Project iMlango
Endline Evaluation Report

Project implemented by Avanti Communications, sQuid, Whizz Education and Camara Education

Endline survey conducted by Advantech Consulting

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2.3	07/05/2017	Update of Section 2.2, Executive summary and Conclusions to respond to FM feedback on learning outcomes	AVA
3.0	09/05/2017	Final submission to GEC	AVA

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List of Acronyms

DEO	District Education Officer
DFID	Department for International Development
EEO	Expert External Organisation
FGD	Focus Group Discussion
FGM	Female Genital Mutilation
FM	Fund Manager
GEC	Girls' Education Challenge
HH	Household
ICT	Information and Communications Technology
KES	Kenyan Shilling
KICD	Kenya Institute of Curriculum Development
KII	Key Informant Interview
KNBS	Kenya National Bureau of Statistics
M&E	Monitoring and Evaluation
MoE	Ministry of Education, Science and Technology
ToC	Theory of Change
ToT	Training of Trainer
TSC	Teachers Service Commission
VfM	Value for Money
VSAT	Very Small Aperture Terminal

Executive Summary

The iMlango project ("mlango" means doorway or portal in Swahili) aimed to improve the enrolment, retention and learning outcomes for 56,561 marginalised girls across 205 primary schools in Kenya through the delivery of:

- High-speed satellite broadband connectivity to schools;
- Individualised simulated maths tutoring alongside digital learning content for literacy and life skills;
- Continuous training and support to teachers to use best practice to integrate ICT into schools' learning processes;
- In-field teams to provide educational support to teachers and leadership guidance to headteachers;
- Electronic attendance monitoring with digital semi-conditional payments to incentivise families to send their daughters to school – with the money used at local merchants;
- In-field teams to support the schools and ensure timely technical maintenance is delivered;
- Real-time project monitoring and measurement.

The partnership of the iMlango project was led by global satellite operator *Avanti Communications* and its partners are: *sQuid*, the smartcard and digital payments system provider*; Whizz Education,* simulated maths tutoring provider; and the international charity *Camara Education. Advantech*, based in Nairobi, was the EEO (Expert External Organisation) of the project bringing expertise and experience in conducting M&E in Kenya, as well as broader advisory services across both government and private sector.

The iMlango primary schools are spread across four counties (Kilifi, Kajiado, Makueni and Uasin Gishu) that were selected based on marginalisation factors (poverty rates, attendance statistics and learning achievements for girls) as well as availability of electricity, safety and accessibility.

Theory of Change
The iMlango ToC is based on the hypothesis that the offered technology capabilities can be harnessed in a Kenyan education context to deliver improved educational outcomes and life skills for marginalised girls and students more generally.

The five pillars that the project ToC is based on are:

1. **Motivation** – a tangible financial incentive linked to girls' attendance to encourage parents to ensure school attendance. The positive impact from the incentives helps reduce educational marginalisation as well as the risk of educational marginalisation by boosting students' attendance in school.
2. **Monitoring** – attendance monitoring helps to understand the students' attendance patterns and whether they are in school benefiting from the project activities and also tracks the effectiveness of financial incentive. Online tutoring records students' interactions with the tutor which in turn allows for deep mining and analysis of students' learning and engagement throughout their tutoring journey. In combination, the project is empowered to provide effective and timely reporting as well as identify what is effective, what causes challenges and introduce adaptations to the implementation model to increase the impact of the intervention.
3. **Content** – the iMlango learning platform provides a large amount of content on various subjects such as Maths, English and Life Skills that children can explore in either a whole class setting or individually in the ICT lab during schools hours or in the after school clubs. Exposure to Life Skills (non-curriculum) content used in child clubs improves the life chances of marginalised girls, through awareness of opportunities for girls/women and a greater positive aspiration and outlook. Access to the Maths-Whizz simulated tutoring service provides a learning journey that is tailored to each child's needs and pace of learning, and is continuously adaptive that in turn facilitates accelerated learning. Teachers benefit from having vast variety of teaching resources to make learning engaging as well as to provide variety of new teaching techniques and methodologies.

4. **Connectivity** –provision of high speed satellite internet to the schools provides access both for students and teachers to a wide range of online resources and services that are available through the learning platform and beyond.

5. **Capacity** – equipping schools with the necessary technology, building teachers' and students' capacity to enable them to efficiently use the project's components and providing continuous on the ground support – serves as sound base for a successfully implemented project.

The evaluation of iMlango uses a randomised control trial and is based on randomly breaking down the participating schools into four groups A, B, C and D, with group D being the control group. Each of the groups A, B and C received different iMlango components; Group A receives the full intervention, Group B has no ICT lab or personalised tutoring and Group C receives no stipends. This increases the VfM by allowing more comprehensive research of the iMlango components.

Impact on girl's learning, attendance and enrolment
The implementation of the interventions has effectively been just two school years (2015 and 2016). Despite a highly disruptive national teachers' strike in 2015 (September and October) and an emerging significant drought situation in Kilifi since the beginning of 2016 (affecting over a third of the project's pupils), iMlango has managed to meet most of its logframe targets, suggesting that the fundamentals of the Theory of Change are correct.

Whilst the project has delivered positive impacts at the output level, these unfortunately haven't been demonstrated at the outcome level. The evaluation structure was based on three different intervention groups. Because of sample size limitations in these three groups the project was not able to detect the target improvements. Although the targets for the learning outcomes haven't been reached, there is evidence suggesting that for some girls and schools there were successes. Most notably, Group A schools achieved 0.16SD improvement in numeracy, which is directionally positive although limitations in sample sizing and statistical significance exist. Further analysis needs to be conducted around the differing performances of the intervention groups, but Group A schools had a consistently greater proportion of students meeting the recommended usage than Group C schools, which may partially explain the difference.

Looking at all the intervention groups as a whole (in comparison to the control group) the evidence does not demonstrate improved learning; however this should be interpreted with caution as the groups are very different and it is likely that there are averaging effects. Additionally, the randomisation exercise which was used to allocate schools in the different groups might have resulted in the introduction of a county bias in the data, even though schools were originally selected on the basis of key criteria of marginalisation that applied across all counties.

An important achievement of the electronic attendance monitoring is the understanding of the true nature of attendance in iMlango schools. Anecdotal evidence existed in the past around this, and there has been much focus on out of school girls. The project's programme has exposed that average attendance levels of those in school is only around 80%. The range of attendance groups (90%+, 80-80%; 70-80% etc.) probably creates the need for targeted strategies to help deal with this issue, since the attendance patterns even in the groups are not uniform. In all intervention schools the average term attendance of the cohort girls was around 80% with Group C being consistently slightly lower compared to the others. Perhaps unsurprisingly, the drought effect in Kilifi has manifested itself with further reductions in attendance. Malindi, Kaloleni and Magarini sub-counties (Kilifi) all saw a 4-5% decrease in attendance from the period February – November 2016.

Key findings from the analysis of the endline results
iMlango has demonstrated that a complex education technology programme can be implemented successfully in a rural Kenyan primary school environment, delivering positive results in its key target areas, and laying the foundation for the possibility to become sustainable in the long-term.

When interviewed during the endline assessment, many of the girls said that the digital learning tools had been beneficial to their learning and reported that literacy and numeracy skills are some of the new things they learnt. The project has been well received by the schools and the communities and many parents were grateful that mastering ICT skills that can be used in the learning environment, enhancing the chances of their children getting a good job. Some parents even said that use of

computers in school had saved them money that they could have spent later to pay for ICT classes for their children.

Use of the digital learning tools was also effective in improving school attendance in some cases. Parents who participated in FGDs reported that their children did not want to miss school because this could mean missing maths or literacy classes in the computer lab. Additionally, 67.5% of all the teachers from treatment schools who were interviewed at endline said that the use of new interactive and engaging learning materials has made the girls more interested in attending school. An increase in willingness to attend has largely not translated into increased attendance, however, suggesting that there exist systemic barriers to regular attendance, such as a lack of household financial capacity.

It is also worth noting that results from the girls interviewed at endline showed that use of digital learning tools had helped to positively change the girls' view towards school with 60.5% saying that they were now more interested in attending school while 67.8% reported that they found school more exciting. And although there is no evidence that the girls who gave these responses translated this into action this positive change could result into improved school attendance for the girls. The girls too reported that as a result of use of use of digital learning tools the way they looked at their future has changed. This change is capable of enhancing their self-esteem.

The project has established 387 child clubs in the intervention schools and provided life skills content through the learning portal with the aim of improving girls' self-esteem and knowledge of the outside world. At endline we saw an improvement since baseline in the average score of the perception scorecard delivered to the girls in intervention schools. It is worth noting that since baseline the girls agreed on average more with the statement that "their schools have the necessary facilities for their learning" and "their parents encourage them to attend school and complete their education".

The project used small value stipends to try to improve the attendance profile of poor, badly attending pupils, recording an overall attendance uplift of more than 10% in 68.4% of those girls who saw any improvement in their attendance. 56% of all stipend recipients improved their attendance by any measure. The stipend proved most effective amongst pupils with the worst attendance (<60%), with 100% of these 1,472 pupils recording improvement. 46% of the stipend recipients recorded improvements of more than 40%, which demonstrates that removing a financial barrier – even as small as 1,000 KES a month – can have a massive impact on a child's ability to attend school regularly. Head teachers as well as parents reported that stipends helped with reduced cases of absenteeism which can be seen as a key achievement. The challenge is the sustainability of such an activity and the project is looking at alternative ways to improve attendance issues caused by economic standing of families.

Engagement by schools and communities is a critical building block for sustainability. We found significant support for the programme by communities with some of them addressing funding for electricity and initiating mechanisms to start earning money to offset costs of the programme. One critical finding in engagement has been the level of interest and buy-in by head teachers. The project addressed this as far as possible with local programme support in the schools, and engagement with local ministerial education officials.

It is intended that after donor support is withdrawn, schools/communities will find ways of sustaining the project initiatives. Asked about whether the schools would be willing to contribute towards the continued running of the project, 83.3% (30) of the interviewed head teachers said they would be, and many suggested ways in which they would go about raising the necessary funds ranging from an in-school printing service for the nearby community to using currently unused land for agricultural development.

Key recommendations
Project data has shown that securing sufficient time on task per girl was a challenge due to the large school size and limited number of computers available in the lab. Given that the analysis of project data against the maths and literacy test scores showed a link between time spent on the learning activities and progress, the project needs to find a way to address the issue of maximising time on task for all pupils.

For the evaluation of the project we analysed the results of different intervention groups to decide which were more impactful, however the analysis was hindered by the high attrition rates faced at the endline data collection. The project should consider changes in the structure of the learning outcomes evaluation to ensure that in the next phase the sample sizes are sufficient to detect the targeted improvement in every group.

Child clubs were introduced in schools to help raise the girls' self-esteem and knowledge of the outside world. The vast majority of the girls participating in the child clubs reported that they attended 1-3 sessions per week and the main activities were reading stories in the portal and using Maths-Whizz. The child club activities contributed to the improvement of the average score in the perception scorecard but were not sufficient to motivate the girls to discuss their thoughts about the future with their families. The project should consider a more structured approach for how the child clubs are operating and also providing more targeted content on life skills and self-esteem to be able to reach the desired impact.

Upon learning that the project is coming to an end, the schools viewed the project implementation period as too short. While some head teachers thought of ways to meet the costs of running the project, some had concerns of how they might get the finances to pay for running costs. For this reason it is recommended that prior to implementation of a project, it is important to have effective engagement with the beneficiaries, which could include helping them to come up with strategies of sustaining the project when donor support comes to an end.

Additionally, the iMlango activities in the schools have run for about two years and though it has led to positive change on the target community, a longer duration could have had a greater impact. Facilitating change in beliefs and attitudes takes time, and is inherently a long-term phenomenon. The recommendation here would be to give future projects a longer duration, as this gives a more realistic timeframe for results to be achieved, and would allow for deeper impact at the community level through reinforcing the work already begun.

Although no data was collected on this, teachers and headteachers expressed the desire to be informed of the findings from the evaluation conducted in their schools since baseline. The project should disseminate the project results to the local stakeholders i.e. the headteachers, County education officials and local administration. This will help to further improve ownership of the project but also serve as a forum where those involved get to learn much more about the roles that they ought to play in the project implementation.

1 Introduction

1.1 Background to project

1.1.1 Project context

1.1.1.1 Main contextual factors influencing project design

Political situation

Project iMlango aims to improve education outcomes of girls in marginalised communities in Kenya coming soon after the current Constitution came into force. Most of the functions of the government have been devolved and decisions are now made at the County level so County governments are able to run their affairs without having to consult the national government. However the education sector has not been devolved, it was necessary for the project to begin consultations at the national level. This happened and the project has benefited from government support and go-ahead from the Ministry of Education through the Principal Secretary from the beginning. The County officials in all the Counties beginning with the County Commissioner of Education were all very supportive of the project.

Socio-cultural situation

English and Kiswahili are the official languages of Kenya. In terms of the ethnic mix there is a high degree of diversity within Kenya. Christian (82.5%) and Muslims (11.1%) are the main religions followed. Agricultural communities dominate the community landscape of Kenya where it is estimated that women do up to 80% of the work. They work in the fields, take care of the children, cook and take food to the market to sell. In urban areas, women are more likely to take jobs outside of the home with 40% of the urban work force being female. Mostly women are confined to lower-paying and lower status jobs e.g. food service and secretarial work.

Kilifi is the only Muslim-majority county within the programme; Kajiado, Makueni and Uasin Gishu are all predominantly Christian, although tribal differences are marked. As well as English and Kiswahili, several other local languages are spoken across the regions. The Maasai in Kajiado possess a particular set of customs, norms and beliefs, some of which have a direct bearing on the adverse social circumstances that impede girls from attaining a full education. For example, FGM and early marriage, although not limited to the Maasai, are generally more commonplace in Kajiado[1].

Economic situation

Rural communities in Kenya typically see higher levels of gross poverty and economic marginalisation than their urban counterparts. Across the four counties covered by iMlango, there is regional variation, with Kilifi possessing the highest incidences of poverty (67%), and Kajiado the lowest (12%)[2].

Schools show lack of investment, with significant issues in teacher quality, inclusivity of the disabled, and ability to deal with gender specific issues[3]. Resourcing challenges for primary schools are exacerbated by very poor national attendance data. Internet access and online tools are limited across the Kenyan state school system. The Kenyan MoE aim is to ensure that the education system is relevant and in line with the national education sector plan and it promotes innovation. It plays an active role in curriculum development. Alignment with MoE is a critical requirement for iMlango, and the project has built close working relationships at both national and regional levels.

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[1] Wasike, 2016, "The challenge of eradicating FGM among Kenya's Maasai", http://www.dw.com/en/the-challenge-of-eradicating-fgm-among-kenyas-maasai/a-19029709).
[2] Kenya Integrated Household Budget Survey, 2005/6, https://data.humdata.org/dataset/kenya-county-poverty-rates-estimates-based-on-kihbs-data-for-constituencies-in-2005-6
[3] Bunyi et al, 2011, "Learning to Teach Reading and Mathematics and Influences on Practice in Kenya," https://www.sussex.ac.uk/webteam/gateway/file.php?name=report-kenya-1july2011.pdf&site=320

1.1.1.2   Gender inequalities and marginalisation impact on education

Marginalisation that is experienced in these Counties can be said to have an impact on the education of the girls even as reported by some of the parents and teachers who participated in FGDs at endline.

> *"At times a child can be sent home for school fees, and you tell her to stay home for two, three days as you look for that money for her to go back to school. It is always advisable if a parent does not have money to go to school immediately the child is sent home and explain to the teacher and tell them you will clear by such a date. That is the best way to handle it. When my child is sent home I go to school that very day because it does not amuse me to leave my child home while I go for casual labour, I feel so bad"* (Endline FGD Older mothers, Sambut Primary).

Gender inequalities exist and in some cases these were expressed by some of FGD participants. In the communities there appeared to be gender disparity in the distribution of roles and responsibilities with women being left to handle bringing income into the family as well as taking care of household chores. This left some women not only feeling over-burdened with both roles but explaining this as an issue that led to greater vulnerability for the girl child.

> *"I would like to add that as parents here in Kajiado we are oppressed - most mothers here are taking care of their homes; not the men. The men are there but they are helpless, the women take care of the children. So the women are carrying a heavy load everyone looks up to us at home for everything. When you borrow something today, tomorrow they will not loan you so that will make the girl child get an old man and she will use her body so long as she can get a sanitary pad. So women here in Kajiado don't have money"* (Endline FGD Young mothers, Oloolua Primary).

Although responsibilities at home and child labour affected both boys and girls, most participants in FGDs felt that girls bore a bigger burden compared to the boys. This was perceived as a reflection of how parents valued their children differently.

> *"I would say that there are some parents who value boys more than girls so you find that the girls are left to do a lot of work at home and they are not given the same equal opportunities as boys to attend school"* (Endline FGD Teachers, Kiliku Primary).

Cultural practices at home leads to the girl child doing the house chores.

> *"If you have a daughter and a son, as soon as they return from school, the boy will remove his uniform and get a ball to go and play with friends, but the girl has to remain in the house, wash utensils, sweep the house, prepare supper and all that. She has no time for homework, so she is disadvantaged."* (Endline FGD Teachers, Central Primary).

At baseline one of the main issues identified was that girl children had many responsibilities that they had to complete after school. These ranged from household chores, taking care of their younger siblings, and helping in other duties like going to the market or trading in their parents businesses (food stalls and hawking was mentioned). In most cases these take priority over schoolwork and mean that they do not have time or are too tired to complete their homework, and consequently their school performance is negatively affected. In some situations this was made worse by parents who are sickly, drunkards and those who don't care about education, which in some cases led to girls completely dropping out of school to take care of their siblings and parents. These findings were echoed by teachers, students and even parents themselves.

> *"When she gets home to school is not being asked what she learnt in school, she is usually given chores around the house. These become a priority over her school work."* (Baseline FGD Fathers, Sigowet Primary)

> *"Because she might come home to find her mother is not home and there are various duties such as washing dishes and cooking that she has to do and she is unable to do her homework. Most of them will not want to go to school the next day if her homework is incomplete." (Baseline KII Village Elder, Benyoka Primary)*

These gender inequalities have a negative effect on the education of girls that was highlighted in the FGDs:

> *"But many parents, as you had asked, treasure a lot educating the boy because they know that the girl will be married early and thus that problem would have been sorted as they see that she can be married but the boy cannot be married, so they educate the boy. In my opinion, this is where you weigh the options; you cannot leave a home stead without a man. A household must have a man who should be the first person, you have to look for a man and then number two can be someone else because, how do you leave a homestead just like that and then people will be asking whose homestead is this?" (Endline FGD Fathers, Mukuyuni Primary)*

Having the girls perform household chores and other home duties as reported by some respondents could mean that they have less time to attend to their schoolwork including revising for exams compared to the boys. This in effect could have had an impact on the performance of girls in school.

Some of the parents when faced with financial challenges were reported to give preference to education of boys even if it in some cases meant the girls stopping going to school altogether. By providing the financial incentive the project aimed at supporting the parents meet some of the needs of their children and in this way help keep them in school.

1.1.1.3 Educational policy context in Kenya

In 1985 the 7-4-2-3 system was replaced with the current 8-4-4 educational system, based on the American educational system. This system consists of 8 years of primary school, 4 years of secondary school and 4 years of higher education. The curriculum focuses on Mathematics, English and various vocational subjects. This includes a broad range of subjects aimed both at pupils who will complete only their primary education and then enter the labour market, and those pupils who plan to continue on to higher education. Children also attend 1 or 2 years of pre-primary school before starting primary school. This is usually between the ages of 3 and 6.

The first phase of the 8-4-4 educational system is primary education. Primary education is free and compulsory in Kenya since 2003 and lasts 8 years (Standards 1 to 8). Pupils are usually 6 years old when they start school and 14 when they complete their primary education, although it is not uncommon for pupils to join and subsequently finish later. The curriculum is made up of Languages, Mathematics, History, Geography, Science, Crafts and Religious Studies. At the end of primary, pupils take exams for the award of the Kenya Certificate of Primary Education (KCPE). Exams are held in five subjects: Kiswahili, English, Mathematics, Science and Agriculture, and Social Studies.
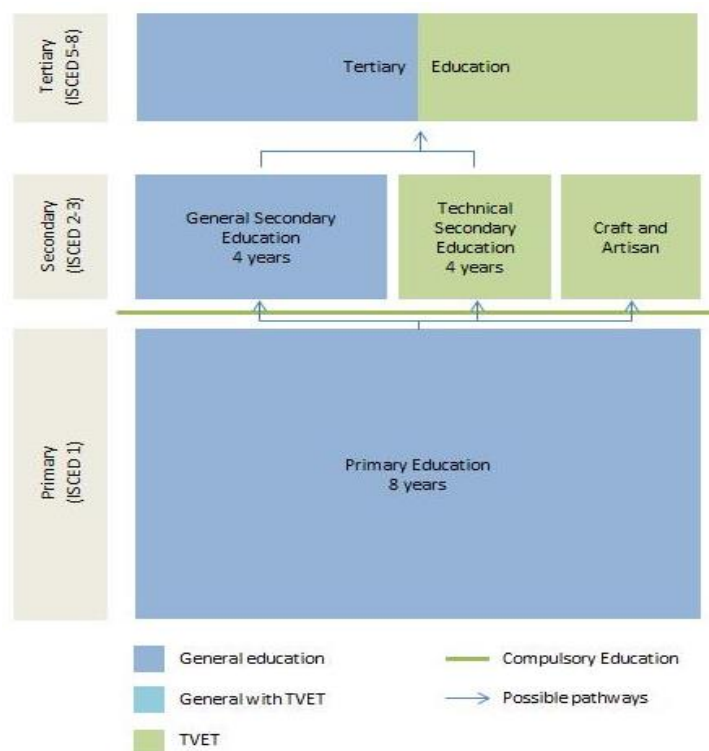
Figure 1: The Kenyan education system[4]

The primary curriculum is delivered in English and the school term dates are:

Term	Term dates	Term vacation
Term 1	January to April (13 week)	April (3 weeks)
Term 2	May to July (13 weeks)	August (3 weeks)
Term 3	September to November (13 weeks)	December (8 weeks)

English is the official language of instruction for schools in Kenya, however this is not fully enforced. As a result the local mother tongues and at times Kiswahili are used as the language of instruction at primary school level. This is a more common issue in schools in the rural areas.

Free primary education was introduced in 2003 in Kenya, however due to the following issues parents are still expected to pay levies to the schools:

- Inadequate level of capitation to hire additional PTA teachers, night guards, and maintenance work in the school;
- Delayed remittances of the capitation from the MoE, forcing school management to impose levies to purchase urgently needed learning materials at the beginning of each year;
- Parents have to buy uniforms for their children;
- Examination fees;
- Payment for lunch in those schools which do not benefit from the school feeding programme.

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[4] Figure extracted from http://www.unevoc.unesco.org/go.php?q=World+TVET+Database&ct=KEN

On many occasions the children are sent back home if their parents haven't paid the fees.

In Kenya the MoE allows and recommends pregnant girls to return to school and no girl should be barred from school as a result of pregnancy. Parents are aware of this policy and some expressed it when asked about the issues that would cause girls to stop going to school:

> *"For a girl child to drop out of school completely unless she is pregnant. But these days even if a girl is pregnant, she can continue going to school. There are those who continue going to school until they give birth. But some are shy/ashamed; you know sometimes they are laughed at by their classmates. So she feels ashamed/shy. But the regulation these days is that she can be allowed to continue all the way until she gives birth. The exam papers can even be brought to her" (Endline FGD Mothers, Kwaupanga Primary).*

1.1.2 Project theory of change and assumptions

1.1.2.1 Barriers to education

At project inception the main barriers to girls' education to be addressed had been identified. These were confirmed by the baseline survey at the beginning of the project thus the project ToC remained the same.

Educational barriers: Educationally marginalised girls have a poor performance and/or attendance and are in risk of dropping out of school. There are several reasons that affect learning in the iMlango schools, namely:

- Poor attendance at school – baseline data suggested that the level of attendance is around 70% of the time for girls and boys;
- Poor quality of teaching – absenteeism, lack of good quality teaching skills and often deficiencies in subject matter expertise;
- Lack of high quality learning content – the students are frequently missing books and school materials necessary for their learning;
- Large class sizes – many of the classes in the project have more than 70 pupils with varying ages and wide ranges of ability, meaning that individual attention is extremely limited with many educationally disenfranchised children.

Financial barriers: Economic marginalisation is a key factor influencing learning, as it can lead to low school attendance. All the assessments from the baseline HH surveys indicate that the group is overall below or only just above the $1.25 per day household income. Inability of parents to pay school fees, buy school uniforms and lack of food have been mentioned as reasons for missing or stopping school at baseline.

Social barriers: Social issues that contribute to dropout amongst girls include pregnancy, early marriage, lack of access to sanitary facilities, and domestic work requirements. According to the baseline findings, while parents expressed positive views on girls' education and wanted their daughters to continue to higher education, teachers raised the issue of household chores that prevents the girls from attending school.

1.1.2.2 iMlango Theory of Change

In creating iMlango and its intervention elements, the central hypothesis was that these technology capabilities can be harnessed in a Kenyan education context to deliver an effective intervention delivering improvement in education and life skills for students, assisted by high quality quantitative information about students, such as school attendance and their educational progress.

With a focus on the Girls' Education Challenge, the aim for iMlango is to demonstrate an improvement in the life chances of marginalised girls, and to help contribute to their ability to complete a full cycle of education.

The five pillars of the iMlango Theory of Change (ToC) are:

1. **Motivation** – a tangible financial incentive linked to girls' attendance to encourage parents to ensure school attendance. The positive impact from the incentives helps reduce educational marginalisation as well as the risk of educational marginalisation by boosting students' attendance in school.

   - Financial incentive improves household income and contributes to the improvement of school attendance;
   - Stipend enables family to cover education related expenses and to offset the need for work activities that sometimes prevent school attendance;
   - More time available for school and association of payment with attendance encourages girl to be allowed and to want to attend school.
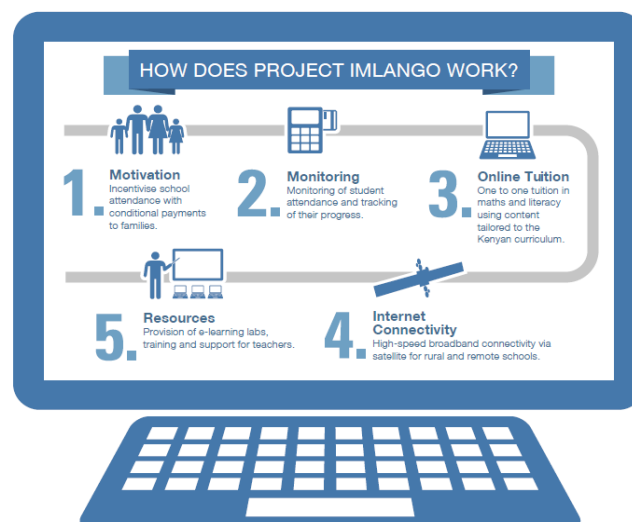
Figure 2: iMlango Theory of Change

2. **Monitoring** – attendance monitoring helps to understand the students' attendance patterns and whether they are in school benefiting from the project activities and also tracks the effectiveness of financial incentive. Online tutoring records students' interactions with the tutor which in turn allows for deep mining and analysis of students' learning and engagement throughout their tutoring journey. In combination, the project is empowered to provide effective and timely reporting as well as identify what is effective, what causes challenges and introduce adaptations to the implementation model to increase the impact of the intervention.

3. **Content** – the iMlango learning platform provides a large amount of content on various subjects such as Maths, English and Life Skills that children can explore in either a whole class setting or individually in the ICT lab during schools hours or in the after school clubs. Exposure to Life Skills (non-curriculum) content used in child clubs improves the life chances of marginalised girls, through awareness of opportunities for girls/women and a greater positive aspiration and outlook. Access to Maths-Whizz' simulated tutoring service provides a learning journey that is tailored to each child's needs and pace of learning, and is continuously adaptive that in turn facilitates accelerated learning. Teachers benefit from having vast variety of teaching resources to make learning engaging as well as to provide variety of new teaching techniques and methodologies.

4. **Connectivity** – provision of high speed satellite internet to the schools provides access for both students and teachers to a wide range of online resources and services that are available through the learning platform and beyond:

   - Broadband connectivity enable teachers to access high quality and interesting content for tuition;
   - Teachers want to improve their digital literacy and are motivated to participate;
   - Teachers ensure students get access within lessons because they see a positive effect on students (so better teaching outcomes for them);
   - Students engage in interesting and stimulating content that advances their Maths and Literacy.

5. **Capacity** – equipping schools with the necessary technology, building teachers' and students' capacity of to enable them to efficiently use the project's components and providing continuous on the ground support – serves as sound base for a successfully implemented project.

- First exposure to a learning platform and ICT environment can be daunting for teachers and students;
- Careful building of knowledge and confidence for teachers to integrate ICT into everyday learning processes, together with non-monetary motivation - will encourage them to use ICT;
- Teacher's continuous application of the ICT tools within the learning environment will encourage students to become engaged in the same, so a positive reinforcement is achieved.

The link between the project activities and the barriers to education are shown in Table 1, while Figure 3 presents how the project activities link to the Outputs and contribute to the Outcomes.

