J-PAL
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CASE STUDY 1: EDUCATION IN PAKISTAN

Database Theory and Measuring Outcomes

This case study is based on "Report Cards: The Impact of Providing School and Child Test-scores on Educational Markets", by Tahir Andrabi, Jishnu Das, and Asim Ijaz Khwaja

J-PAL thanks the authors for allowing us to use their paper as a teaching tool.

KEY VOCABULARY

Hypothesis: a proposed explanation of and for the effects of a given intervention. Hypotheses are intended to be made ex-ante, or prior to the implementation of the intervention.

Indicators: metrics used to quantify and measure specific short-term and long-term effects of a program

Logical Framework: a management tool used to facilitate the design, execution, and evaluation of an intervention. It involves identifying strategic elements (inputs, outputs, outcomes and impact) and their causal relationships, indicators, and the assumptions and risks that may influence success and failure

Theory of Change: describes a strategy or blueprint for achieving a given long-term goal. It identifies the preconditions, pathways and interventions necessary for an initiative's success

INTRODUCTION

In 2001, achievement tests of Grade 3 students in three districts of Punjab, Pakistan showed that only 50% had mastered the mathematics curriculum for Grade 1 and less than 20% were able to comprehend a simple paragraph. In an effort to increase school quality, researchers designed an intervention that examines the impact of providing school and child level report cards on the education system of rural villages in Pakistan. In order to conduct a rigorous evaluation of this intervention, 112 villages were identified and half were randomly selected to receive report cards. The intervention tracked public and private primary schools (on average, there are 7 schools per village) to determine if providing parents with information on school and child performance would generate credible competitive pressures between schools that would cause schools to increase their quality. Over time, the evaluation measures whether improvements in the quality of education services lead to an increase in children's learning outcomes.

We will use this intervention to lead our discussion on the initial steps of developing an intervention and an appropriate evaluation design. Can information provision have an impact on improving students' educational achievement? The evaluation must collect data on appropriate indicators that would measure program impacts. What data should be collected? What are the appropriate indicators? What data collection methods should be used? We will discuss all this below.

CHALLENGES AND CHANGES IN PAKISTAN'S EDUCATION SYSTEM

The education system in Pakistan has been improving in recent years, but continues to face two major challenges: low enrollment rates and low educational quality. In 2004, the primary school net-enrollment rate of Pakistan was 66%. This is extremely low, even when compared to neighboring South Asian countries, with 90% of primary school aged children enrolled in India, 97% in Sri-Lanka and 78% in Nepal. While enrollment is a clear issue, low educational quality greatly contributes to poor learning outcomes. Mean student-teacher ratios in government schools exceed 35. Such high ratios have also been linked to Pakistan's below average achievement scores in reading and mathematics (scores mentioned above).

With a desire to improve the education system in Pakistan, a group of researchers began collecting data on the "Learning and Educational Achievements in Punjab Schools" (LEAPS) in order to analyze the education sector, its major challenges and policy options for moving forward. In three districts of Punjab province, the largest state in Pakistan, data was collected for several years to obtain a better understanding of the level of learning actually taking place and to identify factors that determine the quality of children's education. Information collected through LEAPS has dispelled the notion that private schools are too expensive for anyone but the rich and that madrassas are on the rise. In fact, since the 1990s, Pakistan has seen a rapid increase in non-religious private schooling driven primarily by the establishment of small enterprises that face little government oversight or regulation. Furthermore, within the sample of villages, there has been a steady increase in the number of schools with an average of over 7 per village.

Wealthier, more literate villages have higher enrollment rates than poorer, less literate villages. However, village characteristics have almost nothing to do with learning outcomes. Instead, most of the variation in learning is explained by differences across schools in the same village, and a large portion of this is due to differences between public and private schools. Private schools generally score higher on tests when compared to government schools and these differences remain significant even after controlling for variations in socioeconomic, parental and child characteristics. Currently, over a third of primary school enrollment is in the private sector.

