

Is generalized impact of learning outcomes explained by positive deviance? The challenge of social norms on the scaling of early grade reading programs

Authors:

Simon King, sjking@rti.org, RTI International & EdD candidate, Institute of Education, UCL

Kellie Betts, kbetts@rti.org, RTI International

Alastair Rodd, arodd@rti.org, RTI International

Sagar Neupane, sagarneupane@kusoed.edu.np, Kathmandu University

“ . . . the holy grail of change is to know under what conditions hordes of people become motivated to change. The answer is not as straightforward as we would like.”

Michael Fullan, *The New Meaning of Educational Change*, 2015, p.39

Abstract

This study explored the influence of positive deviants on impact evaluations of multiple USAID Early Grade Reading (EGR) Programs. The study concluded that between 14.2% and 42.3% of schools explain 80% of program impact on learning outcomes. Additionally, no EGR program has improved learning outcomes after an initial midterm gain. Explanatory qualitative research suggests that impact is accounted for by positive deviants who resist negative social and cultural norms within the education system due to positive personality characteristics aligned with early implementors from diffusion theory (Rogers, 2003). Teachers whose students did not show learning improvement applied the program content using ineffective pedagogies. The accountability and support system encouraged weak classroom instructional practice by giving teachers passing grades for observable compliance measures, to the detriment of quality instruction focused on student learning. These teachers believed most of their students would reach expected proficient reading benchmarks. However, external learning outcome data suggests that most students would fall short of the expected reading standard.

The authors recommend reducing the restraining forces that enable poor pedagogical practice (Kahneman 2011; Lewin 1997) to address these challenges rather than add extra training and incentives. Theories that show promise include Rogers's (2003) Diffusion of Innovations and Michael Fullan's (2015) drivers of educational change.

Introduction

Bright spots. Positive deviants. Early adopters. These are different words used to name individuals whose uncommon behavior helps them solve problems in the same environment as their peers. In education systems, positive deviance is often used to define individuals who can apply an educational innovation while those around them do not, given the same circumstances. However, positive deviants are the minority (Rogers 2003), and the *social and cultural norms* within an education system make scaling and implementing change en masse challenging or unachievable (Fullan 2015).

Positive deviance has long been anecdotally observed and highlighted in early grade reading programming in Lower and middle-income countries (LMICs). Still, little has been done to explicitly understand and leverage positive deviance to improve the design and implement a system scaling approach.

Fundamentally, is positive deviance a phenom that occurs early in the process of education change and has little bearing on implementation and scaling activities? Is this positive deviance significant enough to be prioritized and leveraged for stretched education systems with limited resources and bandwidth? At its core, these are the ideas that this study will investigate.

What is an Early Grade Reading Program?

School enrollment has increased over the past 30 years in many developing countries. However, the quality of education has stagnated at a low-level (UNESCO - Institute for Statistics, 2006). As a response to this, many governments and donors have invested in early grade reading programs to help children “read to learn.” The expected outcomes of these programs include improved early grade literacy and greater student retention. The United States Agency for International Development (USAID) is one of the donors who, since 2009, has invested in dozens of early grade reading programs worldwide. These USAID programs focus on developing children’s reading skills by using the local languages as the language of instruction in the early grades.

For sustainability, cost, and logistical reasons, these early grade reading programs at scale generally utilize local ministry of education systems. Most of these educational systems use either a centralized-decentralized structure, with an education innovation designed centrally but implemented locally at a regional or sub-regional level. Typically, a school is managed by a headteacher and school management committee (SMC), with visits from local education officials, including classroom observations.

The standard components of a program design include (but are not limited to); the development and distribution of classroom teaching and learning materials, teacher training, and follow-up teacher support to implement the program in the classroom.

Positive Deviance and Diffusion

There are typically two ways an education innovation can diffuse, either top-down or ground-up. A top-down approach usually diffuses an innovation faster (Hung et al., 2017). A ground-up solution is generally slower to diffuse because it does not leverage a centralized-decentralized cascade system (Hung et al., 2017). A ground-up approach benefits from the perception that the

education innovation is genuine, practical, and already applied to context (Rogers 2003; Hung et al. 2017). Singapore and Indonesia are good examples of such education systems where local education solutions are facilitated through a centrally implemented framework of support and expectations (Hung et al., 2017). In contrast, EGR programs are designed centrally to provide teachers and other stakeholders with the knowledge to implement a phonics-based literacy program (Gove et al., 2017). Teachers receive training through a cascade delivered by change agents (e.g., central and regional education officers, technical experts).

Diffusion theory focuses on a ground-up approach to developing and communicating innovations. Within a DOI theory framework, positive deviants are called *early adopters* (Rogers 2003). These individuals are generally risk-tolerant and comfortable with change and disruption. They are willing to experiment with innovations – adapting and learning how to get the best innovation to work within their environment (Rogers 2003). Rogers discusses how DOI is “. . . *the process in which an innovation is communicated through certain channels over time among the members of a social system*” (Rogers, 2003, p.5). An approach not yet leveraged for EGR Programming.

We might find early adopters adopting an effective classroom approach, even with the challenge of large class sizes (Ngware, Oketch, and Mutisya 2014). This example highlights the difference between positive deviants, the same conditions as their peers but very different outcomes. DOI also describes the personality characteristics of early adopters. Generally, early adopters have a higher social status, have more years of formal education, possess more empathy and rationality, and have higher social participation (Rogers, 2003). DOI uses a normal distribution to describe the percentage of the early adopters' population as 13.5% (Rogers, 2003) – one standard deviation or less to the left of the middle.