Table 1: Linking of project activities to barriers to education

Activity	Poor attendance	Poor quality of teaching	Barriers to learning Lack of high quality learning content	Large class sizes	Financial barriers	Social barriers
In-field instruction and support		✔				
Provision & maintenance of connectivity & hardware		✔	✔	✔		
Child clubs						✔
Provision & maintenance of Maths-Whizz		✔	✔			
Provision & maintenance of learning portal and content		✔	✔			
Financial incentives					✔	
Attendance monitoring system	✔					

The project ToC was aiming to investigate the effects and potential linkages of the following elements in the context of marginalised girls at rural schools in Kenya:
- Does access to ICT assist teachers in delivering learning?
- Can content (accessible through ICT) which is targeted at marginalised girls raise their self esteem, career aspirations, and knowledge of the outside world?
- Can iMlango in its totality improve student learning (for marginalised girls in particular) and engagement in ICT (improve digital literacy through utilisation of the learning platform). In particular, does individualised simulated tutoring in maths have a measurable impact on learning outcomes?
- Does a financial incentive for families, linked with attendance by marginalised girls, increase learning outcomes?
- Can electronic attendance monitoring be effectively used in schools and can it assist in improving the education outcomes of students?
- Does the iMlango programme create a long-term sustainable model for deploying and delivering ICT services that in the long run achieve positive results for the above measures (or to facilitate other measures)?
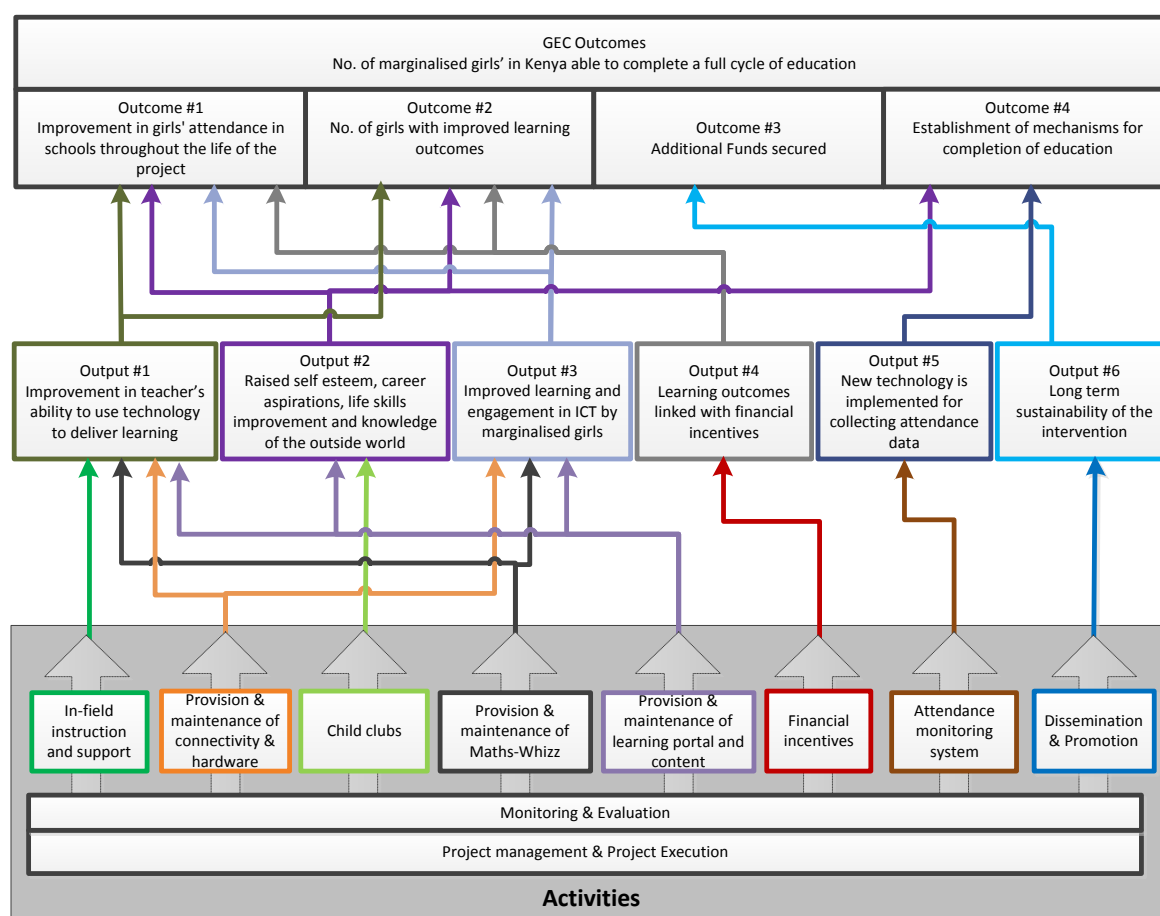
Figure 3: Linking of project activities to Outputs and Outcomes

1.2 M&E approach and research methods

1.2.1 Evaluation approach

The evaluation of iMlango uses a randomised control trial and is based on randomly breaking down the 260 participating schools into four groups A, B, C and D, with group D being the control group. Each of the groups A, B and C received different iMlango components, so that the project evaluation is split into three separate evaluations (A against D, B against D and C against D). This increases the VfM by allowing more comprehensive research of the iMlango components.

Table 2: Description of intervention groups

Description	Group A Full intervention	Group B No Personalised Tutoring	Group C No Stipends	Group D Control Group
Access to iMlango learning platform	X	X	X	
Maths-Whizz individualised learning	X		X	
Maths-Whizz Teacher's Resource for whole class learning	X	X	X	

Description	Group A Full intervention	Group B No Personalised Tutoring	Group C No Stipends	Group D Control Group
Stipend programme	X	X		
Attendance monitoring	X	X	X	
Internet connectivity	X	X	X	
ICT lab (25 computers)	X		X	
Laptops & Projectors (for whole class teaching)	X	X	X	

1.2.1.1   *School selection methodology and clustering*

The iMlango project is implemented in the four counties shown in Figure 4; Kilifi, Kajiado, Makueni and Uasin Gishu. These regions were chosen based on marginalisation factors (poverty rates, attendance statistics and learning achievements for girls), statistics from KNBS and Kenya Open Data and other factors such as availability of electricity, safety of regions to minimise risk of project disruption and accessibility and location of regions to simplify logistics and on-going support.

During the design of the M&E Framework we identified cluster sampling as the most appropriate sampling methodology, because it enabled us to perform the baseline in a subset of schools thus reducing its duration and simplifying logistics. More specifically, 50% of the schools were chosen to be evaluation schools meaning 130 out of the 260 schools were visited for the baseline and endline surveys. In addition to the cluster sampling approach, we matched the selected schools through a matching process that ensured the homogeneity of the schools. This homogeneity allowed us to reduce the minimum requirement for the total girl assessments that had to be conducted because the sampled beneficiaries were representative of the whole population. This matching exercise was integral in selecting the iMlango schools from the initial list provided by the MoE. Additional information on the school matching can be found in Annex 4.

Guided by the MoE and the local governments, we created a school pool of approximately 400 schools. A total of 260 schools were selected from this initial school pool based on the results of a school survey. The data collected in this survey include:

- **Suitability for the programme information** – electricity access, willingness to participate in the programme, availability of room for conversion to ICT lab; enrolment, attendance and absence (using the schools manual records); number of boys and girls attending by class/year; number of teachers and an assessment of current digital literacy amongst teachers.
- **Information for matching of the schools** – school size, boys-to-girl enrolment ratio, existence and duration of poverty support programmes, number of marginalisation issues identified by the school.

The 260 selected schools were randomly assigned to one of the four intervention groups and they are presented in Figure 4.
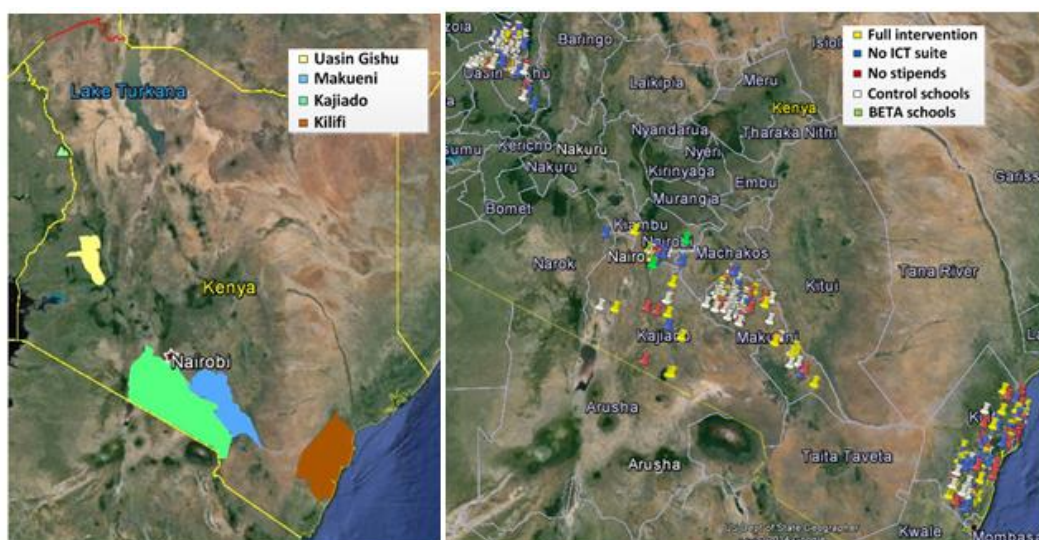
Figure 4: Map of iMlango Counties and schools

1.2.1.2 Cohort tracking

In order to maintain VfM we selected to track two year groups at baseline (Standards 1 and 3), which we expected to be representative of assessing the effect (in educational outcome terms) of the intervention. The total number of girls that were assessed for the baseline as well as the breakdown per group and Standard is presented in Table 3. We had also taken into account 10% attrition when calculating the total sample size in the following table. The girls were randomly selected by the class teacher and tested in the evaluation schools.

Table 3: Learning assessment distribution by Standard and intervention group for baseline

Description	Group A	Group B	Group C	Group D	Grand Total
Girls assessments (in school)	32 schools 453	33 schools 424	32 schools 425	33 schools 307	130 schools 1,608 girls
10% attrition	50	47	47	34	179 girls
Standard 1	180	170	170	170	690
Standard 2 (baseline only)	35	33	33	1	102
Standard 3	180	170	170	170	690
Standard 4 (baseline only)	36	33	33	-	102
Standard 5 (baseline only)	36	33	33	-	102
Standard 6 (baseline only)	36	32	33	-	101
Grand total	503	471	472	341	1,787

Following the baseline learning test results and because different tests were delivered for each Standard, we decided to drop Standard 1 from the evaluation cohort as the probability of ceiling effects was high. Therefore for the endline we only tested the cohort of girls that were in Standard 3 at baseline.

The approach for the endline assessment was longitudinal, which means aiming to test the exact same girls that were tested at baseline to assess their learning outcomes. To effectively track them, we captured their full name, Standard, age and school at the baseline and assigned to each one a unique identifier. When the attendance monitoring system was rolled out in the schools we linked these baseline unique identifiers with their unique attendance card numbers. As a result we were able to periodically check whether the girls are still attending school. As we demonstrate in this report, our attendance monitoring exposed the immense challenges in maintaining the sample size at the endline, with attrition due to 'on-the-day' non-attendance, moves within the school system, and indeed hold-backs to re-sit a given Standard.

In preparation for the endline, Advantech contacted the schools before visiting for the data collection to let them know which students they would like to test so that the school can arrange for them to be present. When we couldn't find a student because she left the school or had repeated a class, we selected another girl from the same class as a substitute. The methodology used was to check through the register, write all the names of the girls on pieces of paper which were then folded and a member of the research team would pick one at random. This went on until the required number of replacement girls from that particular class was reached. The initial plan was to replace a missing girl with another of the same age from the same class, however based on field experience and specifically interviews with the girls, it came out that many of them were not quite sure of their date of birth.

Overall the attrition rate at endline was 43.38%; Kajiado contributed to 10.5% of the total attrition rate, Kilifi for 34.2%, Makueni for 24.7% and Uasin Gishu for 30.6%. This attrition rate is higher than what was envisaged at baseline. We sought to find out from the schools the reasons why the girls tested at baseline were unavailable. Among the reasons that were given was that the girls had either repeated class or had transferred to other schools with the latter being the most common. The girls that had repeated class were not tested at endline because the difficulty of the tests was adapted for the cohort standard that was to be tested (Standard 6) and we believe they would not be able to respond to the majority of the questions leading to floor effects. In Malindi HGM Primary in Kilifi County, for example, 6 out of the 7 girls tested at baseline had been transferred to other schools.

1.2.1.3   *Data collection tools for endline and sampling*

Both quantitative and qualitative tools were used for the endline survey to capture the results of the iMlango project, gain understanding around what worked and why as well as what the various stakeholders think about the project and its impact.

All the qualitative interviews and Focus Group Discussions (FGDs) were tied to a specific evaluation school. The schools to which either an FGD or an in-depth interview was conducted were selected based on the student population so more weight being given to the schools with a higher population. Additionally, more weight was given to the Counties with more evaluation schools. Therefore Kilifi, which has most of the schools, had a higher number of FGDs and in-depth interviews allocated to it. All the FGDs and key informant interviews were audio-recorded and to make it possible for analysis were transcribed while those conducted in Kiswahili were translated to English.

In order to be able to capture the difference from the baseline we based the development of the endline tools to the baseline ones and updated them to reflect the findings during the project. The table below summarises the various endline tools, their goal and baseline and endline samples. The tools are included in Annex A8.

Table 4: Summary of endline tools

Tool	Goal	Type	Baseline Sample	Endline Sample	Input to Logframe
Household survey	Gain knowledge about the communities that our schools are in and explore the financial, social and educational barriers that girls (and boys) face.	Quantitative	700	695	No specific input; it is useful in interpreting the project impact.
Maths and Literacy learning tests	Assess the learning outcomes of the cohort standard of the project.	Quantitative	690 in total (682 in maths and 680 in literacy)	682 in total (675 in maths and 675 in literacy)	Outcome indicator 2
Girl questionnaire	Capture the experience of the girls in iMlango, the difference it has made on their learning and self-confidence and future aspirations as well as barriers they face.	Quantitative	1,772	1,734	Output indicator 2.2 and 2.3
Girl perception scorecard	Inform Output indicator 2.1 in the logframe and track improvement in girls' perception of education, self-esteem and views on girl related issues.	Quantitative	137	135	Output indicator 2.1
Teacher questionnaire	Capture the experience of the teachers in iMlango, the difference it has made on their students learning, what has worked and what not.	Quantitative	266	246	No specific input; it is useful in interpreting the project impact.
Headteacher interview	Discuss with the headteachers about their experience with iMlango, how they think it has helped their school and the girls as well as hear what they think we can do to improve it.	Quantitative/ Qualitative	N/A	37	Output indicator 5.2
Classroom observation	Understand how the ICT infrastructure is being used in the lab and in the classroom by the teachers and students. We want to understand how the teachers integrate ICT and the learning resources to their teaching and how the individualised learning works in the lab.	Qualitative	N/A	25	No specific input; it is useful in interpreting the project impact.
KIIs – Chiefs, Assistant Chiefs and village elders	Explore the marginalisation issues and find out if the Chiefs/Assistant Chiefs and village elders are aware of what is happening in the iMlango schools as well as how they think education is working and what they would improve.	Qualitative	12	12	Outcome indicator 4
FGDs with mothers (younger and older)	Explore what the views of the mothers are towards girls' education and what they do about it, how they feel about the project and whether they think it has made a difference.	Qualitative	6	6	No specific input; it is useful in interpreting the project impact.

Tool	Goal	Type	Baseline Sample	Endline Sample	Input to Logframe
FGDs with fathers	Explore what the views of the fathers are towards girls' education and what they do about it, how they feel about the project and whether they think it has made a difference.	Qualitative	6	6	No specific input; it is useful in interpreting the project impact.
FGDs with girls	Explore what the views of the girls are towards their education and the difficulties they face, how they feel about the project and whether they think it has made a difference. More specifically the tool will feed into Output 2 around girls' self-confidence and aspirations to support the findings of the girls' questionnaire.	Qualitative	6	6	Output 2
FGD with teachers	Explore what is the situation for the teachers in the schools and get their view on the project, what worked, what issues they faced and what they would do differently.	Qualitative	6	6	No specific input; it is useful in interpreting the project impact.
Interview with parents receiving the stipend	Explore what issues the family was facing that affected attendance, if the stipend has worked and why. Do the parents understand the impact of their children attending school more frequently and what improvements have they noticed if any?	Quantitative	N/A	399	No specific input; it is useful in interpreting the project impact.

1.2.2 Limitations of the evaluation approach

1.2.2.1 *Methodological challenges of approach*

iMlango is an EdTech project so one of the requirements for its implementation was for a school to have electricity, since the project did not carry sufficient budget for the delivery of a solar solution. A few of the schools already had computers prior to receiving those from the project, and it is possible that this might have slightly affected the results; however our observations were that in these instances the type of skills being taught were more around ICT skills (like typing) than academic and life skills which is the focus of the project.

The data collection for iMlango was based in schools so girls were tested in schools instead of households as it frequently happens. This means that the household surveys were not linked to the specific girls that were tested but rather captured a general picture of the marginalisation factors and barriers to education in the communities around the schools.

Due to the fact that the intervention was introduced to the whole school and in order to ensure the project did not interfere with the M&E activities, the cohort students that were tested at baseline were not specifically targeted so that they spend a minimum amount of time on the resources provided. As a result, some of the cohort girls did not get sufficient exposure to the content or receive the stipend which has an effect on the evaluation of the project impact.

Another limitation was that the baseline tests delivered at baseline different for every standard and aligned to the curriculum, therefore at endline additional questions needed to be added to the tests to avoid potential ceiling effects. As a result, the evaluation of improvement is not as straightforward as originally planned.

Regarding the evaluation of attendance there was a limitation with the data sources available in the control schools. All intervention schools were equipped with the electronic attendance monitoring system whereas in the control schools we relied on the school register and spot check data which are not as reliable. Therefore the comparison in attendance rates and evaluation of improvement against control schools is challenging. There was also a challenge in the verification of the spot check data through the attendance registers because of the fact that in some cases the attendance registers were not updated.

Lastly, although we carried out termly assessments to evaluate most of the logframe indicators, the girls were not re-tested between baseline and endline as there was no requirement for a midline survey. As a result we were not able to know how the girls were progressing against the GEC SD improvement target and recommend corrective actions before endline.

1.2.2.2   Training and monitoring of enumerators

The endline survey started with the hiring of the research assistants that were going to conduct the data collection in the schools and communities. After they were contacted by Advantech and confirmed they were willing to work on the endline survey, they were all required to produce a Certificate of Good Conduct and a Certificate of Research Ethics which they all provided.

Then Advantech conducted a 5-day training of the data collection team that was composed mainly of people who had had prior experience in research including collection of qualitative data. The team was brought together at a central point and training was done by someone who has worked on the project baseline and termly assessments and thus has a good understanding on the project. In addition to being trained on the specific endline data collection tools and what was required of them in the field, the research team was given a background of the project including its objectives and design. The team was trained on the following areas:

- Administration of the numeracy and the literacy tests;
- Generation of student codes for identification of girls;
- Collection of data using mobile phone;
- Getting consent from every participant bearing in mind that participation in the evaluation is voluntary;
- Ensuring that information gathered from respondents is kept confidential and not disclosed to anyone.

The team was then broken down into 8 groups; 1 was sent to work in Kajiado, 2 in Uasin Gishu, 2 in Makueni and 3 in Kilifi which has more schools than any of the other three Counties. Monitoring visits from supervisors were made to check that the teams carried out the activities as planned and respond to queries that the research assistants might have.

1.2.2.3   Challenges faced at endline

The intervention period of the iMlango programme was just under two complete school years (2015 and 2016). To maximise learning opportunity, we conducted the household surveys at the end of the school year in December 2016 and the learning assessments along with all the interviews and FGDs at the beginning of the 2017 school year in January 2017. The first weeks of Term 1 have some disruptions while timetables settle down. One such issue is enrolment of students that can continue for several weeks with some of the existing students reported to school late after the holidays. Teachers were transferred from one school to another and some other had left the schools but their replacements are late in reporting to their new schools. This had an effect on data collection specifically in the attendance spot check as some of the classes did not have a register available at the time of visit leading to gaps in the data collected. In one of the schools where the data collection team was scheduled to conduct a classroom observation, they were informed that learning in the ICT lab had not yet resumed because it was too early in the term. Some schools had also their electricity disconnected because of unpaid bills and so classroom observation could not be conducted. In these cases classroom observations in other schools of the same group were arranged.

More significantly, the timing of the endline data collection also had an effect on being able to find the girls tested at baseline; we experienced many cases of girls from the baseline cohort that hadn't yet

reported back from holidays at the time the team was visiting the school. The consequence of this, as well as the underlying average rate of attendance at school (around 80%) meant that we had to increase the number of replacement students for the endline survey to counteract the attrition rate.

The high attrition at the endline data collection was one of the main limitations for the evaluation of the project results. Because of this, the sample sizes for each of the intervention and control groups was not sufficient to be able to detect the 0.4SD improvement in numeracy and literacy which heavily influenced the significance of the learning outcomes evaluation.

Lastly, one of the Group C evaluation schools in Uasin Gishu (Bwayi Primary) had a theft incident (on 16/09/2016) and lost all the computers, laptops and projectors provided by the project. As a result, the school could not be included in the termly assessment conducted in September-October and was also left out from the endline evaluation.

2 Key findings

2.1 To what extent has the GEC reached and affected marginalised girls?

2.1.1 Who did the project target?

The project targeted primary school-going girls from four Counties in Kenya. The targeted girls are exposed to multiple marginalisation factors with the three main ones being educational, economic and social as described in Section 1.1.2.1. It should be pointed out that although the targeted beneficiaries are girls, boys attending the project schools participated in all the activities thus benefiting from the project. For a more detailed disaggregation of project beneficiaries please refer to Annex A5.

iMlango targets the marginalised girls in an innovative and holistic way using technology as a vital enabler to deliver accelerated learning outcomes at scale. Although the marginalised girls are the main target group, the project has adopted a whole school approach in order to be inclusive and engage effectively with the schools, teachers, students and the wider communities in which the project operates. More information on the project innovations is provided in Section 2.4.4.

The project retained the same target groups since baseline and we noted that the depth of the services offered by the iMlango project increased over the duration of the intervention – for example in the range of educational material available, additional training and support on the grounds and in the creation of child clubs to focus particular aspects of the programme. These are discussed in more detail elsewhere in this report.

Girls are considered as educationally marginalised when their performance or attendance is poor and they are in risk of dropping out of school. iMlango was designed to deliver educational content in an all-encompassing, non-discriminatory manner. Yet through the individualised, simulated tutoring in Maths-Whizz and access to further learning materials on the portal, girls are enabled to catch up at a pace that best suits them. In this sense, the educational needs of the girls are explicitly addressed through the online education platform.

None of the girls in the targeted communities speak English, which is the language of instruction, as their first language. Kajiado County is home to the Maasai and so most of the girls speak Maasai as their first language, while in Kilifi, being home to the Miji Kenda, most of the girls speak Miji Kenda as their first language. In Makueni, home to the Kamba people, most of the girls speak Kamba as their first language and in Uasin Gishu being home to the Kalenjin people most of the girls speaking Kalenjin. In Kilifi where there are Swahili people many children learn Kiswahili before going to school thus this becomes their second language. Although most of the girls speak the language of the particular ethnic group that lives in each County, it is worth noting that some of these Counties are composed of people from different ethnic groups. Kajiado, owing to its proximity to Nairobi, is home to people who work in Nairobi. This affects mainly the urban centres like Ngong Town, Ongata Rongai and Kiserian. Therefore the students in the some of the schools near these urban centres are from different ethnic groups and thus speak different languages. The same applies to Uasin Gishu where people from different ethnic communities have bought land and settled there. Both Makueni and Kilifi are less affected by such issues. Although it would not be possible to quantify the number of girls who speak the various tribal languages, it is safe to say that for the vast majority of the girls in these Counties English is the second or even third language.

Weather conditions experienced in all the Counties further contributes to girls being marginalised from education, and throughout the programme drought and adverse rains affected various communities. Kilifi, Makueni and Kajiado especially suffer periods of drought and thus scarcity of food which has led to girls missing school. The complexity of the issues is great, as demonstrated by the following interview in Kilifi:

> *"To say the truth, money is not enough, especially here at the coast, we depend on tourism very much. Right now, tourism has gone very down. And when the tourism sector suffers, then it is cries from everywhere. And also in the area of farming, for example in previous years, farming was doing very well. And when farming is doing well, when the parent gets food, when the parent is armed with food at home, then he can be able to direct the money to school so that the child can continue to learn. But since farming these days has gone down, these trees that we depend upon as cash crops, for example coconut trees, are drying up because of the sun, the cashew nuts are also not doing well because the drought is too much. But maybe if farming was doing well, money would have been available to take children to school. And if the tourism sector was doing well, children would not have stayed home without going to school and because for us here at the coast, we lack industries."* (Endline FGD Fathers, Gede Primary)

Social issues such as FGM, pregnancy and early marriage are prevalent in the project Counties but with varying intensity depending on the region. In Kajiado and Kilifi, early marriage is practised and this compromises the chances of girls to complete their education. In Kajiado, the Maasai are a pastoralist community and as a result they migrate from one place to another in search of pasture for their livestock. As they migrate, most take their families along, including school-going children who are pulled out of school and can only go back to school when their parents go back to their original home.

Gender inequalities are experienced in these Counties according to information gathered from parents and teachers who participated in the endline FGDs.

> *"Looking at the African culture which we have as Kenyans, culture has been very unfair for the girl child because we have areas where girls are really disadvantaged so badly that they are not supposed to be going to school, they cannot be given inheritance by their parents, property inheritance. They are disadvantaged in social life and education is the only thing that will help them come out of this."* (Endline FGD Teachers, Central Primary)

> *"I would say that there are some parents who value boys more than girls so you find that the girls are left to do a lot of work at home and they are not given the opportunities as equal at the boys to attend school."* (Endline FGD Teachers, Kiliku Primary)

The role of education in enhancing the independence of girls was acknowledged in the FGDs with girls who highlighted the disruptive role of early marriage; they preferred to get married at the age of 18-28.

> *"Interviewer: eeeh ……For those who said 25 and above ……why do you say so?*
> *Respondent4: Because she will have gotten a job*
> *Respondent: Because she will have completed her college studies or university."*
> *(Endline FGD Girls, Kalamba Primary)*

We asked the household heads about the issues that negatively affect the education of girls (as shown in the table below); nearly 80% of the respondents mentioned early marriage/early pregnancy. 57.3% of the respondents believed that the girls are being lured into relationships for money/gifts which has a negative impact on their education. Abuse (sexual abuse, discrimination, child labour) and working at home were mentioned but were not that common. This might reflect the view of the parents that working at home is not negatively impacting on girls' education compared to other issues. Other issues were mentioned by 26.9% of the respondents. These included lack of school fees (10.5%), lack of sanitary towels (4.5%), lack food, inability to buy uniform and other school requirements like books, negligence from parents/irresponsible parents, negative peer pressure, being forced to repeat classes and lack of interest in school among others.

Table 5: Issues that affect negatively girls' education – household survey

Issues affecting girls education	Frequency	Percentage %
Early marriage/early pregnancy	550	79.1
Abuse (sexual abuse, discrimination/child labour)	58	8.3
Work at home	90	12.9
Being lured into relationships with money/gifts	398	57.3
Other	187	26.9

2.1.2   How well were target groups reached?

The marginalised girls were reached in their schools through the focus on learning delivery, attendance monitoring, child clubs and the stipend initiative. Although all the activities were made available for all girls and boys in the schools, stipends were only provided to a subset of students that fulfilled the selection criteria set by the project. The methodology followed for the selection of the stipend beneficiaries is described in Section 2.4.1.4. We observed significant effort by the project field officers to build relations with the teachers and beyond the school gate with the local communities helping to focus on particularly difficult cases of girls facing the marginalisation issues that have been presented in previous sections.

In order to showcase how well the marginalised girls were reached by the project we are going to use data from the girl and teacher questionnaire, the household survey and the FGDs.

From the household surveys we have data about the level of education achieved by the household heads that were interviewed. Our findings showed that most respondents in Kajiado had received no education at all, while the corresponding figure for Makueni was the lowest across all Counties. In Makueni the highest percentage of respondents had completed primary education, whereas in Kilifi and Uasin Gishu they had attended primary but not completed it. It is worth noting that the percentage of household heads without any education in Kilifi was similar to the one in Kajiado (26.8% and 28.6% respectively). Secondary school education was generally low, with only Makueni and Uasin Gishu having double digit percentages for completed secondary education (14.8% and 17.5% respectively). Almost none of the respondents had gone to university. The table below provides a breakdown of the findings.

Table 6: Achieved level of education for household heads interviewed at endline

Level of education	Kajiado (n=77) %	Makueni (n=176) %	Uasin Gishu (n=177) %	Kilifi (n=265) %	Total (n=695) %
None	28.6	2.8	4.5	26.8	15.3
Primary (incomplete)	24.7	31.3	30.5	33.2	31.1
Primary (completed)	24.7	36.9	26.6	23.4	27.8
Secondary (incomplete)	9.1	10.2	16.9	5.3	9.9
Secondary (completed)	6.5	14.8	17.5	6.8	11.5
College	6.5	2.8	3.4	2.3	3.2
University	0.0	0.0	0.6	0.8	0.4
Other	0.0	1.1	0.0	1.5	0.9
Total	100.0	100.0	100.0	100.0	100.0

The baseline study indicated very high levels of economic marginalisation across the iMlango communities. Many girls are missing out on education as a result of their parents' inability to pay education expenses, even at times as low as 20 KES (£0.16). Girls have also been reported to miss school because of lack of sanitary towels, which many parents in these Counties cannot afford to buy. As a result of the marginalisation many cannot afford even basic commodities like food. Lack of

money to buy basic commodities was cited by many parents who participated in the endline FGDs as a key reason for their child's poor attendance:

> *"There is no money to educate the children. If you get something small, you remain wondering whether to take it to school as school fees or to buy food. Even if you have somebody who goes to work every day and the following day you request him. Even if you have something small from work, you will realize that you borrowed a lot of money and must refund." (Endline FGD Fathers, Oloosurutia Primary)*

House building material provides an indication of economic status of the home owner; therefore we gathered information on the materials used to construct the houses that were visited during the endline survey. The table below provides our findings; 57.3% of the houses are constructed of semi-permanent material (mud walls, mud or thatched/palm roofing). The majority of houses in Kilifi (75.8%) and Uasin Gishu (80.2%) had mud walls and floor and roofing from grass/palm leaves or iron sheet. In Kajiado 66.2% of the households had iron sheet walls, cement or mud floor and iron sheet roofing while in Makueni 55.1% had brick walls, cement or mud floor and iron sheet roofing.