PROVIDING INFORMATION TO IMPROVE EDUCATIONAL QUALITY

Recently, there have been several attempts in developing countries (e.g. Uganda, Madagascar, and India) to use *information* as an intervention that can improve outcomes related to health and education services. The World Development Report (2004) argues that information is one channel through which the users of services can hold providers accountable and therefore demand quality improvements. Based on previous research and the initial LEAPS data collection, researchers designed a large-scale intervention that examines the village-level impacts of providing school and child-level learning report cards in rural Pakistan.

The recent increase in the number of schools per village gives parents more power in selecting a school. Given high levels of adult illiteracy in Pakistan (nearly 50%), critics argue that parents have little hope in evaluating the progress of their child, much less evaluating the schools and making an informed investment decision on which school to enroll their child. By providing parents with more information, the intervention aims to improve parents' ability to make these informed investment decisions while at the same time putting competitive pressures on the schools to improve their quality.

Half of the participating 112 villages were randomly selected to receive the report card intervention. Based on parent, teacher and school feedback, the report cards provided information on the academic performance of children by school subject, both on an absolute scale and relative to other children, as well as the average test scores for each school within the village. Different versions of report cards were made for parents and teachers to provide them with information most relevant to their concerns. All participants were notified that report cards

would be completed in the following year to ensure the intervention would instigate behavioral changes.

Given widespread illiteracy of the parents, the report cards were delivered through discussion groups rather than mail. Before distributing the cards to parents, there was a 30 minute open group discussion on what influences test score results. Once they were given the report cards, a facilitator focused on positive aspects of the card rather than assign blame. Although these discussions could have had impacts of their own, they were seen as necessary since information without comprehension would greatly weaken the intervention.

ASSIGNMENT: EVALUATE WHETHER AND HOW INFORMATION MOTIVATES SCHOOLS TO IMPROVE SERVICES?

Your evaluation team has been entrusted with the responsibility of estimating the impact of the report card program on improving educational quality. The evaluation design should address all the ways in which providing additional information on the quality of private and public schools could change the local education system. Through a facilitated discussion we will address the needs of the community, the steps needed to reach the intervention's goals and the channels or mechanism through which change can occur.

Discussion Topic 1
Addressing Education Challenges in Pakistan

As a first step, you want to understand all you can about the report card program. Who is the targeted community? What needs did the intervention address?

GOAL: This discussion topic should mimic a "needs assessment" (who is the target, what is the issue that needs to be addressed). Participants should understand the case, the importance of the issue in the context of development and identify the goals of the intervention.

NOTE: this section should be discussed relatively quickly as it is more about reading comprehension – understanding the case. This will leave more time for the more involved questions below. About 10 minutes - discuss as a full group.

1. What are the major challenges of Pakistan's education system? Who is most affected by the current deficits of the system?

Major Challenges: Low enrollment and poor education quality – poor service delivery.

Target Population: The children are directly affected, but it may have additional effects on the parents who want their children educated. Participants may think more peripherally or on a larger scale discussing how it affects the development of the country as a whole. Mention that this information was identified through the needs assessment and expert reports on education in Pakistan. This information helped to confirm that this was an actual issue.

2. What were the main goals of implementing the report card intervention? What were the creators of the program trying to achieve by providing parents and teachers with this information?

Immediate Goal: provide information to parents about the quality of their children's education and the schools that they attend

Intermediate Goals: (1) improve accountability of teachers and schools, (2) increase involvement/participation of parents and improve their decision making capabilities with regards to selecting schools and ensuring their child is performing well

Overall Goal: to increase the quality of primary school education, especially the value or quality per dollar

Long-Term Goal: improve the educational attainment and learning outcomes of the children.

STEPS OF EVALUATION DESIGN

First, when designing an evaluation, you need to be clear about the likely impact(s) of the program. The data that you collect will be directly aimed at providing evidence on whether or not the intervention was successful. Examples of questions to keep in mind while moving forward are:

What are the main outcomes that should be evaluated for the report card intervention?

As a result of the intervention, what do you anticipate to change?

What are the steps that must be taken to arrive at the desired final outcome?

Discussion Topic 2
Use a logic model to describe outputs, intermediate outcomes and final outcomes of interest

NOTE: About 20 minutes should be spent on this section.

