The Efficacy of Classroom Incentives: Experimental evidence from Kenya

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1 Introduction

Many students in developing countries still lag behind their grade in learning. One strategy to motivate student effort and achievement that has received considerable attention is providing incentives at the individual level. However, overall individual-level incentives for a range of outcomes such as reading books, practicing more or getting better test scores have shown mixed results on student achievement at the mean across different contexts (Fryer Jr 2011, Behrman et al. 2015, Hirshleifer 2015, Angrist & Lavy 2009, Jalava et al. 2015, Levitt et al. 2016). Further, there is little evidence on whether these incentives, will continue to be effective over a longer period of time when they are repeated at a given frequency, for instance, every term.

In this project, we seek to study whether the provision of incentives at the classroom level might be more effective and inclusive for pupils compared to individual-level incentives. Non-monetary incentives are relatively low cost and uncontroversial compared to financial incentives in the education context. If seen as symbols of recognition for student's hard work, they can also help create additional meaning for effort (Cassar & Meier 2018, Riener & Wagner 2019).

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In Jan 2020, we launched a randomized controlled trial where we use non-monetary incentives in the form of a certificate and a badge for recognition for students at both the individual (depending on how well the student does in a class) and classroom (depending on how well the class does overall compared to other classes) level across 225 low-cost primary schools in Kenya. We explore the potential for using group-level incentives for entire classes of students in place of individual level incentives in order to see whether student effort and positive peer interactions can be better incentivized. We present here our preliminary results from Term 1 2020. The trial is currently paused amidst COVID-19 as schools across Kenya were shut and are resuming in a staggered way. We will resume the trial in 2021 once the situation permits.

2 Setting and Experimental Design

We implemented our intervention in Grades 1-8 of all primary schools in 225 academies across Kenya associated with Bridge International Academies. The organization operates over 300 primary low-cost private schools in Kenya which cater to economically disadvantaged populations. Pupils can enroll in grades 1-8 (primary school grades in Kenya). The academic year in Kenya runs from January - November and comprises of three terms. All pupils in Bridge Academies sit a mid-term and end-term test every term in Math, Science, Kiswahili, English and Social Studies administered and assessed by Bridge internally. With an average class size of 15, we have over 30,000 pupils in our study sample. The sample includes schools in both rural and urban areas. We randomized assignment to a treatment group at the school level. Schools in our sample were divided equally into the following four arms:

1. Individual-level incentives: The top 2 students in every class based on individual-level average achievement in Math and English will earn "Star

Pupil" status (described below).

2. Classroom-level incentives: All students in a class who belong to the top class in each school based on classroom-level average achievement in Math and English will earn "Star Pupil" status.

3. Both incentives: Students who are the top scorers in their class based on individual-level achievement or who belong to the top class based on classroom-level average achievement in Math and English within each school will gain "Star Pupil" status. Students belonging to either of these groups gets the rewards. If the student belongs to both the groups, the rewards are still only given once.

4. Control: No students will gain "Star Pupil" status.

Students are given this status at the end of each term depending on their school's assigned treatment group. As a "Star Pupil", a student gains the following two benefits[1]:

1. A certificate and recognition for being a "Star Pupil" at a school assembly and at parent-teacher conferences.

2. A special badge that students can wear to school for the first two weeks of the next term.

Randomization was stratified along the geographic location of the academy (rural, urban or peri-urban), average pupil teacher-ratio and baseline KCPE scores.

To ensure credibility of the assessment scores and for avoiding any unconscious bias due to the teachers marking their own students' scripts, there was

[1]While recognition through certificates is common in this setting, there is no formal system currently in place with these rewards based on student's performance in each semester.

a teacher exchange in each school for the marking of the assessments. This ensured that the teachers were blind to the characteristics of the students whose scripts they marked to mitigate subjective bias resulting from observing the level of the problem set assigned to the student in class.

3 Preliminary Results from Term 1 2020

3.1 Balance

Data consist of midterm tests in Term 1 across grades 1-8. Additionally, historical data on pupil tests was shared from the last semester along with pupil characteristics. Table 1 shows that treatment was balanced across the treatment and control groups along key baseline characteristics of students, namely, gender, age, years enrolled at Bridge, and their last semester's Literacy and Reading Scores.