Table 7: Type of house across the households surveyed at endline

Type of house	Kajiado (n=77) %	Makueni (n=176) %	Uasin Gishu (n=177) %	Kilifi (n=265) %	Total (n=695) %
Mud walls, grass/palm leaves thatched roof and mud floor	3.9	0	2.8	40.8	16.7
Mud walls, iron sheet roofing and mud floor	6.5	5.7	77.4	35.1	35.3
Stone walls, thatched/palm roofing and mud floor	0	0.6	0	1.1	0.6
Timber walls, iron sheet roofing and mud floor	2.6	0	0	0	0.3
Timber walls, iron sheet roofing and cemented floor	7.8	0	0.6	0	1.0
Iron sheet walls and roofing and mud floor	16.9	2.8	1.1	0.0	2.9
Iron sheets walls and roofing and cement floor	28.6	2.8	2.3	0.8	4.7
Stone walls, iron sheet roofing and cement floor	20.8	11.4	11.3	16.2	14.2
Iron sheets roofing, brick walls and cement floor	0	26.7	1.7	0	7.2
Mud walls, mud roofing and mud floor	6.5	11.9	0	2.6	4.7
Iron sheet roofing, brick walls and mud floor	6.5	28.4	1.1%	2.6	9.2
Other	0	9.7	1.7	0.8	3.2
Total	100.0	100.0	100.0	100.0	100.0

Source of lighting used at home can also provide an indication on economic status. All the girls interviewed during the endline survey (1,734 in total) were asked what the main source of lighting used at home is and 45.4% reported that a kerosene lamp is used. A total of 24.1% (418 girls) reported that they had electricity being used as the main source of lighting at home. In Kilifi and Makueni the most popular answer was the kerosene lamp, whereas in Kajiado electricity was reported as the main source of lighting from the majority of girls. In Uasin Gishu half of the girls (52.7%) said their household was using solar for lighting. It is interesting to note that Kilifi had the lowest percentage of answers for electricity. The table below displays the results.

Table 8: Source of lighting by County – girl questionnaire

Source of lighting	Kajiado (n=202) %	Makueni (n=414) %	Uasin Gishu (n=444) %	Kilifi (n=673) %	Total (n=1,734)
Kerosene lamp	27.7	42.9	22.3	67.8	45.4
Solar	14.4	32.3	52.7	15.6	29.0
Electricity	57.4	23.9	23.9	14.4	24.1
Other	0.5	1.0	1.1	2.2	1.4
Total	100.0	100.0	100.0	100.0	100.0

An indicator that can be used to establish poverty level is the annual household income. The household heads were asked again at the endline evaluation about the amount of money they earn in a year. Their responses are displayed in the table below; Uasin Gishu has the lowest percentage of people reporting no income (2.3%), while Makueni has 22.7% of respondents earning less than 12,000 KES per year. Kajiado and Kilifi have the highest percentage of household heads reporting no income (16.9% and 16.2% respectively) and Kilifi the lowest percentage of those earning less than 12,000 KES per year. Overall the vast majority (about 70%) of the households interviewed at endline in all regions earn less than $1.25 per day which corresponds to about 47,000 KES per year.

Table 9: Annual household income reported in HH surveys

Household head average annual income (in Kenya shillings)	Kajiado (n=77) %	Makueni (n=176) %	Uasin Gishu (n=177) %	Kilifi (n=265) %	Total (n=695) %
No income /unemployed	16.9	12.5	2.3	16.2	11.8
Less than 12,000	14.3	22.7	15.3	8.3	14.4
12,000 – 23,999	3.9	14.8	21.5	14.3	15.1
24,000 – 35,999	15.6	17.0	12.4	14.3	14.7
36,000 – 47,999	20.8	8.5	11.3	15.5	13.2
48,000 – 59,999	11.7	7.4	9.0	7.9	8.5
60,000 and above	16.9	17.0	28.2	23.4	22.3
Total	100.0	100.0	100.0	100.0	100.0

Further to the annual income we asked the household heads how much they spent on food per month. Slightly above 60% of the respondents said that they spent more than 4,000 KES on food. These findings are displayed in the table below.

Table 10: Monthly household spend on food – HH surveys

Monthly spend on food (in Kenya shillings)	Frequency	Percentage %	Cumulative percentage %
Up to 800	14	2	2.0
801 – 2,000	65	9.4	11.4
2,001 – 2,800	50	7.2	18.6
2,801 – 4,000	145	20.9	39.4
4,000 and above	421	60.6	100.0
Total	695	100	

We asked the girls how many meals the get in day and to this 74.5% said that they get three meals with only 2.8% saying that they only get a meal in a day. This is shown in the table below.

Table 11: Number of meals per day – girl questionnaire

Number of meals per day	Frequency	Percentage %	Cumulative percentage %
One meal	49	2.8	2.8
Two meals	325	18.7	21.6
Three meals	1,291	74.5	96.0
More than 3 meals	69	4.0	100.0
Total	1,734	100.0	

We also sought to find out from the household heads how much they spent on the education of their children including what items they actually paid for to cater for the education. The table below presents the results. The majority of the parents (60.2%) spend 500-1,999 KES for education which is a considerable proportion of their annual income.

Table 12: Annual education expenses – household survey

Annual education expenses (in Kenya shillings)	Frequency	Percentage %	Cumulative percentage %
Less than 500	32	4.6	4.6
500-999	156	22.4	27.1
1,000-1,999	263	37.8	64.9
2,000 and above	237	34.1	99.0
Gets support from CSO/CBO/CDF/FBO	3	0.4	99.4
Other	4	0.6	100.0
Total	695	100.0	

The items that were paid for included PTA teachers and other non-governmental staff (84.9%), exam fees (91.2%), books (18.3%), school activities (24.9%) and other costs like electricity and water bills, watchman and cook (9.4%).

We also sought to know from the girls whether their household owned some specific items like television, motorbike, bicycle etc. As shown in the table below, more than 50% of the households owned a radio and almost all (95.5%) owned a mobile phone. Only 2.0% of the households were reported to own a computer and only 59 of the girls (3.5%) that their households owned none of the items.

Table 13: Item ownership – girl questionnaire

Item ownership	Frequency	Percentage %
Radio	925	53.3
Television	411	23.7
Motorbike	328	18.9
Mobile phone	1,644	94.8
Bicycle	525	30.3
Computer	36	2.1
None	59	3.4

We further asked the girls how many people lived in their households and how many of those are their siblings. Table 14 and Table 15 below display the results. More than 50% of the households have between 5 and 8 occupants with only 6.9% having 2 or 3 occupants.

Table 14: Number of people living in the household – girl questionnaire

Number of people in the household	Frequency	Percentage %	Cumulative percentage %
1-2	39	2.3	2.3
3	79	4.6	6.9
4	204	11.8	18.7
5	281	16.3	35.0
6	311	18.0	53.1
7	249	14.4	67.5
8	181	10.5	78.0
9	124	7.2	85.2
10	78	4.5	89.7
11	62	3.6	93.3
12	51	3.0	96.3
13-35	64	3.7	100.0
Total	1,723	100.0	

63.6% of the 1,723 girls who responded to this question reported that 2-5 of those who lived in their households were their siblings.

Table 15: Number of siblings in the household – girl questionnaire

Number of siblings in the household	Frequency	Percentage %	Cumulative percentage %
0	129	7.5	7.5
1	213	12.4	19.8
2	307	17.8	37.7
3	331	19.2	56.9
4	255	14.8	71.7
5	202	11.7	83.4
6	123	7.1	90.5
7	73	4.2	94.8
8	36	2.1	96.9
9-14	54	3.1	100.0
Total	1,723	100.0	

Lastly, we asked the girls what responsibilities they have at home and how often. The table below shows that the vast majority of the girls (98.4%) are expected to do house work while a small percentage of girls is working in the farm/looking after the cattle or working outside the house (17.1% and 10.9% respectively). 60.5% of the girls said that these are responsibilities that they have all the time, while 36.7% during weekends and holidays.

Table 16: Responsibilities at home – girl questionnaire

Responsibilities at home	Frequency	Percentage %
House work	1,707	98.4
Caring for family members	189	10.9
Helping in the farm work/looking after cattle	297	17.1
Work outside the home	84	4.8

As an indication of how well girls in these communities were reached, during the endline evaluation we asked the girls and teachers about access to the ICT lab for Group A and C schools. 92% of the teachers in Group A and C schools who were interviewed reported that all the girls in these schools had access to the ICT lab. When we asked the girls, the vast majority (97.5% for Group A and 97.1% for Group C) responded that they personally use the computers in the ICT lab. On the frequency of the sessions, 56.2% of the girls said they have 2-3 sessions in the lab per week and 38.6% one session per week. These sessions last 30-40 min on average according to 75.2% of the girls that responded. The answers from Group A and C on these questions are very similar and are presented in Table 17 and Table 18.

Table 17: Frequency of lab sessions – girl questionnaire

Frequency of lab sessions	Group A (n=459) %	Group C (n=440) %	Total (n=899) %
Once per week	34.6	42.7	38.6
2-3 times per week	59.7	52.5	56.2
More than 3 times per week	5.7	4.8	5.2
Total	100.0	100.0	100.0

Table 18: Duration of lab sessions – girl questionnaire

Duration of lab sessions	Group A (n=459) %	Group C (n=440) %	Total (n=899) %
Less than 20 min	1.7	0.9	1.3
20-30 min	7.4	1.4	4.4
30-40 min	71.9	78.6	75.2
More than 40 min	9.6	13.2	11.3
Don't know	9.4	5.9	7.7
Total	100.0	100.0	100.0

Further to the use of the ICT lab, we asked about the whole class teaching that takes place in the intervention schools. 81.9% teachers from the intervention schools reported that all girls had access to whole class learning. On the same topic, 84.9% of the 1,396 girls interviewed in intervention schools reported that the teachers in the school use the projector and laptop for whole class teaching. When asked if they personally attend such whole class sessions, 85.4% of the girls who answered responded positively. As shown in Table 19, 91.2% of Group B girls attend whole class sessions while the percentage for the other groups is lower. We further asked the girls who said they attend whole class sessions about their frequency and overall 84.4% of them have 1-3 such sessions per week.

Table 19: Girls who report they attend whole class sessions – girl questionnaire

Girls saying that the attend whole class sessions	Group A (n=385) %	Group B (n=408) %	Group C (n=382) %	Total (n=1,175) %
Yes	78.4	91.2	86.1	85.4
No	21.6	8.8	13.9	14.6
Total	100.0	100.0	100.0	100.0

Table 20: Frequency of whole class sessions – girl questionnaire

Frequency of whole class sessions	Group A (n=302) %	Group B (n=372) %	Group C (n=329) %	Total (n=1,003) %
A few times per month	15.9	8.1	12.8	12.0
Once per week	46.4	43.5	53.5	47.7
2-3 times per week	36.1	43.0	30.4	36.8
More than 3 times per week	1.7	5.4	3.3	3.6
Total	100.0	100.0	100.0	100.0

When the girls attending intervention schools were asked if there is a child club in their school, 44.3% responded positively, 28.0% negatively and 27.7% didn't know. From the girls that said there is a child club in their school, 53.6% reported they attend the child club sessions. In Groups A and C about 56% of the girls interviewed attend the child clubs whereas in Group B the percentage drops to 46.4%. The vast majority of these girls (90.6%) attend 1-3 child clubs sessions per week as presented in Table 22.

Table 21: Girls who report they attend child club sessions – girl questionnaire

Girls saying that the attend child club sessions	Group A (n=217) %	Group B (n=192) %	Group C (n=209) %	Total (n=618) %
Yes	56.7	46.4	56.9	53.6
No	43.3	53.6	43.1	46.4
Total	100.0	100.0	100.0	100.0

Table 22: Frequency of child club sessions – girl questionnaire

Frequency of child club sessions	Group A (n=123) %	Group B (n=89) %	Group C (n=119) %	Total (n=331) %
Once per week	49.6	51.7	48.7	49.8
2-3 times per week	39.8	39.3	42.9	40.8
More than 3 times per week	8.1	5.6	5.0	6.3
Other	2.4	3.4	3.4	3.0
Total	100.0	100.0	100.0	100.0

2.2 What impact has the project had on marginalised girls' learning?

2.2.1 What impact has the project had on literacy outcomes?

i)   Methodology and design

The literacy tests at baseline and endline were administered in the evaluation schools to the same cohort of girls. The cohort was in Standard 3 at baseline and Standard 6 at endline. As already mentioned in this report, attrition rates were high; of the initial 680 students that sat the baseline literacy test, 349 also completed the endline test.

The literacy tests were specifically designed for the project and were delivered in English. The baseline test consisted of three sets of pictures/stories accompanied by comprehension questions and a reading passage of 100 words. The comprehension questions were equally weighted with 1 mark each. The girls were asked to read out loud the reading passage while the research assistants took note of how many words were read correctly in 1 minute (WPM). For the reading part, the WPM read was translated into a score according to Table 23.

Table 23: Marking scheme for reading passage in baseline and endline test

Baseline test		Endline test	
WPM	Mark awarded	WPM	Mark awarded
100-95	12	120-179	16
94-90	11	119-115	15
89-85	10	114-110	14
84-80	9	109-105	13
79-75	8	104-100	12
74-70	7	99-95	11
69-65	6	94-90	10
64-60	5	89-85	9
59-55	4	84-80	8
54-50	3	79-75	7
49-45	2	74-70	6
44-1	1	69-65	5
0	0	64-60	4
		59-50	3
		49-40	2
		39-1	1
		0	0

The endline test was an extended version of the baseline test. Piloting of two endline test versions with a small number of Standard 5 students indicated that changes would be required to minimise possible ceiling effects. In total, the endline test consisted of 3 sets of pictures/stories with comprehension questions and a reading passage of 179 words. In addition, the endline test included 5 comprehension questions on the reading passage. The number of marks for each topic tested at baseline and endline is shown in Table 24 with all comprehension questions being allocated 1 mark each.

Table 24: Literacy topics tested at baseline and endline

Topic	Marks at endline	Marks at baseline
Comprehension questions on pictures/story read	19	8
Reading passage	16	12
Comprehension questions on reading passage	5	N/A
Total	40	20

The suitable approach to the analysis was determined by two main challenges relating to attrition and replacement of students taking the tests in both the baseline and endline. The attrition rates were both very high for the control and treatment group (49% and 43% respectively) which extremely limits the likelihood of any analysis showing a statistically significant change between the treatment and the control group. In addition to high attrition rates, the analysis of the learning scores of re-contacted, lost and substitute girls revealed two key findings:

- Lost girls were similarly less skilled than re-contacted girls at baseline for both treatment and the control group;
- Substitute girls were less skilled than re-contacted girls at the endline. This skill level was found to be notably lower in the treatment group than in the control group.

These findings suggest both an attrition bias and a bias between the treatment and control group within this attrition. For this reason a cohort regression methodology was chosen over a cross-sectional approach.

Since the attrition rate was so high and resulted in an attrition bias, leading to a cohort regression being chosen, this also impacted in how the comparison between intervention and control groups is evaluated. By carrying out power calculations we found that the sample sizes of the re-contacted students were too low and therefore insufficient to demonstrate differences between the intervention Groups A, B, C against D but were sufficient to demonstrate differences by pooling the interventions together against the control group. Therefore, the whole sample was used in the cohort regression and individual intervention impact was evaluated through the use of dummy control variables.

Further evaluation into the sample, specifically the composition across the counties, revealed a potential bias between the treatment and control group within each county. In order to account for this county dummy variables are used to distinguish the impact against the control from for both the pooled group and the individual Groups (A, B and C) within the four counties.

Table 25: Sample composition across regions

County	Treatment	Control
Kajiado	14%	5%
Kilifi	44%	27%
Makueni	21%	51%
Uasin Gishu	22%	18%

In addition, to improve the precision of the estimations, the baseline scores were used as an additional control variable along with the counties dummy variables due to there being different baseline average scores across each intervention group.

Table 26: Learning scores at baseline

Group	Mean - Words per Minute		Mean - Numeracy standardised score	
	Treatment	Control	Treatment	Control
A	46.0	43.4	0.1	0.1
B	47.6	43.4	0.3	0.1
C	47.2	43.4	0.1	0.1

Following the findings above, in order to be able to compare the baseline and endline scores we standardised them by using the following methodology for every intervention group and test subject (maths and literacy) separately:

a) We started by filtering out non-returning students in the endline and anyone who did not take the examined test subject.

b) From the baseline scores, we calculated the average score and standard deviation using the sample of re-contacted girls at endline from the intervention group (A or B or C) and control group D.

c) We created a new variable that expressed the standardised baseline score by subtracting the average from the absolute score and dividing by the standard deviation.

d) Repeated steps a) and b) to standardise the endline scores.

Using the standardised scores, we carried out two separate regression analyses that are adjusted for school clustered errors:

1. Pooling the intervention groups as one treatment group and use control variables for counties and baseline scores;

2. Regression across the four evaluation groups with intervention dummy variables and control variables for counties and baseline score.

ii)   Findings

Figure 5 presents the distribution of students' scores in each test. At baseline, 1% of the students scored 0 marks and 0.3% 20 marks which was the maximum score. At endline, less than 1% of students scored 0 marks and no student scored full marks. This suggests that there are no ceiling or floor effects to be considered.
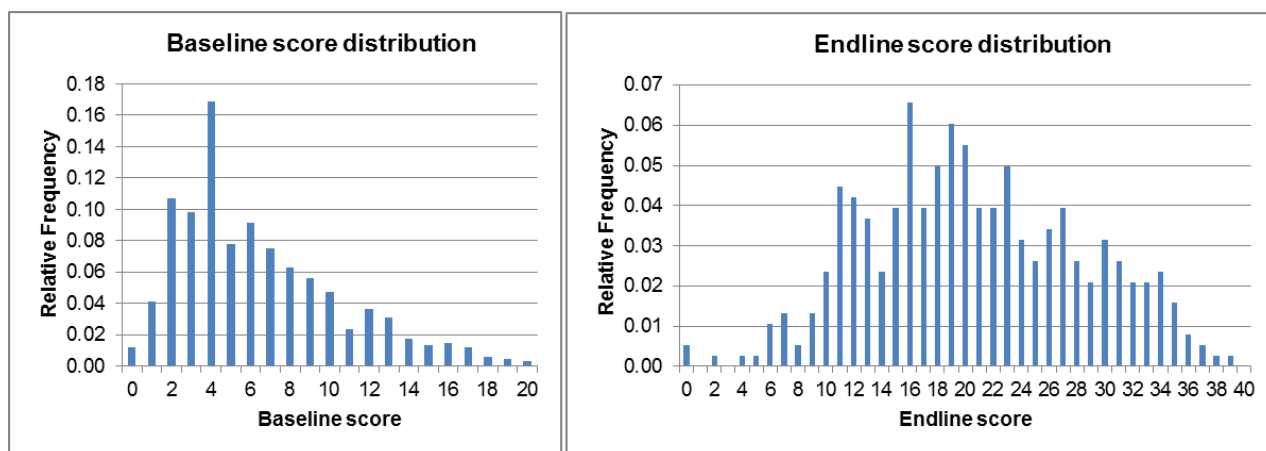
Figure 5: Distribution of baseline and endline literacy scores

The results of the two regression analyses for literacy scores can be seen in the tables below.

Analysis 1 (Literacy Scores): One Intervention Group with controls

The coefficient value for treatment indicates that, when controlling for the effects of County and initial baseline score, students in the pooled evaluation group of A, B and C had a negative standard deviation in literacy scores compared to the control group however this is not a statistically significant difference.

Table 27: Summary of project performance on literacy outcome – combined treatments

	Coefficient (Beta)	School Cluster P-Value
Intercept	1.07	0.00
Treatment	-0.08	0.54
County		
Kajiado	0.00	
Kilifi	-0.09	0.60
Makueni	-0.31	0.09
Uasin Gishu	-0.42	0.01
Baseline Score	-0.02	0.00
Observation	349	

Table 28: Summary of project performance on literacy outcome – pooled treatment group

Result	Details	Comments
Literacy result (Baseline to Endline)	**Beta** [estimated change in literacy score as result of intervention from regression or outcomes spreadsheet]: *-0.08* **p-value** [estimated statistical significance value from regression]**: *0.54*** **Target** [weighted average target for literacy from Outcomes Spreadsheet]: *0.40* **Performance** [as percentage, which should equal Beta divided by the Target]: *-20%*	The regression model for the pooled literacy data has no statistically significant relationship. The ANOVA for regression coefficients reveals that the pooled treatment group indicator variable with control variables are not statistically significant in predicting the change variable "Change Variable (EL-BL)" at a 95% confidence level.

The county dummy control variables, when controlling for the effects of the treatment group and baseline score, indicate that Kajiado had the highest performing students in literacy, whereas in comparison, Uasin Gishu students performed the worse. The output indicates that students in Kilifi scored lower that Kajiado but this was not a statically significance difference. Students in Makueni scored a lot less than Kajiado which is not statistically significant at the 5% confidence interval but is at a 10% confidence interval. Lastly, students in Uasin Gishu scored much lower than Kajiado which was significant at a 95% confidence interval. The final control variable, baseline score, indicates that students who performed higher initially were more likely to have a decreased position in their standardised score. The negative effect of the baseline score control variable is a statistically significant inclusion to the model.

Analysis 2 (Literacy Scores): Individual Intervention Group with controls

When controlling for the effects of county and initial baseline score, the coefficient values for the individual intervention all mirror the results of pooled group on intervention students. Whilst continuing

to control for the effects of county and baseline score, on an individual intervention level, group A students had a statistically insignificant negative difference compared to the control group. In addition, intervention B and C saw a decrease against the control group's standardised score but this was not a statistically significant difference.

Table 29: Summary of project performance on literacy outcome – individual treatments

	Coefficient (Beta)	School Cluster P-Value
Intercept	1.05	0.00
Group		
A	-0.04	0.83
B	-0.08	0.57
C	-0.12	0.44
D	0.00	
County		
Kajiado	0.00	
Kilifi	-0.07	0.70
Makueni	-0.29	0.14
Uasin Gishu	-0.39	0.04
Baseline Score	-0.02	0.00
Observation	349	

Table 30: Summary of project performance on literacy outcome – Group A

Result	Details	Comments
Literacy result (Baseline to Endline)	**Beta** [estimated change in literacy score as result of intervention from regression or outcomes spreadsheet]: *-0.04* **p-value** [estimated statistical significance value from regression]**: *0.83*** **Target** [weighted average target for literacy from Outcomes Spreadsheet]: *0.40* **Performance** [as percentage, which should equal Beta divided by the Target]: *-10%*	The regression model for intervention A in the individual intervention group data has no statistically significant relationship. The ANOVA for regression coefficients reveals that the pooled treatment group indicator variable with control variables are not statistically significant in predicting the change variable "Change Variable (EL-BL)" at a 95% confidence level.

Table 31: Summary of project performance on literacy outcome – Group B

Result	Details	Comments
Literacy result (Baseline to Endline)	**Beta** [estimated change in literacy score as result of intervention from regression or outcomes spreadsheet]: *-0.08* **p-value** [estimated statistical significance value from regression]**: *0.54*** **Target** [weighted average target for literacy from Outcomes Spreadsheet]: *0.40* **Performance** [as percentage, which should equal Beta divided by the Target]: *-20%*	The regression model for intervention B in the individual intervention group data has no statistically significant relationship. The ANOVA for regression coefficients reveals that the pooled treatment group indicator variable with control variables are not statistically significant in predicting the change variable "Change Variable (EL-BL)" at a 95% confidence level.

Table 32: Summary of project performance on literacy outcome – Group C

Result	Details	Comments
Literacy result (Baseline to Endline)	**Beta** [estimated change in literacy score as result of intervention from regression or outcomes spreadsheet]: *-0.12* **p-value** [estimated statistical significance value from regression]: *0.54* **Target** [weighted average target for literacy from Outcomes Spreadsheet]: *0.40* **Performance** [as percentage, which should equal Beta divided by the Target]: *-30%*	The regression model for intervention C in the individual intervention group data has no statistically significant relationship. The ANOVA for regression coefficients reveals that the pooled treatment group indicator variable with control variables are not statistically significant in predicting the change variable "Change Variable (EL-BL)" at a 95% confidence level.

When controlling the effects of the intervention groups and the initial baseline scores of the sample, the county dummy variables indicate that students in Kajiado performed the best in the literacy test, whereas Uasin Gishu performed significantly worse. The remaining county outputs indicate that students in Kilifi scored lower than Kajiado but this was not a statically significance difference, whilst students in Makueni scored a lot less than Kajiado but the difference is not statistically significant at the 5% or 10% confidence level. The final control variable, baseline score, indicates that students who performed higher initially were more likely to have a decrease position in their standardised score. The negative effect of the baseline score control variable is a statistically significant inclusion to the model.

Further to the total score analysis, we also analysed the unstandardised Words Per Minute (WPM) scores of the reading test that the girls completed and the results are presented in the tables below.

Analysis 1 (WPM): One Intervention Group with controls

The coefficient value for treatment indicates that, when controlling for the effects of County and initial baseline score, students in the pooled evaluation group of A, B and C had a small negative change by about 2 WPM on average when compared to the control group, however this is not a statistically significant difference.

Table 33: Summary of project performance on reading test – combined treatments

	Coefficient (Beta)	School Cluster P-Value
Intercept	69.61	0.00
Treatment	-2.10	0.54
County		
Kajiado	0.00	
Kilifi	-2.19	0.60
Makueni	-7.82	0.09
Uasin Gishu	-10.75	0.01
Baseline Score	-0.50	0.00
Observation	349	

Table 34: Summary of project performance on reading test – pooled treatment group

Result	Details	Comments
Reading test result (Baseline to Endline)	**Beta** [estimated change in literacy score as result of intervention from regression or outcomes spreadsheet]: **-2.1 (-0.08 SD)** **p-value** [estimated statistical significance value from regression]**: 0.54** **Target** [weighted average target for literacy from Outcomes Spreadsheet]: **0.40** **Performance** [as percentage, which should equal Beta divided by the Target]: **-20%**	The regression model for the pooled literacy data has no statistically significant relationship. The ANOVA for regression coefficients reveals that the pooled treatment group indicator variable with control variables are not statistically significant in predicting the change variable "Change Variable (EL-BL)" at a 95% confidence level.

The county dummy control variables, when controlling for the effects of the treatment group and baseline score, indicate that Kajiado had the highest performing students in literacy, whereas in comparison, Uasin Gishu students performed the worse. The output indicates that students in Kilifi scored about 2 WPM lower than Kajiado but this was not a statically significance difference. Students in Makueni scored nearly 8 WPM less than Kajiado which is not statistically significant at the 5% confidence interval but is at a 10% confidence interval. Lastly, students in Uasin Gishu scored nearly 11 WPM lower than Kajiado which was significant at a 95% confidence interval. The final control variable, baseline WPM, indicates that students who performed higher initially were more likely to have a higher decrease in WPM read in the endline test. The negative effect of the baseline WPM control variable is a statistically significant inclusion to the model.

Analysis 2 (WPM): Individual Intervention Group with controls

When controlling for the effects of county and initial baseline score, the coefficient values for the individual intervention all mirror the results of pooled group on intervention students. Whilst continuing to control for the effects of county and baseline score, on an individual intervention level, group A students had a statistically insignificant negative difference of just over 1 WPM compared to the control group. In addition, intervention B and C saw a decrease against the control group's WPM by about 2 and 3 WPM respectively but this was also not a statistically significant difference.

Table 35: Summary of project performance on reading test – individual treatments

	Coefficient (Beta)	School Cluster P-Value
Intercept	69.02	0.00
Group		
A	-1.03	0.83
B	-2.14	0.57
C	-3.16	0.44
D	0.00	
County		
Kajiado	0.00	
Kilifi	-1.77	0.70
Makueni	-7.29	0.14
Uasin Gishu	-9.99	0.04
Baseline Score	-0.50	0.00
Observation	349	

Table 36: Summary of project performance on reading test – Group A

Result	Details	Comments
Reading test result (Baseline to Endline)	**Beta** [estimated change in literacy score as result of intervention from regression or outcomes spreadsheet]: *-1.03 WPM (-0.04 SD)* **p-value** [estimated statistical significance value from regression]: *0.83* **Target** [weighted average target for literacy from Outcomes Spreadsheet]: **10.9 (0.4 SD)** **Performance** [as percentage, which should equal Beta divided by the Target]: **-9%**	Controlling for the effects of county and baseline score, for each change of one unit in control, the average change in the mean of **intervention A** is about *-1.03 WPM* However, there is no statistically significant linear difference of **intervention A** on **control D** detected.

Table 37: Summary of project performance on reading test – Group B

Result	Details	Comments
Reading test result (Baseline to Endline)	**Beta** [estimated change in literacy score as result of intervention from regression or outcomes spreadsheet]: *-2.14 WPM (-0.08 SD)* **p-value** [estimated statistical significance value from regression]: *0.57* **Target** [weighted average target for literacy from Outcomes Spreadsheet]: **10.9 (0.4 SD)** **Performance** [as percentage, which should equal Beta divided by the Target]: *-20%*	Controlling for the effects of county and baseline score, for or each change of one unit in control, the average change in the mean of **intervention B** is about *-2.14 WPM* However, there is no statistically significant linear difference of **intervention B** on **control D** detected.

