

# KiuFunza: Cash on Delivery for Teachers in Tanzania

## 2016 Implementation Report

All children should learn to read and calculate well in their first years of primary school. Teachers are the key agents to make this happen. To show that learning is important and encourage teachers to help children learn, Twaweza introduced “Cash on Delivery”, a new way to pay teachers. That is, Twaweza promised to pay teachers in Standards I, II and III depending on the skills their students learned. This Cash on Delivery bonus came on top of the normal salary and there were no sanctions for bad performance. With Cash on Delivery (COD), teachers have an opportunity to earn more if they improve the skills of their students.

This COD programme is called KiuFunza (short for Kiu ya Kujifunza or the Thirst to Learn). After talking to Government and securing their permission, Twaweza started the KiuFunza programme in a small number of schools to test it. KiuFunza research shows how teachers reacted to the programme and how much children learned as a result.

The key implementation results are:

- Twaweza is rewarding 788 Standard I-II-III subject teachers and 135 head teachers for the 2016 test performance
- The programme rewards value-added learning in one group of schools (Mashindano)
- The programme rewards levels of learning in a second group of schools (Stadi)
- The value of the total bonus fund is TZS 251,827,040. One-sixth of this is paid to head teachers, five-sixth or TZS 209,855,867 is paid to subject teachers.
- The average bonus earned over 2016 by subject teachers is TZS 266,315 or about 42% of the average net monthly wage
- Preliminary impact results show positive effects on student learning
- 91 percent of teachers support the idea of performance pay

This brief explains what happened when Twaweza implemented the programme in 2016. At the end of the brief we discuss a similar larger programme that could be implemented to benefit many more students and teachers.

### 1. KiuFunza overview

KiuFunza is a school based randomized control trial (RCT): this means that the bonus programme was implemented in one group of schools while intentionally keeping another group of schools under “business as usual” – a control group. A key feature is that the programme schools were selected by chance. This means that at on average the programme schools and the control schools were “the same” before the programme started. Therefore we have a fair comparison between control and treatment.

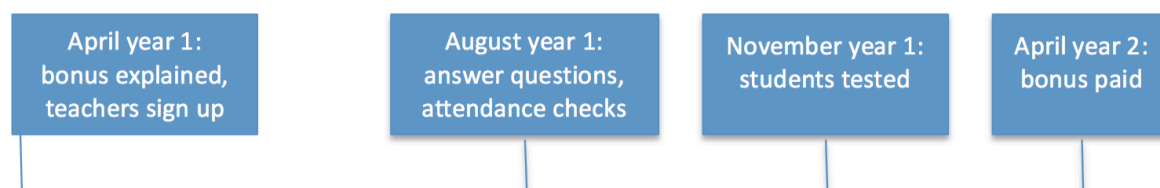


Figure 1: KiuFunza implementation cycle summary

The KiuFunza II incentive programme was implemented in 2015 and 2016.<sup>1</sup> In each of these years KiuFunza district teams explained the bonus to teachers early in the year (April). Teachers signed up for the programme and provided their grade-subject assignment and payment account details. Then teachers taught the curriculum during the year. At the end of the year (November) the teams came back to test the skills mastered by the students. The test results were digitized and processed. By early April of the following year teachers received the bonus payment in their bank or mobile money account, according to their choice. This cycle of activities took place once in 2015, and once in 2016. Table 1 below provides a summary of the KiuFunza interventions in 2015-16.

**Table 1: KiuFunza key implementation numbers**

	2016	2015
<b>Number of schools in KiuFunza</b>	134 COD 60 control	133 COD 60 control
<b>Standards with bonus</b>	I, II and III	I, II and III
<b>Topics tested</b>	Kiswahili, Math (English only in Standard III)	Kiswahili, Math, English
<b>Teachers</b>		
<b>Number of subject teachers in KiuFunza</b>	788	758
<b>Number of Head Teachers in KiuFunza</b>	135	134
<b>Number of students tested</b>	65,643	51,580
<b>Bonus money earned, totals</b>		
<b>Kiswahili</b>	110,000,000	105,000,000
<b>Math</b>	110,000,000	105,000,000
<b>English</b>	31,827,040 (only St.III)	105,000,000

