How did local wisdom and practice make schools thrive during the pandemic? Evidence from a positive deviance study in rural Uganda

Received 31 January 2023
Revised 25 May 2023
Accepted 3 June 2023

Julius Atuhurra, Yoonjung Kim-Hines and Mikiko Nishimura
International Christian University, Mitaka, Japan

Abstract

Purpose – This research explores the impact of the locally grown strategies for learning support, as a positive deviance (PD) study, during the COVID-19 pandemic in rural Uganda.

Design/methodology/approach – The researchers employed a randomized control trial (RCT) as an original design whereby 50 schools received a full package of SMS and WhatsApp peer groups of head teachers, 50 schools received SMS only and another 50 served as a control group. As an analytical method, this study adopted a difference-in-difference (DID) model to analyze the impact of the radio talk shows promoted through SMS followed by discussion among WhatsApp peer groups. The data collected in June 2021 and February 2022 were used due to the COVID-19-related data limitation of the baseline survey collected in 2019.

Findings – The authors found that the local radio talk shows as a PD intervention had a humble impact on preventing pupils' dropout during the school closures for two years in Uganda. However, the authors did not obtain a significant result on the impact of the PD intervention on pedagogical support or learning outcomes at the school level. The authors also found that the pupils have significantly dropped their level of proficiencies in literacy and numeracy during the pandemic.

Originality/value – The findings could be of value for the leaders, educators and policymakers to understand the most recent update of learning situation in Uganda and the potential impact of locally grown strategies for learning which does not require external inputs.

Keywords Positive deviance, Parental involvement, Primary education, Uganda, COVID-19

Paper type Research paper

Introduction

The learning crisis affecting many developing countries presents the biggest challenge to one of the Sustainable Development Goals (SDGs), achieving quality education for all by 2030 (UNESCO, 2021; UNICEF, 2022). Learning outcomes were very low in many developing countries even before the COVID-19 (UNESCO, 2013; Conn, 2017; Pritchett, 2015; Snilstveit *et al.*, 2015; World Bank, 2017). In recent years, Uwezo citizen-led assessments of basic competences in literacy and numeracy in East Africa have consistently found that less than

This paper forms part of a special section "Bridging Theory and Practices in Educational Development", guest edited by Prof. Yoko Ishida.

This research was funded by the Japan Society for the Promotion of Science (JSPS) under the Grant-in-Aid for Scientific Research (B) titled *Leveraging 'Positive Deviance' to improve learning under COVID-19 pandemic. A randomized intervention in rural East Africa*.

Journal of International Cooperation in Education
Vol. 25 No. 2, 2023
pp. 171-187
Emerald Publishing Limited
e-ISSN: 2755-0303
p-ISSN: 2755-029X
DOI 10.1108/JICE-01-2023-0004

one third of grade three school-going children depict full competence at the grade two level in Kenya, Uganda and Tanzania (Uwezo, 2017). Recent high-impact studies suggest a multi-pronged approach is needed to improve learning, with programs combining two or more of five intervention levels – child, household, classroom, school and system (Conn, 2017; Evans & Popova, 2015; Snilstveit *et al.*, 2015). High-impact intervention areas include teacher knowledge and pedagogical practices, community engagement and monitoring and remedial instruction tailored to students' learning levels.

A question remains: who should be the main actor(s) to implement and act on high-impact practices? The common assumption that the "expertise" knowledge defines intervention in developing countries has recently shifted to locally grown intervention generated by local wisdom. Positive deviance (PD) is an asset-based approach to solving complex social problems. It begins from the observation that communities are endowed with capabilities to solve their problems and need not find extra resources for solutions to emerge (Pascale, Sternin and Sternin, 2010). Positive Deviants (PDs) are individuals or organizations that have successfully applied locally available solutions to the problems affecting them. This approach progresses from unearthing the unique behaviors of PDs to adaptively replicating this locally relevant wisdom among neighbors and discernment of impacts on the problem (Tufts University, 2010).

The purpose of this article is to examine how PD works on the ground by linking the locally grown high-impact practices to expanding other schools of the similar socio-economic status. We adopted a randomized-control trial design to give some local intervention with 100 schools, dividing them into two groups to give two different types of intervention, while having another 50 control schools in rural Uganda. As a part of this large-scale study, we use the midline survey to see the impact of the PD intervention at the school level.

Literature review

Determinants of leaning outcomes

A rich body of recent literature on the education outcomes of children in developing countries has focused on impact evaluations of interventions designed to improve school participation and learning. With the overriding goal being to identify causal effects of the interventions, these studies have tended to use either experimental or quasi-experimental methods that can effectively address selection bias concerns. A rich synthesis of this literature now exists (Kremer, Brannen, & Glennerster, 2013; Krishnaratne, White, & Carpenter, 2013; Westbrook *et al.*, 2013; Glewwe, Maiga, & Zheng, 2014; Murnane & Ganimian, 2014; Conn, 2017; Evans & Popova, 2015; McEwan, 2015; Snilstveit *et al.*, 2015; Glewwe & Muralidharan, 2015) and reveals five key lessons. First, most interventions improve either enrollment or learning, not both. Among the exceptions are multi-pronged programs that are designed to target multiple constraints.

Second, interventions targeted at improvement of the instructional experience in the classroom are more impactful on children's learning. These pedagogical interventions also have a large multiplier effect on learning since they tend to affect several student cohorts. Analyzing 56 high-quality studies from the sub-Saharan Africa (SSA) region, Conn (2017) finds significantly large impacts on learning of programs that target improving teacher pedagogical methods.

Third, programs involving teachers are more effective if they focus on specific needs of the teacher's work, involve teachers themselves in the design of the intervention, include regular opportunities for peer-level discussions and practice in the classroom and are implemented at the school to take full advantage of the success factors existing at that level. Fourth, implementation fidelity is key in ensuring effective interventions translate into improved learning. Finally, local contexts matter: programs can be more impactful in some locations but not others. The PD approach assures against contextual inappropriateness or social rejection of programs since the solutions being expanded have been locally generated.