Table 38: Summary of project performance on reading test – Group C

Result	Details	Comments
Reading test result (Baseline to Endline)	**Beta** [estimated change in literacy score as result of intervention from regression or outcomes spreadsheet]: *-3.16 WPM (-0.12 SD)* **p-value** [estimated statistical significance value from regression]: *0.44* **Target** [weighted average target for literacy from Outcomes Spreadsheet]: **10.9 (0.4 SD)** **Performance** [as percentage, which should equal Beta divided by the Target]: **-29%**	Controlling for the effects of county and baseline score, for or each change of one unit in control, the average change in the mean of **intervention C** is about *-3.16 WPM* However, there is no statistically significant difference of **intervention C** on **control D** detected.

When controlling the effects of the intervention groups and the initial baseline scores of the sample, the county dummy variables indicate that students in Kajiado performed the best in the WPM test, whereas Uasin Gishu student performed the least with about 10 WPM worse. The remaining county outputs indicate that students in Kilifi read less WPM than Kajiado by nearly 2 words but this was not a statically significance difference, whilst students in Makueni read about 7 words less than Kajiado but the difference is not statistically significant at the 5% or 10% confidence level. The final control variable, baseline WPM, indicates that students who performed higher initially were more likely to read less WPM. The negative effect of the baseline score control variable is a statistically significant inclusion to the model.

Project contribution

Figure 6 presents the regression graph displays the number of individual sessions our intervention A students spent viewing literacy content v endline test score, the summary figures tell us that 14.7% of the total variation in the endline test score can be explained by the number of sessions a student had on literacy content. On completion of an ANOVA (analysis of variation) table, which reports how well the regression equation fits the data, our p-value indicates that overall the regression model statistically significantly predicts the endline test score and therefore a good fit for the data. The regression equation in this case tells us that intervention A students are set to achieve a score of 18.3 if they did not have any sessions focusing on literacy content (statistically significant p-value<0.05). However, for every additional session our intervention A students focused on the literacy content of the learning platform their endline test score improved by a score increase of 0.4.

When looking at the relationship between number of students and endline test score for intervention C students (see Figure 7), the r-squared output indicates that the number of sessions did not explain very well the variation of endline test line scores with an r-squared of 0.1%. The resulting ANOVA and coefficient's table indicates that the regression model did not accurately predict the endline test score, and it is not statistically significant with a p-value of 0.469.

Figure 8 shows that 13.2% of the total variation in endline test scores can be explained by the time students spent on the literacy content. On completion of an ANOVA (analysis of variation) table, which reports how well the regression equation fits the data, our p-value indicates that overall the regression model statistically significantly predicts the endline test score and is therefore a good fit for the data. Regarding the regression equation, intervention A students are set to achieve a score of 18.6 if they had not spent any time on the learning platform's literacy content (statistically significant p-value<0.05). However, for every additional hour our intervention A students spent on the learning platform their endline test score improved by a score increase of 2.1.

The regression output in Figure 9 compared intervention C student's time on literacy content against their endline test score. The summary figures provided in the chart shows that the time on literacy content did not explain the variation of test line scores with an r-squared of >0.0%. The resulting ANOVA and coefficient's table indicates that the regression model did not predict the endline test score very well and is not statistically significant with a p-value of 0.958.
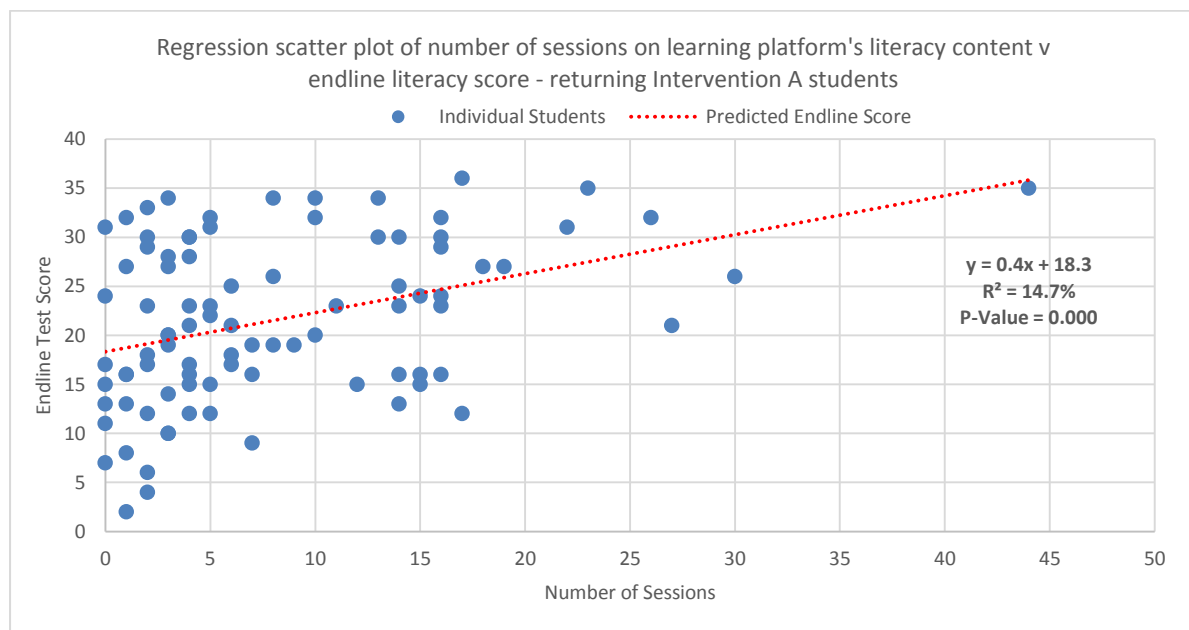
Figure 6: Scatterplot of number of literacy sessions on portal vs. endline literacy score – Group A
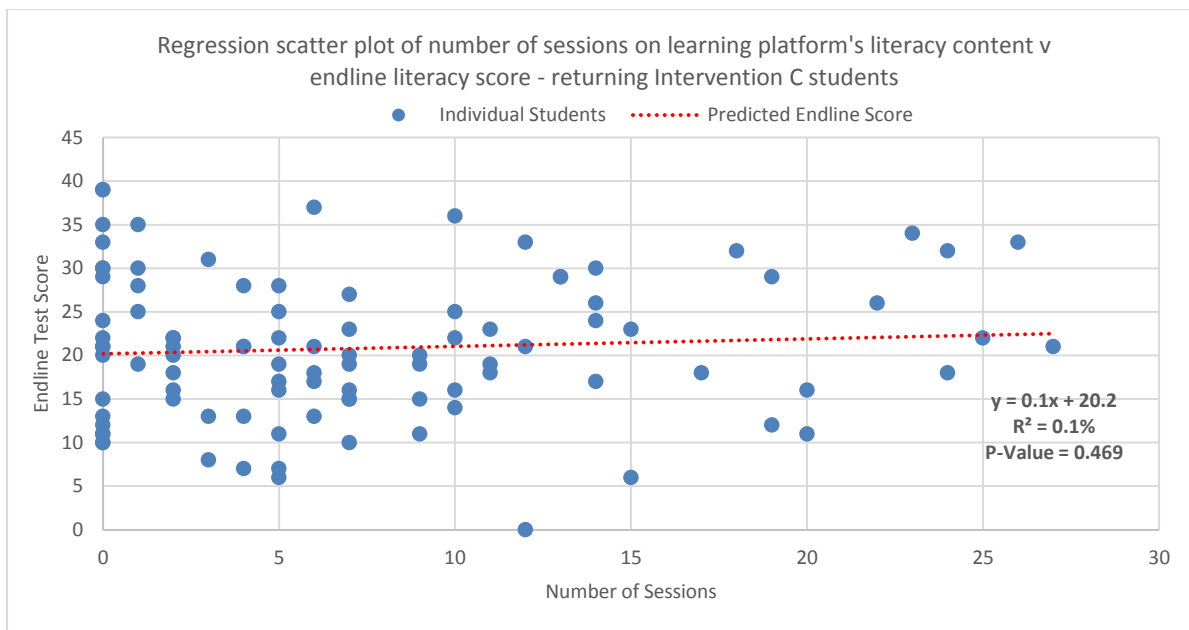
Figure 7: Scatterplot of number of literacy sessions on portal vs. endline literacy score – Group C
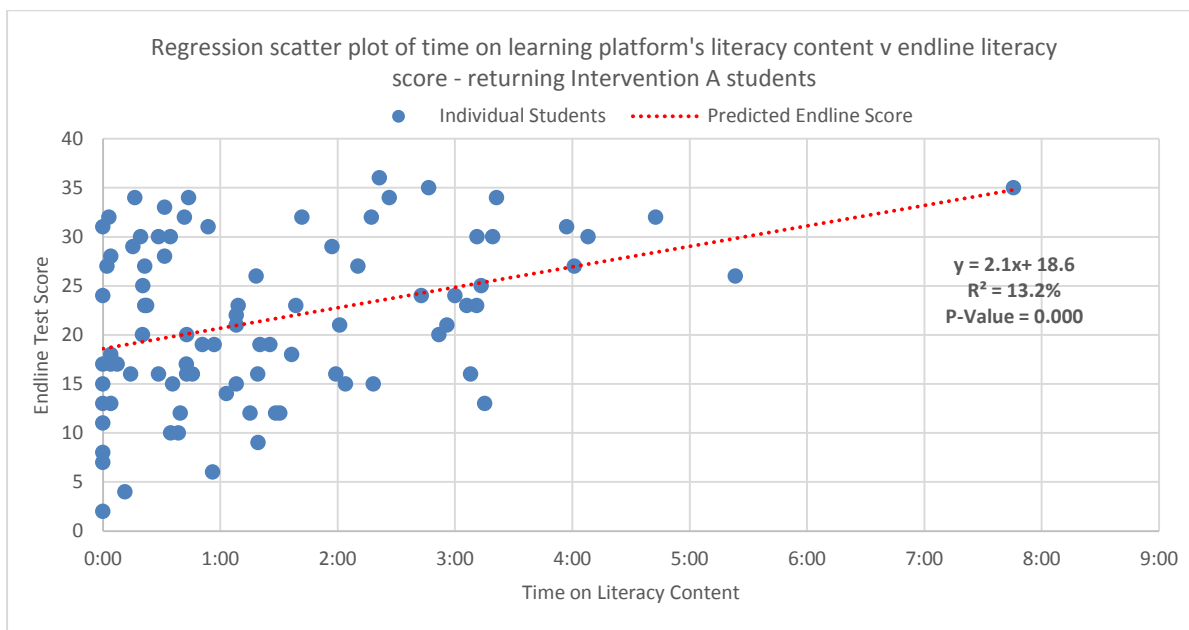
Figure 8: Scatterplot of total time spent on literacy content vs. endline literacy score – Group A

Regression scatter plot of time on learning platform's literacy content v endline literacy score - returning Intervention C students

y = -0.02x + 20.86
R² = 0.0%
P-Value = 0.958
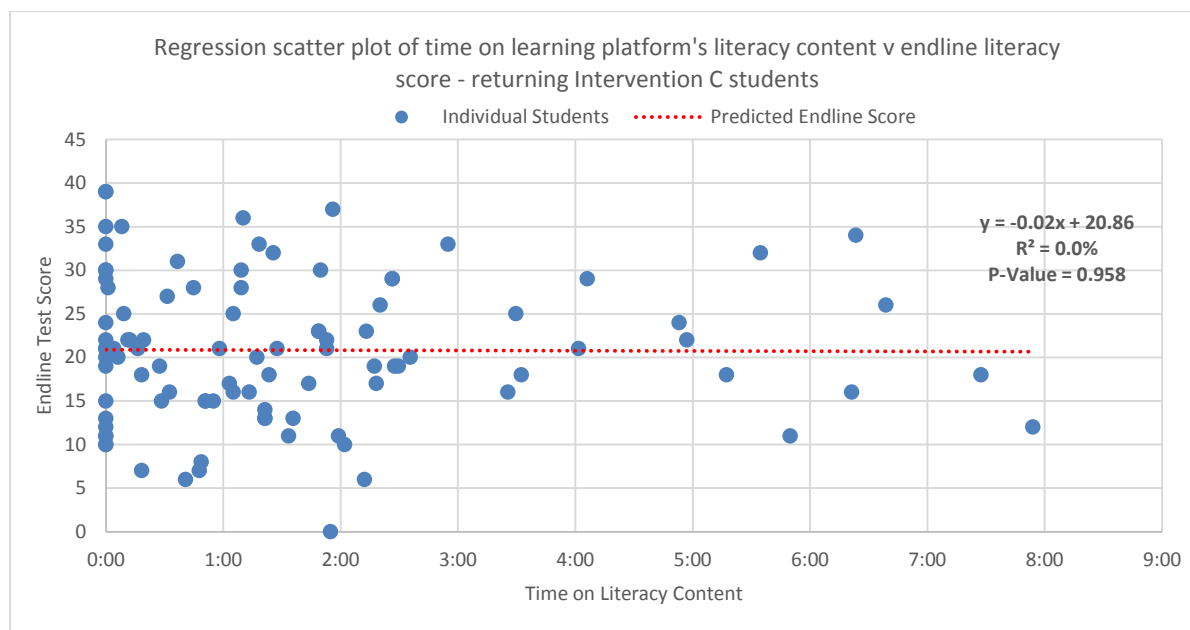
Figure 9: Scatterplot of total time spent on literacy content vs. endline literacy score – Group C

For both literacy and numeracy, school attendance has an effect on academic performance of students. From the interviews carried out with head teachers as part of the endline survey, 97.2% of the 36 headteachers said that it leads to a decline in grades. Teachers too were interviewed during the endline survey and when asked a similar question with 98.4% agreeing with the headteachers that absenteeism causes a drop in grades, while 48.4% said the absenteeism causes students to lose interest in education.

Asked what is done about students that miss school in order to help them catch up, 75.6% of the interviewed teachers said that they spend time to help teach them what was covered in their absence, while 18.8% said that the students were encouraged to read on their own. Only 2.4% of the teachers said that nothing was done to help those students. When asked the same question, 41.8% of the interviewed girls reported that the teachers spent time with them to teach what was covered in their absence and 52.8% that the teachers encouraged then to read on their own. 14.2% of the girls on the other hand said that nothing was done. This could mean that some of the students that are missing school for a few days are left to study on their own to cover their gaps which might cause them to fall further behind and underperform.

iii)   Literacy results in context of local / regional / national environment

The language spoken at home by the girls was found to have an effect on their literacy levels in English. Although this was not documented formally, feedback from the research assistants reported cases of girls that read English words (such as "time") in the reading passage the way they would read a word in their own mother tongue or language spoken at home.

As reported elsewhere in this report, there are different ethnic groups in the project regions; Maasai in Kajiado, Miji Kenda in Kilifi, Kamba in Makueni and Kalenjin in Uasin Gishu. Pronunciation in the different mother tongues across these communities affects the girls' ability in English differently. For example, a girl from Kajiado could probably read/pronounce a particular English word with ease compared to the girls from the other three Counties.

One of the factors that could have influenced the literacy results is that in some schools the use of the local dialects and even Kiswahili as language of communication. While administering the tests, it was found that although girls could read the passage, comprehension was a challenge as many of them did not answer the questions that referred to the passage.

Results from the reading passage analysis show that some of the girls read fewer words within the first minute but were able read more words if they were given more time. This could be attributed to the fact that these girls may not have been very confident in the presence of the enumerators who were unknown to them but were however able to regain their confidence after some time and read.

These factors can be said to have influenced the educational outcomes in literacy. The project would probably have achieved higher outcomes if, for example, use of the language of instruction as the language of communication by students in schools was enforced by the schools.

Project contribution

In addition to the learning outcomes captured through the learning assessments for the cohort standard we also analysed the 2016 KCPE exam results to evaluate the link between time spent on the learning resources and the students' performance.

Figure 10 below displays a positive linear trend between total time on the learning platform's literacy related content and the average 2016 Literacy KCPE results of students. Regression analysis indicates a statistical significant link ($p<0.05$) between total time on literacy related content that explains 15.9% of the total variation in Literacy KCPE results.
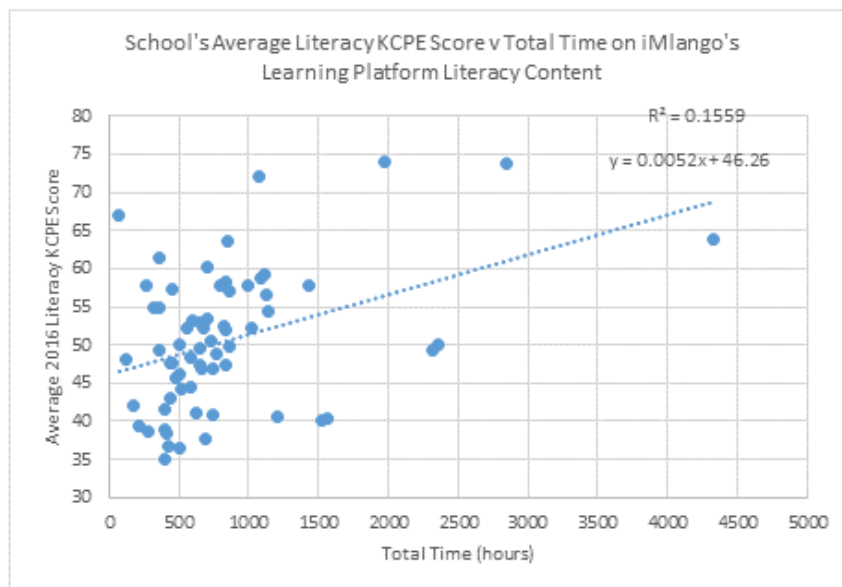
Figure 10: Scatterplot of 65 full intervention schools comparing the total hours spent on literacy content by students and the school's average 2016 Literacy KCPE score

2.2.2 What impact has the GEC had on numeracy outcomes?

i)   Methodology and design

The numeracy tests at baseline and endline were administered in the evaluation schools to the same cohort of girls. The cohort was in Standard 3 at baseline and Standard 6 at endline. As already mentioned in this report, attrition rates were high; of the initial 682 students that sat the baseline numeracy test, 384 also completed the endline test.

The numeracy tests were specifically designed for the project and were delivered in English. The baseline test consisted of 10 questions covering the topics of addition, subtraction, multiplication, division and worded problems. Topics were equally weighted; each topic was presented as 2 questions worth 1 mark each.

The endline test was an extended version of the baseline test. Piloting of two endline test versions with a small number of Standard 5 students indicated that extra questions would be required to minimise possible ceiling effects. In total, the endline test consisted of 32 questions. In addition to the topics of the baseline test, the endline test saw the inclusion of fractions and measurement (time) questions, to further distinguish higher ability candidates. The number of questions for each topic tested at baseline and endline is shown in Table 39, each question was allocated 1 mark.

Table 39: Numeracy topics tested at baseline and endline

Topic	Number of questions at endline	Number of questions at baseline
Addition	4	2
Subtraction	4	2
Multiplication	4	2
Division	4	2
Problem solving	12	2
Fractions	4	N/A
Total	32	10

To compare baseline and endline ability, we used the same methodology as for literacy scores i.e. normalising within intervention group pairs: A vs. D, B vs. D and C vs. D.

The numeracy test results were analysed with the same methodology as the literacy results. Attrition rates were high; 42% and 50% for the treatment and control groups respectively. Power calculations suggested that grouping the treatment groups together was required to draw statistically significant conclusions given the small sample size. Control variables were introduced for county (see Table 25) and baseline performance (see Table 26).

ii)   Findings

Figure 11 presents the distribution of students' scores in each test. At baseline, 1% of the students scored 0 marks and 5% 10 marks which was the maximum score. At endline, less than 1% of students scored 0 marks and no student scored full marks. This suggests that there is a possible ceiling effect at baseline, though we expect its impact on our results to be small. No analysis has been carried out to determine if reweighting topics at endline has impacted results.
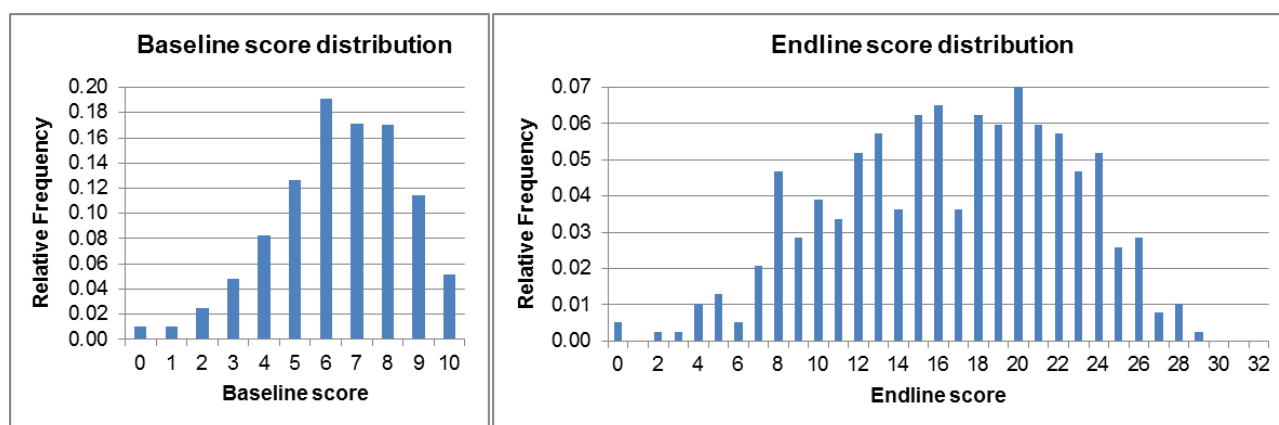
Figure 11: Distribution of baseline and endline numeracy scores

The results of the two regression analysis for literacy scores can be seen in the tables below.

Analysis 1 (Numeracy Scores): One Intervention Group with controls

Quantitatively, the combined treatment groups saw only marginal improvement when compared to the control group. This improvement was not statistically significant. There appears to be an inverse relationship between baseline performance and improvement, i.e. the smaller your score at baseline, the greater an improvement you would expect at endline.

Table 40: Summary of project performance on numeracy outcome – combined treatments

	Coefficient (Beta)	School Cluster P-Value
Intercept	0.40	0.08
Treatment	0.03	0.82
County		
Kajiado		
Kilifi	-0.12	0.59
Makueni	-0.44	0.06
Uasin Gishu	-0.66	0.01
Baseline Score	-0.70	0.00
Observation	384	

Table 41: Summary of project performance on numeracy outcome – pooled treatment group

Result	Details	Comments
Numeracy result (Baseline to Endline)	**Beta** [estimated change in numeracy score as result of intervention from regression or outcomes spreadsheet]: *0.03* **p-value** [estimated statistical significance value from regression]: *0.82* **Target** [weighted average target for numeracy from Outcomes Spreadsheet]:*0.40* **Performance** [as percentage, which should equal Beta divided by the Target]: *7.5%*	The ANOVA for regression coefficients reveals that intervention A indicator variable is not statistically significant in predicting the change variable "Change Variable (EL-BL)" at a 95% confidence level.

Students from Kajiado and Kilifi improved more than students from the other two counties. Makueni and Uasin Gishu students improved 0.44 and 0.66 fewer standardised scores respectively.

No further analysis was carried out to explore possible correlation between baseline score, county and the treatment groups.

Qualitative data from the household and school surveys suggests that teachers and students felt that the treatments had a positive to learning in numeracy

Analysis 2 (Numeracy Scores): Individual Intervention Group with Controls

Investigating the individual treatment groups, A and B saw an average increase in student attainment, while group C saw a small decrease compared to control students. These results were not statistically significant.

In the case of Group C, usage of individualised learning in maths was prohibitively low; on average students had just 9 minutes of usage each week during term time. In addition, further project analysis (see Section 2.4.1.1 projection contribution on logframe indicator 1.2) showed that Group C had a consistently smaller proportion of students meeting the recommended usage than Group A, which may go some way to explaining the difference in performance of the two groups.

The project contribution in the 'sub-group analysis' section below indicates that students who used personalised tutoring on Maths-Whizz for a greater amount of time, saw larger improvements in their endline test scores.

In the case of Group B, no data was collected to indicate how often Maths-Whizz was used for whole class teaching and whether the delivery was effective.

Table 42: Summary of project performance on numeracy outcome – individual treatments

	Coefficient (Beta)	School Cluster P-Value
Intercept	0.23	0.30
Group		
A	0.16	0.29
B	0.04	0.82
C	-0.09	0.63
D		
County		
Kajiado		
Kilifi	-0.05	0.81
Makueni	-0.37	0.10
Uasin Gishu	-0.56	0.02
Baseline Score	-0.65	0.00
Observation	384	

Table 43: Summary of project performance on numeracy outcome – Group A

Result	Details	Comments
Numeracy result (Baseline to Endline)	**Beta** [estimated change in numeracy score as result of intervention from regression or outcomes spreadsheet]: *0.16* **p-value** [estimated statistical significance value from regression]: *0.29* **Target** [weighted average target for numeracy from Outcomes Spreadsheet]:*0.40* **Performance** [as percentage, which should equal Beta divided by the Target]: **40%**	The ANOVA for regression coefficients reveals that Treatment A indicator variable is not statistically significant in predicting the change variable "Change Variable (EL-BL)" at a 95% confidence level.

Table 44: Summary of project performance on numeracy outcome – Group B

Result	Details	Comments
Numeracy result (Baseline to Endline)	**Beta** [estimated change in numeracy score as result of intervention from regression or outcomes spreadsheet]: *0.04* **p-value** [estimated statistical significance value from regression]: *0.82* **Target** [weighted average target for numeracy from Outcomes Spreadsheet]: *0.40* **Performance** [as percentage, which should equal Beta divided by the Target]: **10%**	The ANOVA for regression coefficients reveals that Treatment B indicator variable is not statistically significant in predicting the change variable "Change Variable (EL-BL)" at a 95% confidence level.

Table 45: Summary of project performance on numeracy outcome – Group C

Result	Details	Comments
Numeracy result (Baseline to Endline)	**Beta** [estimated change in numeracy score as result of intervention from regression or outcomes spreadsheet]: *-0.09* **p-value** [estimated statistical significance value from regression]**:** *0.63* **Target** [weighted average target for numeracy from Outcomes Spreadsheet]**:** *0.40* **Performance** [as percentage, which should equal Beta divided by the Target]: **-22.5%**	The ANOVA for regression coefficients reveals that the Treatment C indicator variable is not statistically significant in predicting the change variable "Change Variable (EL-BL)" at a 95% confidence level.

iii)   Sub-group analysis

Project contribution

Further analysis was carried out on the subset of the performance cohort with sustained exposure to Maths-Whizz, defined as an average weekly usage of at least 15 minutes. This usage threshold was selected ahead of the provisional threshold of 30 minutes (corresponding to Whizz's recommended usage for iMlango students) on account of the larger sample of students meeting the usage criteria, which makes the subsequent analysis more reliable. The same analysis is repeated for the sample of students with weekly usage above 30 minutes, with the caveat that the findings are not as reliable due to the smaller sample size.

Of the 189 cohort students from groups A and C that completed both the baseline and endline test, 161 students were identified as having completed their initial assessment on Maths-Whizz.

The main results are summarised in Table 46. Students with just 15 minutes of weekly usage advanced more than the group as a whole. The relatively large sample size of 40 students allows for more confidence in the reliability of the results. Groups A and C advanced more than the target 0.4 standard deviations, with statistical significance at the 10% and 15% levels respectively.

Table 46: Investigating cohort girls' performance that had used Maths-Whizz effectively

Sub-group	Beta	p-value	N
Group A, >= 30 minutes of average weekly usage	0.567	0.189	7
Group A, >= 15 minutes of average weekly usage	0.418	0.093	25
Group C, >= 30 minutes of average weekly usage	1.204	0.049	4
Group C, >= 15 minutes of average weekly usage	0.501	0.138	15

Students that had used Maths-Whizz for at least the recommended amount of time (30 minutes of weekly usage) advanced noticeably more than the group as a whole. Beyond general trends, these results should be interpreted with care due to a small sample of students meeting the recommended usage.

i)   Numeracy results in context of local / regional / national environment

Other than project contributions, no secondary data sources were analysed. Anecdotal evidence suggested that treatment students scored higher than expected in the mathematics part of KCPE examinations.

The baseline and endline tests were designed to be appropriate to the Standard 3 and Standard 6 respectively, the correct grade for the students sitting them.

As discussed in the previous section, the language of instruction does not correspond to most students' first language. This may have negatively influenced both students' test results and their learning during the project.

Many studies show strong correlation between numeracy and literacy results. From the analysis presented here we see an almost inverse relation between the literacy and maths improvement in the intervention groups. It is possible that with only limited time to spend on the digital resources, students advanced in the topic they focused on, but made no accelerated progress in the other.

Over the years it has been noted that girls perform better in certain subjects compared to boys. When announcing the KCPE results in December 2016, the Cabinet Secretary for Education noted that girls performed better than boys in language subjects (i.e. English, Kiswahili and Kenya Sign Language), while boys performed better than girls in Mathematics, Science and Social Studies & Religion. This could help explain the reason why tested girls performed better in English compared to Mathematics.