## 2. Where did Twaweza run the program?

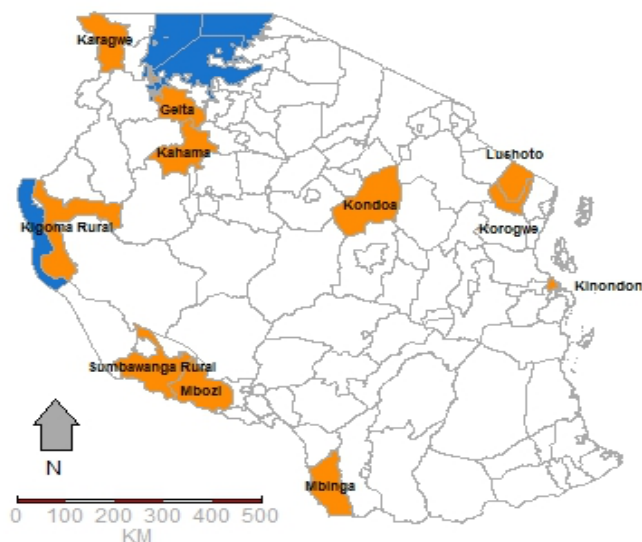
To be able to finance and manage the project Twaweza implemented the interventions in 11 districts only. KiuFunza districts have been sampled *randomly* from all districts in Mainland Tanzania. Districts with a higher number of primary school students had a higher chance of being in the sample.<sup>2</sup> The selected sample includes the following 11 districts (districts that split during the study period are still labeled as part of the mother district): Geita, Kahama, Karagwe, Kigoma, Kinondoni, Kondoa, Korogwe Rural, Lushoto, Mbinga, Mbozi, and Sumbawanga Rural.

In each district all primary government schools were *eligible* to participate; but only 12 schools were selected for the intervention. These schools were randomly selected and assigned to the different interventions (six in each district for Stadi; six in each district for Mashindano). In each district 10

<sup>1</sup> Note that Twaweza implemented KiuFunza I in 2013-14. This was a different version of the programme and included a Capitation Grant component.

<sup>2</sup> The exception is Kigoma, which was selected on purpose for the *implementation sample* as the district leadership had expressed early interest in the initiative. Kigoma was the training and pilot district and is not represented in the KiuFunza *research sample*. Similarly, two additional intervention schools were selected for piloting in Kinondoni.

other randomly selected schools are monitored in the “control arm”, consisting of schools not receiving any financial flows or other support.<sup>3</sup>



Random sampling means that every school and student in Mainland Tanzania had an equal chance to be selected for the study. This also means that findings from KiuFunza are nationally representative and provide relevant lessons for the whole education system.

### 3. How did the incentive program work?

In KiuFunza II there are two types of incentive offers, called **Stadi** and **Mashindano**. Each incentive type is a separate intervention. So a school is either a Stadi or a Mashindano school. The incentives are calculated based on test results at the stream level and a teacher is paid only for streams he/she is responsible for.

The difference between Stadi and Mashindano is that Stadi rewards the absolute learning level a student has at one point in time, e.g. can or cannot read words. In Mashindano, learning improvements are rewarded, when assessed relative to other students who start at the same skill level. For this “learning gains” model, learning in KiuFunza was measured at two points in time: at the end of last school year and at the end of the current school year.

In a **Stadi** school a teacher receives a bonus for every child in her classroom that passes a curriculum skill test. For example, in reading Kiswahili, a standard 1 student that can read syllables earns her teacher a small bonus; if the child can also read words, the teacher earns more; if she also reads a paragraph she again earns more, and so on. The same applies to Math, where the skills include counting, recognizing numbers, telling which number is larger, adding up, subtracting; and multiplication and division in Standard 2 and 3.<sup>4</sup>

In a **Mashindano** school, children were placed in one of 10 national ability groups based on the previous year’s test. Ability groups range from low level (cannot read anything, no knowledge of numbers) to high levels (can read fluently, do math operations well). Each ability group would typically have students from KiuFunza schools from all over the country. For example, a Standard 2 ability group for students who can read Kiswahili words but not sentences could have a student from

<sup>3</sup> For details on the intervention and research school sample please see our note on methods and sample at <http://twaweza.org/go/kiufunza1>.

