on enrollment may be overestimated or underestimated. Likely factors that could change during the study period that affect enrollment of OOSGs include:

- The government implements a new program to build more educational institutes for girls, like the Beti Bachao Beti Padhao campaign recently announced by the PM

- Immigration or emigration of families with OOSGs as a result of changing economic circumstances (e.g. the NDA government successfully rolls back MGNREGS, resulting in less work available in rural areas)

- Increase/decrease in supply of schools (new government school buildings, new private schools)

- Change in how enrollment is measured or recorded. For instance, new district administration may require schools to digitize school registers, resulting in more scrutiny/fewer mistakes

The likelihood of underestimating Educate Girls' impact is reduced by measuring enrollment changes from the lists of OOSGs compiled by Educate Girls (i.e., such that enrollment cannot fall below 0). However, it is still possible to underestimate Educate Girls' impact if enrollment would have fallen in the absence of Educate Girls' program. This occurred in control villages in the Jalore RCT. If this occurs in Bhilwara during the study period, then Educate Girls may be underpaid for enrollment outcomes, since Educate Girls would not get credit for preventing any drop in enrollment. This pre-post design can also overestimate the causal impact of Educate Girls' program on enrollment if some of the OOSGs identified by Educate Girls would have enrolled anyways (without Educate Girls' intervention).

It is extremely likely that the identifying assumption will fail, and therefore that measuring enrollment through the proposed pre-post evaluation in treatment villages will not be a robust estimate of Educate Girls' causal impact on enrollment. However, given evaluation budgetary constraints and the priority of focusing on learning outcomes, the pre-post evaluation is the best option for measuring enrollment outcomes.

Randomized controlled trial to measure learning

Under certain assumptions, randomly assigning students to treatment and control groups can eliminate the majority of systematic differences between groups at the beginning of the evaluation and enable causal estimation of the impact of an intervention on outcomes of interest. However, when executing a randomized evaluation in practice, there are some common "threats to validity" that introduce bias. These threats are described below, along with steps that IDinsight will take to make the evaluation design and analysis more robust to these threats.

Non-compliance

Non-compliance occurs when units switch study groups (treatment to control or vice versa) during the course of the evaluation. Non-compliance can occur at the individual level (e.g. a student at a control group school transfers to a treated school) or, more worryingly, at the cluster level (e.g. a treated village stops receiving the program).

Since non-compliance reduces the difference in exposure to the program across the two groups – not all students in the treatment group are treated and/or not all students in the control group are left untreated – it can lead to

incorrect estimates of the treatment effects (usually underestimates impact) if it is not addressed. The most effective way to deal with non-compliance is to minimize the likelihood of it happening in the first place. For instance, close adherence to study protocol will reduce the chances of mistakenly treating a school in the control group, and anticipating interactions across study groups will help program officers to manage the expectations of students and teachers in the control group. Close communication between Educate Girls and IDinsight is critical to minimizing the occurrence of non-compliance.

A special case of non-compliance: Contamination of the control group

The Working Group has raised the concern that the government may 'contaminate' the control group by allocating additional resources to control schools. IDinsight proposes the following measures to mitigate government contamination under village-level program assignment, as well as the option for pursuing a village-level matched design if large scale contamination occurs:

- *Prevention*: IDinsight or other parties will schedule proactive discussions with the district administration about the methodology and about the importance of adhering to treatment assignment. IDinsight or other parties will obtain MOUs from the District Collector and from state-level officials promising not to interfere in study villages, and will show those letters to future district administrations. If possible, IDinsight or other parties secure a signed cabinet note through the Chief Minister's office (in addition to any existing MOUs) indicating the State Government's desire to maintain control and treatment assignments for the purpose of this study.

- *Detection*: IDinsight will include checks in annual data collection to detect new education programs that have been implemented in the region (including Educate Girls-style programs), and whether new programs' implementation is different in treatment and control villages. IDinsight will conduct semi-annual spot checks on a subset of treatment and control villages to detect differential treatment from district education administration. This ongoing monitoring will be useful both to trigger immediate conversations with the district administration about stopping contamination, as well as recording the magnitude of contamination for the purposes of making data adjustments during the analysis phase (see below).