Rogers (2003) discusses that emotions play a large part in an individual's interaction with and perception of innovation. In the book “Nudge” by Richard Thaler and Cass Sunstein (2009), the authors suggest that individuals make decisions in irrational yet predictable ways. This suggests that when teachers are presented with training and resources for an early grade reading program, their response is not simply a logical acceptance of a “superior” product compared with the current instructional approach; then work to implement as designed, with the capacity of the teacher being the only barrier. To this end, the authors of this study will further expand their research to understand positive deviance and develop an understanding of the responses of teachers who do not implement the program as designed. How does their environment, including cultural norms, drive their interaction with the education innovation? To this effect, this study will also incorporate and explore teacher response to EGR Programming using a behavioral economics lens.

The influence of social and cultural norms on program implementation is often downplayed, suggesting that other factors such as class size, teacher salary, and so on are dominating factors that explain why teachers often struggle to implement programming. However, the most straightforward counter-argument is to highlight low-cost private schools in LMICs. These schools gain from a reset of the social norms in education with different accountability conditions from fee-paying parents - resulting in improved teacher attendance (Tooley and Dixon 2005; Alderman, Orazem, and Paterno 2001; Andrabi, Das, and Khwaja 2008). This also

highlights that it is easier to create social and cultural norms than to change them (Fuller, 2015). While factors like large class sizes and low pay are serious, they cannot always be used to explain poor learning outcomes – especially when you look at what positive deviants can achieve in similar conditions.

Research Questions

The research questions this study will answer are:

1. What impact do EGR programs show over three time points (e.g., baseline, midterm, endline)?
2. What percentage of high-performing schools account for the overall impact?
3. Do schools showing strong average baseline scores have the largest average gains?
4. What are the environmental conditions, personal characteristics, and actions of teachers who implement the reading program as designed?
5. What are the environment, personal characteristics, and actions of teachers who **do not** implement the reading program as designed?

These questions will be answered using a quantitative-qualitative mixed-methods design. The quantitative aspect will answer research questions 1, 2, and 3. Qualitative analysis will be used to explain research questions 4 and 5.

Literature Review

The literature review will present the theories that influence the theoretical framework of this study.

Diffusion of Innovations Theory

Everett Rogers developed the Diffusion of Innovation (DOI) Theory in 1962. DOI has been updated and reapplied in different settings and contexts, with the book's fifth edition being released in 2003. DOI has been applied in over 5,000 studies (“What’s so wrong with the Diffusion of Innovations Theory?” 2021) and remains most popular in education when focusing on the introduction of ICT in the classroom (Asongu and Nwachukwu 2016; Dooley 1999; Hung et al. 2017; Richardson 2011). Technology is almost always seen as an innovation, so this framing is quite understandable. However, DOI defines innovation as “*An innovation is an idea, practice, or object perceived as new by an individual*” (Rogers, 2003, p.13). Using this definition, an EGR Program can be also considered an innovation.

DOI is a complex theory that has many different components. For relevance to this research, DOI components can be summarized as (i) categories, and characteristics of adopters, (ii) perceived characteristics of innovations, and (iii) innovation-decision process (Rogers, 2003). Rogers (2003) always made it clear that DOI should be adapted to the context. For example, Rogers (2003) describes five categories of adopters (i.e., innovators, early adopters, early majority, late majority, laggards) but explains the categories as convenient categorizations (like socioeconomic quintiles), but adopters exist on a scale. Consequently, DOI is a very adaptable framework to the research context of this study.

The aspect of DOI that is difficult to adopt into this research framework is the innovation-decision process (Rogers, 2003). Rogers (2003) generally describes this process in five steps: knowledge, persuasion, decision, implementation, and confirmation. However, this process varies greatly by individual, is frequently not linear, happens over time (usually years), and can be interrupted by discontinuance (Rogers, 2003). It is challenging to use interview recall for a teacher to be able to accurately describe in precise detail their interaction steps with the EGR program within a timeline.

One aspect of the innovation-decision process, *persuasion*, can be expanded upon for this study. Rather than understanding persuasion as a dialogue and interaction between a teacher and coach or headteacher, persuasion under DOI is viewed as the potential adopter's perception of the innovation – an *emotional* stage after the cognitive knowledge stage (Rogers, 2003). Persuasion depends on the perceived characteristics of the innovation: relative advantage, compatibility (familiar and consistent with prior practice), complexity, trialability, and observability (Rogers, 2003, p.176).

DOI considers diffusion to be a process of interaction between members of a social system. This idea aligns with a culture of shared learning, a critical component of research on successful education change (Bryk et al. 2010; Fullan 2015; DuFour and DuFour 2013; Lezotte 1991; Scheerens 1992). DOI has two critical steps involving peer interaction, where the potential adopter:

- seeks approval from their peers of their opinion towards and interaction with the innovation,
- can use trialing of the innovation by peers as a substitution for their trial of the innovation

(Rogers, 2003)

Some components of DOI have been applied to education research. For example, the main factors determining the adoption of a specific set of ICT skills for teacher trainers in Cambodian public schools if the innovation was perceived to be easy to adopt (i.e., complexity) and mandatory (i.e., the voluntariness of use) (Richardson 2011). Hughes and Keith (1980) also found a statistically significant association between perception of the innovation and teacher implementation (perceived relative advantage of the innovation explaining the most variation).

Behavioral Economics

Aligned with Roger's (2003) observation that the interaction between the innovation and the recipient is emotional, this study will incorporate Behavioral Economics (BE) into the research framework. BE pushes against conventionality about how we think about participants in standard economic models, that individuals “ . . . *think and choose unfailingly well*” (Thaler and Sunstein, 2009, p. 6). Instead, individuals' behavior is irrational yet expected, predictable, and can be accounted for in design (Ariely 2009). While early research in what is now called BE was focused on applying psychology with economic models to understand better how humans respond, understanding the emotional irrationality of human behavior in economics is not exactly new. In 1936, John Maynard Keynes acknowledged the existence of “animal spirits” (Keynes, 1936, p.77) driving financial decisions. Therefore, the authors view BE as a means to add-on to economic theory, not contradict it.