<sup>4</sup> For details of the student testing, including test sets and test protocol, visit <http://twaweza.org/go/kiufunza1>.

Mbozi and a student from Geita. The progress of these students over the year is compared and rewarded. At the end of the year, students that did the test very well in their group received a high rank which resulted in a high bonus for the teacher. The total payment for each teacher is determined by the rank of each of his students. Teachers that moved many of their students to the top of their national ability group therefore earned a lot.

**Conclusion:** Mashindano is more complex to understand than Stadi, but it is also more equitable for the teachers, since students compete at their own level. This is not the case for Stadi, where teachers with higher level students (often in urban schools) tend to earn more. Twaweza decided to test both systems as a comparison: Stadi pays for levels and is easier to understand, while the slightly more complicated Mashindano design pays for value-added and is fairer for teachers.

#### 4. Teacher engagement, understanding and opinions

At the start of each year Twaweza asked each teacher in the Stadi and Mashindano schools whether they agreed to participate. All teachers signed up for the program (once a teacher declined at first but later changed her mind and asked to be registered). Moreover, our implementation data show that teachers have made an effort to make sure that many children participated in the student tests.

At various points during the implementation, teachers were asked a set of questions to test their understanding of the program (since they would not be able to respond without understanding the program). These tests typically showed sufficient to high percentages “correct”. The highest average score is 91 percent correct, the lowest 62 percent correct. Significantly, trust in Twaweza to calculate and pay the bonuses in a transparent manner was high at 95 percent.

Teachers were also asked for their opinion about performance pay programs in general. Nine out of ten teachers (91%) teachers support the idea of performance pay. When asked whether the government should include a performance-based bonus scheme in a future salary review, 63 percent of teachers say yes (while 37 percent prefer just a flat increase).

#### 5. Student test results in 2016

The three below tables give the overall test results for the KiuFunza end-line tests. As reported earlier the overall number of students tested is 65,643 (up from 51,580 in 2015).

The **Kiswahili reading** results show that while learning is slow in Standard I, substantial improvements are made for reading words and sentences in Standard II. (Note that for skills that are tested in two grades, the test level is higher in the higher grade; this conforms to the curriculum). Similarly, pass rates for paragraph reading in Standard II are muted but pick up in Standard III where 57 percent can read a simple story.

Table 2

Kiswahili reading 2016				
Skill	Examples	Can do (%)		
		Standard 1	Standard 2	Standard 3
<b>Silabi</b>	fu, mwa, ngu	33%		
<b>Maneno</b>	baba, samaki, simba	48%	82%	
<b>Sentensi</b>	Paka anawinda panya	34%	72%	
<b>Hadithi (St. II)</b>	Leo ni siku ya Jumatatu. Mvua imenyeshwa kijijini. Watu wote wana furaha. Kila mmoja amekwenda shambani. Wote wanapanda mbegu za mazao.		40%	



<b>Hadithi (St. III)</b>	Hamisi anaishi Savei. Mtaani kwao kuna uwanja wa michezo. Kila siku jioni wanafanya mazoezi. Leo timu yao ina mashindano. Inashindana na timu ya kijiji jirani. Kila mmoja amejiandaa vizuri.		57%
<b>Swali, ufuhamu</b>	Hamisi anaishi wapi? Kwa nini wanafanya mazoezi?	47%	68%
Students tested		29,243	19,295
			17,105

For **numeracy**, we find that pass rates are highest for the easier skills of counting, recognizing numbers and understanding which of two numbers is the larger one. This shows that good teaching in the early grades can lead to quick acquisition of skills. Pass rates are just above 50 percent for the core skills of addition and subtraction in Standards I-III. However, the Standard III skills of multiplication and division show low pass rates. Apparently, the rate of improvement or value-added in numeracy decreases as the difficulty of the skills taught increases.