Interventions aimed at filling information gaps to influence individuals' beliefs and actions in education mostly involve students and parents. While student-focused studies typically provide information on the returns to education in the hope of improving attitudes, effort and completion rates (Nguyen, 2008; Jensen, 2010; Avitabile & de Hoyos, 2015), parent-focused studies involve more frequent information sharing episodes and target correcting inaccurate beliefs around school performance, children's attendance, behaviors and academic achievements (Lieberman, Posner and Tsai, 2014; Berlinski *et al.*, 2016; Andrabi, Das and Khwaja, 2017; Rogers & Feller, 2018; Dizon-Ross, 2019; Atuhurra, 2021; Yamada & Nishimura, 2021). Findings from the baseline survey of parents involved in this study further indicate that they hold inaccurate beliefs about their knowledge of how they can best support their children's learning (Yamada & Nishimura, 2021).

While information interventions are relatively cheap to implement and scale up, their effectiveness depends on some critical factors. An experiment that provided children's test performance information to parents in Kenya did not find any impacts from anticipated increases in parents' involvement in their children's learning efforts (Lieberman *et al.*, 2014). This study highlighted the critical success factors: the issue must be one that people care about, the actions to take must be clearly articulated to them, and if required, they must believe that other recipients will also act on the information. In a context of limited information, when this gap is adequately filled, parents and communities will take individual and collective actions in agency for their children's learning (Bruns, Filmer, & Patrinos, 2011; Kozuka, Sawada and Todo, 2016; Atuhurra, 2016; Atuhurra, 2018; Islam, 2019; Nishimura, 2019; Nishimura, 2020; Atuhurra, Winter, & Nishimura, 2022).

Positive deviance (PD) approach

Over the last thirty years, application of the PD approach to international development has experienced significant growth. However, a detailed synthesis of PD literature reveals a preoccupation with the public health domain, geographic concentration on countries in Asia and the Americas and limited scale-up of PD studies (i.e., going beyond the unearthing of PD behaviors to designing and evaluating interventions within and across communities) (Albanna & Heeks, 2019). The earliest application of the PD approach in education was in 2002-2003 in Argentina's rural province of Misiones where behaviors of PD elementary schools that exhibited student retention rates above 75% were successfully replicated in other schools within the province (Dura & Singhal, 2009). Other PD studies targeted at addressing student absenteeism, tardiness and dropout problems have been conducted in California (2008), Pennsylvania (2010), Denmark (2012 – 2014), North Macedonia and Northern Romania (2017).

Studies targeting improvement of student performance have covered inner schools around the state of New Jersey (2008-2012), lower socioeconomic background and minority immigrant students of Rotterdam's VMBO schools in the Netherlands (2009), Black and Latino students in South Bronx, New York (2012), students with lower clinical skills in a medical school found in Rawalpindi, Pakistan (2011), and children from low income families that struggle to achieve success in schools in Singapore (2016). The Sunday's project was a large program implemented between 2006 and 2011 in Hawaii that successfully applied the PD approach to increase parental involvement and strengthen parent-school partnerships among highly vulnerable Micronesian Chuukese residents. Programs to increase girl's access to education have also successfully applied the PD approach in Ethiopia (2002) and Burkina Faso (2010). As such, application of the PD approach in education has stretched from improving student attendance and retention (Dura & Singhal, 2009) to empowering children as agents for improving their learning (Cheang & Goh, 2018) and bridging school-community gaps in efforts to improve parental involvement (Young, 2019).

In many developing countries, the teaching and learning environment is extremely challenging, typified by overcrowded classrooms, unsupported teachers and highly constrained education budgets (Bashir *et al.*, 2018). An important research question, therefore, relates to how to improve learning in such contexts without requiring large amounts of extra resources. Twaweza's recent PD inquiry in Uganda unearthed two strategies, namely, bridging the gap existing between schools and parents and fostering a supportive school environment for teachers and learners (Twaweza, 2019). Conducted in 2017, Twaweza's PD inquiry in Uganda covered ten districts in the Eastern region and unearthed five strategies from the ten school communities involved in the ethnographic inquiry. These strategies include creating teacher and child support mechanisms at the school, enhancing teacher effectiveness in the classroom, promoting community engagement and securing backup from formal structures existing at the school (Green, 2018; Atuhurra, 2018; Twaweza, 2019). Similarly in Kenya, Twaweza unearthed two closely related strategies, namely, developing strong inspiring school leadership rooted in collaborative engagement with other stakeholders and adopting myriad learning improvement efforts at the school entrenched in teacher effectiveness, learner agency, support provision and child protection.

Learning context with the pandemic in Uganda

On 18th March, 2020, the Government of Uganda (GoU) announced closure of all educational institutions in the country for a period of 30 days as one of the preventive actions against the spread of COVID-19. The country went into a national lockdown with the imposition of a ban on public transport on 25th March, 2020. The Ministry of Education and Sports (MoES) rolled out television and radio-based remote learning programs. By targeting children from poor households that may not have access to radio or television, the MoES distributed self-study materials through local council leaders from whom parents were expected to access them free of charge: however, in reality, sufficient materials did not reach the district level and made local leaders charge parents to photocopy the materials and hampered their wide distribution.

On 15th October, 2020, schools in Uganda officially reopened for the first time for only candidate students (i.e., 7th graders at primary level) to prepare for their final examinations. Beginning in March 2021, the MoES adopted a staggered approach to re-opening of schools, starting with semi candidates reporting back on 1st March, 2021. On 6th June, 2021 the GoU announced complete closures of all educational institutions following the resurgence of the COVID-19 pandemic in the country. This second phase of school closures meant that children of grades 1-3 never returned to school at all since 20th March, 2020 until 10th January, 2022 when schools were finally reopened.