Nobel Laureate awardee Daniel Kahneman (2011) suggests that to nudge good decision-making, we should focus on diminishing the restraining forces, not increasing the driving forces. Kahneman credits much of his theoretical thinking to Kurt Lewin, a German-American psychologist. Lewin (1997) suggested that to achieve behavior change; there is a good way and bad way to do it. The bad way is to increase the driving forces, such as incentives, while the good way is to diminish the restraining forces. This approach, according to Kahneman, is profoundly counter-intuitive. The *intuitive* approach is demonstrated in most development work, which is often focused on building the cognitive capacity of local stakeholders and providing the necessary resources to implement change. Kahneman and Lewin suggest that unless the environment is conducive to change, the impact will always be modest to none.

The most common application of BE in education is to understand and/or nudge students' behavior in and out of the classroom (Koch, Nafziger, and Nielsen, 2015; Levitt et al., 2012). However, there has been little traction with BE in education regarding understanding teacher behavior, social norms, and classroom instructional approaches in LMICs (Jabbar, 2011; Levitt et al., 2012; Stevano, 2019).

One key challenge when applying BE to education systems is that BE is mainly focused on decisions made by individuals in civil society, mainly regarding individual finance (such as pension contributions) and personal health (eating habits and exercise). Often the same examples are used across books (Thaler and Sunstein 2009; Heath and Heath 2011; Ariely 2009). However, teachers function within an education system, so civil society freedom of choice is a poor fit, as actual (or perceptions of) accountability and expectations are valid considerations for teacher behavior. Thaler and Sunstein (2009) proposed that BE be applied using Libertarian Paternalism (LP), where individuals are free to choose. However, they will be nudged to make good decisions through programming design. Likely, individual nudging might not be the solution to a complex problem like scaling EGR Programming within a local education system.

Further evidence for the importance of the social component for improving education systems comes from Change Theory (Fullan 2015) and Effective Schools theory (Scheerens 1992), which both suggest that shared and local values are critical to effective education systems change. Fullan discusses the wrong drivers of change, "*The problem is that no nation has improved by focusing on individual teachers as the driver*" (Fullan, 2015, p.43). By focusing on individuals, Fullan (2015) argues if we fail to address the culture and relationships within the systems, which cannot be achieved by focusing on individuals. This aligns with the behavioral economics argument by Kahneman (2011) of changing behaviors by focusing on reducing the restraining forces in the environment, not increasing the number of drivers.

Although BE primarily focuses on the individual, it still has a valid place in the theoretical framework to support the consideration of how teachers respond in different ways to EGR Programming. For example, Kahneman (2015) discusses the power of the default and that making no decision is, in effect, a decision. This easily applies to the situation when a teacher is presented with a new classroom approach hoping that they will adopt it. Many teachers will assess their existing classroom approach and decide against implementing the new strategy. BE suggests that the mental lift of adopting a new approach is considerable; thus, even if they

see merit in the new approach, they will stick with their existing approach because the time and effort of change are considerable (Kahneman 2011).

Theoretical Framework

The framework's assumption is the response to introducing an early grade reading program.

The theoretical framework adapts the inputs and influences the five stages of the innovation process (Rogers, 2003, p.170). Behavioral economics theory (Kahneman 2011) is added to expand on the teachers' response based on their environment.

1. Teacher Characteristics, e.g.
 - a. Social participation and communication
 - b. Socioeconomic characteristics
 - c. Empathy
 - d. Ability to cope with risk or uncertainty
2. The Education System, e.g.
 - a. Mandated expectations and accountability
 - b. Cascaded systems support
 - c. Planned communication and channels employed
 - d. Learning and results orientated
3. The Local Environment, e.g.
 - a. Perceived characteristics of the innovation
 - b. Interaction with the innovation (e.g., DOI persuasion)
 - c. Social and cultural norms
 - d. School characteristics, e.g.,
 - i. interaction between teacher peers, administration, and community,
 - ii. communication (channels and content)
 - iii. learning

Most of the literature on BE and DOI is focused on civil society. Consequently, the framework also considers literature that applies or expands on using these theories in an education setting, where diffusion, social structures, communication, and interaction with the innovation will differ from civil society. For example, we will also expand perceptions of the innovation to include image (the extent to which the innovation is perceived to enhance an individual's social status) and voluntariness of use (e.g., is the innovation perceived to be mandatory) (Moore and Benbasat 1991).

Data Sources

This study used data collected to assess four EGR Programs:

- USAID Kenya Tusome (USAID 2022)
- USAID Nepal Early Grade Reading Program (EGRP) (USAID 2017)
- USAID Uganda School Health and Reading Program (SHRP) (RTI International 2019)
- USAID Tanzania Jifunze Uelewe (USAID 2021)

These programs were selected due to the availability of quantitative impact evaluation data at three timepoints, and/or qualitative follow-up research aligned with this study's research framework. The criteria used to select the qualitative data were:

- The EGR Program must have shown a statistically significant impact and at least a small effect size in magnitude
- Data must have been collected at at least two-time points following on from the baseline
- The data must be cross-sectional at all time points; assessing different students, but the same schools and grades

Note that all quantitative data used for this study is available upon request from the Data Development Library (DDL) (USAID n.d.).

The overall quantitative sample sizes used are in Figure 1 below.

<Figure 1 here>

The qualitative data was either collected as part of the work conducted for the EGR program (e.g., Nepal EGRP) or through RTI International institutionally funded research (Tanzania).

Learning outcomes were assessed using an Early Grade Reading Assessment (EGRA) (RTI International 2016). EGRA is a one-on-one diagnostic assessment of reading skills (Dubeck and Gove 2015) based mainly on existing assessments of early grade reading skills, such as the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) tool (Bartlett, Dowd, and Jonason 2015). While DIBELS was developed to diagnose individual child literacy, the EGRA is used as an aggregate measure of literacy across a program. This study used the following EGRA subtasks (Figure 2):

<Figure 2 here>

(EGRA Toolkit (Second Edition), RTI, 2016, p.41)

This study will analyze learning outcomes for grade 2 for Nepal EGRP and Kenya Tusome. Correct letter sounds per minute will be used as the learning outcomes for grade 1 students as it is content appropriate for that grade.