GOAL: Develop a logic model for the intervention in order to clearly demonstrate how inputs lead to outputs, which lead to outcomes and then to impacts, while acknowledging the important assumptions made at each stage of this cause-and-effect sequence.

A logic model is a valuable tool that can inform and strengthen the design of an appropriate intervention and evaluation. Since interventions can have many outcomes (intended vs. unintended, short-term vs. long-term, etc.) the logic model helps to clearly identify the cause-and-effect sequences associated with each outcome at each stage of the intervention. This process allows policymakers and researchers to think about the channels through which the intervention can cause change. Furthermore, the information mapped out in the logic model can contribute to the proper selection of indicators and data that can accurately inform the success of the

intervention and through which channels the change(s) occurred.

On the last page of this packet you will find a blank logic model. During this discussion topic we will work through the diagram to help identify the theory of how the intervention can lead to the desired outcomes and impacts.

TEACHING NOTES:

Before beginning the questions have participants take out the logic model template.

Based on responses to Discussion 1, question 1 have participants write down the need that that program is addressing in the first column of the logic model.

Inputs: Explain to participants that the main input of the project is the actual report card. In order to create the report cards, the researchers conducted a needs assessment. As mentioned in the background section, through LEAPS they collected data that allowed them to assess the educational attainment of the children – their scores in three subjects (math, Urdu and English) – and the comparative quality of the schools based on all test scores of children. They also met with parents, teachers and administrators to see what they wanted to know and the best way of reporting. This last point is mentioned but not in detail in the text.

After the explanation of inputs see if anyone has any questions before moving forward.

1. **Outputs are what the intervention produces or provides to program participants. They are direct products of program activities and may include services delivered by the program. The process evaluation will be based largely on monitoring or tracking the output(s).**

i. **Work together to identify the output(s) of the project. Write the output(s) in the third column of the logic model.**

ii. **What is the difference between outputs and outcomes?**

iii. Discuss process evaluation data that could be collected to determine the intervention's success in providing the output. What method(s) would you use to collect this data?

Output(s): Disseminating the report cards to teachers and parents. This output would include the discussion groups that facilitators held to describe the report cards to parents and help them interpret the scores – or read the cards for them if illiterate.

Outputs are what are produced – the actual intervention – and outcomes are what the intervention causes, the resulting effects of the output. For example, here the output is report cards and an outcome would be that the parents use of the information, the behavioral changes of the teachers after having the information distributed, etc. (discussed in more detail in Question 2).

Process Evaluation Data: To ensure that the intervention has been successfully implemented you need to be sure that (1) parents received the report cards – and (2) they understood the information presented

- Meeting Attendance: the cards left over at the end of the meeting indicate who did not attend the meeting. Side note: They could pick the cards up later in the town center and still have the information explained. If no one came after about a month then the card was dropped off at their house.

- Are the facilitators doing a good job at providing parents with the information?: Data may include someone attending the meetings and asking parents if they understood the report cards or asking a specific question that gets at their

understanding of the information provided.

- Who picked up the report card? Was it a parent or an older sibling? – It may be interesting to collect data on the relationship of the child with the individual who attended the meeting.

MULTIPLE OUTCOMES ARE DIFFICULT TO INTERPRET

Outcomes are the believed effects or changes that are anticipated to occur as a result of the intervention. These consequences of the intervention can be intended or unintended, positive or negative, as well as short-term or long-term. It is important to think of each type of outcome. For example, report cards may improve the overall quality of primary education; however this may lead to an unexpected outcome that poorer quality private schools shutdown resulting in less choice or competition between schools within a given village.

Discussion Topic 2 continued…

2. To begin, work with your group to make a simple list of possible impacts or effects associated with the report card intervention.