In general, school closures shifted the burden of keeping children's learning to parents and caregivers. Parents became directly responsible for ensuring that their children had access to remote learning materials. Parents also played a key role in supervising and assisting children while they were learning, whereas teachers could attempt home visit and sporadic monitoring for themselves. Our recent study shows that about 22% of 1,222 households surveyed in Busoga Region in July 2021 reported being visited at least once by a teacher from their local school, representing a 14-percentage point increase from the 8% a year earlier (Atuhurra *et al.*, 2022). When we surveyed all the 150 schools in November 2020, 34% reported that they had been open since May 2020 (Atuhurra *et al.*, 2022). Since then, many schools have adopted this position of keeping the school open and making teachers available to support children's home learning needs. To supplement the government's remote learning program, some schools developed and distributed home study materials to their learners. Our radio talk shows and some public interaction between role-model teachers and parents had impacted on increasing interaction of parents and teachers in supporting children's learning and care (Atuhurra *et al.*, 2022).

Having socio-economic diversity among parents, varying leadership quality of head teachers, teachers' status of hiring, and most importantly, unique characteristics of children themselves in their attitudes towards learning and their socio-economic environment affecting their choice of learning, the COVID-19 pandemic has brought us a chance to rethink the conventional form of learning through schooling that has been prevalent over the past century. Nevertheless, it is still challenging for all to upgrade the level of learning at home without linking up with various stakeholders to support it. Remote learning technology may enable one channel to open a forum, but the most essential transformation should perhaps be reimagination and reconstruction of a learning community (Atuhurra *et al.*, 2022). Given the pandemic which stopped all external assistance and common school operation, local community leaders attempted to adopt some locally generated intervention in the Eastern region in Uganda. By using this case, this study explores how we can link with various stakeholders to support learning without external resources under the pandemic.

Methodology

Research question

The goal of this study was to measure the impact of PD replication in the impoverished areas through continuing the implementation, monitoring and evaluation of an ongoing low-cost randomized intervention leveraging local solutions to the learning problem in 150 rural school communities in Eastern Uganda, taking extra care to establish effects of the currently ongoing remote strategy targeted at mitigating the negative impacts of the COVID-19 pandemic-imposed school closures on children's educational, socio-emotional and behavioral outcomes. As part of the larger study and at the point of midline survey conducted in February 2022, this article aims at examining how schools reacted to the pandemic by attempting continuous learning of pupils at home as well as to prevent drop out during the pandemic. Local intervention was made to encourage schools through SMS and WhatsApp and to organize local radio talk shows involving teachers, parents and community to discuss education issues during the pandemic (hereinafter we call PD intervention). In concrete terms, we focus on the following research question:

RQ1. What are the impacts of a multi-pronged local intervention package on school level outcomes?

We have three sub-research questions as follows:

Sub-RQ1. How did the PD intervention affect schools' remote learning support during the school closures?

Sub-RQ2. How did the PD intervention affect pupils' return to school after the reopening of schools?

Sub-RQ3. How did the PD intervention affect the head teachers' perception on teachers' professional development needs at the time of reopening of schools?

Research design and data

Based on the PD strategies identified by Twaweza (2019), we designed a randomized controlled trial intended to extend the unearthed PD strategies to other neighboring communities in Eastern Uganda. The intervention targeted public primary schools that are mostly attended by children from poor households in rural areas. Given the pandemic, we had to adjust our intervention by postponing direct intervention to classroom teachers and more focusing on head teachers and community to share experiences and to discuss education issues during the pandemic. Regular information sharing among head teachers through

WhatsApp and school-community information sharing and interactions through radio talk shows were held in randomly assigned program school communities. 50 schools received the encouraging messages through SMS and their head teachers were included in the WhatsApp group for discussion. Another 50 received the SMS messages only. We circulated information on the radio talk shows through the SMS messages. The last 50 did not receive any intervention and served as a control group.

A baseline survey was conducted in October-November 2019 covering 150 school communities from six districts in Busoga sub-region. Descriptive evidence from this survey suggested very low levels of parental involvement in their children's learning efforts beyond the provision of basic requirements and high prevalence of child labor (Atuhurra, 2021). All surveyed respondents[1] highlighted provision of better and actionable information to parents as a top priority need for improving children's learning in Busoga.

The present study looks into the midline survey conducted in February 2022 in addition to the baseline survey in 2019 and the phone survey in June 2021 to make a panel data. The baseline survey was used to confirm the level of pupils' performance before and after the pandemic, but was not suitable for our analysis on the impact of the PD intervention as the baseline did not consider the pandemic situation and hence lacked some information on emerging themes in school management such as remote learning support. The June 2021 data was deemed more suitable to measure the impact of our PD intervention designed for the current pandemic situation as it was collected during the pandemic, after the complete school closure and before our intervention of the second phase radio talk show (see Table 1). The surveys were conducted by local community leaders with 1,471 households with 2,698 children aged 6-13 years and 150 schools. We also present the results of a learning assessment for children aged 6-16 in households originally collected by using the Uwezo assessment tool as the background information of the learning status of rural children before and after the pandemic (see Table 3).

Data analysis method

We use descriptive analysis to show differences of children's learning performance and attendance before and after school closures caused by the pandemic and differences of school outcomes at the time of school reopening. A Difference-in-Differences (DID) analysis was used to measure the impact of the radio talk shows on three school-level outcomes as follows:

(1) Provision of remote support (indicator variable: 1, 0)

	Date	Theme content	Panelist	# Calls from listeners
1	18 Sep	Status update, situation in communities	2 Head Teachers	5
2	25 Sep	Remote learning – demands on parents	Parent, Teacher	8
3	2 Oct	Remote learning for lower primary children	2 Teachers	12
4	9 Oct	Parents' experiences	2 Parents	15
5	16 Oct	Reflection – lessons from previous shows	2 Head Teachers	9
6	23 Oct	Parents as teachers at home	Teacher, Parent	10
7	30 Oct	Modal teachers' reflections	2 Teachers	14
8	6 Nov	Other stakeholders' support	SMC, LC leader, Head Teacher	9
9	13 Nov	District education officials' support	DEO, DIS, Head Teacher	7
10	20 Nov	Plans for re-opening in 2022	Principal, DEO, Head Teacher	5

Table 1.
The second phase radio talk show in 2021

Note(s): The first phase radio talk show was conducted in August-December 2020 and consisted of 12 themes
Source(s): Created by Authors