Project contribution

Figure 12 displays a positive linear trend between total time on the learning platform's maths lessons and the average 2016 Maths KCPE results of students. Regression analysis indicates a statistical significant link ($p<0.05$) between total time on maths content that explains 9.1% of the total variation in Maths KCPE results. When average attendance of the schools is also included as a predictor variable the model indicates a statistically significant relationship ($p<0.05$) between Maths KCPE Score and the variables Average Attendance and Total Time on Maths Content. This relationship explains 18.1% of the total variation in maths KCPE results indicating that both strong attendance and increased access to IT resources has a positive impact on the schools KCPE results.
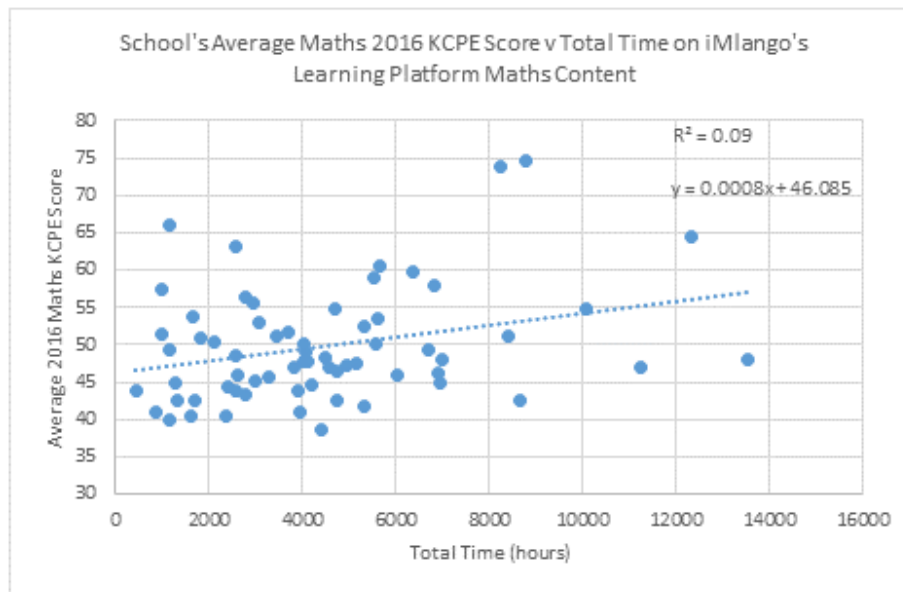
Figure 12: Scatterplot of 65 full intervention schools comparing the total hours spent on maths content by students and the school's average 2016 Maths KCPE score

2.3 What impact has the GEC had on enabling marginalised girls to be in school?

2.3.1 What effects has the GEC had on attendance?

i)   Methodology and design

The project measured attendance for all students in the intervention schools through the sQuid attendance monitoring system. In the evaluation control schools the project performed termly spot checks for the cohort standard. These termly spot checks captured data on attendance for the specific day for both boys and girls in the cohort standard. At the endline the external evaluator conducted spot checks in both the evaluation intervention and control groups for the cohort standard. Both at baseline and endline the household heads have been questioned about the attendance profile of their children that are attending school and the findings are provided below as supporting evidence.

Figure 13: Attendance smartcard and terminal

Throughout the project, schools have measured attendance daily on sQuid's digital attendance monitoring system. This has enabled real-time data reporting capabilities providing high reliability and insight in attendance patterns.

sQuid provides a contactless smartcard for students and an Android application (shown in Figure 13), able to record and monitor attendance. Once the teacher has taken attendance, the app stores the data locally until it communicates with the sQuid database to upload the secure records for the day. Each school is issued with Android attendance tablets (amount depends on the number of students) and every student is given a contactless iMlango card that they use to take attendance.

Every day the teachers hand out to students their cards that are kept in a central location at the school to avoid cases of loss. Each student taps the attendance smartcard on the attendance terminal which then records the card number, date and school ID therefore placing the student at that school for that particular day (see Figure 13).

As we show below, traditional sampling of attendance through spot checks and register records is very unreliable, and it is difficult to draw conclusions from such data. Throughout the programme, monitoring spot checks showed very poor data. One of iMlango's significant innovations has been the introduction of smartcard based electronic attendance in all intervention schools. We observed good usage of the attendance system and it is very likely that the data arising from the iMlango platform is far more reliable than any other data sources from these regions or these schools. The project contribution section of this report provides significant insights into the true profile of attendance in the schools.

The primary source used for attendance data for all students in Group A, B and C schools is the attendance monitoring system. As a secondary source, unannounced spot checks for all evaluation intervention schools were conducted termly by the project in-field team and annually by the external evaluator for all evaluation schools. This means that for the control schools the only source of data available is the spot check data. For the endline, attendance data was collected through the use of schools spot checks and school registers. This was conducted in a total of 127 evaluation treatment and control schools as shown in the table below. At endline only the attendance of class 6 pupils (both girls and boys) was assessed as they are the cohort we are tracking.

Table 47: Number of spot checks conducted at endline per County

County	Group A	Group B	Group C	Group D
Kajiado	6	3	3	2
Makueni	7	6	5	15
Uasin Gishu	7	10	9	7
Kilifi	11	13	14	9
Total	31	32	31	33

Being the beginning of the year and therefore a new school term, there were a few challenges with in collection of attendance data. In some cases girls had transferred into the school and their names had not been included in the attendance register, some teachers had been transferred to other schools and there was no replacement yet, and some teachers were away, each of these resulting in no attendance register. In some classes, even with teacher present, the attendance register had not been updated for the day. In such cases there was not data from the attendance register that could be used to verify data obtained from head count.

It was found that 54 (24.5%) of the 220 classes in which a spot check was conducted did not have their registers updated. For this reason, when measuring attendance levels, it would be recommended that data from head count is given the first priority.

For the attendance data presented below on the evaluation cohort of girls (Figure 14-Figure 16), the entire standard is used at both baseline and endline. This means that the data does not refer to the same group of girls, as the endline data set has accounted for dropouts and enrolment since baseline. There were 8,554 active standard 4 girls at baseline. Of these, 7,117 (83%) were still active at endline, with an attrition rate of 17%. A further 2305 students joined between baseline and endline (including the 10 new schools in Uasin Gishu), making for an endline total of 9,422 (10% more than at baseline).

There is little variation between the cohort's endline average attendance **without** newly transacting pupils (i.e. 7,117 girls at endline: the 8,554 at baseline, with those dropped out), and **with** newly transacting girls (i.e. the data used in Table 49-Table 51 and Figure 14). The variation in Group A schools is -0.3%, in Group B +0.1% and in Group C -1.1%.

Table 48: Number of classes in which the register was updated

Whether register was updated	Frequency	Percentage %
Yes	166	75.5%
No	54	24.5%
Total	220	100.0%

ii)   Findings

Attendance data is generated daily via sQuid's attendance monitoring system, which has been integrated into every school's lesson plans. The attendance system data was intended to develop greater understanding of the drivers behind absenteeism.

As the charts below indicate, the project has not positively impacted upon attendance levels. It is worth mentioning that raising attendance levels, other than through the stipend, was never tied to the ToC nor the project's logframe. The data sets have begun to show the highly varied, complex nature of pupils' attendance profiles across the schools. From the October 2016 termly assessment report, 65.2% of girls interviewed responded that sickness was the main reason for absenteeism; 22.4% of girls said that lack of school fees or uniform/materials was the main reason; 8.7% said helping out with chores at home.

The stipend's success, particularly among recipients that had low (<70%) attendance, shows that targeting the financial barrier is effective in increasing pupils' attendance. As the stipend is less effective at raising attendance levels of pupils who already have good attendance (>90%), lack of

financial capacity is not the only barrier to attending school regularly and issues such as illness and the need to help with home duties are still prevalent.

Table 49: Summary of project performance on attendance outcome – Group A

Result	Details	Comments
Attendance result (Baseline to Endline)	**Source:** Electronic attendance monitoring data for intervention schools and headcount spot check data for evaluation control schools **A: Weighted average Treatment group attendance rate at Baseline:** 80.1% **B: Weighted average Control group attendance rate at Baseline:** N/A **C: Weighted average Treatment group attendance rate at Endline:** 81.1% **D: Weighted average Control group attendance rate at Endline:** N/A **E: Difference-in-difference attendance change at Endline (C-A)-(D-B):** N/A	Due to the poor register data in the control schools the comparison between intervention and control schools is not meaningful.

Table 50: Summary of project performance on attendance outcome – Group B

Result	Details	Comments
Attendance result (Baseline to Endline)	**Source:** Electronic attendance monitoring data for intervention schools and headcount spot check data for evaluation control schools **A: Weighted average Treatment group attendance rate at Baseline:** 78.8% **B: Weighted average Control group attendance rate at Baseline:** N/A **C: Weighted average Treatment group attendance rate at Endline:** 79.4% **D: Weighted average Control group attendance rate at Endline:** N/A **E: Difference-in-difference attendance change at Endline (C-A)-(D-B):** N/A	Due to the poor register data in the control schools the comparison between intervention and control schools is not meaningful.

Table 51: Summary of project performance on attendance outcome – Group C

Result	Details	Comments
Attendance result (Baseline to Endline)	**Source:** Electronic attendance monitoring data for intervention schools and headcount spot check data for evaluation control schools **A: Weighted average Treatment group attendance rate at Baseline:** 77.4% **B: Weighted average Control group attendance rate at Baseline:** N/A **C: Weighted average Treatment group attendance rate at Endline:** 74.2% **D: Weighted average Control group attendance rate at Endline:** N/A **E: Difference-in-difference attendance change at Endline (C-A)-(D-B):** N/A	Due to the poor register data in the control schools the comparison between intervention and control schools is not meaningful.

Project contribution

Attendance data for the intervention groups was captured on a daily basis through the sQuid attendance monitoring system. Tracking pupils' attendance is exclusively for monitoring purposes, with the aim of finding out attendance levels over a substantial period, the reasons behind these levels, and what might be done to improve them. Therefore, attendance levels have not been one of the project's measured outputs. To ensure we are looking at a sufficient number of days we review the average normalised attendance rates over the duration of school terms. We have assumed the following periods for baseline and endline attendance:

- Baseline: 29th April – 19th June 2015
- Endline: 5th September – 19th November 2016

We should note that the baseline and endline periods correspond to different terms in the school year

which affects the level of attendance.

In Figure 14 we are looking at the average attendance profile of the girls in the cohort standard across the school years of 2015 and 2016. Girls in Group C seem to have lower average attendance in every term compared to Group A and B. Average attendance in Term 1 2016 is lower than the other terms which possibly reflects that activities in the school take a few weeks to resume as the new school year begins and registration of new students is completed.

Figure 15 compares the average normalised attendance across all students between baseline and endline for every intervention group. All Groups at endline have similar average attendance rates that are slightly decreased since baseline.

There are three factors that have affected attendance from baseline to endline. The nationwide drought has made regular attendance harder for some pupils, particularly those in Kilifi where the drought has been felt most acutely. We've observed a gradual decline in attendance throughout 2016, correlating with the worsening drought.

Endline occurred in third term (vs. second term for baseline), which is highly disrupted due to KCPE examinations. Even though it is only standard 8 that sits the examinations, the whole school experiences disruptions for most of October - as well as the exam period in November. Therefore, we would expect attendance levels to be slightly lower than in other terms.

The progression of the cohort standard from 4 to 6 also likely had a negative impact on attendance levels. As discussed below in greater detail (see Figure 17), standards 5-8 have slightly lower attendance levels compared to Standards 1-4, due to adolescence and the difficulties associated with it.

In Figure 16 we present the average normalised attendance by intervention, split by gender, for baseline and endline. The endline attendance is dropping slightly since baseline for both boys and girls.
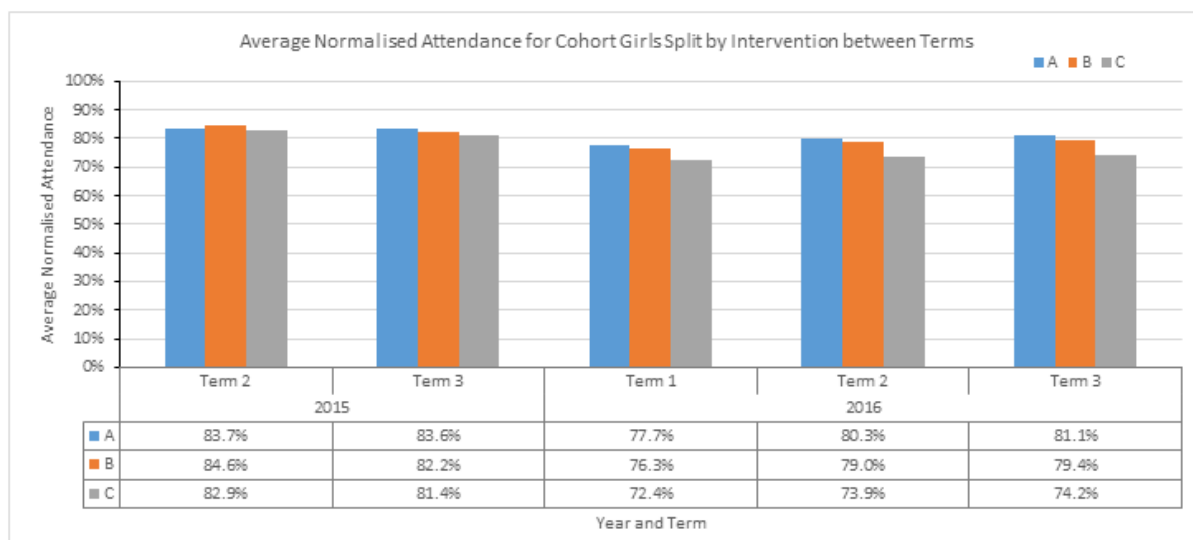
Figure 14: Average normalised attendance for girls in the cohort standard by group
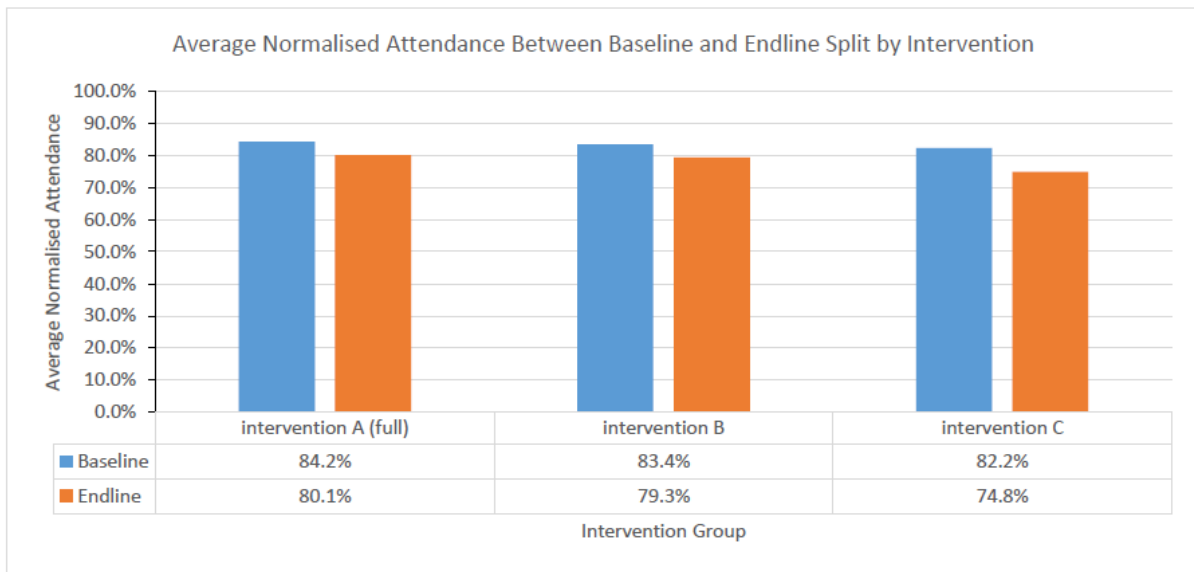
Figure 15: Average normalised attendance across all Standards by intervention for baseline and endline
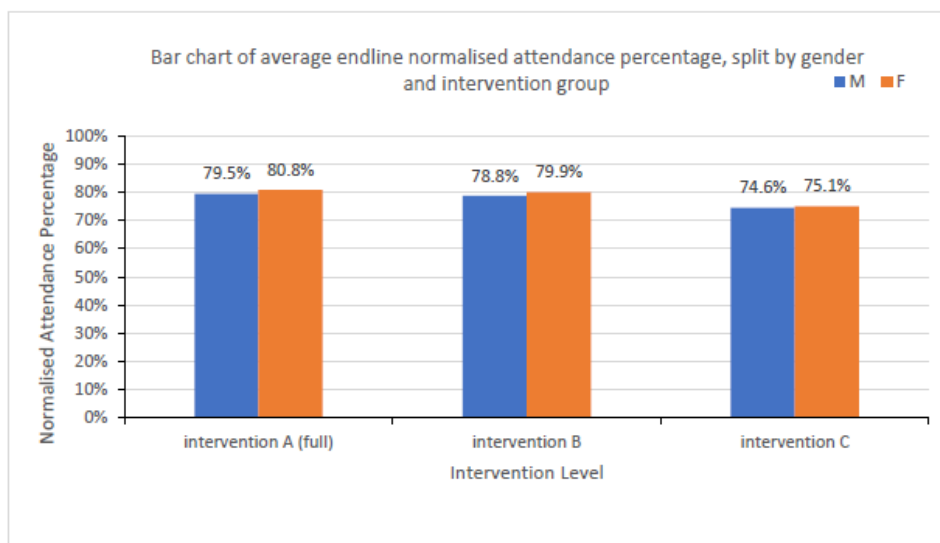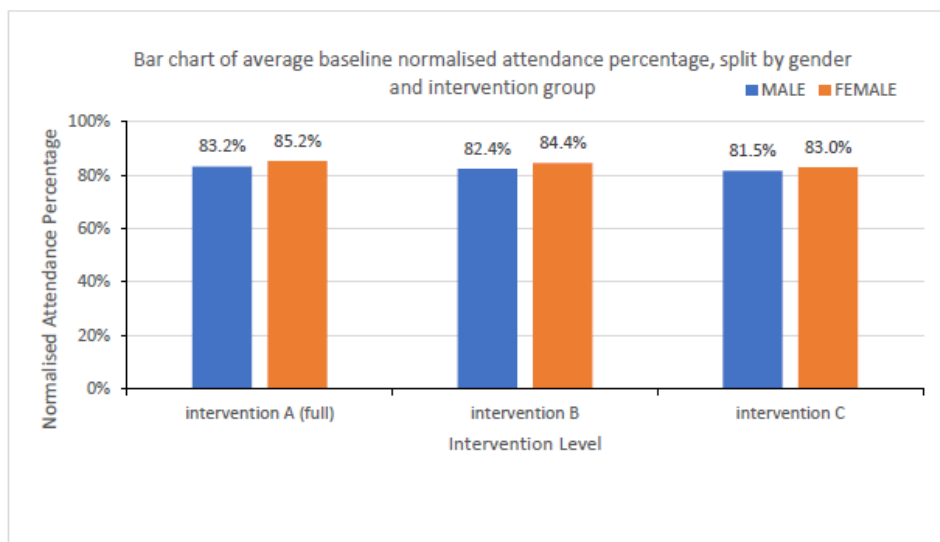
Figure 16: Average normalised attendance across all Standards by intervention, split by gender, for baseline and endline

In the household survey we asked the household heads who had children attending the iMlango schools how many days their daughters had missed school in the past one month. For the parents that had more than one child we asked the attendance for each of them separately. In total, the household heads provided data for 863 daughters and the analysis is presented in Table 52.

Table 52: Girl attendance pattern – household survey

Attendance pattern in the last month	Group A (n=207) %	Group B (n=255) %	Group C (n=187) %	Group D (n=214) %	Total (n=863) %
Attended every day	70.5	63.5	72.7	75.7	70.2
Missed < 4 days	21.7	21.6	16.6	14.5	18.8
Missed 4-10 days	5.3	12.9	8.6	7.5	8.8
Missed > 10 days	2.4	2.0	2.1	2.3	2.2
Total	100.0	100.0	100.0	100.0	100.0

In total 70.2% of the household head daughters were reported to have attended school every day in the month prior to the data collection. Group B schools seem to have the lowest proportion of girls that attending every day (63.5) with Group D having the highest (75.7%). 21% of the girls in Group B and C were reported to have missed up to 4 days in a month, whereas 2% across all groups missed more than 10 days.

From the 135 girls that completed the perception scorecard at endline, 71.1% stated that their parents/guardians almost always encouraged them to attend school and complete their education, while 25.9% reported that their parents/guardians frequently encouraged them. The importance of girl education and need for girls to attend school was echoed in the FGDs where some of the participants viewed education as a right enshrined in the Kenyan Constitution:

> *"I think it is important for children to go to school because it is one of the requirements in our constitution that any child who has reached school going age to go to school. Secondly, learning will make the child learn, have an open mind and be able to benefit them in future." (Endline FGD Fathers, Sigowet Primary)*

Some parents also perceived education as important in shaping their children's character and enhancing their status in society and thus they saw the need to ensure that children attended school:

> *"I am never happy when they miss school even a day so that when they grow up they will be independent and become teachers, engineers. I will be happy to see them succeed and become important people in society. Those who do not go to school engage in bad activities like becoming thieves and any other bad activities and finally they are killed. Such people do not lead good lives like those who go to school. Education is important and those who are educated are respected yeah." (Endline FGD Older women, Sambut Primary)*

The girls in the intervention schools who were interviewed at endline using the girl questionnaire were asked 'what difference the use of digital learning tools has made in their perception of school'. 49% said that they were more interested in attending school and 54.5% said they found school more exciting. While this cannot be interpreted to mean that the girls do not miss school, it is an indicator that they may not want to miss school. This was supported by the views from mothers who participated in the FGDs:

> *"And even they help children a lot because a lot of children do not want to miss school because of these computers and are adamant not to miss because of that swiping, because if they swipe they tell us that you will know that they are in class when you are in Nairobi and even when they miss, you will still from there so many don't to miss school and they have really helped us a lot." (Endline FGD Mothers, Kiambani Primary)*

"Children usually attend school every day and the child tells you, "Mum I can't miss going to school because if I get late, the computer will show that I was not in school? It is not like in the olden days when children used to hide in the bushes, you now that if its 8 a.m., you know you have to swipe in the computer, so it's a must by 8 a.m. to be in class so that is something that makes them not to be late for school as they do it daily." (Endline FGD Mothers, Kiambani Primary)

iii)   Sub-group analysis

Project contribution

Figure 17 shows the average normalised attendance per standard during the baseline and endline period (as mentioned previously baseline and endline periods correspond to different terms). The figure shows that there is a drop in average attendance levels after Standard 4. This correlates with pupils approaching adolescence age, where barriers to regular attendance become more pronounced. These issues can be broadly divided into two categories:

Economic factors:

- Both boys and girls are more likely to be able to financially support their parents once they're no longer children (i.e. reach adolescence). This is a particularly widespread problem amongst poor households: there is an opportunity cost of sending the child to school.
- In Kajiado, sometimes boys migrate with their father and the herds to seek pasture. Not only does this disrupt boys' attendance, but also girls', as they often have to assist their mother with household duties and income generation in their fathers'/brothers' absence.

Social/cultural factors:

- Girls often lack sanitary pads once they reach adolescence. There is a government initiative to provide for girls, but it's sporadically applied and rarely enough. This can lead to monthly absences for girls who don't have the finances to buy pads.
- Girls can be deemed ready for marriage once they reach adolescence - an especially widespread problem in Kajiado (amongst the Maasai). Early pregnancy also becomes a potential pitfall for girls, and problems associated with FGM (still widely practiced in Maasai land).
- Adolescent peer pressure can be more detrimental to attendance, such as through regular truancy and rejection of school (exacerbated by a difficult home situation). Boys, especially within informal settlements, can succumb to drug/alcohol abuse and crime.
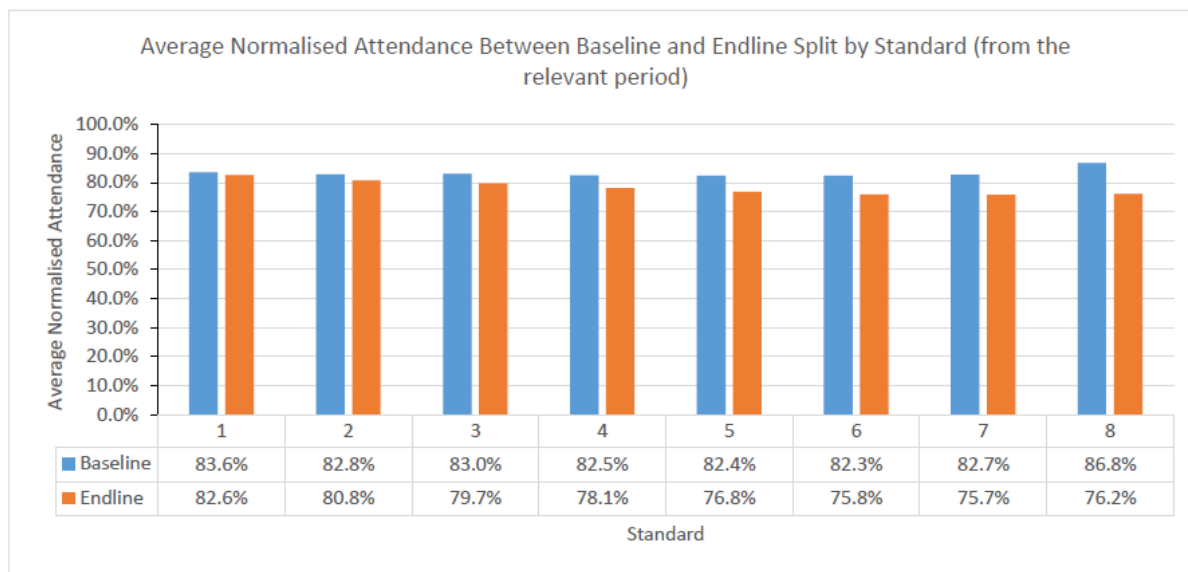
Figure 17: Average normalised attendance split by standard for baseline and endline

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Project contribution

In Figure 18 we present the average normalised attendance split by County and gender during the baseline and endline periods.

Kajiado has seen the greatest decrease in average attendance from baseline to endline. Poverty factors and a poor attitude towards education have been identified as two of the main barriers to high attendance. In Kajiado, especially in communities that are predominantly Maasai, livestock keeping is often the most desirable livelihood option. This has resulted in many communities not valuing education that highly, and attendance levels partly reflect parental indifference to their children regularly attending school.

People have struggled to sustain themselves since the start of the nationwide drought that started at the beginning on 2016. If a community does not see particularly great value in education, then they'll often forego the costs associated with schooling - and consequently children might struggle to attend regularly. Livestock, particularly cattle, is viewed as the most important asset within Maasai society, so during economically challenging times families can suffer at the expense of preserving their herd.

In **Kilifi** attendance has, on average, dropped when compared to baseline. Analysis and in-depth field visits throughout the county have revealed the extent of the drought's effects on communities. Agriculture, which is the primary source of income for most, has been decimated over the past 2 years and the Famine Early Warning System has now warned that the coastal region (of which Kilifi is a part) is now stage 3 (of 5), at "crisis" level. Temporary school closures have been relatively commonplace, and families are struggling for their survival in many instances. It is remarkable how resolute pupils have been in the face of such a deep, persistent drought, and we expected a greater drop-off in attendance levels.

Makueni's attendance is consistently highest of the four counties across all standards at endline. Makueni has the lowest amount of iMlango girls defined as impoverished. Poverty has been identified as one of the, if not the, greatest inhibitor to strong attendance, so where poverty isn't particularly acute (in relative terms) attendance is expected to be better. Whilst the drought has affected all of Kenya to some degree, Makueni hasn't been as badly hit as Kajiado and Kilifi.

Makueni also possesses a very strong, county-wide commitment to full educational attainment for both girls and boys. At both school and community level, education is championed as the *only* way to effectively combat systemic poverty, and this attitude is widely reflected in the school administration's enthusiasm towards well-functioning schools. Parental and community support of education ensures active involvement of all community stakeholders in a child's education, meaning there are strong "push" factors at home driving good attendance levels.

