

Students Helping the Achievement of Rurals in Education (SHARE): A case study of a societal initiative in rural Bangalore

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Abstract: A high learning poverty rate, measured as the proportion of 10-year-olds who cannot read and understand simple text, directly slows the advancement of our societies. The learning poverty rate and other impacted learning gaps will narrow only if students are guided consecutively through the stages of learning. In this paper, we introduce a new approach where the students of an engineering college interacted with school students in a nearby rural area. By analyzing where students typically make mistakes as well as how students chose the incorrect answer, targeted coaching was administered in small groups. The pre-test and post-test performances were analyzed. It is shown that this scheme, with acronym SHARE, produces significant improvements in the learning roadmap of the rural school students, while simultaneously strengthening the concepts of volunteer engineering college students, and contributing to their Academic Social Responsibility.

Keywords: Guidance, Rural, Social Responsibility, Pandemic, Coaching, Foundational Learning, SDG-4

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I. INTRODUCTION

All students are of equal value and no student can be left out or left behind. Sometimes, the most effective way to make progress is to analyze the issue upstream of where it manifests, i.e., target students early in their learning journey. It is evident that even before the pandemic, the UN Sustainable Development Goal-4 (SDG4) targets were not being met, and the situation worsened when shutdown protocols were implemented worldwide. It should furthermore be acknowledged that attending school does not guarantee learning, as many children complete primary school without acquiring fundamental literacy and numeracy (FLN) skills.

Without access to quality and relevant education, younger generations cannot build necessary skills for success in work and life. School closures deeply affected the learning levels of students; thus, we need immediate, well-coordinated and multi-pronged efforts to recover the grade disparities.

Workable solutions do exist once the true problem is correctly delineated. Adaptive, learner-focused methods which can quickly identify and address student specific challenges have been shown to work in real-life scenarios. Tests should not merely provide an Assessment of Learning, but an Assessment for Learning, so that targeted treatment of the individual's problem can be done.

II. LAST MILE OF LEARNING

The learning process has three major components namely, Content-Connect-Consume. Even though there are an array of choices for content and its

access, learning will not occur until we address the third component: consume. This brings us to the "last mile" issue for the learning process, which varies considerably from student to student. When a student is "stuck", he needs the same concept taught differently or by a different person, in near real time.

It is found that merely making the students do more of the same exercises is counterproductive to the extent that they start losing confidence. Hence the focus should be on getting the fundamentals right, which means using well timed, individualistic guidance. A quick turn-around-time for helping the student is important and one method of teaching for all leaves many students lagging.

III. PRIOR INITIATIVES FOR GUIDANCE

Sai Krishna Vidya Mandir (SKVM) is a high school located in Hosadoddi village approximately 20 kms south of Bengaluru. This English medium school offers free education up to grade 10 to children in nearby villages, whose parents are mostly farmers/household workers. The school was an ideal testing ground for the proposed adaptive learning schemes. The first such intervention in this school was "Peer2peer Learning Among Youth (PLAY)." [1] The intervention enhanced the role of student-student interactions for learning, particularly in a rural setting with no access to digital resources and parental guidance. PLAY has been integrated into the school's system since 2019, helping those students who have little to no support at home.

Another method, Guided Offline Asynchronous Learning (GOAL), was subsequently deployed in the to help the students pass the public examination, an

important landmark for rural students.[2] In the final five-weeks of the GOAL program, the class average marks improved from 40.7% to 61.9%. Similar programs have found success in multiple communities. A summary of similar learning schemes is shown in table 1. [3-6]

Table 1 Earlier trials for Guided Learning

Year	Target	Guidance Scheme	Comments	Outcome
2014	Two schools in Kenya; two grades; two subjects	Satellite-Linked Affordable Tablet for Education (SLATE)	The treatment schools (rural and urban) and the control schools were assessed for the effectiveness of the intervention	An increase of student performance by over 150%
2018	A rural school in Bangalore	Peer2peer Learning Among Youth (PLAY)	One student doing one problem right helps another student and vice versa, so that the strengths are shared	PLAY adopted in the school for all classes
2020	Ethiopian secondary schools	Satellite-Connected Hotspot for Offline & Online Learning Systems (SCHOOLS)	Teacher-focused training on a lesson by lesson basis. Student progress monitoring through the return path	Minimal disruption due to the pandemic as learning materials were locally made available
2022	First batch of students taking a public examination	Guided Offline Asynchronous Learning (GOAL)	GOAL adopted a Hub and Spoke model with one Virtual Mentor (VM) for each student and the VM's were handled by a super-mentor	Over 50% increase in class average marks. Students clearing the exam up from 3 to 13, out of 15

IV. A NEW INITIATIVE INVOLVING COLLEGE STUDENTS FOR GUIDANCE

Our initiative tests the effectiveness of a facilitator who can guide the learner as needed. We propose it is more effective to the students' learning if the facilitator walks through why the student made a mistake, rather than reprimanding a student for making the mistake. The remedial steps can be initiated immediately to prevent any student being labeled as 'weak' or 'left behind.' Targeted remedy is an effective way to fill gaps. As the GOAL initiative in early 2022 revealed, many students have difficulty in understanding English terminology in addition to the typical lack of confidence in mathematic manipulations. A multi-pronged approach is called for to close the learning gap.