(2) Incidence of non-return of students on re-opening in January 2022 (indicator variable: 1, 0)

(3) Teacher professional development needs perceived by head teachers on;

- Instructional materials (1, 0) – traditional need
- Handling large classes (1, 0) – traditional need
- COVID-19-related teaching and learning complications (1, 0) – emerging need
- Accelerated teaching and learning (1, 0) – emerging need
- Assessing learning (1, 0) – Both traditional and emerging need

We use the June 2021 phone survey as the baseline for purposes of the remote intervention when none of the head teachers was treated since the phase 2 radio talk shows had not started. As mentioned earlier, the baseline survey in 2019 happened before the pandemic and so had no pandemic-related outcomes on remote support and incidence of non-return, making itself invalid for the pandemic-related outcomes that we want to measure. Thus, we dropped the RCT design for this analysis and resolve to use a DID framework. The phase 2 radio talk shows ran between September and November 2021 and 77 head teachers tuned in (treatment group) while 73 did not tune in.

The statistical formula is shown as follows:

$$Y_{it} = \alpha + \beta(Tuned)_{it} + \delta(After)_{it} + \gamma(Tuned{*}After)_{it} + \rho(Controls)_{it} + \varepsilon_{it}$$

Y is a school-level outcome variable (provision of remote support, incidence of student no returns after re-opening and numbers of non-returned students and indication by head teacher of need for professional development support for teachers in this school).

Tuned is a group indicator for head teachers who reported they had tuned in to the radio talk shows during phase 2 of school closures (Sep – Nov 2021), or the number of key talk show messages mentioned by the head teacher during the survey.

After is an indicator for midline 2022 survey and controls for time effects.

Controls are measures of various school-level control variables.

$\alpha, \beta, \delta, \gamma, \rho$ are parameters to be estimated. The coefficient on the interaction term γ is the effect of the treatment (Average Treatment Effect on the Treated).

Our key interest is on the following two variables (Tuned in; and No. of talk show messages), with the others being controls.

Findings

Change of the learning landscape before and after the school closure

As shown in Table 2, there is a declining trend in performance of children aged between 6 and 13 in both literacy and numeracy between 2019 and 2022. The basic numeracy has a consistent trend of large drop in the level of performance of all age groups, while the drop in literacy in English and the local language, Lusoga was not statistically significant for some age groups. In basic numeracy, all age groups dropped one level during the pandemic, meaning that 10-year-old children used to do addition in 2019 but now only recognize the numbers but are unable to add them in 2022.

While performance of children declined after two years of school closures, school attendance increased by 7% points as shown in Table 3. The trend is the most prominent for older children aged 10-13 years.

In comparing the school-level panel data in 2019 and 2022 shown in Table 4, we see a notable trend in more frequent visit of parents to schools after reopening of schools. More

	Age	n ('22)	n ('19)	Feb '22	Nov '19	Diff
Basic English literacy	6	271	296	1.185	1.345	−0.16***
Basic Lusoga literacy	6	271	296	1.037	1.085	−0.048**
Basic Numeracy	6	271	296	1.273	1.828	−0.554***
Basic English literacy	7	239	349	1.276	1.601	−0.326***
Basic Lusoga literacy	7	239	349	1.076	1.209	−0.134***
Basic Numeracy	7	239	349	1.532	2.464	−0.933***
Basic English literacy	8	314	408	1.452	1.848	−0.396***
Basic Lusoga literacy	8	314	408	1.111	1.336	−0.225***
Basic Numeracy	8	314	408	1.863	3.054	−1.191***
Basic English literacy	9	389	403	1.782	2.047	−0.266***
Basic Lusoga literacy	9	389	403	1.226	1.467	−0.24***
Basic Numeracy	9	389	403	2.36	3.444	−1.085***
Basic English literacy	10	469	475	2.054	2.255	−0.202***
Basic Lusoga literacy	10	469	475	1.471	1.579	−0.107
Basic Numeracy	10	469	475	3.034	3.962	−0.928***
Basic English literacy	11	455	242	2.244	2.496	−0.252***
Basic Lusoga literacy	11	455	242	1.492	1.677	−0.185**
Basic Numeracy	11	455	242	3.284	4.492	−1.208***
Basic English literacy	12	517	293	2.45	2.638	−0.188**
Basic Lusoga literacy	12	517	293	1.681	1.683	−0.002
Basic Numeracy	12	517	293	3.592	4.635	−1.043***
Basic English literacy	13	336	180	2.762	2.85	−0.088
Basic Lusoga literacy	13	336	180	1.825	1.828	−0.004
Basic Numeracy	13	336	180	4.277	4.889	−0.612***

Note(s): *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Source(s): Created by Authors

Table 2.
Mean Literacy and Numeracy performance comparisons by age: Midline 2022 – Baseline 2019

	n (2022)	n (2019)	Feb'22	Nov'19	Diff
Age 6	271	282	0.823	0.752	0.071**
Age 7	239	341	0.858	0.8	0.057
Age 8	314	405	0.87	0.822	0.047
Age 9	389	404	0.917	0.876	0.042
Age 10	469	478	0.914	0.854	0.061***
Age 11	455	242	0.921	0.835	0.086***
Age 12	517	291	0.92	0.811	0.110***
Age 13	336	178	0.902	0.803	0.099***
N	*2,690*	*2,621*	*0.899*	*0.829*	*0.070****

Note(s): *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Source(s): Created by Authors

Table 3.
Mean school attendance comparisons by age: Midline 2022 – Baseline 2019

parents were reported to visit schools to follow-up on various aspects related to their children's education. As the number of enrollments increased, the pupil-teacher ratio increased by 10 pupils per teacher. As we saw that children who enrolled after the school closure increased at all ages, there seemed to be concentration of large class sizes in lower grades. Some schools reallocated teachers to lower primary grades which were the most affected by classroom overcrowding following school re-opening. Another notable trend is that there is a larger student attendance rate even though the difference is only marginally significant. Teachers' attendance rate remained the same.