Methods

All impact evaluation datasets employed a Quasi-Experimental Design (QED); gains from the program region(s) are compared with a carefully selected control region. The exception is the Kenya Tusome data. This program is implemented at the national level and, as such, has no control group.

We used a difference-in-difference analysis to answer our first research question, converting the outcome to a standardized mean. Thus,

$$y_{it} = \beta_0 + \beta_1 treatment_i + \beta_2 Post_t + \beta_3(treatment \cdot Post)_{it},$$

where y is the outcome of interest, $treatment_i$ is a dummy indicator equal to 0 when the observation is in the control group and 1 when the observation is in the treatment (program)

group. $Post_t$ is a post-treatment dummy variable, equal to 1 when the observation is in the follow-up and 0 at baseline. The coefficient of interest, β_3 is the product of the interaction term $treatment \cdot Post$ and is the product of the treatment and Post dummy variables. The model is set to compare the dummy indicator of zero (control) against a dummy indicator of 1 (treatment). Thus, β_3 represents the difference-in-difference estimate for the control gains versus the intervention gains. The standardized mean is Cohen's d effect size (Cohen 1988). This is calculated by dividing the difference-difference by the pooled standard deviation:

$$d = \frac{\beta_3}{S}$$

Using the svy commands in Stata 16, we adjusted the standard errors for the stratified clustered school sampling. Survey weights were used for analysis to reduce estimate bias.

As Kenya Tusome had no control group, a difference analysis was conducted using a t-test to compare the mean estimates across years. The Uganda SHRP data were collected six months apart in the first year of implementation. Consequently, the intervention schools' average gains were adjusted by the control group's average improvement of +1.5 correct letter sounds per minute.

To answer research questions 2 and 3, the data was reshaped into school-level longitudinal data. The average learning outcome collapsed the data by school, treatment group, and timepoint (e.g., year), and the data was then merged across timepoints by the school.

Research questions 4 and 5 used a quantitative-qualitative explanatory method. Eight schools in Nepal and 12 schools in Tanzania were selected using either school-level gains (Nepal) or school league tables (Tanzania). Schools were selectively chosen based on the following criteria:

- a selection-mix of performing and non-performing schools to create variability of responses,
- Where possible, matching schools were selected. These schools would be in the same district, with similar resources and urban/rural classification but different performance levels. This method, as best as possible, controlled for socioeconomic status and other differentiating characteristics

Tools for Nepal data collection we developed by Nepal EGRP II local staff. Draft qualitative data collection tools were contextualized and adapted for Tanzania by local staff and consultants through a cognitive interview training process and five days of piloting tools in school.

Limitations

A limitation of this study is that while it goes beyond generalization and studies variation across schools, it does not explore variation within schools. For example, while an individual school might have impressive average gains, this aggregation does not consider if students already demonstrating literacy skills benefitted more than their peers with lower skills.

The quantitative data only samples within each classroom. A large margin of error will accompany a sample size of 8 or 10. Consequently, the analysis of school-level data explores generalized patterns rather than isolating individual school results.

Pro-innovation bias presumes the innovation to be well designed and should therefore be used by the intended recipients (Glor 2003). This bias often leads researchers to ignore the innovation's design, focusing on uptake and implementation. Additionally, unless the implementors of a planned innovation consider and are responsive to the early majority's needs and personality characteristics, the innovation is unlikely to diffuse and "snowball" (Rogers, 2003).

This study reports qualitative data based on participant recall. While most quantitative and qualitative surveys have this challenge, this study is interested in a teacher's interaction with an EGR Program, which often has different stages over time.

Results

Research Question 1: What impact do EGR programs show over three time points (e.g., baseline, midterm, endline)?

This study specifically selected programs that demonstrated impact and measured impact at multiple time points, as the data sources describe. In Figure 3, we present the impact of three programs at three time points. The results are shown in terms of Cohen's *d* effect size. Note that the Language of Instruction (LOI) is a disaggregate for Uganda SHRP results.

<Figure 3 here>

As all three programs demonstrate impact between baseline and midterm, the only real impact of importance is at the third time point. All three programs do not demonstrate increased impact versus the midterm at the third-time point. Between 2016 and 2019, Kenya's impact decreased significantly from 0.69 to 0.40 ($t=2.95$, $p=0.006$). However, the impact was still significantly higher than baseline ($t=4.06$, $p<0.001$).

The results either stayed the same or decreased. Nepal EGRP shows no significant change in impact between midterm and endline. The outcomes for Uganda SHRP are unchanged for two languages of instruction (Acoli and Lumasaaba), but the results for Runyoro-Rutooro decreased to have a negative impact. The overall result of all three dataset analyses is that no program could continue to demonstrate improved learning outcomes beyond the midterm.

Research Question 2: What percentage of high-performing schools account for the overall impact?

The distribution of school-level gains for the three EGR programs is shown in figure 4.

<Figure 4 here>

These figures are intended to visualize the pattern of school-level gains. The three figures show a similar pattern where a relatively small number of schools impact average learning outcomes. Uganda SHRP (once accounting for the control gain) and Nepal EGRP seem to have a lot of

schools with no gain. Noting the scale on the horizontal axes is essential. The scale on Uganda SHRP leads us to conclude that the best performing school improved by about ten correct letters per minute. For Kenya, Tusome one school has an average gain of almost 60 correct words per minute.