- *Adjustment to the analysis*: If contamination occurs in a small number of control villages, IDinsight will adjust the analysis to calculate the treatment on the treated estimate, or use other measures to try and control for the degree of contamination.

- *Adjustment to the design (ex post)*: If contamination is observed in a large number of control villages, despite these efforts, then IDinsight will match treated villages with villages in untreated districts and collect midline and endline data in newly-matched comparison villages. Depending on when contamination is observed, treatment effects may be estimated as the change in outcomes from midline to endline in treated and matched comparison villages, or as the difference between treated and matched villages at endline.

Spillovers

A related problem are spillovers, which occur when the intervention has indirect effects on units in the control group. Spillovers may occur if students in the treatment group tutor students in the control group, or if teachers from the treatment group share curricula with teachers from the control group. As with partial compliance, spillovers reduce the comparability of study groups: the direct effect of the interventions on outcomes cannot be measured separately from spillover effects in the control group.

Since randomization is occurring at the village-level (as opposed to the school-level or the student-level), IDinsight does not anticipate that spillovers will be a major threat to obtaining accurate estimates of Educate Girls' impact.

Attrition

Attrition occurs when outcomes cannot be measured for certain units (students, schools, or villages). Attrition reduces the effective sample size and therefore the precision of impact estimates. Differential attrition across study groups introduces bias into measurement of the treatment effect. For instance, if low-performing students in the control group are more likely to drop out of the study than low-performing students in the treatment group, then differences in the remaining students at endline will include the effects of treatment and the differential compositions of the two groups, and would underestimate the impact of the treatment.

As with partial compliance and spillovers, the best way to deal with attrition is to prevent it from happening in the first place (e.g. by encouraging students to be present for assessments). For students that are missing during endline assessments, IDinsight will conduct follow-up surveys of random subsamples and reweight missing students' outcomes in the analysis (see the calculation of outcomes for Type 2 and Type 5 students above).

Errors in measurement

Errors in data collection can lead to imprecise or inaccurate measures of impact. IDinsight will develop a robust system of quality controls to minimize the likelihood of errors in the final dataset. Enumerator training and retraining, incentive structures for enumerators, and a systematic field plan will help to prevent errors during survey administration. Questionnaire scrutiny, spot checks, back-checks, and early exploratory data analysis will be used to detect and resolve errors before field teams have left survey areas. During data entry, surveys will be entered twice and discrepancies will be reconciled, and the database will need to pass a certain quality threshold (based on an independent error rate assessment) before data entry operators are compensated.

9. Performance management

Educate Girls is upgrading its performance management system for this project, with the objective of creating a system that helps it improve its enrollment and learning outcomes.

Current system

Educate Girls has a performance management system that focuses on tracking inputs and activities against selected outcomes of its intervention, such as out of school girls' enrollment, student attendance, and learning. This system has enabled Educate Girls to manage its resources effectively and track progress during service delivery.

In a DIB, focus is shifted from managing activities to managing results. Therefore, the objective of performance management also shifts from managing resources and tracking the project progress to dynamically managing the intermediate outcomes that, in this case, ultimately lead to higher levels of enrollment and learning outcomes of the project.

Changes to the performance management system

Active management of results is driven by three fundamental questions:

1. **Strengthening the theory of change**: How can Educate Girls reinforce its theory of change by identifying and focusing on the strongest mechanisms of impact, de-resourcing mechanisms that are weak drivers of impact, and experimenting with new ones that can be effective?

2. **Responding to efficiency drivers and barriers of impact**: How can Educate Girls better understand external and internal drivers of and barriers to impact and improve its impact by responding to them?

3. **Optimizing resource allocation**: How should Educate Girls optimize its resource allocation/attention to various subgroups or implementation units of the program during implementation, based on their respective progress towards desired outcomes?

Educate Girls will track key performance indicators and execute analyses that answer those questions. That will require a shift in measurement from inputs and activities to the intermediate outcomes that are required to achieve the intended impact. This shift in measurement will generate insights on the preliminary indicators of Educate Girls performance against the outcomes of interest that will enable them to make dynamic adjustments to program implementation to ensure impact.