Our local community leaders who conducted the survey and authors also witnessed in the field that a number of low-cost private schools were compelled to close during the school closure and many children came to enroll in the public schools after school reopening. Teachers who were hired by community in public schools also lost jobs in many schools, while some head teachers managed to keep them by giving some in-kind incentives for two years. Many government teachers did side-business during the school closures and some left teaching completely during the pandemic, but the data shows that the majority of teachers came back to schools.

Impact of PD intervention on school outcomes

Table 5 shows school-level outcomes by our random treatment assignment status as of February 2022. Sixty-six percent of head teachers who received the full package of PD intervention (i.e the SMS and the WhatsApp peer groups) listened in the radio talk shows as compared to 44% of head teachers who received SMS only or did not receive anything. Encouragement through SMS alone did not result in more take-up of the radio talk shows. Nevertheless, both treatment groups (i.e. Full package and SMS only) had a significantly lower number of pupils in upper grades who did not return to school after school reopening than the control group in January 2022. Head teachers who received SMS only lost significantly fewer pupils and reported a significantly lower need for teacher professional development in the area of handling of large classes than the control group. There were no statistically significant differences between the full package and comparison groups on: provision of remote support; incidence and numbers of non-returned students; and reports on teacher professional development needs.

	Feb'22	Nov'19	Diff
Parents visiting school	44.607	13.38	31.227***
Attendance rate - pupils	0.984	0.706	0.279*
Attendance rate - teachers	0.839	0.837	0.002
Pupil-Teacher Ratio (overall)	62.431	52.742	9.69***
PTR diff. (Lower Pri. – overall)	36.736	35.371	1.364

Note(s): *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Source(s): Created by Authors

Table 4. Mean comparison of school-level outcomes, within-school differences: Midline 2022- Baseline 2019; N = 150

	Full Pkg. (n = 50)	SMS only (n = 50)	Ctrl. (n = 50)	SMS only Diff	Full Pkg. Diff
Radio talk show turned-in, Phase 2	0.66	0.44	0.44	0.00	0.22**
Remote learning support	0.82	0.76	0.74	0.02	0.08
No return incidence: P4-P7	0.92	0.92	0.94	−0.02	−0.02
No return: Pupils P4-P7	71.88	52.92	88.72	−35.8**	−16.84
Teachers prof. dev't needs (2022)					
Instructional materials	0.56	0.46	0.44	0.02	0.12
Teacher motivation, beliefs	0.4	0.46	0.44	0.02	−0.04
Continuous assessments	0.34	0.38	0.3	0.08	0.04
Handling large classes	0.18	0.12	0.32	−0.20**	−0.14

Note(s): *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Source(s): Created by Authors

Table 5. Mean comparison of school-level outcomes by random treatment assignment status, Feb 2022

As shown in Table 6, a larger proportion of head teachers who tuned in to the phase 2 radio talk shows provided remote learning support during phase 2 school closures. Listening in the radio talk shows did not have any significant relation to other school-outcomes such as no return incidence of pupils or head teachers' perception on teachers' professional development needs in any area.

Tables 7–10 demonstrate the results of DID analysis of the impact of the phase 2 radio talk shows on the school-level outcomes mentioned earlier. First, the radio talk shows did not have a statistically significant impact on the remote support by school (see Table 7). Factors found to be associated with remote learning support were the school age and pupils' attendance rate. Holding other variables constant, older schools and schools with a higher attendance rate of pupils provided more remote learning support than other schools during the school closures.

Second, as shown in Table 8, the radio talk shows showed a negative impact on the incidence of students' no-return after school reopening, albeit with statistical significance at 10% level. Both listening-in of head teachers to the radio talk shows and frequency of listening-in had a statistically significant impact on reducing non-return post-pandemic. Controlling other variables, schools with a higher attendance rate of teachers also had statistically significant lower incidence of pupils' no return. Older schools tend to be associated with a higher incidence of pupils' no return.

As for the impact of the radio talk shows on head teachers' perception on teachers' professional development needs, it revealed that the radio talk shows only impacted on COVID-19-related emerging themes such as COVID-19 procedures after re-opening school and accelerated teaching and learning modalities which MoES adopted after school reopening. As shown in Tables 9 and 10, the more engaged head teachers were in the radio talk shows, the more recognition of teachers' professional needs for COVID-19 procedures and subsequent accelerated teaching and learning have become. Other traditional themes including instructional materials and learning assessment were not affected by participation in the radio talk shows (tables not shown). Other variables also suggest that head teachers of older schools tend not to perceive teachers' professional development needs and that the attendance rate of pupils affect professional needs. The attendance rate of pupils is negatively correlated with the teachers' professional needs for COVID-19 procedures (see Table 9), while it is positively correlated with the teachers' professional development needs for accelerated teaching and learning modalities (see Table 10). It is interesting to note that head teachers of schools with more parents visiting them and with a higher attendance rate of pupils are more keen on teachers' professional development on accelerating teaching and learning.

Table 6.
Mean comparison of school-level outcomes by tuned-in status of radio talk show, Feb 2022

	Tuners (n = 77)	Non-tuners (n = 73)	Diff
Remote support	0.844	0.699	0.145**
No return incidence: P4-P7	0.896	0.959	−0.063
No return: Pupils P4-P7	75.792	66.302	9.491
Teachers prof. dev't needs (2022)			
Instructional materials	0.493	0.48	0.014
Teacher motivation, beliefs	0.428	0.439	−0.01
Continuous assessments	0.311	0.37	−0.058
Handling large classes	0.182	0.233	−0.051

Note(s): *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Source(s): Created by Authors

Variables	(1) ATET	(2) Controls	(3) ATET	(4) Controls
Parent visits		−0.000528		−0.000496
		(0.000349)		(0.000357)
PTR		−0.000565		−0.000254
		(0.00365)		(0.00370)
PTR diff		0.000252		0.000202
		(0.000599)		(0.000614)
Attend rate - Pupils		0.0288***		0.0288***
		(0.00703)		(0.00684)
Attend rate - Teachers		0.212		0.245
		(0.280)		(0.281)
School Age		0.148***		0.147***
		(0.0227)		(0.0208)
School Size		0.000245		0.000231
		(0.000297)		(0.000297)
Tuned in	0.0716			
	(0.0903)			
No. of t-show messages			0.0292	
			(0.0269)	
Constant		−7.903***		−7.908***
		(1.184)		(1.073)
Observations	298	298	298	298