Figure 5 shows the percentage of schools that explain 80% of the program's impact on learning outcomes. For Kenya Tusome, 80% of the total impact evaluation is explained by 42.3% of the sampled schools, suggesting that this national program had impact explained by more than just positive deviants. While still less than 50%, it does suggest that in 2016, quite a few schools in the Kenya Tusome program were demonstrating reasonable progress after one year of the program. Nepal has just 14.5% of schools explaining 80% of the overall program impact. Figure 5 reinforces this idea of Nepal; there are a few schools with impressive average gains, but the majority of schools had either minimal impact, no impact, or even negative impact. Uganda SHRP has 14.3% of the schools, explaining 80% of the impact.

<Figure 5 here>

Research Question 3: Do schools showing strong average baseline scores have the largest average gains?

It is well known that there is a high level of association between achievement and socioeconomic status (Kanyongo and Ayieko, 2017; Piper, Jepkemei, and Kibukho, 2015). Therefore, while data presented in this study consistently lacks a reliable socioeconomic measure, we explore the association between baseline association and gains. By reshaping the data to school-level longitudinal data, we can assess the average school-level baseline achievement and average school-level gain using Pearson's correlation (Figure 4). Note this across-school variation does not consider within-school variation and by-student gains.

<Figure 6 here>

The only statistically significant association is Kenya Tusome, where school-level baseline averages and average school-level gains are negatively associated ($r=-0.366$, $p<0.001$). The associations for Nepal and Uganda are non-significant, with correlations of -0.07 and 0.217 , respectively. These results suggest that achievement and EGR program gains are not associated at a school level.

Research Question 4: What are the environmental conditions, personal characteristics, and actions of teachers who implement the reading program as designed?

This question was explored using qualitative visits to the Nepal EGRP EGR Program schools. Schools were selected using the average school learning gains, setting high performing and low-performing schools for visits and creating contrast.

The schools that demonstrated stronger learning gains had at least one of the following characteristics:

- There was always a “change-agent,”; individuals who set high expectations for themselves and often those around them. This person was usually a headteacher who would observe

classrooms at least weekly. Still, often it was a classroom teacher taking advantage of the teaching and learning resources provided by the early grade reading program. A community member was a clear catalyst for change in one school, actively involving the school by engaging the teachers and headteacher. Critically, high expectations were also followed-up with support and interaction to help others achieve the expectations.

- The children and classroom teacher predominantly spoke the language of instruction, Nepali. This made the teaching and learning materials easy for the teacher to use. The pupils could progress faster because the language they were learning was also the language of instruction. Nepal has 123 local languages (Nepal Central Bureau of Statistics 2011), and teachers switching languages is quite common.
- Strong and positive school culture. The school was an inviting place where the staff and faculty took pride in and cared about the children and their learning.
- Strong student and teacher attendance, exhibited by attendance reports.

These observations are not a surprise for positive deviance (Heath and Heath 2011); however, the link between positive school-level learning outcome gains and observed positive deviance is important for EGR programming.

Research Question 5: What are the environmental influences, personal characteristics, and actions of teachers who struggle to or **do not** implement the reading program as designed?

The results below are from interviews and classroom observations applied to the three components of the research framework.

Education system

- Teachers feel they have clear guidelines about the level of achievement and/or student progress
 - Most teachers reference learning and curriculum targets indicated in the syllabus and teachers' guides, which come from the Ministry of Education, Science, and Technology (MoEST) and Tanzania Institute of Education (TIE)
 - Some teachers mention that these targets are further reinforced or communicated via regional and district level officials and/or at the school level (e.g., academic teacher, school head)
- Nearly all teachers feel the targets/expectations for student learning outcomes were achievable;
- Most teachers say that their recent experiences align with their expectations of being a teacher; however, some teachers expressed that their reality differs from their expectations (but seem willing to overlook the challenges). They mention:
 - They expected that there would be higher respect for teachers/teaching profession from the community
 - teaching conditions (environment, infrastructure, pay) do not meet expectations

The local environment

Perceived characteristics of the program

- The majority of teachers mentioned that they initially found the program approach it challenging or confusing (i.e., phonetic approach), while a small number of teachers said they experienced no challenges when introduced to new approaches
- Many teachers perceived the EGR program as different and an improvement from their old classroom instructional approach. Most of the teachers said they abandoned their old methods ultimately to adopt new strategies—even though they found it difficult at first, they felt using the new approaches became easy after some time. A few teachers mentioned they blended new and old techniques.
- Teachers feel there is alignment between program approaches and their general goals as a teacher
- Most all teachers see the program as mandatory but also beneficial to them and their students' learning

Interaction between teacher peers, administration, and community

- Most all teachers have observed other teachers' lessons (same school or neighboring school), and many are involved in CoLs where they further discuss their teaching practices
- Teachers have limited/inconsistent communications with parents

Discussion

Research questions 1 and 2 suggest a considerable variation in implementation fidelity by a school, assuming that the intervention effectively improves learning outcomes when implemented as designed. An alternative measure of fidelity would be a classroom observation measure. However, questions remain over the reliability of a classroom measure as a reliable individual teacher measure of quality (Filmer, Wane, and Ezequiel 2020) in observed conditions (Merrett 2006; Raymond G. Miltenberger 2012). That aside, the data suggests that the literacy programs' initial impact does not continue to show progress after an initial impact.

If, as the findings for research question four suggest, that uptake of implementation is explained by the positive personality characteristics of positive deviants, then programs likely need to pivot to the needs of those unable to demonstrate a positive impact on student learning outcomes.

Research question 5 explores the population of teachers with a low impact on learning outcomes. Limited to the sampled teachers, the lack of impact on learning outcomes is not explained by resistance to the program as the authors hypothesized. When teachers were asked about the reading program, they welcomed the phonics-based approach. They generally perceived the program as a mandated program with a relative advantage over their prior approach. Critically, they also perceived the program as generally not too difficult to implement. Teachers also report getting support for their teaching; the majority are being observed and receiving feedback from various sources, including headteachers, teacher communities of learning, peer teachers, and external coaches. Finally, the lessons seemed to follow the lesson plans, including the use of the gradual release model (“I do, we do, you do”) (Piper et al. 2018), and teachers monitored the progress of students by reviewing their exercise books.