Uasin Gishu attendance has also declined, but early analysis shows that this is less due to sudden increases in poverty levels stemming from lack of rain (as in Kilifi, and Kajiado to an extent). There is strong attitudinal variation towards the importance of education across the communities we work with in the county. Parts of Uasin Gishu still possess a traditional set of values which are, in part, opposed to the merits of a formal education – yet this is less widespread than in Kajiado.
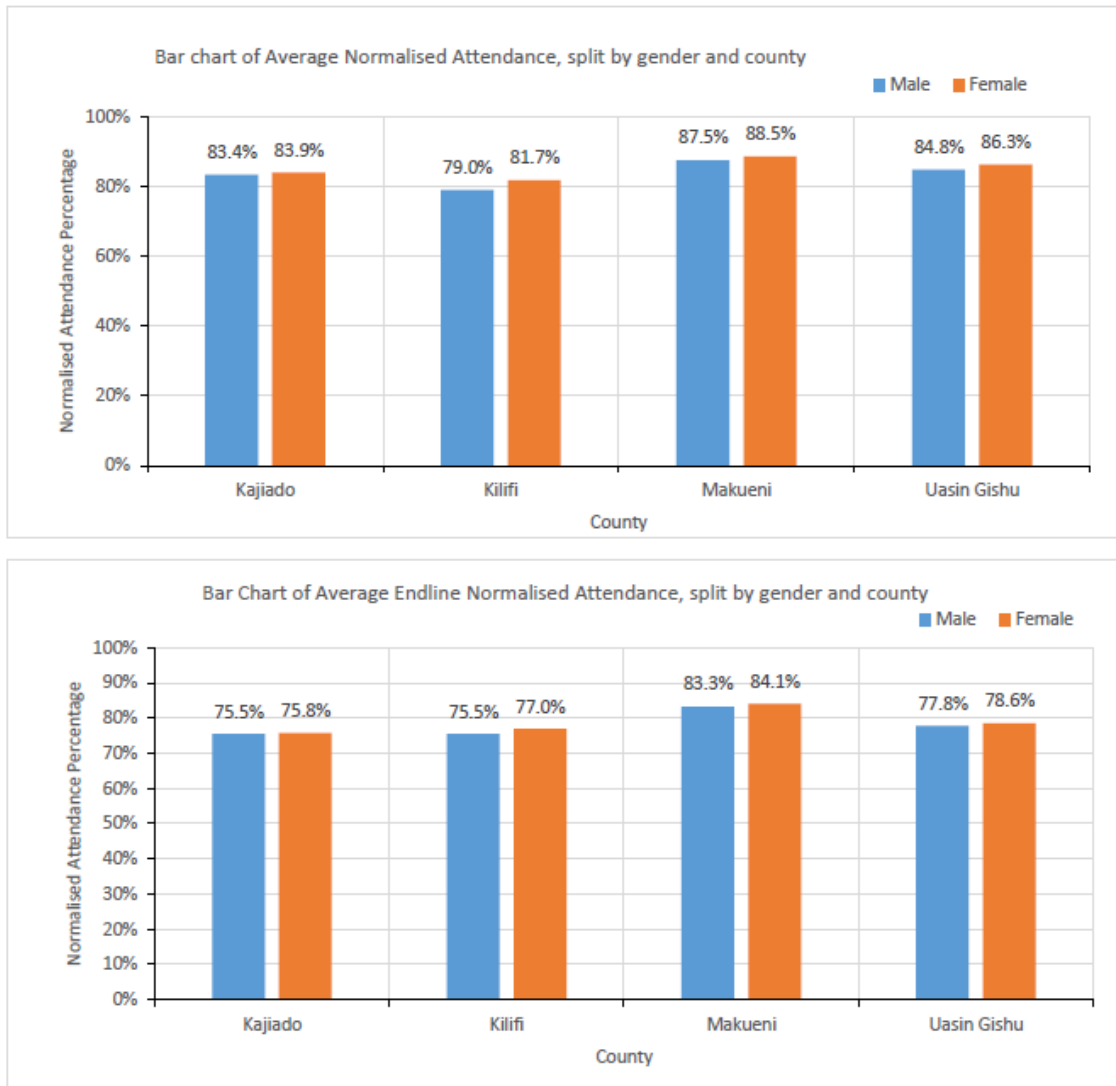
Figure 18: Average normalised attendance across all standards by County, split by gender, for baseline and endline

Project contribution

Figure 19 presents the average normalised attendance split by intervention group and County for the baseline and endline periods. The charts show that group A and B schools are very similar in terms of their average attendance for that intervention group. Group C schools have performed noticeably worse. The fact that Group A and B schools benefit from the stipend has had a layered effect on attendance in the schools.

The stipend has proved to be effective in raising attendance levels of its recipients (refer to Section 2.4.1.4.ii for in-depth analysis on the effectiveness of the stipend). Both schools and parents have been highly appreciative of the stipend, and the field teams have observed that local stakeholders are consequently more supportive of the schools and the benefits of education more generally. The sensitisation surrounding implementation of the stipends has directly impacted upon this support.

Bar chart of average normalised attendance percentage, split by county and intervention group - Baseline

County and Intervention	Kajiado	Kilifi	Makueni	Uasin Gishu
intervention A (full)	85.2%	81.6%	86.4%	85.8%
intervention B	83.7%	81.2%	88.8%	85.4%
intervention C	82.3%	78.8%	90.0%	85.5%

Bar chart of average normalised attendance percentage, split by County and Intervention - Endline

County and Intervention	Kajiado	Kilifi	Makueni	Uasin Gishu
intervention A (full)	78.7%	78.2%	84.4%	79.1%
intervention B	77.5%	78.4%	84.1%	80.3%
intervention C	70.2%	73.0%	81.9%	76.7%

Figure 19: Average normalised attendance split by intervention group and County, for baseline and endline

2.3.2 What effects has the GEC had on enrolment?

i)   Methodology and design

Enrolment is only captured for the intervention schools through the sQuid attendance monitoring system. The methodology used to determine a new student is when she/he completes an attendance transaction for the first time.

The schools were provided with an application on the attendance tablets to register new students during the course of the year.

ii)   Findings

The trend in Kenya has always been that the percentage of boys completing primary school is higher than that of girls. At the end of 2016 it was noted that in the last three years the percentage increase in the number of girls had consistently been higher than boys with 23 Counties registering more girls than boys who sat for KCPE results in 2016. Uasin Gishu is among one of these Counties that has registered more girls.

Additionally, the *2014 Basic Education Statistical Booklet* that compares the enrolment of boys and girls into primary schools shows that a higher number of boys than girls being enrolled into primary school level of education. This is also confirmed by the project data as for 2017 there are 96,778 girls and 99,073 boys registered in the sQuid system (please refer to Annex A5).

Figure 20 presents the flow of enrolment data since the beginning of the project.

Initial pupil data was captured in November 2014 in advance of project rollout based on data provided by the school. 88,000 pupils' details were verified as correct in January 2015, and a further 40,000 students were identified by the field teams during the registration period in the beginning of the school year. Registration was all carried out manually to collect the student data and issue attendance smartcards. After card distribution, there were therefore 128,000 'active users', i.e. pupils enrolled in iMlango schools. The profiles of these pupils are all stored secured in sQuid's central host database.

By the end of 2015, a further 14,000 pupils had been captured in the system thus increasing the total number of students to 142,000. For the January 2016 registration period, sQuid provided an on-the-fly registration app available on the attendance tablets that writes the cardholder details directly onto the server; subsequently the card is issued. The process is a lot quicker, and only requires a single entry of details. 24,000 new pupils were registered in this period.

Figure 21 shows the monthly enrolment of new students in 2016 broken down by group. At the beginning of 2016 Group C experienced considerably higher enrolment compared to Group A and B. This is because the project has 10 more C schools (75) than A (65) or B (65) schools, which were added to Uasin Gishu at the start of 2016.
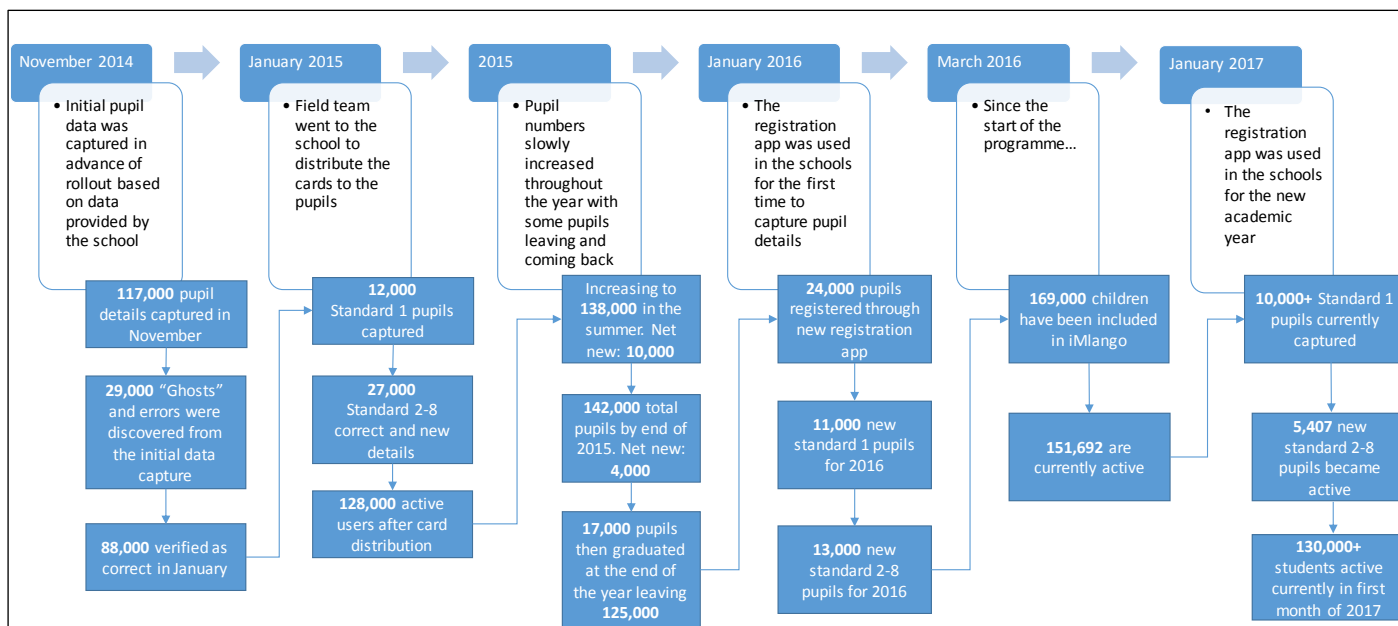
Figure 20: Enrolment flow chart

Project contribution

Net enrolment has remained relatively constant at about 130,000 pupils throughout the project; however, we have observed that some schools have seen year-on-year increases. For example, Elangata-Wuas Primary saw an increase of nearly 50% in their pupil enrolment from 2016 to 2017, to 445. The head teacher, Mr Jeremiah, attributes this huge increase in enrolment to the pull of iMlango. He has stressed the importance of creating positive synergies between pupils, teachers and the community. Parents, and subsequently the community, are therefore highly supportive of the technology, and this has helped to facilitate a positive local learning atmosphere – contributing to increased demand for school spaces.

Figure 18: The time series shows that the number of new students' first attendance transactions peaks, as expected, in the month immediately after the registration period. This figure then rapidly declines as most children register an attendance transaction before the April holiday (which is why there are so few transactions in April; the same with August and November/December). The first-time attendance transactions occurring later in the year are indicative of some pupils' extended absences from school. The attendance data has begun to show that some pupils miss substantial periods of school, before returning later in the academic year. The reasons are diverse, ranging from pregnancy to nomadic pastoralism (amongst the Maasai in Kajiado), yet this "revolving door" situation is not conducive for sustained educational attainment, and can lead to eventual dropout.
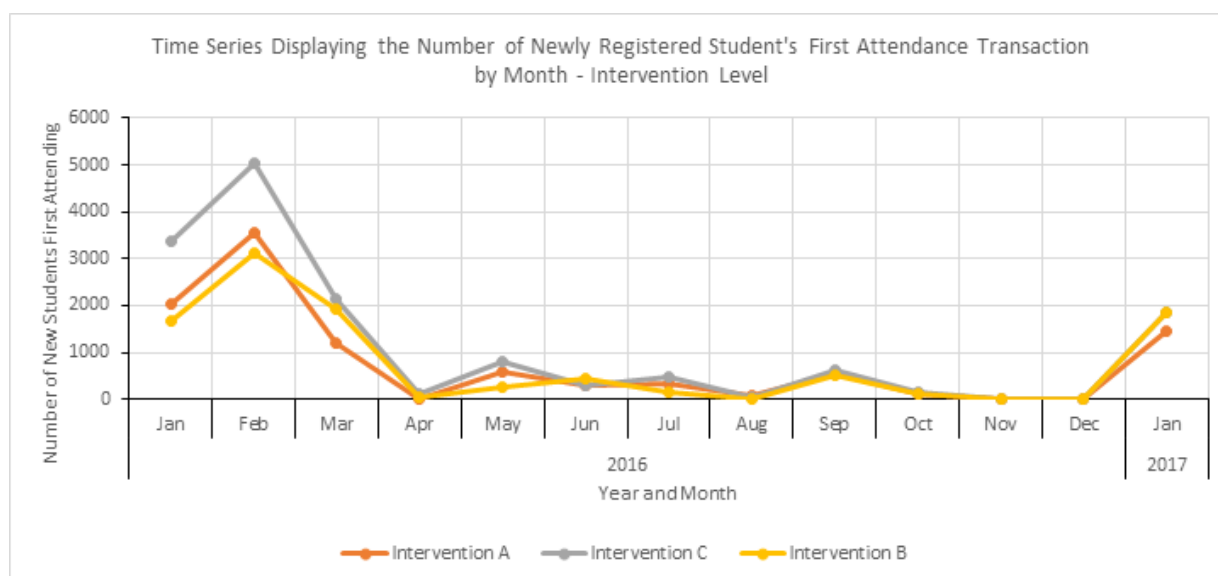
Figure 21: Enrolment of new students in 2016 by month and group

In addition to student enrolment that was captured by sQuid, we asked the household heads whether any of the girls and boys in their households had stopped going to school and only 74 out of 695 (10.6%) responded positively for girls, while 79 out of 695 (11.4%) have responded positively for boys. Asking further about the number of children that have dropped out, the household heads responded similarly for girls and boys as shown in Table 54 with the majority of respondents saying that 1 child has dropped out. Even though we have more instances where 2 or 3 boys have dropped out according to household heads, for girls there are instances where 4, 5 and 6 girls have stopped going to school.

Table 53: HH heads reporting children that have dropped out of school

Have children dropped out of school?	Girls		Boys	
	Frequency	Percentage %	Frequency	Percentage %
Yes	74	10.6	79	11.4
No	621	89.4	616	88.6
Total	695	100.0	695	100.0

Table 54: Number of girls and boys that have dropped out of school – household survey

Number of children that dropped out	Girls		Boys	
	Frequency	Percentage %	Frequency	Percentage %
1	49	66.2	50	63.3
2	19	25.7	22	27.8
3	3	4.1	7	8.9
4	1	1.4	0	0.0
5	1	1.4	0	0.0
6	1	1.4	0	0.0
Total	74	100.0	79	100.0

A total of 33 household heads reported that they have both daughters and sons that have stopped going to school. For these households, Table 55 shows the split of dropouts by gender. In 45.5% of these households equal number of girls and boys has dropped out, while in 33.3% more girls have dropped out of school.

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Table 55: Households were both girls and boys have dropped out

Number of children that dropped out	Number of girls that have dropped out					Total
	1	2	3	4	6	
2	12					12
3	4	8				12
4	2	2	1			5
5		1		1		2
6			1			1
8					1	1
Total	18	11	2	1	1	33

Table 56 presents the reasons why girls and boys have dropped out of school. It is interesting to note that the most prominent reasons for girls were pregnancies, marriage and inability to pay schools fees with similar percentages (35.1%, 32.4% and 28.4% respectively), while for boys inability to pay school fees and the perception that school is not useful/relevant (64.6% and 38.0% respectively).

Table 56: Reasons for dropping out of school – household surveys

Reason for dropping out	Girls		Boys	
	Frequency	Percentage %	Frequency	Percentage %
Unable to pay schools fees	21	28.4	51	64.6
Lack of school uniform	1	1.4	2	2.5
Because of marriage	24	32.4	1	1.3
Because of pregnancy	26	35.1	N/A	N/A
Needed at home	1	1.4	1	1.3
Didn't find school useful/relevant	9	12.2	30	38.0
Sickness	4	5.4	2	2.5
Lured into relationship	7	9.5	N/A	N/A

iii)   Sub-group analysis

> *Project contribution*
>
> Figure 22 presents the monthly enrolment of new students in 2016 broken down by county. The enrolment figures correlate with the number of iMlango schools in each county. Kilifi has the most schools with 80; Uasin Gishu the second most with 62; then Makueni with 37; and finally, Kajiado with 26. Average school size also varies considerably across the 4 counties, impacting on enrolment figures. Kajiado has the highest average school enrolment with 727; Kilifi has 675; Makueni 571; whilst Uasin Gishu has the lowest average enrolment at 448.
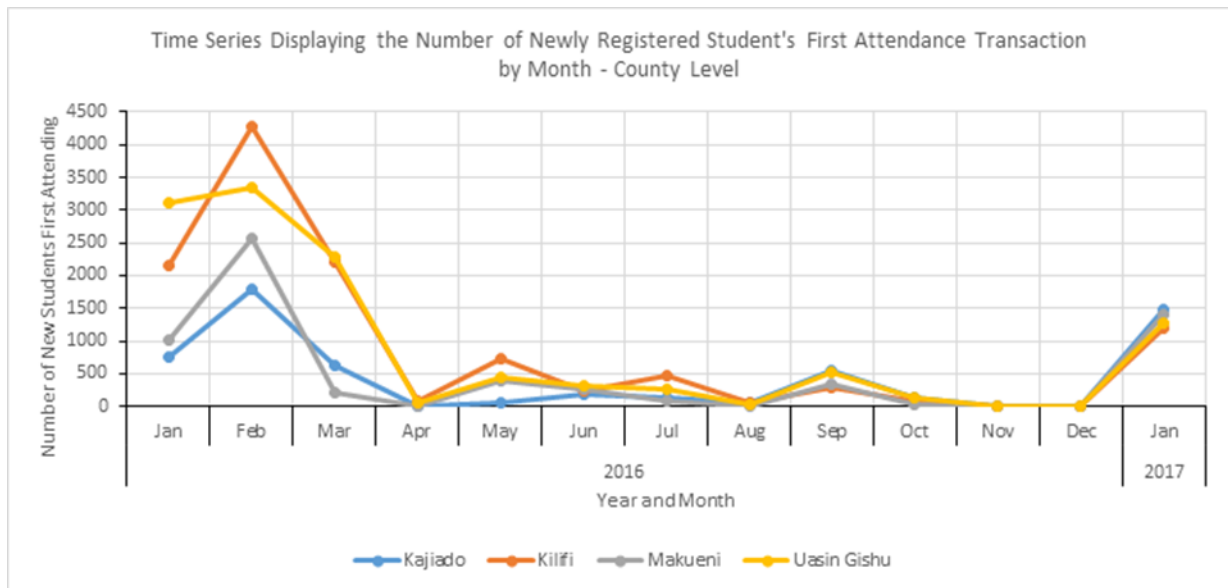
Figure 22: Enrolment of new students in 2016 by month and County

iv)   Enrolment results in context of local / regional / national environment

In the household questionnaire, we asked the household heads whether any of the girls and boys in their households had stopped going to school and only 76 out of 700 (10.9%) responded positively.

Table 57: HH heads reporting children that have dropped out of school

Have children dropped out of school?	Girls		Boys	
	Frequency	Percentage %	Frequency	Percentage %
Yes	76	10.9	80	11.4
No	624	89.1	620	88.6
Total	700	100.0	700	100.0

2.4 What has worked, why and with what effects?

2.4.1 How has the project performed against its target outputs in the logframe and did the project successfully overcome barriers to girls' educational outcomes?

This section presents the progress that the project achieved against the targets set in the logframe for every output.

2.4.1.1   Output 1: Improvement in teachers' ability to use technology to deliver learning

Table 58: Project performance against Endline targets in Logframe Output 1

Output and Output indicators	Activities	Baseline level	Endline target	Endline achieved	Source
Output 1: Improvement in teachers' ability to use technology to deliver learning					
1.1 Number of students (girls and boys) with access to Maths-Whizz tutoring that complete Maths-Whizz initial assessments	The main contributing activities are: • School and teacher support delivered by the in-field teams through monthly school visits; • Initial training of the teachers on the iMlango components and refresher training as needed; • Provision and maintenance of satellite internet ICT infrastructure in the schools; • Provision and maintenance of individualised Maths-Whizz licenses as well as teacher resource for whole class teaching; • Development, provision and maintenance of the learning portal and the content available through it.	N/A	100,000 students	Total: 86,609 Girls: 42,672 Boys: 43,937 (as of 15/03/2017)	Maths-Whizz reporting system; only applicable for Group A and C
1.2 Percentage of students who achieve 30 mins or more of Maths-Whizz usage per week (the percentage is based on the students who have completed the initial assessments)		N/A	10% of students that have completed their assessment (10,000 students)	Total: 10.2% Girls: 9.7% Boys: 10.8% (for the period 01/03/2017 - 15/03/2017)	
1.3 Number of individual teachers logging into the portal per week (total in all the schools)		N/A	1,100 teachers	Overall average: 306 Group A: 105 Group B: 95 Group C: 107	iMlango portal reporting; only applicable for Group A, B and C

i) Activities, methodology and design

This Output refers to the ability of the teachers to use technology to deliver learning and ensure that the students have the necessary access to the ICT lab and the learning resources.

As mentioned previously, students were issued with smartcards for digital attendance monitoring and these also provided the student login details for the learning portal. Time on portal and time on the digital components was measured electronically for all students. Once logged in, the student can choose to navigate through the available resources through selecting one of the boxes:

1. *Maths:* one of the core and innovative educational resources that is provided within the iMlango project is access to Maths-Whizz. Maths-Whizz is an individualised simulated tutor, designed to replicate the behaviour of a human teacher. It first diagnoses student's strengths and weaknesses across several maths topics through an adaptive assessment, which in turn creates a learning profile for each student showing where exactly they are within their learning journey, and what their strengths and weaknesses are. Based on that learning profile, the tutor then delivers a learning journey that is tailored to the individual needs and pace of learning of each student while being continuously adaptive. The tutor prioritises a student's weakest topics, covering knowledge gaps that may have held them back in the classroom environment;

Figure 23: iMlango portal home page and Maths-Whizz lesson page

2. *Literacy:* this includes e-books sourced through eKitabu covering Standards 1-5, alongside web applications that provide digitized exercise books for standards 1 and 2. These exercises allow for progression through the curriculum at a pupil's own pace;

3. *Stories:* this includes 58 stories from African Storybook both in English and Kiswahili for Standards 1-5, as well as 13 stories for pre-primary pupils. The main aim of these relevant, localized stories is to improve children's literacy, but several stories – such as the 'Crocodile in my Body' (discusses HIV/Aids) – also help inform children of potentially harmful situations that they might face;

4. *Children's encyclopedia:* this links to the Q-file webpage where the students can research a wide array of topics, from world history to the human body. This piece of content encourages independent, pro-active research into subject matter that is of interest to the pupil, also allowing for him/her to address a gap in their existing knowledge;

5. *Tusome:* this includes the MoE approved reading programme for Standards 1 and 2 that has been nationally rolled out in hardcopy form. The material is proven to improve reading fluency and reading comprehension, whilst enhancing teacher capacity in whole-class setting;

6. *Longhorn:* this provides curriculum-approved content and assessments to help prepare pupils for their end of year examinations, as well as the KCPE for those in standard 8. Longhorn is one of the biggest providers of learning material in Kenyan primary schools, and the portal provides comprehensive access to their digitised material for all subjects;

7. *iMlango Junior Debaters' Contest*: the iMJDC is aligned with the well-established, televised Great Debaters' Contest. The contest has proven very popular with the pupils that have participated in it so far, allowing for critical engagement in diverse topical debate areas. This provides pupils with the opportunity to work together (in teams of 5) to try and produce coherent and compelling
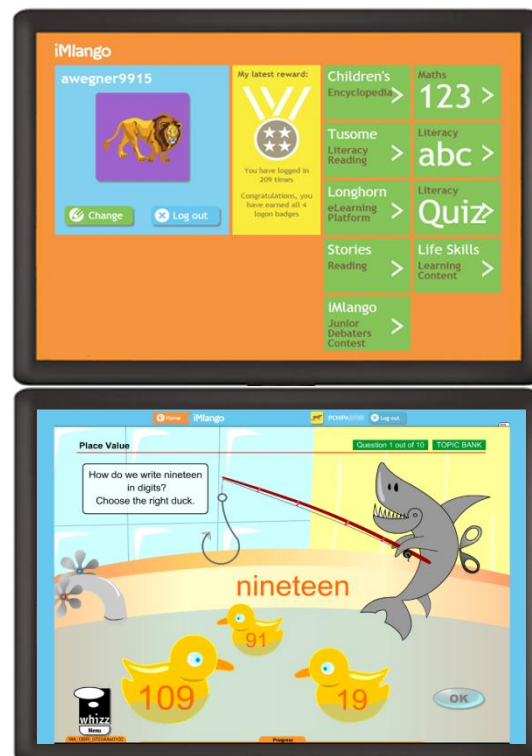
responses to the questions. Answers are submitted electronically via the iMlango portal. There are 3 rounds to each 'season' of the contest; one season has been completed, and one currently underway. Each season is available only to one standard: the first season was for Standard 7, the second (current) season for Standard 6;

8. *Life skills:* this includes the Good School toolkit from Raising Voices that is used in the child club sessions. This comprises 5 steps to achieving a well-functioning school, with content a mixture of posters to be created by the children and engaging stories led by the teachers. There is also a section on the importance of hand washing, with one of the iMlango school's child clubs creating the step-by-step process that's available to all through the portal.

Teachers are also given unique login details where they can access the resources for whole class teaching as well as access to Maths-Whizz live reports – a record of students' interactions with the tutor, including a range of usage and progress metrics – which they can use for their lesson planning. The Whizz Education field team also utilises the reports, proactively supporting schools and adapting the implementation at point of need based upon analysis of the data.

One of the key activities that contributed towards this output was teacher training especially since 50% of the 266 interviewed teachers at baseline reported that they had no ICT skills. This was delivered in stages and through different engagement strategies:

1. Training of Trainer (ToT): Teachers were nominated by their schools to go through a 5 day training course, which was centrally organised in coordination and with support from the MoE and Teachers Service Commission (TSC). The course was designed to train the teachers not only to be able to use the skills that they acquire but to be able to teach those skills to the others. The concept for using the "training of trainer" approach was that teachers would be more receptive to a fellow teacher who would be implementing the same project and hence working towards the common goal. Only the best teachers qualified to become trainers and have received a certificate at a special ceremony; in total 71 teachers were trained (29 in Mombasa and 42 in Nairobi).

2. The iMlango Skillbuilder training was then rolled out to all schools and teachers using the trainers that were part of the ToT initial training. The training was a systematically designed instructional process delivered in 5 days for Group A and C schools and 3 days for Group B schools. The training was carried out on the school premises and was delivered to as many teachers as could possibly be allocated by the school so that student learning went uninterrupted. The project aimed to include all English and Maths teachers, together with (in most cases) head teachers and their deputies. If there was space left in the lab and schedule permitted, other teachers and administrators joined. During this activity 3,058 teachers were trained in total. Based on the iMlango ICT Skillbuilder for Teachers Instruction Plan, the high level objectives of the training were:
   - Introduce the project and explain its benefits for teachers in Kenyan primary schools;
   - Introduce basics of the Ubuntu operating system and how to navigate and effectively utilize the Ubuntu File Management system;
   - Acquire skills to use software teaching and learning process and administration for personal and professional development;
   - Introduce a critical awareness of ICT technologies in the educational environment;
   - Understand the ethical aspect of ICT including concepts on security, ergonomics, environmental management and suitability;
   - Discover the concepts of Internet based resources and communication;
   - Navigate the iMlango Portal to appreciate the resources available;
   - Introduce Maths-Whizz to delivery improved mathematics results to support the Kenyan Curriculum;
   - Understand how Maths-Whizz can be used by students and develop a clear understanding of Maths-Whizz reporting and administration to support teachers (only for Group A and C)

- Understand who to contact for particular scenarios that require support if a problem happens.

3. In addition to the iMlango Skillbuilder, training was delivered to the schools on how to use the attendance monitoring system from the project field officers.

4. Further to the initial training of the teachers the project conducted two refresher training sessions at the beginning of Terms 2 and 3 in 2016. In these sessions the training officers trained new teachers that have been transferred to the schools, assisted in the creation of the ICT lab timetable and helped address specific issues or gaps the teachers had. The refresher training sessions had a significant contribution in busting the project activities at the beginning of the term but also in encouraging the teachers to integrate ICT in their teaching practices as well as into the students' learning processes.

5. During term time the project in-field team conducted regular visits to the schools to follow up with the headteachers, teachers, merchants and other local stakeholders. Their main responsibilities are to:

   - Ensure continued understanding of all the project's core components
   - Providing technical assistance where possible or raising the matter within the consortium to be addressed; Supporting and encouraging teachers, providing them further pedagogical insights or correcting action plan to reflect live progress indicators;
   - Ensuring that teachers are confident in using ICT for learning. Removing any concerns that teachers may have towards technology such as fear to break something, fear to be replaced by technology, fear to have their own weaknesses identified and exposed, etc. If those matters are addressed successfully, teachers are the main drivers of the implementation instead of being the biggest barriers.
   - Sensitise, inform and implement new elements in the programme.

The indicators for this output were measured through the Math-Whizz central reporting system, the iMlango platform and the Avanti OSS system that tracks the resource usage of all students and teachers. Supporting information has been collected at endline from the teacher questionnaires and classroom observations conducted by Advantech.

ii)   Findings

Teachers were successful in delivering learning using technology. Currently, confidence in ICT is mixed, but with time and additional refresher training we believe this will improve further. Access to the online resources was a challenge as for other areas of the project.

The indicators, while short of the targets, demonstrate that teachers were successful in using technology to deliver learning. Despite access challenges, 86,000 students used individualised tutoring to learn numeracy. Of those that were active, the targeted proportion of 10% was able to use the tutoring for the recommended amount of time. 300 teachers accessed educational content during the final term of 2016. Examining the project contribution below however, this number is closer to 600 teachers for the first and second term of the year (Figure 31).

While the logframe data gives a sense of scale of the digital learning carried out, it is unable to fully capture teachers' confidence and competence with digital learning tools. Endline survey data provided much more direct insight into how teachers felt. Intervention teachers were very positive towards digital learning tools. Of the intervention teachers surveyed, 84.4% said that digital learning tools made teaching easier.

77.8% of teachers in intervention schools said that they had used a projector and laptop for whole class teaching. Table 59 examines this figure by intervention group. Notably, Group B schools had almost 10% more teachers conducting whole class sessions supported with digital resources than Groups A and C. Project school visits suggested that it was rare for both the individualised tuition and whole-class teaching to occur simultaneously which may explain the difference between the groups. Transporting projectors from the ICT lab (where they were securely stored overnight) to the classroom

proved to be disruptive and delaying the start of the current lesson, so projectors would usually be used inside the ICT lab itself.