Note(s): Robust standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Tuned in (1 if headteacher tuned in, 0 otherwise): Coefficient is read as effect of tuning in as compared to not tuning in
No. of t-show messages (for headteachers who tuned in, these range from 1 - 10; for those who never tuned in, zero messages). Coefficient is read as effect of a unit increase in the number of recalled messages
Source(s): Created by Authors

Table 7.
Effects of tuning in to radio talk show (phase2) on provision of remote support (0, 1)

Discussion and tentative conclusion

Albeit with the adjusted version of the PD intervention due to the COVID-19 pandemic which struck Uganda after our baseline data collection and PD study design in 2019, our PD intervention with a focus on information sharing and active communication among local stakeholders had a humble impact on prevention of dropout during the pandemic. The study showed that the radio talk, the major PD intervention, significantly reduced the number of pupils who did not return to school-on-school reopening after two years of school closures. The radio talk shows seem to have impacted on activating local discussion on what parents and community can do about children's learning and disciplinary issues at home with close collaboration with teachers as well as to keep public attention to learning during the pandemic. It is a phenomenal impact, given the fact that many children were exposed to child labor during the pandemic and were locally known to have lost interest in learning or married off for additional income in the household.

However, the PD intervention focusing on information and communication through SMS, WhatsApp peer groups of head teachers and radio talk shows which targeted parents, teachers and communities, did not directly affect learning intervention at the school-level. As our results showed, it was more of veteran schools with longer history with a high rate of pupils' attendance that made schools' decision on remote learning support intervention more proactively. The WhatsApp communication and the radio talk shows could have generated opportunities of such schools to share their experiences with other schools in promoting pedagogical intervention. However, non-veteran schools recognize more needs for teachers'

Variables	(1) ATET	(2) Controls	(3) ATET	(4) Controls
Parent visits		0.000192		0.000145
		(0.000343)		(0.000325)
PTR		0.000181		−0.000427
		(0.00357)		(0.00340)
PTR diff		0.000586		0.000721
		(0.000652)		(0.000616)
Attend rate - Pupils		−0.00284		−0.00377
		(0.00483)		(0.00447)
Attend rate - Teachers		−0.237		−0.298**
		(0.144)		(0.145)
School Age		0.0264*		0.0323**
		(0.0159)		(0.0160)
School Size		−0.000168		−0.000153
		(0.000313)		(0.000308)
Tuned in	−0.107*			
	(0.0627)			
No. of t-show messages			−0.0547*	
			(0.0281)	
Constant		−0.177		−0.422
		(0.783)		(0.782)
Observations	298	298	298	298

Note(s): Robust standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Tuned in (1 if headteacher tuned in, 0 otherwise): Coefficient is read as effect of tuning in as compared to not tuning in
No. of t-show messages (for headteachers who tuned in, these range from 1 - 10; for those who never tuned in, zero messages). Coefficient is read as effect of a unit increase in the number of recalled messages
Source(s): Created by Authors

Table 8.
Effects of tuning in to radio talk show (phase2) on incidence of student no-return (0, 1)

professional development under the pandemic, regardless of radio talk show opportunities. It is also implied that more pedagogical approaches will be necessary in order to compensate lost learning opportunities as existing literature suggest (Conn, 2017; Evans & Popova, 2015; Snilstveit *et al.*, 2015). Our intervention after reopening of schools to activate teacher professional training at school level had to postpone and only begun in April 2022, for which further evidence of impacts on improving pedagogy, teachers' team work and consequently pupils' learning outcomes is awaiting.

Another notable finding was how the radio talk shows worked on head teachers' perception on professional development needs at the time of reopening of schools. During the 2nd phase of radio talk shows, teachers, parents and communities were perhaps more anxious about how to resume schools and get back to the learning in schools after reopening of school given the declining trend of COVID-19 at that time. Since the PD intervention was locally generated by picking up topics of their local choice, the themes and focus may have been on COVID-19-related areas rather than conventional themes that had and are existing to determine learning crisis in rural Uganda. It was also revealed that a push for head teachers to pay attention to teachers' professional development needs does not just come from peer pressure of other head teachers through WhatsApp or wide information sharing through public means like the radio talk shows. Rather, other school-level strategies such as community participation with more keen parents on children's learning, promotion of pupils' interest in learning and encouragement of teachers to attend pupils seem equally, if not more, important to influence motivation of school management to teachers' professional development.

Variables	(1) ATET	(2) Controls	(3) ATET	(4) Controls
Parent visits		0.000263		0.000302
		(0.000695)		(0.000707)
PTR		−0.00441		−0.00379
		(0.00422)		(0.00419)
PTR diff		−0.000601		−0.000761
		(0.000858)		(0.000869)
Attend rate – Pupils		−0.0218***		−0.0204***
		(0.00725)		(0.00685)
Attend rate – Teachers		−0.507*		−0.446
		(0.295)		(0.302)
School Age		−0.120***		−0.129***
		(0.0270)		(0.0249)
School Size		0.000483		0.000475
		(0.000374)		(0.000364)
Tuned in	0.0902			
	(0.108)			
No. of t-show messages			0.0543*	
			(0.0321)	
Constant		7.105***		7.503***
		(1.352)		(1.212)
Observations	298	298	298	298

Note(s): Robust standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Tuned in (1 if headteacher tuned in, 0 otherwise): Coefficient is read as effect of tuning in as compared to not tuning in
No. of t-show messages (for headteachers who tuned in, these range from 1 - 10; for those who never tuned in, zero messages). Coefficient is read as effect of a unit increase in the number of recalled messages
Source(s): Created by Authors