GOAL: Get the group thinking about what the intervention will do in a more general sense. They should mention the main effect of improving school quality and children's educational attainment, but may also acknowledge the following:

[the positive and negative marks are for question 4 of this topic – listed here for simplicity]

- Poor quality schools may shut down as they can no longer compete (+/-)

- Poor quality schools may work to improve their quality, but reduce their cost (if they are private schools) (+)

- **High quality schools may not seek to improve further – or may increase their price if they perform far above competitors (if they are private schools) (-)**

- **Government schools may increase efforts to improve quality – decreasing the gap between private and public schools (+)**

- **Parents will understand their child's skills better, how they perform and in relation to others (+)**

- **Parents may switch their child to another school (+/-)**

- **Parents may increase their effort to meet with teachers to help their child improve in a certain subjects (+)**

- **Parents may take over this effort to ensure that report cards continue after this intervention (+/-)**

If found to be successful then the intervention could be adopted in other areas – also referred to as "scaled-up" – having an even larger effect on education in Pakistan

3. **In this question you will think about the timing of the outcomes that you just listed above.**

Start with immediate and short-term impacts, move to intermediate (medium-term) outcomes and finally the overall impact. As a group, discuss the possible chain of outcomes.

   i. **Map at least one possible chain of outcomes for how you plan to get from the output to the main impact. Write this on the logic model diagram.**

Below is an example of a chain, which is obviously not the only answer. However, to

ensure that participants are able to get through the majority of the information covered in the case study, please provide them with this example to facilitate the responses in the upcoming questions. Only provide them with the causation chain – the assumptions will be discussed in the following question.

(1) Report cards disseminated to parents and teachers (Output)

(2) Parents and community put pressure on teachers and schools to improve the quality of the educational services provided.

(3) Teachers put forth greater effort in improving the quality of their teaching

[ASSUMPTIONS: (a) teachers care, or (b) school and/or parents put sufficient pressure on the school and teachers to make the desired change, (c) teachers have the ability to improve their teaching quality, (d) there are resources available to increase inputs (e.g. books, salary for teacher attendance, etc.) that could lead to improvements in quality];

(4) improved quality of teaching will allow children to improve their reading and math skills

[ASSUMPTIONS: (a) the adopted improvements in education fit with the learning styles of the children, (b) children have the aptitude and desire or motivation to learn more and move to a higher level quicker than currently happening – the counterfactual].

Not necessary to discuss this – is a very long-term goal and out of the scope.

(5) children become more educated and have more opportunities in life

[ASSUMPTIONS: (a) there are opportunities for children who want to further their education or obtain different types of jobs requiring more education; (b) parents are willing and able to

support their children in obtaining more education or better job opportunities – costly?].

4. In creating the logical chain of outcomes you have likely mentioned assumptions that are necessary for the chain of outcomes to move from the output to the overall impact.

As a group, discuss the following and have someone take notes.

    i. Write a positive or negative sign by the outcomes listed on your logic model to denote those effects that may improve school quality and those that could negatively affect school quality.

    ii. How do you know the direction of these effects? Are there some scenarios that you are unsure if there would be a positive or negative effect?

    iii. What are the specific assumptions made at each point in the process – mapping out the chain of possible outcomes?

    iv. Are these assumptions or conditions based on evidence or proven hypotheses of how participants will react to the intervention?

See above, under Question 2 for examples of effects with positive (+) or negative (-) impacts. The sign (+/-) means that the direction of the effect is ambiguous.

There are likely assumptions or hypotheses that they will have about putting social pressure or 'shaming' public officials to make positive changes. They may make the distinction between whether there is pressure from parents or if it comes from continuous reporting. It would seem however that continuous reporting would only be feared as a mechanism if the parents' pressure

was a motivator. Otherwise, why would additional reporting be a cause for change in the quality of education services provided?

TEACHING NOTES:

BEFORE MOVING ON: Take just a couple of minutes to identify the primary outcome (impact) and the long-term goal. You may want to make the following teaching points:

- Primary Outcome: improving the quality of educational services in both private and public schools within rural villages of Pakistan

- Long-term Goal: an improvement in the educational/learning outcomes of students in the villages where the intervention took place

- You will have gone through the logic model from left to right, but it is also beneficial to review the logic model from right to left. Working 'backwards' we see that in order for children to score higher on academic tests they need to have a higher quality of education, but how can this be attained?

    o ASK PARTICIPANTS: what are ways in which the actual quality could be improved?