Table 59: Teachers conducting whole class sessions – teacher questionnaire

Teachers conducting whole class sessions	Group A (n=54) %	Group B (n=55) %	Group C (n=58) %	Total (n=167) %
Yes	75.9	83.6	74.1	77.8
No	24.1	16.4	25.9	22.2
Total	100.0	100.0	100.0	100.0

77.8% of teachers using digital tools to support whole class teaching is commendable, but leaves 22.2% of teachers unaccounted for. Survey data suggested that of those not using digital tools for whole class learning, 45.9% did not know how to use the equipment and resources. This could point towards weaknesses in the training or to more fundamental issues with commitment of teachers (23.2% of teachers interviewed did not attend the training provided by the project).

Exploring the possibility of weaknesses of training, 58.4% of teachers did not feel like they had the necessary skills to use computers for teaching. This seemed to contradict classroom observations where in all 12 observed lessons teachers successfully utilised both the laptop and projector to deliver whole class sessions. We suggest that while the training provided gave teachers basic competency in using the technology, they are not yet confident. We believe that this confidence will come with time and effective refresher training.

As with other outputs of the project, access proved to be a challenge for teachers delivering tuition using digital resources. 33.5% of teachers reported problems with internet connectivity and 24.3% mentioned a need for additional devices able to access the content.

Some teachers expressed a desire for a permanent member of staff able to support their school's technical needs:

> *"We appreciate the idea but we also want to request that if possible we need to have somebody on the ground, an ICT assistant for example. If one of your staff would be here permanently to keep the door open throughout the day it would expose these children more compared to a teacher who has something to do." (Endline FGD Teachers, Central Primary)*

While a member of staff in every school might not be a scalable solution for the project, we do recommend that technical support have a shorter response time in future.

Teaching with digital learning tools helped to reduce some barriers to education, particularly engagement with education. 89.7% of intervention teachers reported that girls were more interested in attending school and 76.2% of teachers said that girls were more interested in a higher level of education.

Attendance was also said to have improved as result of the availability and use of ICT and teachers found it easier to monitor attendance.

> *"And even they help children a lot because a lot of children do not want to miss school because of these computers and are adamant not to miss because of that swiping, because if they swipe they tell us that you will know that they are in class when you are in Nairobi and even when they miss, you will still from there so many don't to miss school and they have really helped us a lot" (Endline FGD Mothers, Kiambani Primary)*

The chiefs interviewed at endline also commented on the use of ICT by teachers:

> *"I am aware of the teachers training whereby the teachers are browsing to get more materials from the internet. There is a day I went to Vishakani (Primary) and the teachers were busy browsing looking for more information to get more materials for teaching, so you find that it is very important" (Endline KII Chief, Kizurini)*

> *"One [the project] has improved learning here in Magadi because in the weekends the children have time for that kind of education and most of the teachers have the skills (to teach them) and also through children I can know they are teaching. I remember my kid telling me that he enjoys computers." (Endline KII Chief, Magadi)*

Project contribution

Indicator 1.1 tracked the number of students active on Maths-Whizz with complete initial assessments. Maths-Whizz is designed to behave like a human tutor; it first diagnoses students' strengths and weaknesses across several maths topics with an adaptive initial assessment. Globally this assessment takes an average of 45 minutes to complete. Field observation suggests that students in Kenya take an additional 30 minutes.

The endline target for indicator 1.1 was 100,000 students. By the 15th of March 2017, 86,609 initial assessments had been completed; of these, 43,937 were completed by male students and 42,672 by female students. Figure 24 presents the number of Maths-Whizz assessments at the end of each term disaggregated by region (b), intervention type (c) and gender (d).

The 100,000 target was calculated from the reported number of students attending Group A & C schools. Later, it emerged that some of the numbers reported by schools had been inflated, as schools believed that they would receive greater benefits (e.g. more computers) if they had more students. This may go some way to explaining why the endline target was not met. With intervention schools experiencing increased student recruitment as a result of the project, it is likely that this target will be reached in the next couple of months.

Other factors, such as teacher strikes, drought and less learning time in exam terms also contributed to the target not quite being reached.

Effective completion of initial assessments required proactive support from the Whizz Education field team. It was observed that teachers who had been supported the previous year were much more capable of running the assessments independently. High teacher turnover proved to be a challenge, though the implementation of 'iMlango Champions' – a teacher in each school to manage the computer labs and supporting other teachers through assessments – was effective.

In Figure 24a we see the influence of the academic year on the number of assessments completed. At the beginning of each term, almost no assessments are completed, as schools focus on organisational tasks. In the latter half of term 1 of 2016 and term 2 of 2015-2016 we see the most assessments completed. Term 3 sees far fewer assessments, reflecting the shorter exam term. 2016 saw a much more co-ordinated effort from the field team, resulting in a greater number of assessments completed compared to 2015. Figure 24b, c and d show that these trends are consistent across intervention type, region and gender.
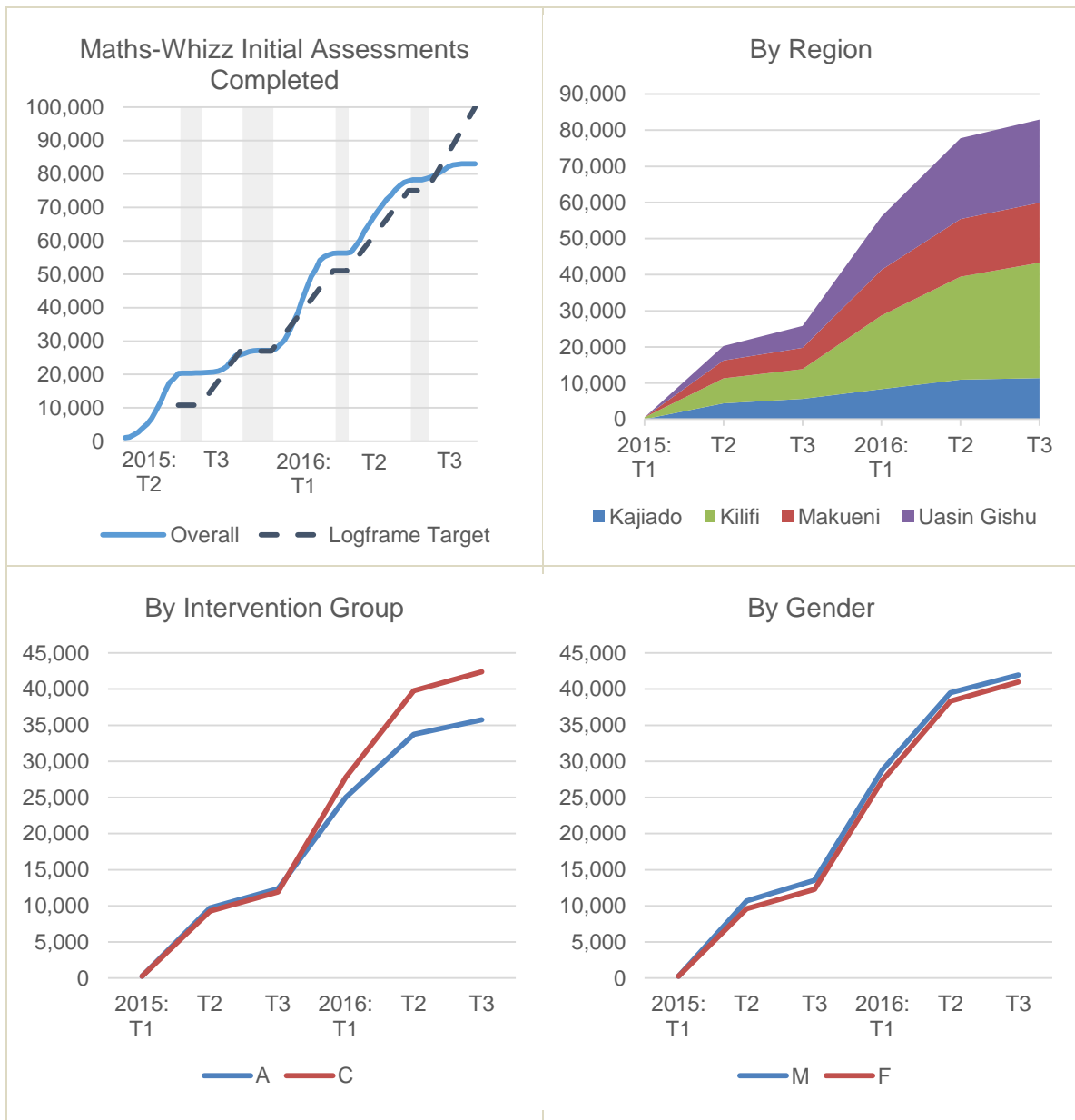
Figure 24: Number of Maths-Whizz assessments completed at the end of each school term (a) overall[5], b) by region, c) by intervention group and d) by gender)

[5] Grey areas denote school holidays. Logframe targets were set for the end of T2 and T3 in each year; we have interpolated linearly assuming no assessments outside of term time.

Project contribution

Indicator 1.2 specifies the proportion of students that are using Maths-Whizz for more than 30 minutes per week on average. Usage reflects how much time students have spent learning on Maths-Whizz. It is typically presented as the average minutes per week over a given period. Students are recommended to use Maths-Whizz for 30-90 minutes each week to make the desired progress.

The target stipulated that 10% of active students who had completed their initial Maths-Whizz assessment should have maintained recommended usage during term time. The percentage of active students that achieved recommended usage over the period of 1st March to 15th March 2017 was 10.2%. This represents 10.8% of male students and 9.7% of female students.

Figure 25 shows the percentage of students meeting the usage requirement in each term. We also show a breakdown by (b) region, (c) intervention type and (d) gender. In the overall graph, we see a clear pattern; Terms 1 and 3 see a much smaller proportion of users than Term 2.

As with indicator 1.1, Term 1 sees a lower proportion of students meeting recommended usage due to schools focusing on organisational tasks. The field team supports these organisational tasks: creating timetables for the computer labs, training teachers (both old and new) and importing student data for new or transferred students. Term 3 is again heavily influenced by the pressure of exams. A lower proportion of students meet the recommended usage, due to teachers focusing on more familiar instructional methods to complete outstanding sections of the curriculum, instead of utilising the computer labs. In Terms 3 learning time is further reduced by the administration of exams. Alongside the KCPE for grade 8 students, the younger students sit county, regional and sub-regional exams.

In general, 2016 saw a smaller percentage of students meeting the usage requirement each term. Term 1 of 2016 saw a large increase in the number of assessed students, while the number of available computers did not dramatically increase. Subsequently, each student had a shorter amount of time in the computer lab, resulting in a smaller proportion of students meeting the recommended usage. While the proportion of students with the recommended usage has fallen, the absolute number has grown.

Of the four counties, Kajiado consistently outperforms the other regions (Figure 25b) in terms of indicator 1.2. Figure 26 shows the proportion of users meeting recommended usage from each school in the region. We see that most schools are exceeding the target of 10%, which points to consistently strong engagement. In-field observation suggests that the teachers in the region were typically more receptive to change than those in other regions. This reaffirms the importance of supporting and engaging teachers for a successful implementation.
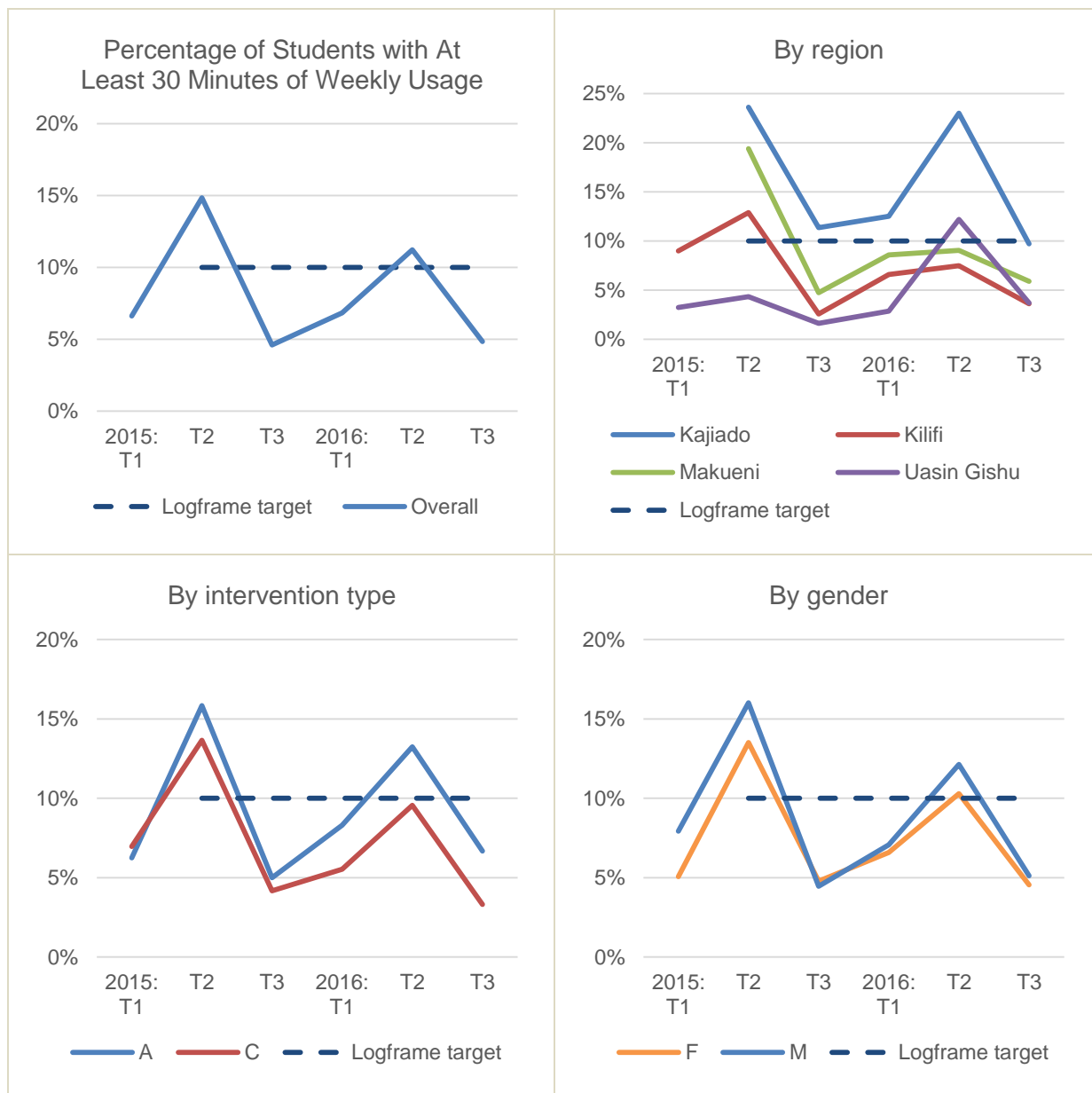
Figure 25: Proportion of students with average Maths-Whizz usage of at least 30 minutes per week during each school term (a) overall, b) by region, c) by intervention group and d) by gender)

Project contribution

According to Figure 25c, Group A has a higher proportion of students meeting the recommended usage than Group C, even though Maths-Whizz was implemented in the two groups in the same manner. Figure 27 indicates that Group A schools consistently show a higher proportion of students meeting the recommended usage than Group C schools, as opposed to just a few outlier schools. This could be due to the difference in the average school size shown in Table 60, which shows that Group C schools are, on average, slightly larger than Group A. With more students, the available time on task per student decreases. However, with so many factors affecting usage, we cannot confidently definitively conclude this is due to school size.

Table 60: Average school size per County and intervention group

Intervention Group	County				Group Average
	Kajiado	Kilifi	Makueni	Uasin Gishu	
A	538	636	633	417	567
B	850	657	507	450	610
C	795	724	541	464	604
County Average	727	675	571	448	

Finally, we see that a higher proportion of male students are meeting the recommended usage (Figure 25d). Ensuring that each student in a class has time in the computer lab proved challenging for teachers. Class sizes in Kenya are typically large – often with 70 students – and timetables for the computer lab would specify class, rather than specific students. In-field observation showed that in many schools, a class would rush into the computer lab and the students would use computers on a first-come-first-serve basis. It is possible that this favours male students, who are viewed as more boisterous than female students. More recently, schools have taken steps to address this issue by implementing gender balanced lab sessions. Alternatively, the difference observed could reflect girls' slight preference for reading over maths. Figure 28 shows girls have spent more hours than boys on literacy content in almost every month of 2016.
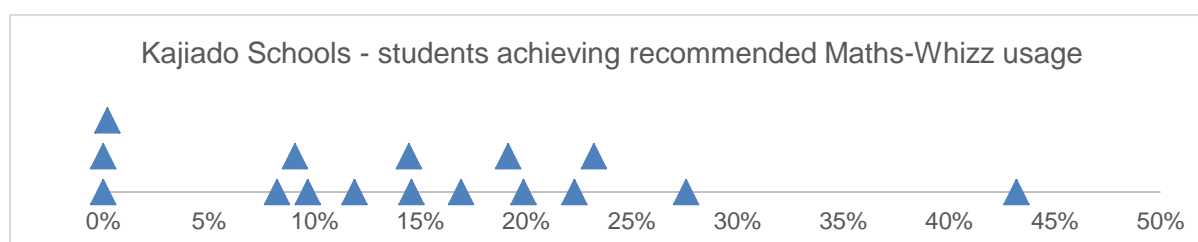
Figure 26: Proportion of students with more than 30 minutes of weekly usage for each school in Kajiado
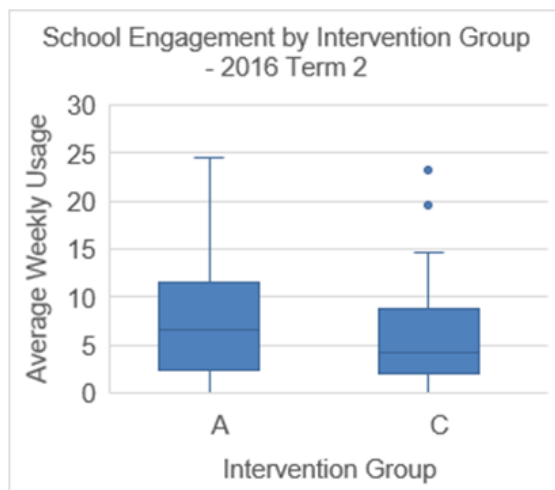
Figure 27: School engagement for Group A and C schools in Term 2 2016
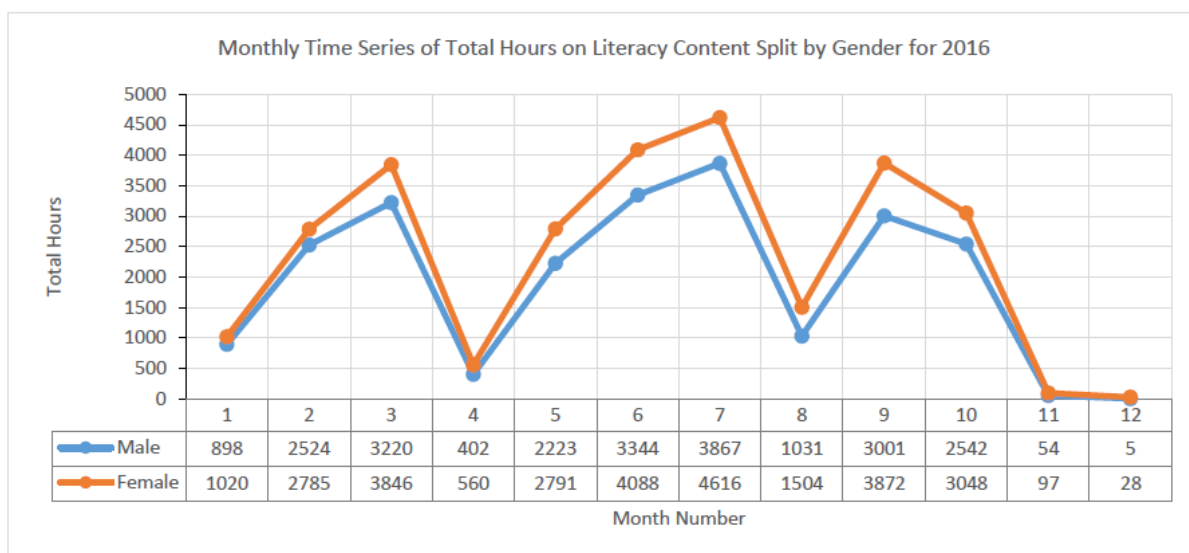
Figure 28: Total hours spent on literacy content per month in 2016 by gender

> ***Project contribution***
>
> Later analysis in section 2.4.1.3 ii) suggests that to achieve the target progress rate, students required 59 minutes of average weekly usage. In Figure 25, we saw that approximately 1% more male students than female students were meeting the recommended weekly usage. Figure 29 shows that this trend continues for students meeting 59 minutes or above of average weekly usage, with typically 1% more male students than female students meeting this threshold. This gap is much less pronounced during the exam terms.
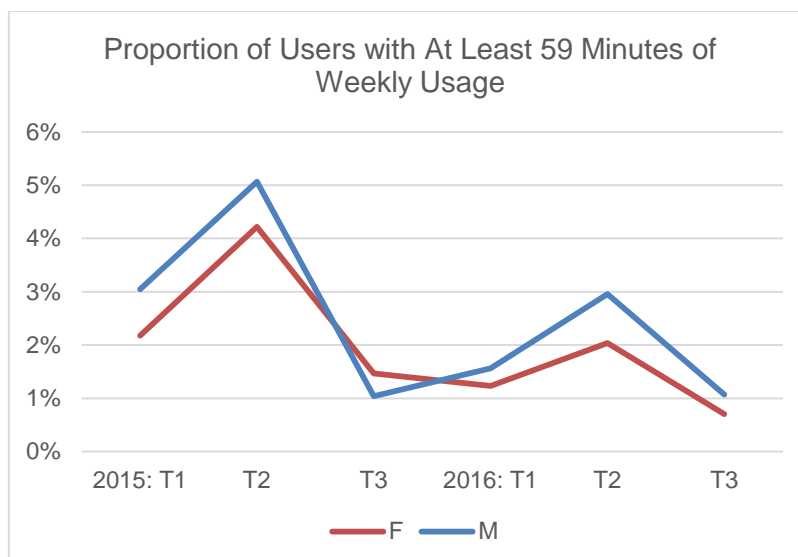
Figure 29: Proportion of students with average Maths-Whizz usage of at least 59 minutes per week

Project contribution

Indicator 1.3 refers to the individual teacher logins in the portal per week. The endline figure in the logframe is the weekly average over the Term 3 2016 (5/9-19/11/2016).

Figure 30 presents the total number of unique teacher logins per week but also a breakdown per intervention group covering Term 3 2016. We can observe that both the trend of the total logins and the trends per group follow the term activities in the schools; in the first week of the term the logins are low as teachers and students return to the school timetable and from the second week they increase until the end of October. At the end of October the logins dropped, which correlates with the focus on the end of year KCPE exams. At the time of endline there was a lack of KCPE-orientated revision content on the portal, meaning that teachers sought alternative sources of curriculum revision material for the lead up to exams.

Groups A and C seem to be equal in terms of teacher logins whereas Group B is slightly underperforming compared to the other groups. This might reflect the difference in the number of devices available for the teachers to use as Group B only has two laptops, whilst A and C have three laptops in addition to their ICT lab's 25 computers.

We believe that the teacher logins metric doesn't quite capture the high levels of engagement most of the teachers are demonstrating with the computers. This is particularly the case in whole-class settings, where teachers tend to freely leverage the internet alongside own-made PowerPoint presentations to deliver lessons. Unfortunately, we can't accurately measure usage when teachers choose not to use the portal for lessons. We've observed that as the teachers have become more comfortable with independent ICT use, they've become more confident using resources outside of the portal - leading to sub-optimal logins.

For example, Mr Samuel, the head teacher of Elgon Estate Primary in Uasin Gishu, has created several of his own PowerPoint presentations for the various topics he teaches on. He says that the children are highly receptive to images and short educational videos, which he draws from the internet to help enhance his lesson delivery. His content ranges from dental and oral hygiene to cloud formation, demonstrating the flexibility of technological application in teaching across differing subjects. Once familiar with the fundamental technology, he said that it's easy to then integrate it into every-day lesson plans.

Figure 31 shows the unique teacher logins per week for the whole duration of the project. The trend confirms the declining numbers between 2015 and 2016 as described above. It also shows that both for 2015 and 2016 Term 3 logins have been lower than Term 2 which agrees with the Maths-Whizz usage trends presented for Indicator 1.2 indicating again the impact of KCPE exams on the school activities.
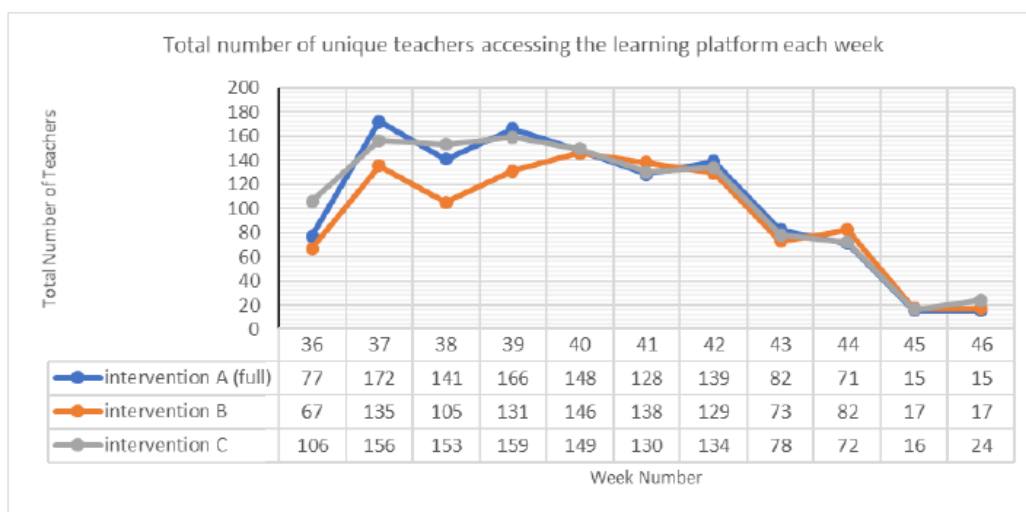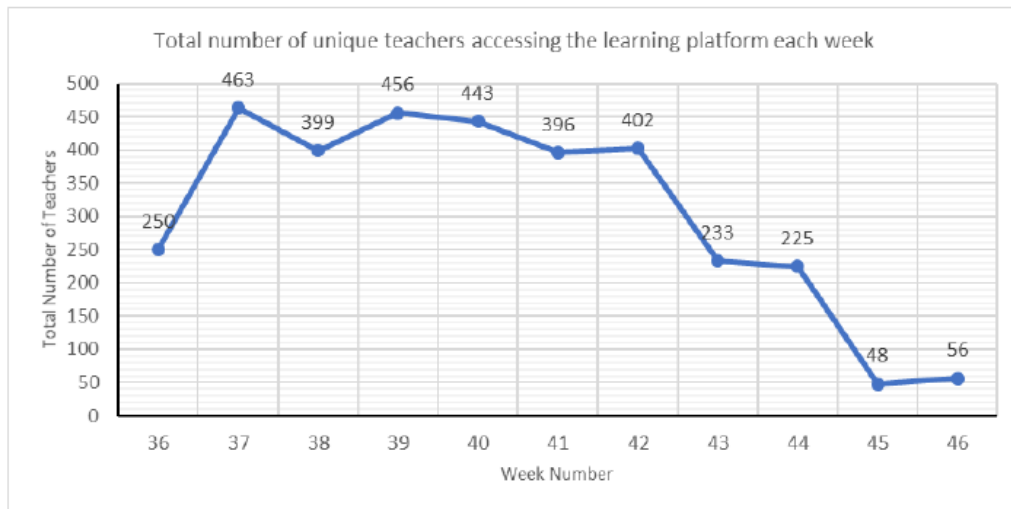
Figure 30: Number of unique teachers accessing the portal per week of the endline period split by intervention group
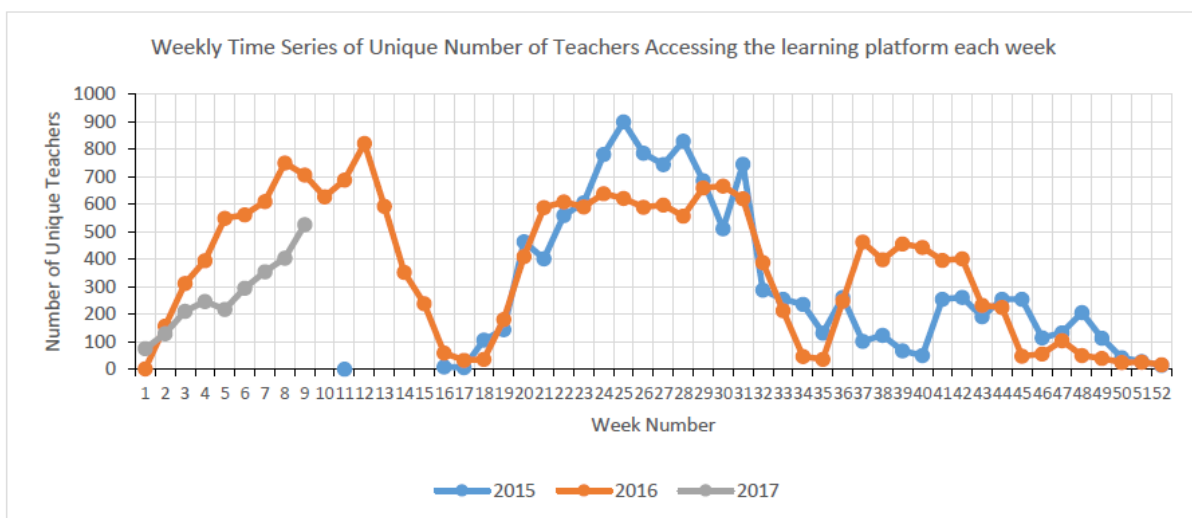
Figure 31: Total number of unique teachers accessing the portal per week split by school year

Project contribution

In order to understand the available time that schools are able to access the internet and use the resources provided we have calculated the availability of the VSAT and the school server (henceforth referred to as uptime). VSAT uptime refers to the percentage of time that the internet is available in the school. Similarly, server uptime refers to the time that the server in the lab is operational meaning that content can be accessed by the computers in the ICT lab network. The uptime of the VSAT and server depend on availability of electricity, the school switching them on every day and equipment failure.