Table 1: Balance

		1	2	3	4	5	6	7	8
		Control Mean	**T1 Mean**	**P-val**	**T2 Mean**	**P-val**	**T3 Mean**	**P-val**	**N**
Without an observed baseline score	Girl	0.450	0.00235	(0.839)	-0.0140	(0.153)	-0.00877	(0.357)	36748
	Age	10.11	0.113	(0.173)	0.108	(0.169)	0.00544	(0.943)	33520
	Years Enrolled	2.374	-0.0833	(0.442)	-0.0970	(0.335)	-0.0724	(0.387)	36684
	Literacy Score	39.06	0.663	(0.320)	0.461	(0.527)	-0.114	(0.882)	8406
	Reading Score	34.43	1.190	(0.228)	0.967	(0.255)	-0.0876	(0.930)	8846
With an observed baseline score	Girl	0.478	-0.000435	(0.970)	-0.0119	(0.202)	-0.00388	(0.694)	25902
	Age	10.30	0.160	(0.087)	0.103	(0.262)	0.0420	(0.614)	25448
	Years Enrolled	2.946	-0.0489	(0.660)	-0.125	(0.199)	-0.0992	(0.219)	25902
	Literacy Score	39.17	0.658	(0.327)	0.337	(0.647)	-0.217	(0.781)	7868
	Reading Score	34.55	1.520	(0.132)	0.915	(0.286)	-0.289	(0.775)	8272

Figure 1

3.2 Treatment Effects

Midterm test scores were standardized with respect to the control group mean and standard deviation, for each grade. The mean is zero and standard deviation

is 1 in each case. Table 2 shows the regression of these scores on the treatment dummies controlling for the grade fixed effects. The table shows that while the individual level incentives (T1) did not raise test scores in treatment schools significantly compared to the control group, class level incentives (T2) however raised test scores significantly for Math, Social Studies and Science over 0.1 standard deviation. The treatment that combined both types of incentives (T3) also raised scores in Math and Social Studies over 0.1 standard deviation.

Treatment Effects

	(1)	(2)	(3)	(4)	(5)
	English	Kiswahili	Maths	Social Studies	Science
T1	0.0775	0.0751	0.101	0.0726	0.0678
	(0.0803)	(0.0805)	(0.0721)	(0.104)	(0.0941)
T2	0.127	0.0851	0.130**	0.230***	0.133**
	(0.0823)	(0.0843)	(0.0620)	(0.0780)	(0.0654)
T3	0.157*	0.111	0.161**	0.221**	0.183*
	(0.0836)	(0.0880)	(0.0725)	(0.0942)	(0.0994)
Control	0.0270	0.0100	-0.0469	0.0944	0.0265
	(0.0717)	(0.0798)	(0.0559)	(0.0781)	(0.0663)
N	12112	11909	22105	12447	12521
R-sq	0.008	0.003	0.006	0.012	0.006

Standard errors in parentheses
* p<0.10 ** p<0.05 *** p<0.01

Figure 2

4 Roll-out plan

Since the trial was paused, and a number of schools have had to close down following the pandemic, we intend to resume the trial in 2021 with around 110 academies. In light of the smaller sample size, we intend to continue to have Treatment arm 1 (individual-level incentives) and 2 (class-level incentives), but will no longer continue the third arm (both incentives).

Through survey data that we collect, we will be able to shed light on the following possible channels or intermediate effects:

- Unlocking positive peer effects within the classroom – students will encourage and help each other study and improve performance. To the extent that there are complementarities in student effort and achievement, this can be more effective than individual-level incentives which induce competition between peers.

- Inclusiveness – class-level incentives can also ensure that the whole achievement distribution within a class improves i.e. this is a more inclusive educational policy, which can also make it easier for teachers to feel motivated and increase their effort in response.

- Competition with other classrooms could be both fun and gives extra motivation to improve performance – while working in teams means that each individual student might have a lower benefit from a given incentive but this effect can be offset since working in a team can be motivating when pupils feel proud from having contributed to a common goal (prosocial behavior).

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