**Table 3**

Numeracy 2016				
Skill	Examples	Can do (%)		
		Standard 1	Standard 2	Standard 3
Counting	Count number of stars: * * * * *	94%		
Recognize number	4, 27, 58	71%		
Which is larger?	St. I: 8 or 3, 12 or 24, 54 or 57	78%	86%	
	St II: 120 or 202, 351 or 372			
Addition	St I: 6 + 8, 4 + 7	61%		
	St II: 60 + 23, 33 + 15		62%	
	St III: 520 + 215, 664 + 352			65%
Subtraction	St I: 7 – 3, 8 – 6	55%		
	St II: 51 – 45, 37 – 14		62%	
	St III: 443 – 321, 712 – 419			55%
Multiplication*	St III: 10 x 6, 11 x 16			12%
Division	St III: 4 ÷ 2, 48 ÷ 4			19%
Students tested		29,243	19,295	17,105

\*Note: multiplication was part of the Standard II curriculum in 2015 but not in 2016. Therefore it was not tested in Standard II in 2016.

**English reading** is a particularly difficult subject [to teach]. English was taught and tested in Standards I-II until 2015, after which a curriculum change removed it from Standards I and II. Therefore, in 2016 English was tested in Standard III only. We find that pass rates are low, with only 2 percent passing a reading test in Standard III. Since the budget for English in Standard III was fixed, the payment per student who passed was relatively large. This explains why English accounts for both the highest and the lowest teacher payments in KiuFunza.

Table 4

English reading 2016 (Standard III only)		
Skill	Examples	Can do (%)
		<b>Standard 3</b>
<b>Story</b>	Bakari is a good boy. He is eleven years old. He lives in Motomoto town. He lives with his mother, father, and sister. Bakari works hard at home. He also works hard at school. In the evening, he waters flowers in the garden. He also helps his mother to cook dinner. His father and mother love him very much.	2%
<b>Comprehension questions</b>	Where does Bakari live? Why is Bakari a good boy?	3%
Students tested		17,105

\*Note: English reading was part of the Standard I-II curriculum in 2015 but not in 2016. Therefore it was not tested in Standards I-II in 2016.

## 6. Teacher bonus earnings in 2016

The total budget for incentive payments for teachers and head teachers in 2016 was set at TZS 251,827,040. The budget was originally set at TZS 105,000,000 per subject in 2015. Then to adjust for inflation the budget was increased to TZS 110,000 per subject, but English was removed from the Standard I-II curriculum in the course of 2015. Therefore, the English incentive budget was adjusted downward. The remaining English incentive budget reflects the number of students in Standard III, such that the incentive amount per student is equal between grades. As was the case in previous years, head teachers receive 20 percent of subject teacher earnings.

Table 5 shows the incentive amounts earned in 2016 that will be paid to teachers in 2017. The total budget *per student* is equal between the two interventions, but since the total number of students is slightly larger in the Stadi group the *total* budget amount is also slightly larger.

Table 5: Incentive payments 2016

Incentive	Teachers	Head Teachers	Totals
<b>Mashindano</b>	97,966,883	19,593,377	117,560,260
<b>Stadi</b>	111,888,984	22,377,797	134,266,780
<b>TOTAL</b>	209,855,867	41,971,173	<b>251,827,040</b>

Table 6 shows the distribution of the 2016 incentives over the 11 KiuFunza districts.

Table 6: Incentive payments 2016 by district

District	Teachers	Head Teachers
Geita	37,139,134	7,427,827
Kahama	16,461,657	3,292,331
Karagwe	14,946,439	2,989,288

Kinondoni	42,329,790	8,465,958
Kondoa	18,045,381	3,609,076
Korogwe Rural	13,368,905	2,673,781
Lushoto	13,785,074	2,757,015
Mbinga	9,674,692	1,934,938
Mbozi	18,253,712	3,650,742
Sumbawanga Rural	12,593,641	2,518,728
Kigoma	13,257,443	2,651,489
<b>TOTALS</b>	<b>209,855,867</b>	<b>41,971,173</b>

The total amount of bonuses earned by subject teachers is TZS 209,855,867. This amount was earned by 788 early grade teachers. Therefore, the average teacher bonus equals TZS 266,315.