On the surface, everything looks solid. However, in applying the research framework, issues appear. Perhaps the prime example of this is that when asked, most teachers responded that it was expected of them to teach the curriculum, and students at the end of grade two should be able to read a simple, short sentence. Teachers felt this was achievable for all their students, with a few exceptions. However, external assessments of student learning suggest a different story of low performance. Teachers are participating in reflection, support, and learning – this process is not focused on *results* (i.e., improved learning outcomes), a key characteristic of effective schools and systems (Fullan 2015; Scheerens 1992).

The only formative continuous assessment is provided in terms of teachers marking exercise books; however, most of what students wrote was rote copying. So, if the student has no exercise book, they do not write anything. Still, the teacher moves through the task. There is no follow-up or remediation planned.

The teachers observed and interviewed are focusing on the delivery of curriculum through daily lesson plans and a very structured routine to lessons rather than student learning. A blog post by Holman (2012) characterizes the difference between curriculum delivery (i.e., lesson plans) and student learning below:

Teaching can be . . . “Lesson plans”	Learning can be . . . “Understanding”
Neat	Messy
Orderly	Spontaneous
Sequential	Irregular
Managed	Non Linear
Documented	Complex

(Holman 2012)

All the classes observed in Tanzania could be described as the left-hand column. These classes had a remarkable level of homogeneity – all gradual release models with teachers monitoring progress through exercise books, an approach taught to teachers before the reading program (which does not provide lesson plans). Consequently, while teachers have adopted much of the phonics content, their approach is identical to their default. This classroom instructional approach is repeated at every lesson providing a low lift of mental effort. However, for seventeen observations, no student was observed asking an unsolicited question, highlighting the highly structured approach to teaching rather than the actuality of how learning varies by student. If students did not understand how to do something, they waited patiently for the teacher to notice. Sometimes their needs were addressed, sometimes not.

Perhaps the most critical factor to consider is that teachers believed most of their students would achieve the stated end of year expectations of being fluent readers. However, the schools in the study were selected were low performing, and the majority of the students would not achieve this standard at the end of grade 2. Why are the teachers so wrong in their assessment? BE incorporates psychology and sociology to explain behaviors. The two theories that show promise are self-concept and cognitive dissonance.

Defining self-concept as how we perceive our abilities, behaviors, and characteristics (Bailey 2003), research on teacher self-concept and association with pedagogical skills and learning is well researched (Glotova and Wilhelm 2014; James Mbuva 2017; Lohbeck, Hagenauer, and Frenzel 2018; Yeung, Craven, and Kaur 2014). Teachers' self-concept seems to have some bearing on how teachers perceive their work. How does a teacher “convince” themselves that all their students will be reading at the end of the year and that low teacher attendance is acceptable? One suggestion is that “. . . *people behave dishonestly enough to profit but honestly enough to delude themselves of their integrity*” (Mazar, Amir, and Ariely 2008, p.633). This behavior is further encouraged by social norms theory (Bicchieri and Noah 2017), where the perception is that other teachers believe this behavior to be acceptable.

Another possibility is teacher *cognitive dissonance* – a situation where a situation creates conflicting beliefs or behaviors (McLeod 2008). Consequently, this results in mental discomfort leading to a shifting of beliefs or behaviors to reduce the mentally stressful situation. It is possible that teachers have applied this to the actual literacy level of their students. This concept seems to have some foundation to it. We have all met “bad” teachers, but most likely not met teachers who believed they were “bad”. This also aligns with other research that suggests that if teachers know their students are performing poorly, they blame this on the home life characteristics of their students. Consequently, the teachers acquit themselves from the responsibility of poor learning outcomes (Sabarwal and Abu-Jawdeh 2018).

Conclusions

The conclusions section will consist of author recommendations for systems thinking.

Reflection 1: Accountability and compliance is not the answer.

Two issues at play suggest that accountability for teacher performance measures will be ineffective. First, teachers believe that they are effective teachers. They believe they are implementing the EGR program and are supporting student learning. This idea is supported by Sabarwal and Abu-Lawdeh (2018), who argued that teachers in low-income countries already believe that they are applying maximum effort due to their mental models and how they see themselves in the environment they inhabit. Observationally, this is not the case, and consequently, the issue is a combination of capacity and self-concept. Accountability systems “. . . *assumes that educators have the capacity to provide effective instruction*” (Fullan, 2015, p.43). Additionally, when the accountability takes the form of compliance, meeting basic indicators program fidelity does not correlate with learning gains (King 2020).

Reflection 2: Be counter-intuitive and change the environment rather than add new interventions.

The human instinct is to fix what you see. Based on the teacher observations and interviews used for Research Question 5, the natural response is to add formative assessments, more teacher training, and focused communications clarifying teacher expectations and support. However, knowledge does not guarantee a change in behavior. The normative environment will likely make the effectiveness of this additional intervention limited or ineffective (Kahneman 2011; Lewin 1997). It seems the less tried approach is to change the environment. In the case

of Tanzania, this would involve shifting teacher behavior from a classroom curriculum delivery approach to student learning. It seems some of the best approaches from research to shifting teaching norms would be through applying the work of Michael Fullan (2015), who discusses the importance of alignment of shared and individual goals.

Additionally, Rogers' (2003) DOI work seems like a good option to identify and diffuse a social norm as an innovation - improving and leveraging the education system to perform this function. However, the only way to prevent a negative social norm is to replace it with a positive norm. This could be done by identifying exemplary teachers who are focusing on student learning and are results focused, diffusing these teachers throughout the Tanzanian teaching community, providing a "genuine" voice of opinion leadership. This type of process would take longer than a typical education systems intervention, and would need more facilitation through the cascaded education system. It isn't to say that you shouldn't apply the short-term fix to support student learning immediately, but this would have to be in parallel with an approach to shift normative behavior.