Instiglio's role

The main goal of performance management services provided by Instiglio is to improve the enrollment and learning outcomes of the project. Instiglio will help Educate Girls accomplish this in three ways:

1. Helping Educate Girls understand how its program affects each of the payment outcomes: A central part of this component is mapping Educate Girls' theory of change for the enrollment and learning outcomes. The theory of change outlines the causal pathway to change that is expected from Educate Girls' intervention and is meant to articulate the implicit and explicit strategies required to achieve the desired results and to evaluate them. It follows the following logic:

Inputs → Activities → Outputs → Outcomes → Impact

This is complemented with a diagnostic report of the current operational plan identifying the key operational risks for underperformance as well as recommendations to mitigate these risks.

2. **Helping Educate Girls monitor its performance against the payment outcomes over time**. This component includes the design of the performance management system including the key performance indicators to be measured, the data collection system, the data analysis system, the design of a performance dashboard system and course-correction/insight-to-action protocols. The performance management will focus on 3 types of analysis that will allow Educate Girls 1) improve their impact model, 2) learn from experience to promote intra-learning transfer and 3) optimize resource allocation by using a needs-based allocation system.

3. **Helping Educate Girls improve its performance against the payment outcomes**: To achieve this, Instiglio will create and execute a capacity building plan to enable Educate Girls to efficiently use the performance management system. Instiglio will also accompany Educate Girls during the initial months of the implementation process and then during regular performance reviews through the three years of implementation.

The figure below outlines the performance management process as described above:

| Define theory of change | Define indicators | Design dashboard | Design monitoring process | Capacity Building |

10. Coordination framework

This section describes the interaction among all the stakeholders over the three years of the project.

Table A describes the different levels of meetings that will take place during the project. The most frequent meeting will be between Instiglio and Educate Girls and will focus on performance management. The Steering Committee meeting will happen annually and include discussion of program outcomes. The final meeting will be for reviewing the outcomes of the program.

Table B describes the reporting requirements of the stakeholders.

Table A: Meetings

Meeting	Topics	Attendees	Frequency
PM Meeting Owner: Instiglio	• Discuss performance, dashboard and course correction • Flags issues to communicate to the WG	• Educate Girls • Instiglio	September, December, March
Working Group Meeting Owner: Educate Girls	• Program status • Key risks and resolution approach *(see slides 13 – 16)* • Decisions requiring input from working group *(see slides 10 – 12 for framework)* • Team resourcing needs • Risk resolution approach • Quantitative performance along key indicators, and qualitative assessment • Budget report	• Educate Girls • Instiglio • UBS Optimus	In mid-September and mid-March
Steering Committee Meeting Owner: Instiglio	• Program status, issues and risks, special topics, financials and progress toward meeting key project outcomes • Concerns related to outcomes of IDinsight yearly report • Any available outcome data findings • Marketing and outreach efforts conducted and publicity tracker	• Advisory Group • Educate Girls • CIFF • Dalberg • IDinsight • Instiglio • UBS Optimus • Weber Shandwick	Yearly
Outcomes Review Meeting Owner: IDInsight	• Final outcomes report findings and interpretation • Next steps	• CIFF • Dalberg • Educate Girls • UBS Optimus • IDinsight • Instiglio	Once
Ad Hoc Meetings	*TBD*	*TBD*	*As needed*

Table B: Reporting

Report	Frequency	Preparer	Audience	Description | Content
Baseline Report	Once *(2015)*	IDinsight	UBS Optimus Educate Girls CIFF Instiglio	• Baseline performance in treatment and control areas • List of Out-of-School girls against which enrollment will be tracked
EG performance report	Mid-September and mid-March	EG	UBS Optimus	• 1st report: performance in enrollment • 2nd report: performance on attendance/learning • Both reports include updates on budget, risks and key decisions
Interim Outcomes Report	Twice *(2016, 2017)*	IDinsight EG Instiglio	Steering committee	Discuss performance, risks and challenges, course-corrections, and major decisions • Interim outcomes from ID insight • Quantitative performance along key indicators, and qualitative assessment • Budget report from EG • Major risk factors or challenges and proposed course-correction • Report according to reporting template
Final Outcomes Report	Once *(2018)*	IDinsight	Steering committee	• Final report on all outcomes, including: • Outcomes achieved • Methods used to reach outcomes
Special memo	As needed	As required	As required	• Unanticipated, critical risks with major implications on program (e.g., policy changes, budget overruns, MOU risks)