KS School of Engineering & Management (KSSEM), a premier institution in South Bangalore, with their students drawn from all over India, offered to involve their engineering students to interact with the 9th and 10th class students of SKVM on successive Saturdays. This triggered the concept of "Students Helping the Achievement of Rurals in Education" (SHARE).

V. SHARE INITIATIVE

SHARE intervention from KSSEM was meant to supplement the other interventions adopted like PLAY and GOAL. On the other hand, the main objective of this one-off SHARE initiative was to solve some of the basic learning gaps that the majority of rural students face.

An experimental study is a type of evaluation that seeks to determine whether a program or intervention produces the intended causal effect on program

participants. There are three key components of an experimental study design:

1. *Pre- and post-test design*
2. *A treatment group and a control group*
3. *Random assignment of study participants.*

A pre- and post test design requires that data is collected on study participants' level of performance before the intervention takes place (pre-) and collect similar data on where study participants are after the intervention took place (post). In this case, the results of the pretest would also be a guideline to list out such concepts that are missing for the majority of the participants, versus some that are specific to a few students. The remedial steps for these two categories would be dissimilar.

VI. PRETEST-POSTTEST DESIGN

To address some of the issues arising with assignment bias and the allocation of participants to groups, pretest-posttest designs are the preferred method to compare participant groups and measure the degree of change occurring as a result of treatments or interventions.

The most intuitive test would be a single group, post-treatment test of the students who undergo the treatment. But this would not have any statistical basis of testing and the results are qualitative and subjective. The basic premise behind the pretest-posttest design involves obtaining a pretest measure of the outcome of interest prior to administering the treatment, followed by a posttest on the same measure after treatment occurs for the Target Group. The treatment in this case are the interactive sessions held by the KSSEM students with the target group.

VII. IMPLEMENTATION

- The engineering students were briefed on the scope of this intervention, their role, the approach, the topics, and the expectations.
- Two tests were created on the 3 chosen topics, randomly one of them was used for the pre-test and the other for the post-test.
- The tests were made available through a QR code for the students to take them on a tab.
- The responses of the students are gathered on a google form to identify the learning gaps.
- The analysis of the pre-tests was made available in a matrix form by student as well as by the question number.
- Based on the actual response of the students to the pretests, detailed explanatory notes for each question were prepared and shared with the engineering students.

VIII. PERFORMANCE

There was a total of 22 students who took the 3 pretests, the SHARE coaching classes and then took the post tests for the same 3 topics.

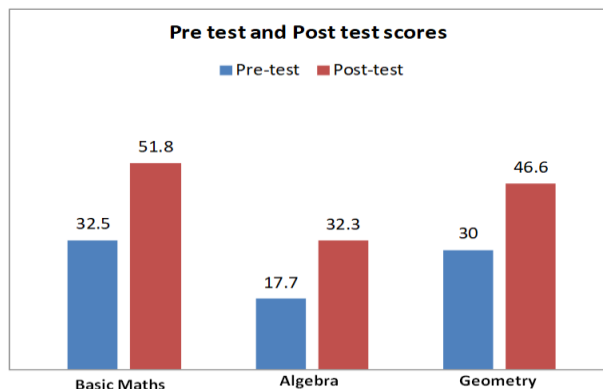


Figure 1 Comparison of performance before and after the intervention

The null hypothesis is equality of test scores for the pre and post test scores of the target group and the alternate hypothesis is that the post test performance is superior. The *p*-value is the observed probability of the null hypothesis happening (calculated from the sample data).

Table 2 t-Test for two samples of unequal variance

Parameter	Pre-test	Post-test
Number of Students	22	22
Mean score for 33 questions (%)	26.8	46.6
Standard Deviation	11.6	22.5
Degrees of freedom	33	
t value	-3.59	
p value (one tail)	0.00044	
Critical value of t @99% significance	-2.445	

ANALYSIS

Table 3 presents the *t* and *p* values for the three topics. We notice that there is significant improvement in all the three cases.

Table 3 Results of t-test for the individual topics

Topic	Degrees of freedom	"t" value	"p" value
Basic Maths	33	-2.82	0.004
Algebra	34	-2.24	0.016
Geometry	41	-2.57	0.006

CONCLUSION

The success of SHARE intervention further reinforces the importance providing the right type of guidance at the right time when a particular student needs it. The help was offered by classmates in the PLAY scheme, by virtual mentors in GOAL, and by senior students

in the SHARE initiative. The analysis of the performances in the pre and post tests clearly establishes the effectiveness of these approaches. Besides improving how foundational concepts are learnt in the system, it was found that the volunteered college students also benefitted from teaching the topics to the high school students. They played the role of a teacher for these sessions and hence had to do more homework to face possible questions from the wards. It was heartening to see the comment of one of the teaching students that these SHARE sessions helped her recover from a huge personal bereavement.

These investment place the school students on a different learning trajectory and sets them on a positive spiral. All these initiatives can run concurrently, as they are all community-based, replicable and highly scalable.

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