Reflection 3: Design education systems that think beyond individual teacher quality.

It is typical for program designs in international education to focus on the individual teacher to increase their capacity. However, while the capacity of the individual teacher is critical when we consider the quality of classroom instruction, focusing on the collective seems a sorely missed component. Fullan discusses the wrong drivers of change, "*The problem is that no nation has improved by focusing on individual teachers as the driver*" (Fullan, 2015, p.43). Fullan calls the approach of focusing on groups rather than individuals "**collective efficacy** – *when the group gets better, improving and attracting talent, the group and individuals become more effective in tandem*" (Fullan, 2015, p. 44). Fullan is not alone in stressing the importance of teaching as more collaborative and less private (DuFour and DuFour 2013; Bryk et al. 2010).

With this, DOI stresses the importance of diffusion through interaction between intended recipients through localite and cosmopolite communication. Peer interaction and opinion leadership can positively affect the perception of innovation and persuade the individual to adopt the innovation during the innovation-decision process (Rogers, 2003).

Reflection 4: Use research applied from outside of LMICs

Much of the core research used this study borrows from sources outside of LMIC research. Michael Fullan's work has mainly focused on Canada and the UK. However, Fullan has also effectively applied his framework to education systems in LMICs (Fullan 2016). However, there is a genuine concern that Fullan's collective approach and DOI theory would be harder to apply in an education system in sub-Saharan Africa, with the many schools being small and isolated. Both theories rely on communication and networks to flourish, which needs to be understood more.

BE is perhaps the most challenging theory for researchers in international development. The core idea of BE is that all humans behave similarly due to evolutionary traits and so places an agnostic approach to community cultures and traditions.

In most LMICs, reading fluency results are far from acceptable, and most early grade interventions provide either a small or no impact (Piper and Stern 2019). It seems time to try something more innovative rather than repeat the past.

Figure 1: Sample Size – Students and Schools

Program	Grade (data used for study)	Year	Number of Students	Number of Schools
Uganda SHRP	One	Baseline, 2014	7,470	262
		Midterm I, 2014	3,201	154
		Midterm II, 2015	1,105	111
Nepal EGRP	Two	Baseline, 2016	1,796	180
		Midterm, 2018	1,764	178
		Endline, 2020	1,848	193
Kenya Tusome	Two	Baseline, 2015	2,427	203
		Midterm, 2016	2,344	203
		Follow-up, 2019	1,429	211

Figure 2: EGRA subtasks

Component	Activity	Early reading skill	Skill demonstrated by pupils' ability to:
Letter identification / sounds	A pupil is given a 10 by 10 grid of letters and asked to identify or sound out as many letters as possible in 60 seconds. Their raw score is converted into correct letters per minute rate.	Alphabet knowledge	Provide the name and/or sound of letters presented in both upper case and lower case in a random order
Oral reading fluency	A pupil is given a simple reading passage and one minute to read. Their raw score is converted to a correct words per minute rate.	Oral reading fluency	Read a text with accuracy, with little effort, and at a sufficient rate

(EGRA Toolkit (Second Edition), RTI, 2016, p.41)