Table 9.
Effects of tuning in to radio talk shows (phase2) on need for teachers' professional development for the COVID-19 procedures (0, 1)

In a nutshell, the radio talk shows worked well during the COVID-19 when schools were closed and people could not move freely to discuss issues on education or to conduct regular monitoring of pupils. It is also worth noting that pupils did come back to school after two-year-long closure of schools despite general observation and fear that schools lost a lot of pupils due to lost interest in studies, child labor and early marriage due to poverty-induced needs of households during the pandemic. However, in order for it to link with quality learning, we need more direct pedagogical support through teachers and parents. Our earlier survey showed that siblings supported to each other in learning during the school closures, while some teachers sporadically visited homes (Atuhurra, 2021; Atuhurra *et al.*, 2022). Such emerging positive trend may stop unless teachers, parents and community share a clear picture of how they manage to ensure the lost time of learning. Children's learning levels in literacy and numeracy have significantly dropped after the two years of school closures. How can they catch up with learning loss by accelerating teaching and learning program currently put in place by the Government? What are the roles of schools, parents and communities to ensure continuous and accelerated learning in school and at home? This is going to be a pressing issue at the local level, for which our PD intervention is to further attempt to generate discussion groups and to implement school-level activities among teachers.

While the study only examined one aspect of our PD intervention in rural Uganda, it showed a humble impact at school level on prevention of dropout. Further study should explore more options of locally grown PD intervention that have more direct impact on

Variables	(1) ATET	(2) Controls	(3) ATET	(4) Controls
Parent visits		0.000845**		0.000892**
		(0.000379)		(0.000366)
PTR		0.00554		0.00645
		(0.00422)		(0.00409)
PTR diff		0.000652		0.000394
		(0.000970)		(0.000981)
Attend rate – Pupils		0.0482***		0.0508***
		(0.00935)		(0.00873)
Attend rate – Teachers		−0.154		−0.0672
		(0.300)		(0.304)
School Age		−0.107***		−0.123***
		(0.0241)		(0.0224)
School Size		−0.000248		−0.000252
		(0.000368)		(0.000355)
Tuned in	0.112			
	(0.0983)			
No. of t-show messages			0.0781**	
			(0.0303)	
Constant		5.998***		6.736***
		(1.245)		(1.135)
Observations	298	298	298	298

Table 10.
Effects of tuning in to radio talk shows (phase2) on need for teachers' professional development for accelerated teaching and learning (0, 1)

Note(s): Robust standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Tuned in (1 if headteacher tuned in, 0 otherwise): Coefficient is read as effect of tuning in as compared to not tuning in
No. of t-show messages (for headteachers who tuned in, these range from 1 - 10; for those who never tuned in, zero messages). Coefficient is read as effect of a unit increase in the number of recalled messages
Source(s): Created by Authors

learning outcome of children. Thus, further studies are suggested to implement and measure an impact of combined intervention of locally generated direct pedagogical support and teacher development on pupil's learning outcomes and to draw more recent locally grown strategies to combat the post-COVID-19 era of learning in rural Uganda.

References

Albanna, B., & Heeks, R. (2019). Positive deviance, big data, and development: A systematic literature review. *The Electronic Journal of Information Systems in Developing Countries*, *85*(1), e12063.

Andrabi, T., Das, J., & Khwaja, A. I. (2017). Report cards: The impact of providing school and child test scores on educational markets. *American Economic Review*, *107*(6), 1535–1563.

Atuhurra, J. (2016). Does community involvement affect teacher effort? Assessing learning impacts of free primary education in Kenya. *International Journal of Educational Development*, *49*, 234–246.

Atuhurra, J. (2018). Identify local solutions for quality education. *The Daily Monitor*, Kampala. Available from: https://www.monitor.co.ug/OpEd/Commentary/solutions-quality-education-young-people-schools-teachers/689364-4908386-iex4as/index.html

Atuhurra, J. (2021). Can positive deviance improve learning in developing countries? Baseline findings and study adaptations to counter COVID-19 effects in rural Uganda. *Educational Studies*, *63*, 69–77.

Atuhurra, J., Winter, D., & Nishimura, M. (2022). Has COVID-19 changed the education landscape in developing countries? Evidence under school closures in Uganda. *Educational Studies*, *64*, 1–18.

Avitabile, C. & de Hoyos, R. (2015). The heterogeneous effect of information on student performance: Evidence from a randomized control trial in Mexico. Policy Research Working Paper, 7422.

Bashir, S., Lockheed, M., Ninan, E., & Tan, J. P. (2018). *Facing forward. Schooling for learning in Africa*. Washington DC: The World Bank.

Berlinski, S., Busso, M., Dinkelman, T., & Martinez, C., (2016). Reducing parent-school information gaps and improving education outcomes: Evidence from high frequency text messaging in Chile. Unpublished Manuscript.

Bruns, B., Filmer, D., & Patrinos, H.A. (2011). *Making schools work. New evidence on accountability reforms*. Washington D.C: The World Bank.

Cheang, C. J., & Goh, E. C. (2018). Why some children from poor families do well—an in-depth analysis of positive deviance cases in Singapore. *International Journal of Qualitative Studies on Health and Well-Being*, *13*(sup1), 1563431.

Conn, K. M. (2017). Identifying effective education interventions in sub-saharan Africa: A meta-analysis of impact evaluations. *Review of Educational Research*, *87*(5), 863–898. doi: 10.3102/0034654317712025.

Dizon-Ross, R. (2019). Parents' beliefs about their children's academic ability: Implications for educational investments. *American Economic Review*, *109*(8), 2728–65.

Dura, L., & Singhal, A. (2009). Utilizing a positive deviance approach to reduce girls' trafficking in Indonesia: Asset-based communicative acts that make a difference. *Journal of Creative Communications*, *4*(1), 1–17.

Glewwe, P. & Muralidharan, K. (2015). Improving school education outcomes in developing countries. *RISE Working Paper 15/001*. doi: 10.35489/BSG-RISE-WP_2015/001.