The average net monthly teacher salary in 2016 is TZS 637,790 so the average bonus is about 42 percent of that monthly wage. But for each teacher the bonus depends on how well his or her students did. The lowest bonus paid was TZS 8,100. But the highest paid teacher earned TZS 3.6 million, or almost six months of the net average teacher salary.

There is a clear distinction between Stadi and Mashindano in terms of rural-urban equity. Because Mashindano rewards value-added gains *within* student groups of equal starting ability, rural schools typically do much better in Mashindano. Urban schools have students that start at a higher level and therefore these schools do better in Stadi, where learning *levels* are rewarded. Table 7 illustrates these differences for subject teacher incentives.

The payment *per student* in Mashindano schools reflects value-added relative to other schools. In this regard the rural schools *outperform* the urban schools by 100 TZS per student. For Stadi the payment per student reflects the level of students learning; here we find that urban schools do better than rural schools. A separate factor that explains pay differences is school size: urban schools are larger than rural schools. Since our incentive pays for every student's achievements, the average urban incentive payment is larger than the average rural payment, even for Mashindano.

**Table 7: Average incentive pay by intervention and setting**

Incentive type	School setting		
	Urban	Rural	All
<b>Mashindano</b>			
Payment per student	570	670	652
Number of students per school	585	478	497
Average teacher bonus	297,188	246,231	255,122
% of Urban bonus	100%	83%	86%
<b>Stadi</b>			
Payment per student	684	599	618
Number of students per school	604	462	494
Average teacher bonus	376,746	244,993	276,953
% of Urban bonus	100%	65%	74%

## 7. Preliminary impacts on skills learned

This brief uses programme data to report on the implementation of KiuFunza. A team of independent education researchers evaluates the impact of the programme. At the moment of publication of this report the analysis of the research data is still ongoing and the full impact results will be presented mid 2017.

However, qualitative and preliminary results show that the programme has a significant positive impact on average student test scores. Furthermore, a higher share of enrolled students was tested in intervention schools. These results are consistent with the preliminary findings for 2015, when learning improvements relative to the control group were found across focal subjects and grades. Moreover, they are consistent with positive learning impacts detected in KiuFunza I (2013-14), an incentive program with a different design.

## 8. Should performance pay be implemented in all schools in Tanzania?

Schooling is expensive and education expenditure in Tanzania has recently been growing fast, reaching 5.9 percent of GDP in 2014, up from 4.6 percent of GDP in 2006. The largest share of the education budget is spent on teacher salaries, which makes sense as teachers are the key to everyday learning in classrooms across the country. However, the way teacher contracts are currently written does not do justice to the goal of learning for all children. As in most other countries, teacher pay does not differentiate between the quality of teaching and learning that takes place. A large body of research shows that there are substantial differences in teacher quality within schools. Having a good or a bad teacher affects the learning and life-time incomes of students. However, teacher quality differences are difficult to observe. Currently teacher salary is based in large part on experience, but research shows that more experience does not correlate well with teaching effort and quality (except for the first years of a teacher's career).

In Tanzania, teachers are paid only for an **input** (their time), not for the learning **output** they produce. This does not provide the correct signals to teachers about the value of their output, nor does it excite talented potential teachers to join the profession. Moreover, it is very hard for education administrators to enforce the delivery of a full day of teaching in every classroom, as shown by widespread classroom absence. Large amounts of valuable instruction time are lost every day in schools across the country, putting children's learning and future welfare at risk.

The Twaweza implementation of incentive pay over the last four years is a proof of concept. It shows that teacher performance pay can inspire teachers to improve learning. It sends a signal to all teachers that learning is the key outcome that matters most. It recognizes that some teachers put in more effort than others and it rewards that effort in a transparent manner. It also provides feedback about performance through the payment and feedback reports. Teachers respond to the acknowledgement of their efforts. Twaweza has only measured the incentive effects on teachers already employed. In addition, teacher incentive pay may increase the quality of newly recruited teachers in the future.

Twaweza believes that teacher incentive pay can be implemented nation-wide and is ready to support a larger scale trial. This would look different from the proof-of-concept implementation and therefore needs testing and discussion about details. If the incentive design is chosen wisely, the program is well-communicated and independent audits are in place, this would be a powerful and productive investment in the quality of learning in Tanzania.