Figure 3: EGR Program Impact at three time points

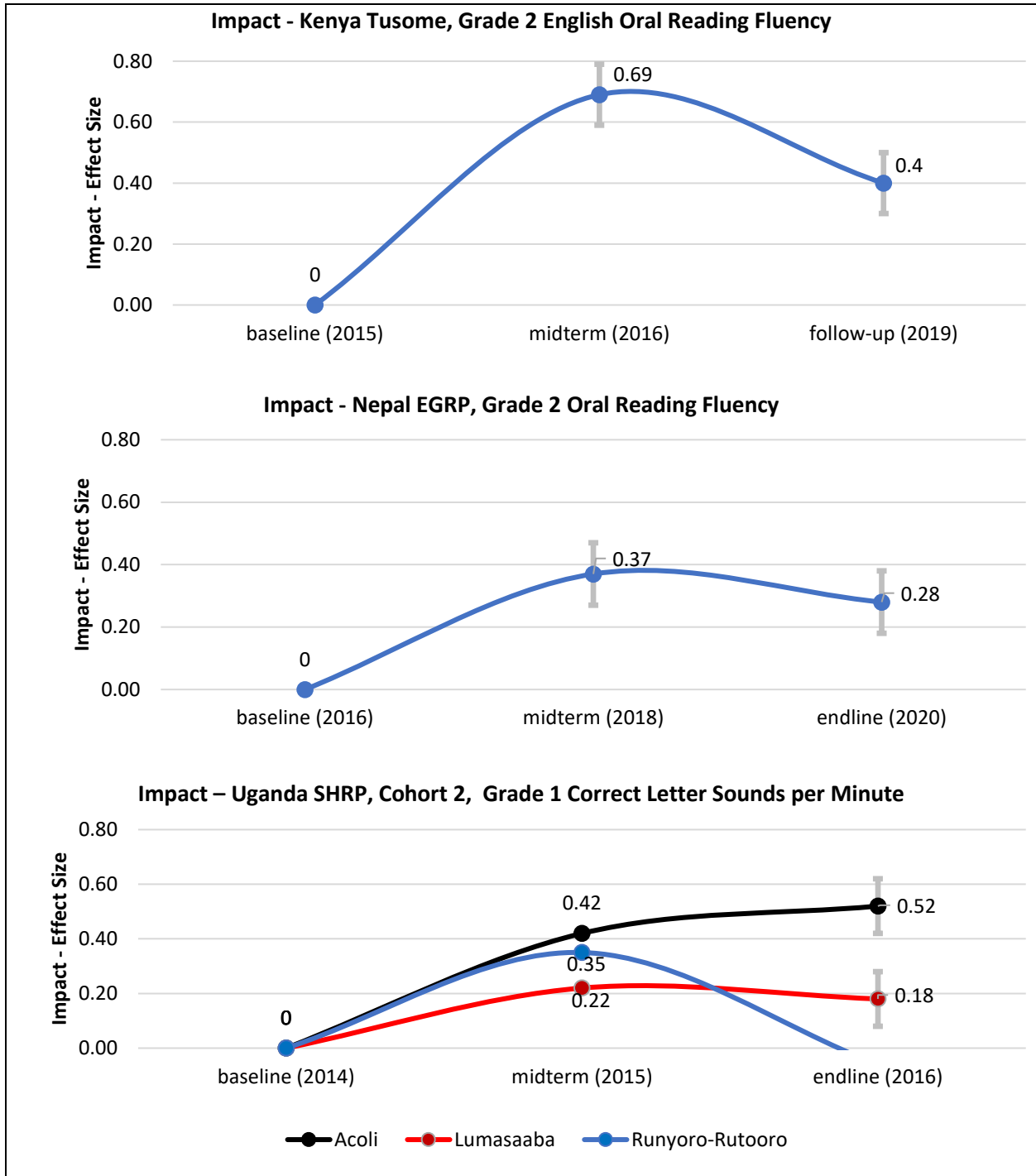


Figure 4: School-level average Baseline and Gains

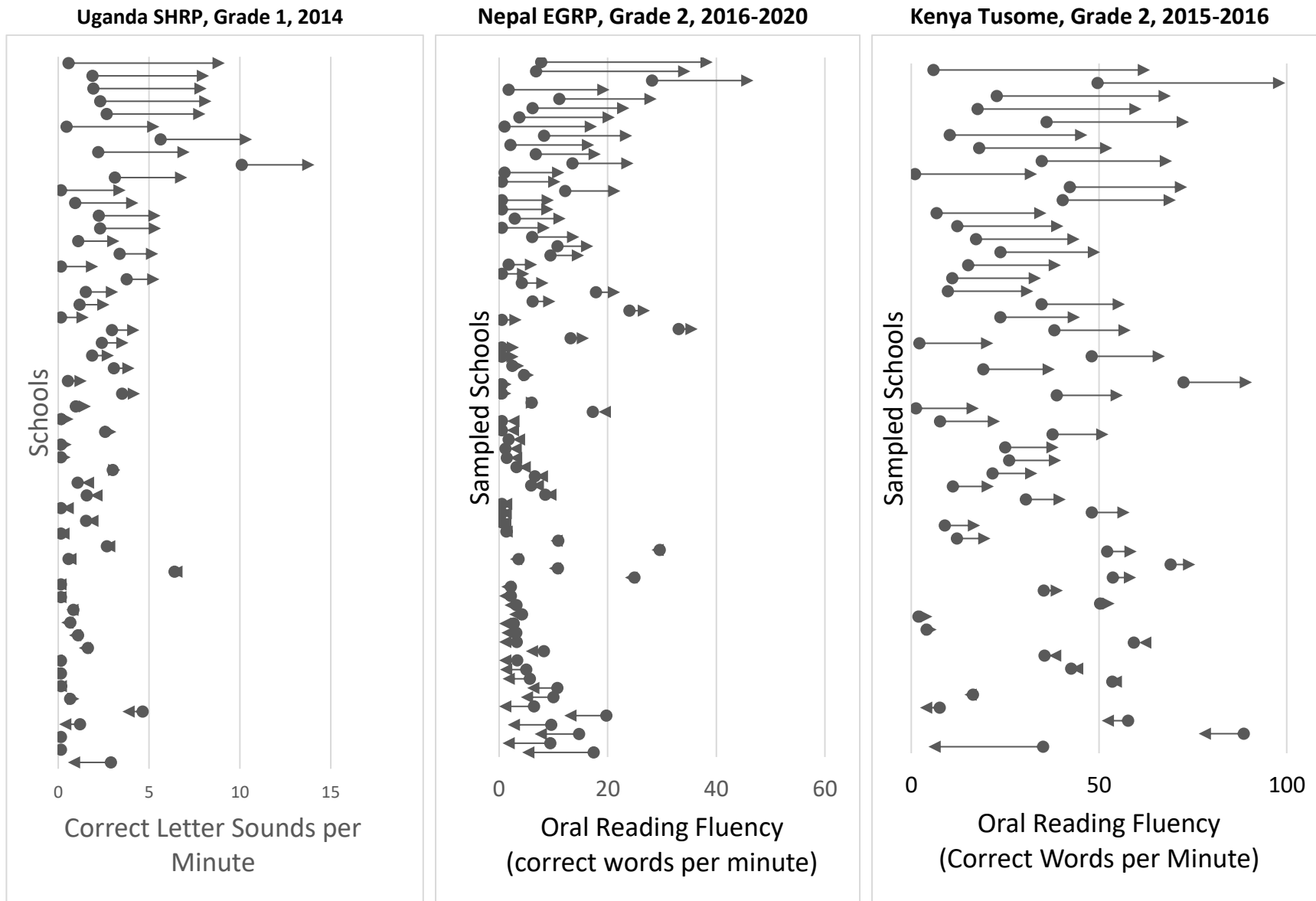


Figure 5: Percentage of schools explaining 80% of the impact

Program	Early Grade Reading Program	Percentage of schools explaining 80% of the impact on learning outcomes
Kenya Tusome	Tusome	42.3%
Nepal EGRP	EGRP I	14.5%
Uganda SHRP	SHRP	14.3%

Figure 6: Pearson Correlation between school-level baseline average and average student gain

Country	Early Grade Reading Program	Pearson correlation between school-level baseline average student achievement and gain
Kenya (n=160)	Tusome	-0.366 (p<0.001)
Nepal (n=76)	EGRP I	-0.07 (p=0.533)
Uganda (n=56)	SHRP	0.217 (p=0.108)

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