Evans, D.K. and Popova, A. (2015). What really works to improve learning in developing countries?: An analysis of divergent findings in systematic reviews. Policy Research Working Paper, No. 7203, World Bank Group, Washington, DC. Available from: http://hdl.handle.net/10986/21642

Glewwe, P., Maiga, E., & Zheng, H. (2014). The contribution of education to economic growth: A review of the evidence, with special attention and an application to sub-saharan Africa. *World Development*, *59*, 379–393.

Green, D. (2018) Positive deviance in action: The search for schools that defy the odds in Kenya. *From Poverty to power*. Available from: https://oxfamblogs.org/fp2p/positive-deviance-in-action-the-search-for-schools-that-defy-the-odds-in-kenya/

Islam, A. (2019). Parent-teacher meetings and student outcomes: Evidence from a developing country. *European Economic Review*, *111*, 273–304.

Jensen, R. (2010). The (perceived) returns to education and the demand for schooling. *The Quarterly Journal of Economics*, *125*(2), 515–548.

Kozuka, E., Sawada, Y., & Todo, Y. (2016). How can community participation improve educational outcomes? Experimental evidence from a school-based management project in Burkina Faso. In Working Papers (112). JICA Research Institute. Available from: https://www.jica.go.jp/jica-ri/publication/workingpaper/jrft3q000000273e-att/JICA-RI_WP_No.112.pdf

Kremer, M., Brannen, C., & Glennerster, R. (2013). The challenge of education and learning in the developing world. *Science*, *340*(6130), 297–300.

Krishnaratne, S., White, H., & Carpenter, E. (2013). *Quality education for all children?* (*155*). New Delhi: What Works in Education in Developing Countries.

Lieberman, E. S., Posner, D. N., & Tsai, L. L. (2014). Does information lead to more active citizenship? Evidence from an education intervention in rural Kenya. *World Development*, *60*, 69–83.

McEwan, P. J. (2015). Improving learning in primary schools of developing countries: A meta-analysis of randomized experiments. *Review of Educational Research*, *85*, 353–394.

Murnane, R. J. & Ganimian, A. (2014). Improving educational outcomes in developing countries: Lessons from rigorous impact evaluations. NBER Working Paper No. w20284, Available from: https://ssrn.com/abstract=2471177

Nguyen, T. (2008). Information, role models, and perceived returns to education: Experimental evidence from Madagascar. Available from: https://www.povertyactionlab.org/sites/default/files/documents/Nguyen%202008.pdf

Nishimura, M. (2019). Community participation in school governance: The Maasai community in Kenya. *PROSPECTS*, *47*(4), 393–412. doi: 10.1007/s11125-018-9439-8.

Nishimura, M. (ed.). (2020). *Community participation with schools in developing countries*. London: Routledge. doi: 10.4324/9780429057472.

Pascale, R., Sternin, J., & Sternin, M. (2010). *The power of positive deviance how unlikely innovators solve the world's toughest problems*. Boston: Harvard Business Review Press.

Pritchett, L. (2015). Creating education systems coherent for learning outcomes: Making the transition from schooling to learning. Oxford: *Research on Improving Systems of Education (RISE)*.

Rogers, T., & Feller, A. (2018). Reducing student absences at scale by targeting parents' misbeliefs. *Nature Human Behaviour*, *2*(5), 335–342.

Snilstveit, B., Gallagher, E., Phillips, D., Vojtkova, M., Eyers, J., Skaldiou, D., ... Davies, P. (2015). Interventions for improving learning outcomes and access to education in low- and middle- income countries: A systematic review. International Initiative for Impact Evaluation. London. Available from: https://www.3ieimpact.org/evidence-hub/publications/systematic-submitted for publications/interventions-improving-learning-outcomes-and-access (accessed 29 January 2023).

Tufts University (2010). *Basic field guide to the positive deviance approach*. Boston: Positive Deviance Initiative. Available from: http://www.positivedeviance.org/pdf/Field%20Guide/FINALguide10072010.pdf

Twaweza (2019). How are some children learning when most are not? - elevate education. Available from: https://elevateeducation.org/wp-content/uploads/2021/08/Launch-brief-PD-in-Ugandas-primary-schools-Aug2019.pdf (accessed 29 January 2023).

UNESCO (2013). The global learning crisis: Why every child deserves a quality education. Available from: https://unesdoc.unesco.org/ark:/48223/pf0000223826 (accessed 23 June 2023).

UNESCO (2021). *A snapshot of educational challenges and opportunities for recovery in Africa. Unesdoc.unesco.org*. Available from: https://unesdoc.unesco.org/ark:/48223/pf0000377513/PDF/377513eng.pdf.multi (accessed 29 January 2023). Paris, France.

UNICEF (2022). COVID-19 and children, UNICEF DATA. Available from: https://data.unicef.org/COVID-19-and-children/ (accessed 29 January 2023).

Uwezo (2017). Are our children learning? Lessons from Uwezo learning assessments from 2011 to 2015. Available from: https://uwezotanzania.or.tz/wp-content/uploads/2022/03/Uwezo-Assessment-Report-2017-Web-Version.pdf (accessed 29 January 2023).

Westbrook, J., Durrani, N., Brown, R., Orr, D., Pryor, J., Boddy, J. & Salvi, F. (2013). *Pedagogy, curriculum, teaching practices and teacher education in developing countries. Final report*. Education rigorous literature submitted for publication.Social Science Research Unit, Institute of Education, University of London.

World Bank (2017). *World development report 2018: Learning to realize education's promise*. Washington, D.C.: World Bank.

Yamada, T., & Nishimura, M. (2021). Gender differences in awareness and participation: Case of information sharing practices in Maasai community in Kenya. *Africa Educational Research Journal*, *12*, 109–122.

Young, M. J. (2019), Help for parents and children. *Hawaii Business Magazine*, Available from: https://www.hawaiibusiness.com/help-for-parents-and-children/

Further reading

World Bank (2003). *World development report 2004: Making services work for poor people*. Washington, D.C: World Bank.

Corresponding author
Mikiko Nishimura can be contacted at: nmikiko@icu.ac.jp