        ▪ Change in teaching aids (textbooks, computers, etc.)

        ▪ Reduction in teacher-student ratio

        ▪ Parental time spent with students

        ▪ More time spent at school – or working on subjects

- More time spent on school work after school

This intervention was not particularly specific on the mechanism/channel through which the change in quality occurred. However, it was explored and this is an important aspect of knowing how and why the intervention worked.

**Mention the above so they are thinking also about collecting data that can indicate where the change in quality is coming from.

WHAT DATA SHOULD YOU COLLECT?

You have just created a logic model for the report card intervention. Now that you have a better understanding of the intervention at large and the channels through which change may occur, it should be easier to determine the best indicators and data to collect. Using the diagram as a map, what data will you collect at each step of the project to indicate the success of the intervention?

Discussion Topic 3
Determine appropriate indicators and data to collect

1. Suppose you had all the money and resources in the world and could collect data on every one of these indicators in reserved and unreserved communities, and compare them. How many indicators would you collect?

Collect data on all indicators to learn as much as possible about the outcomes

2. Based on the logic model that you have created, take a few moments to create a list of 1-3 indicator(s) for the main outcomes. Data collected on these indicators should help you determine if the outcomes actually occurred and to what degree they occurred.

When choosing an indicator keep the following criteria in mind:

- The indicator must be measurable.

How can you quantify the change? Can change be measured monetarily, in time, number of people, attendance, etc.?

- The indicator must be observable.

Although we could try to ask individuals how happy they are or if they feel smarter, it is more difficult to measure these perceptions. We would rather have test scores to indicate if an individual had actually learned more.

- The indicator must be directly related to the outcome.

For example, if we want to know the effects of providing access to savings accounts then we want to know the amount of money in savings accounts or the number of savings account opened. These would serve all of the above criteria for indicators.

NOTE: If necessary, mention the distinction between subjective and objective data. Subjective data can be based on perception and could be biased by a variety of factors. This type of data may include collecting self-reported health or learning outcomes that cannot be clearly proven. Objective data is more concrete. For example, this type of data may include having someone stand on a scale and determining their height and weight. With this data over time you could determine if someone had lost or gained weight rather than asking the individual. Both data have their place within the life of an intervention, but we would like participants to focus more on objective data.

It is important to have them work off the chain created above so they have time to complete these exercises.

Some indicators of interest may include the following:

Education Outcomes:

- **Test scores (math, Urdu, and English)**

- **Enrollment rates of children**

Knowing the Mechanism through which the educational quality may **change:**

- **Amount of money that schools spend on various inputs (e.g. textbooks, more teachers, computers, etc.)**

- **Amount of government funding allocated to schools changes**

- **Number of teachers in the school – any new hires**

- **Student-Teacher ratios**

- **Hours spent at school**

- **Time in the day spent on the different subjects**

- **Parents make children spend more time on homework after school (want to show that this is not happening – and changes coming from schools)**

- **Curriculum changes – (this is not such a good indicator, difficult to measure, but nice to know)**

- **Changes in motivation (less concrete, not observable – not likely to collect data on this)**

Perceptions of Parents and the Community on the quality of schools:

- **Do parents believe that there has been an increase in the quality of the education in the school that their child attends?**

Process related data was discussed in Discussion Topic 2, Question 1. Participants may also acknowledge the need to collect this type of data as well. Just make sure that they are clear

between the difference between the data used for process and impact evaluation.

3. **Data Collection:** Use the list of indicators that you have just created and the logic model as a resource to determine what data you should collect.

Discuss the following data collection considerations as group.

- **How could you collect this data? Is any of the data already being collected for other purposes?**

Make sure that groups discuss the difference between administrative data, test score data and household data. Although the latter two may be expensive, they will provide more information and may be the best way to show whether the intervention has been successful.

Focus on the first question and ask question below only if there is enough time.

Question 2: Can you collect data to support or disprove the assumptions or hypotheses that you outlined in the diagram?

Logic Model

Logic M

Needs (the issue/ problem)	Input	Output	Outcome	Impact (primary outcome)	Long-term Goal