Considering only the school hours (Monday to Friday 9am to 3pm) the average uptime of the VSAT and the school server per intervention group and County is shown in the tables below.

Table 61: Average VSAT and school server uptime during school hours per term and group

Group	Term 2 2016		Term 3 2016	
	Average VSAT Uptime (%)	Average School Server Uptime (%)	Average VSAT Uptime (%)	Average School Server Uptime (%)
A	70.0	57.3	54.0	40.8
C	70.8	59.4	53.0	43.8

Table 62: Average VSAT and school server uptime during school hours per term and County

County	Term 2 2016		Term 3 2016	
	Average VSAT Uptime (%)	Average School Server Uptime (%)	Average VSAT Uptime (%)	Average School Server Uptime (%)
Kajiado	77.6	63.8	65.7	49.9
Kilifi	66.2	50.0	55.7	38.5
Makueni	64.0	55.1	53.6	40.5
Uasin Gishu	76.4	68.0	55.1	45.3

Both groups experienced similar uptime for both VSAT and server so on average there was no significant difference in the overall availability of the ICT lab service between Group A and C.

The difference of uptime between the VSAT and the server is reasonable if we take into consideration that the servers were failing more frequently (based on the monitoring system we were using to raise issues to be resolved in the schools there were 11 VSAT and 67 server failures during the lifetime of the project) and the schools most probably turned on the VSAT almost every day to be able to access the internet but might have kept the server in the lab turned off when they weren't using it.

Kajiado had high uptimes for Term 2 and 3 of 2016 compared to the other regions which could be a possible reason for its improved performance in Maths-Whizz as presented in indicator 1.2.

Looking further into the uptime figures, it is obvious that the availability of the service in the schools is limited compared to the maximum theoretical value. In Term 2 2016 the service was on average available only for 3.6 out of 6 hours during the school day, while this dropped to 2.6 hours in Term 3 2016. We believe that this is mainly a reflection of poor enforcement of the timetable. Although these figures do not consider the use that has been happening outside of school hours, the limited uptime of the service during school time puts another strain on the time on task available for each student.
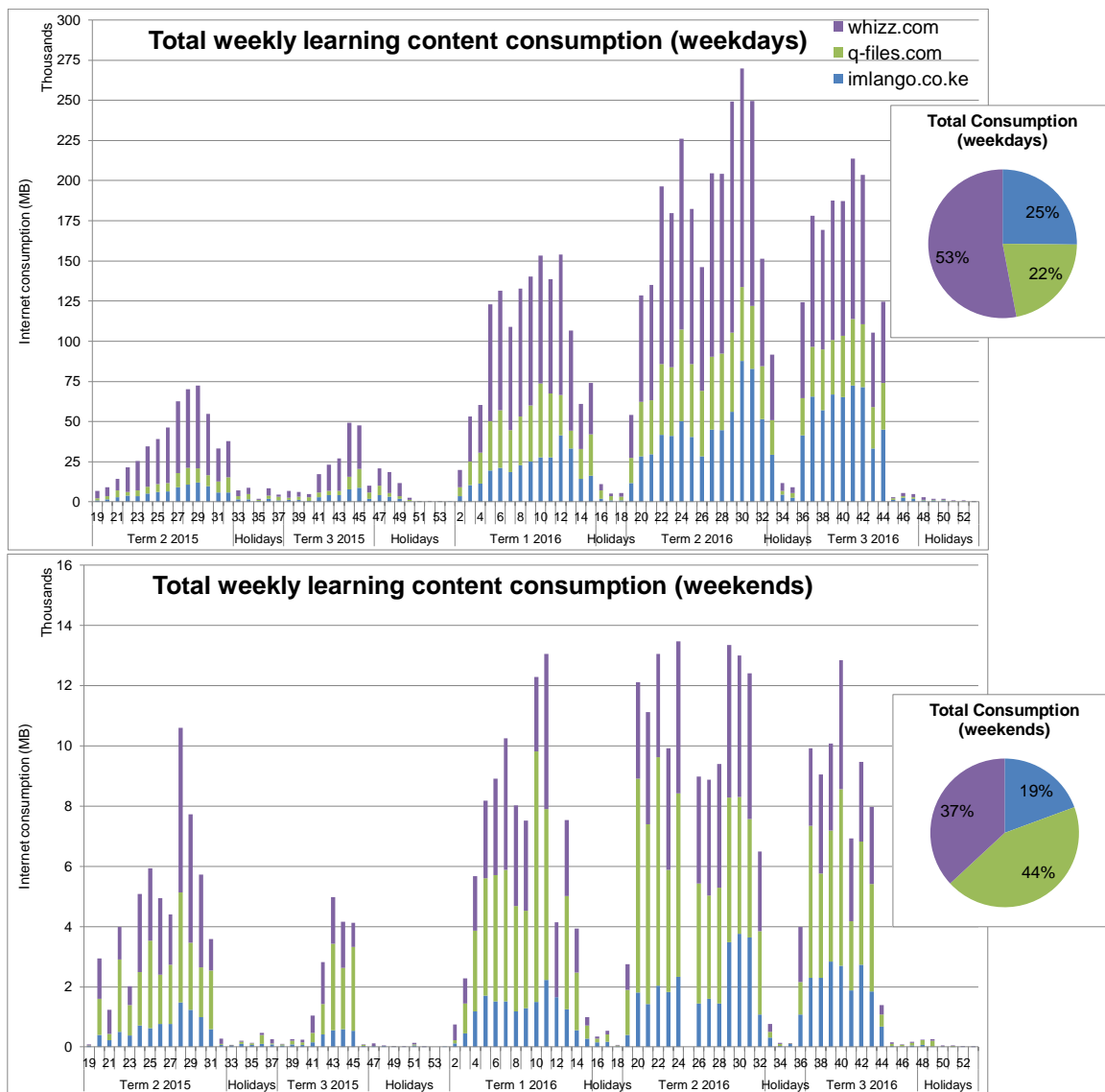
Figure 32: Total weekly learning content consumption disaggregated by content type and weekdays/weekends
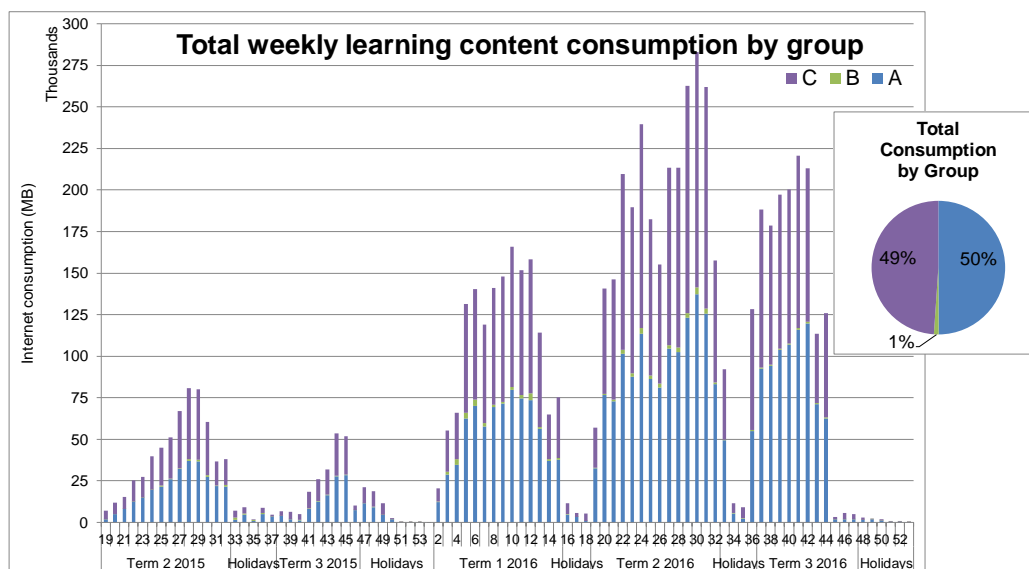
Figure 33: Total weekly learning content consumption disaggregated by group

Project contribution

All the VSAT terminals that are installed in the iMlango network can be monitored through the Avanti Operation Support System (OSS). The OSS monitors the availability of the internet, technical characteristics of the connection as well as usage statistics such as amount of data downloaded for all the iMlango schools. This effectively means that we can calculate the internet consumption of the schools on the various learning components.

Figure 32 shows the total weekly consumption across 2015 and 2016 disaggregated by weekdays and weekends as well as by type of learning content accessed. The three types of usage we can capture is Maths-Whizz, Q-files the online encyclopaedia and imlango.co.ke which includes the rest of the resources for literacy and life skills.

The overall consumption in 2016 is substantially increased which reflects the impact of the teacher refresher training sessions. It is important to note that there is usage of all the learning resources during most of the weekends during term time, although the average consumption is reduced by 96%.

Maths-Whizz consumption takes up 53% of the overall consumption on weekdays with Q-files having in increased consumption during weekends. This reflects the focus of the ICT lab and the timetable on individualised learning while on weekends teachers or students might be doing other activities such as child club activities or researching on the encyclopaedia.

Looking at the consumption per group (Figure 33) we observe that the usage of Group B is very low compared to the other groups due to the fact that they only use whole class content. Consumption between Group A and C is at similar levels.

Figure 34 shows the breakdown of learning content type for the usage per group. In Groups A and C Maths-Whizz takes up half on their overall consumption due to the presence of the ICT lab but Group B schools utilise the literacy related content on the portal and Q-files more than Maths-Whizz.

All traffic that goes through the VSAT terminals is subjected to access policies that are implemented by the Access Controller. This means that the teachers need to log in to the Access Controller in order to have wider access to the internet which enables us to disaggregate usage statistics by access policy. Based on the statistics collected throughout the project, the teachers are accessing various types of content outside of the portal as shown in Figure 35. The vast majority of the internet consumption is on YouTube which we know from the field team feedback is also used for teaching. The fact that YouTube is video based content drives up the consumption compared to other content such as WhatsApp of Facebook. Overall we can deduce that many teachers are comfortable with using the internet for accessing video and streaming services, emailing, researching and using messaging and social media services.
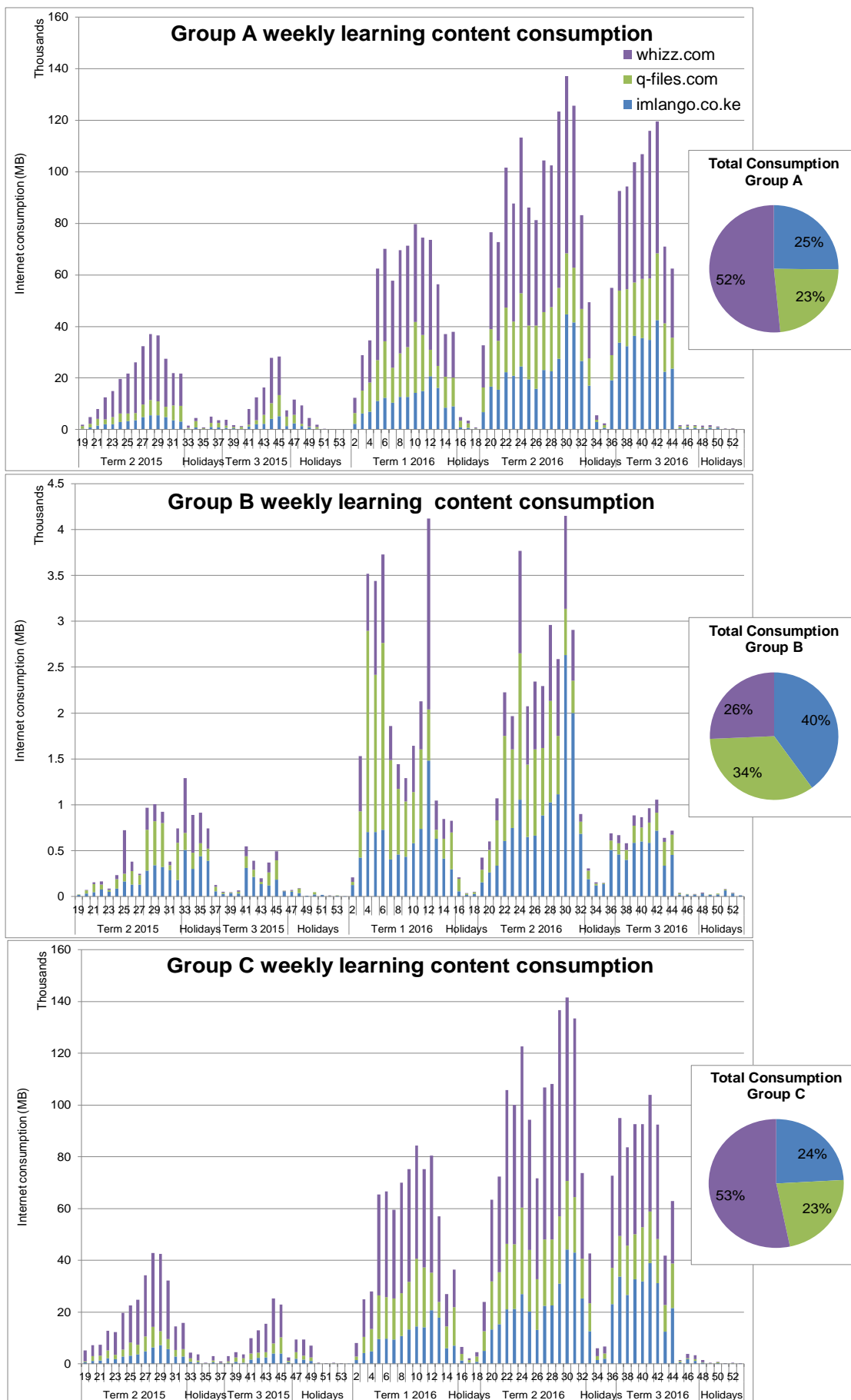
Figure 34: Total weekly learning content consumption disaggregated by content type and group
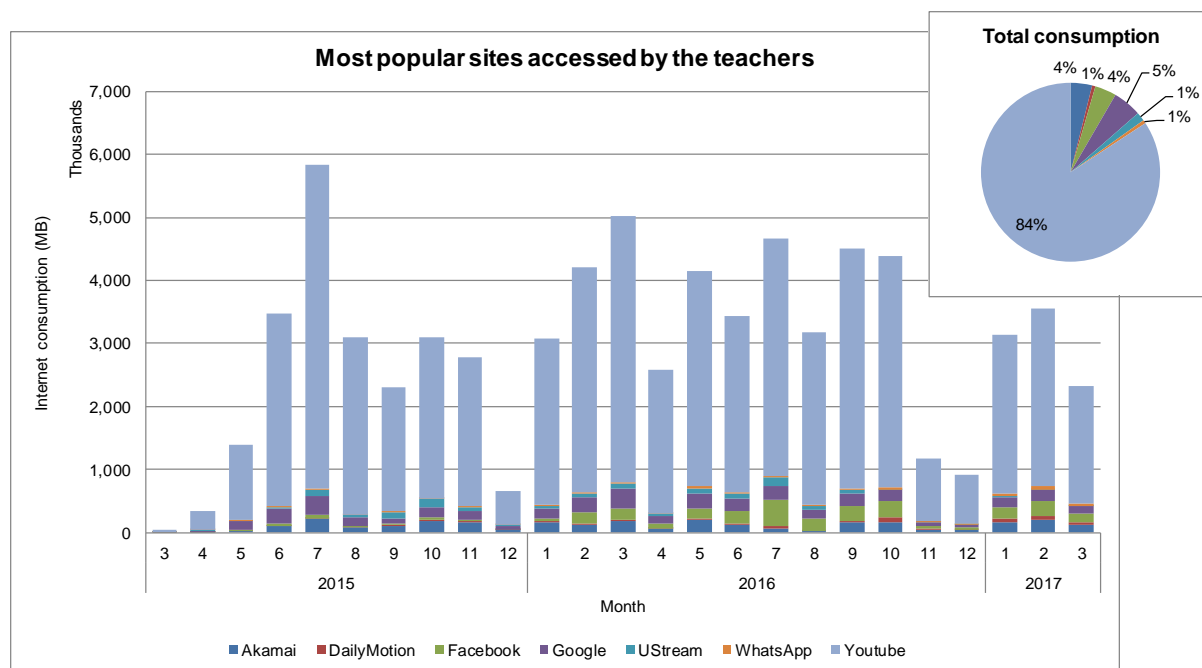
Figure 35: Most popular sites accessed by teachers

iii)   Sustainability

Some of the positive changes arising from iMlango, as reported through the endline survey will most likely be sustained if the schools are continually able to raise funds to keep the project running. Taken together, a multi-component improvement is visible – in teacher ICT skills, in their engagement is using digital learning tools, in improving the engagement of girls at school, and in building greater community understanding of the importance of education.

The changes which have come as result of the project are highly likely to be sustained beyond the life of the project. According to information gathered during the termly assessment, as well the endline evaluation, the project was not only very well received but also led to students gaining more interest in school. Computers were perceived to strongly influence pupils' attendance and academic performance. Parents reported that their children were eager to attend school and therefore they believe that absenteeism has been reduced:

> *"Since the computers were introduced I have seen a difference, they come to school in a hurry, they say they access the computers early in the morning before teachers start teaching them the normal lessons. I said earlier they earn more marks by using the computer, so they hurry up and it is making students more interested in school."*
> *(Endline FGD Older Mothers, Sambut Primary)*

As the equipment will be left at the school, this is likely to be sustained even after donor support comes to an end.

2.4.1.2 Output 2: Raised self-esteem, career aspirations, life skill improvement and knowledge of the outside world

Table 63: Project performance against Endline targets in Logframe Output 2

Output and Output indicators	Activities	Baseline level	Endline target	Endline achieved	Source
Output 2: Raised self-esteem, career aspirations, life skill improvement and knowledge of the outside world					
2.1 Improvement in the average score on the girls' perception scorecard	The main activities that contribute to this output are the development and provision of the learning portal for access by students and teachers as well as the provision of appropriate content for the child clubs.	Overall: 88.8% Group A: 89.2% Group B: 87.6% Group C: 90.3% Group D: 88.0%	7% improvement from baseline	Overall: 91.7% Group A: 92.5 % Group B: 92.3% Group C: 92.4% Group D: 89.5%	Girl scorecard
2.2 Proportion of marginalised girls who have considered a career path or have had positive conversations within the family relating to delaying marriage.		1. 50.9% of the 495 girls were more interested in acquiring a higher level of education after the introduction of the project 2. 42.8% of the 495 girls were more interested in pursuing a career after school after the introduction of the project 3. 69.0% of the 364 girls had discussed about their future plans with their family (November 2015)	1. 65.9% 2. 57.8% 3. 74.0% (15% improvement from baseline)	1. 53.4% 2. 50.4% 3. 69.8% (1,396 respondents)	Girl questionnaire
2.3 Proportion of girls that feel that the intervention is positively affecting their education and outlook.		1. 74.3% of the 501 girls stated they learnt numeracy, 42.3% literacy and 30.5% basic computer skills 2. 47.9% of the 495 girls are now more interested in attending school 3. 62.8% of the 495 girls reported that the use of computers has made school more exciting (November 2015)	1. 79.3% for numeracy, 57.3% literacy and 45.5% computer skills 2. 62.9% 3. 77.8% (15% improvement from baseline)	1. 85.5% of the 1,175 girls stated they learnt mentioned numeracy, 76.2% literacy and 14.5% basic computer skills 2. 60.5% of the 1,396 girls are now more interested in attending school 3. 67.8% of the 1,396 girls reported that the use of computers has made school more exciting	

i)   Activities, methodology and design

For all schools, the project undertook the same 3-stage approach which builds on the initial interview findings;

1) Stage 1 – achieve additional 'Time on Task' on the Learning Platform: the least structured of the clubs, with emphasis on use of the learning platform in a supervised way.
2) Stage 2 – embrace subject matter e.g. Good School Toolkit in a slightly more structured approach. This is an optional stage, since the schools were not expected to prioritise this area, but its use was encouraged.
3) Stage 3 – teacher led girl-focused clubs: these required much more commitment, and again have been optional and dependent on individual school/teacher willingness.

Child clubs are run by teaching staff. With limited resources, the focus was on positive choices within Life Skills, with content such as the Good School Toolkit and the Q-files online encyclopaedia. One of the limitations of design, mainly due to budget, was the limited access hours of computers vs. whole school population. With a major focus on Maths and Literacy, life skills was more limited in its ambition – simply because time on task was itself rather limited.

The indicators for this Output were measured through the girl questionnaire and girl perception scorecard in termly assessments and the endline. The project has also provided a success story.

The table below shows the distribution of girl perception scorecards by intervention group. It is important to note that the girls who participated at endline in these tools were not the same as those who participated at baseline. The successive independent sample surveys are designed so that changes within a population can be observed, however it is impossible to infer changes between individuals' perceptions over time, as two different sets of individuals are used at baseline and endline.

Table 64: Distribution of girl perception scorecard by group at endline

Group	Frequency	Percentage %
A	37	27.4
B	30	22.2
C	35	25.9
D	33	24.4
Total	135	100.0

ii)   Findings

At endline we asked the girls in the intervention schools about the operation of the child clubs that have been running in their schools as well as their opinion about them. 44.3% of them said that child clubs existed in their schools. Asked what activities they engaged in during child clubs time, 67.4% (223) of the girls in the intervention schools that attend the child club sessions said that they read stories in the portal, 63.1% (209) that they used Maths-Whizz, 16.3% (54) that they watched videos, 8.8% (29) that they used the Good School Toolkit and 16.9% (56) that they did activities with other students. The same girls were asked about their favourite child club activities; 42.6% (141) reported that their favourite activity is Maths-Whizz and 27.5% (91) reading stories in the portal. This suggests that the child clubs were used in the schools as an opportunity to study Maths and Literacy further rather than specifically use the life skills content. Therefore the impact of the child club activity on the Output indicators is limited.

This is again verified by the fact that the majority of the girls feel that the child clubs have helped them improve their grades (61.6%) and learn new things (58.0%) with just 20.8% of the girls thinking that the child clubs have made them more confident.

Table 65: Girls reporting how the child clubs have helped them

How the child clubs have helped the girls	Frequency	Percentage %
Helped improve my grades	204	61.6
Has helped improve my careers aspirations	56	16.9
Makes school more interesting	138	41.7
Helped me learn new things	192	58.0
Helped me feel more confident	69	20.8
Total	331	100.0

Indicator 2.1 tracks the improvement of girls' perceptions captured with the girl perception scorecard. A total of 17 questions are presented to the girls who are asked to answer using a likert-type scale. To evaluate the average score per question and overall we assigned a score to each answer based on how positive or negative it was. The scores ranged from 1 to 5 with 1 representing the most negative and 5 the most positive answer. The overall and per question average scores in % for baseline and endline are presented in Table 66 disaggregated by group.

Overall the intervention groups have improved more than the control schools based on the overall average scorecard score; Group A has improved by 3.3%, Group B by 4.6%, Group C by 2.1% and Group D by 1.5%. We have to note that the 7% target was set in the logframe based on another methodology for the evaluation of the indicator.

Looking further into specific question, the most improvement was captured when the girls were asked whether their school and teachers had the necessary facilities and skills respectively to teach the students. From the endline average score we can see that the students in the intervention groups seem to be equally satisfied with the school facilities with control school lagging behind. On the other hand, the perception of teacher skills across the groups is at about the same level at endline even though the intervention schools recorded a significant improvement since baseline. We consider that these changes in perception are linked to the equipment and training that the project provided in the intervention schools.

Another positive change was that more girls in the intervention schools agreed that their parents encourage them to marry when they are ready to do so. This was reflected in the FGDs were some of the girls stated the following:

> *"Interviewer: Do your parents tell you to be married after university?*
> *Respondent9: My mother has shared this with me and she advises that I clear university first before marriage.*
> *Respondent7: After University. At 29 years.*
> *Respondent6: At 25 years and above. She does want me to go to school first and does not want me to get married at an early age.*
> *Respondent5: She advises that you first of all finish your education and find a good job that can sustain you thereafter you may get married." (Endline FGD Girls, Ziwa Primary)*

Another interesting finding is that girls' perception of completing school has slightly deteriorated across all groups at endline. This could be linked to the fact that at endline all girls had stated that they will definitely complete primary school whereas at endline a few girls said that they might complete.

Table 66: Average score per scorecard question for baseline and endline by group

	Girl Scorecard Question	Baseline (BL) %				Endline (EL) %				EL-BL %			
		A	B	C	D	A	B	C	D	A	B	C	D
1	My school has the necessary facilities for my learning.	68.6	59.4	82.4	74.5	86.7	88.4	89.1	77.0	18.0	29.0	6.8	2.4
2	The teachers in my school have the necessary skills to teach the students.	85.9	84.8	87.6	91.5	92.8	92.9	93.7	92.7	6.8	8.1	6.1	1.2
3	Girls' education is as important as that of boys.	91.9	90.3	87.1	88.5	88.9	94.2	93.7	87.3	-3.0	3.9	6.7	-1.2
4	Girls should stay at home and help with work instead of going to school.	93.0	85.5	90.6	88.5	93.9	87.7	90.9	91.5	0.9	2.3	0.3	3.0
5	How often are you able to complete your homework/assignment in time?	84.3	89.1	87.1	85.5	91.1	87.7	87.4	89.1	6.8	-1.3	0.4	3.6
6	What I learn at school is useful in my life outside school.	92.4	90.9	92.9	86.7	94.4	93.5	95.4	91.5	2.0	2.6	2.5	4.8
7	My parents/guardians encourage me to attend school and complete my education.	89.7	86.1	90.6	84.2	93.9	94.2	90.9	93.3	4.2	8.1	0.3	9.1
8	It is important for girls to complete their education so that they can have a good career.	93.5	95.8	95.3	93.3	98.3	95.5	93.7	96.4	4.8	-0.3	-1.6	3.0
9	I intend to complete my education and not stop school mid-way.	100.0	100.0	100.0	100.0	98.3	100.0	98.3	98.2	-1.7	0.0	-1.7	-1.8
10	I believe it is necessary to encourage other girls to complete their education.	94.1	93.9	94.7	93.3	98.3	95.5	93.1	93.9	4.3	1.5	-1.6	0.6
11	It would be important for the government to make it mandatory for parents/guardians to educate their daughters.	94.6	95.8	97.6	93.9	94.4	97.4	93.7	96.4	-0.2	1.7	-3.9	2.4
12	Early marriage should be discouraged.	89.2	90.3	91.2	86.7	97.2	94.8	96.6	92.7	8.0	4.5	5.4	6.1
13	My parents encourage me to get married when I am ready to.	81.6	72.7	76.5	78.8	86.1	85.8	84.6	75.8	4.5	13.1	8.1	-3.0
14	I feel safe in school	90.3	92.7	92.4	92.7	95.0	95.5	93.7	92.1	4.7	2.8	1.4	-0.6
15	I feel confident asking questions to my teachers in class during lessons?	85.9	90.3	90.0	89.7	87.8	88.4	93.1	86.7	1.8	-1.9	3.1	-3.0
16	I know what to do and who to tell if someone is violent towards me at school.	91.9	90.9	92.4	88.5	88.3	92.3	92.0	84.8	-3.6	1.3	-0.4	-3.6
17	If feel able to tell someone if someone is violent towards me at school.	89.7	81.2	87.1	80.0	87.2	84.5	91.4	81.8	-2.5	3.3	4.4	1.8
	Overall Average Score	**89.2**	**87.6**	**90.3**	**88.0**	**92.5**	**92.3**	**92.4**	**89.5**	**3.3**	**4.6**	**2.1**	**1.5**

Regarding girls' confidence in asking questions to their teachers (Question 15) we can see that there was a slight improvement for Groups A and C but none in Groups B and D. This might be because the individualised use of resources had an impact on confidence. Further to this, girls in intervention and control schools were also asked though the girl questionnaire whether they feel comfortable answering teacher questions. The most frequent answer in all groups was that they always feel confident with similar percentages. According to Table 67, the percentage of girls that report they feel confident sometimes, most of the time and always has increased for all groups by 6% for Group A, 5.6% for B, 3.5 for C and 1.1% for D. This means that in Groups A and C both the confidence in answering and asking questions while in class has increased, while in Group B and D only the confidence in answering questions has increased.

Table 67: Girls reporting whether they feel confident answering teacher questions

Confidence answering teacher questions	Endline				Baseline			
	Group A (n=471) %	Group B (n=472) %	Group C (n=453) %	Group D (n=338) %	Group A (n=491) %	Group B (n=472) %	Group C (n=454) %	Group D (n=355) %
Always	48.0	48.3	51.0	47.9	46.2	45.3	45.2	52.1
Most of the time	23.4	21.2	15.0	23.4	19.6	20.3	21.8	16.3
Sometimes	25.7	27.1	29.4	21.6	25.3	25.4	24.9	23.4
Rarely	2.1	2.3	4.6	5.9	6.7	4.0	4.2	4.8
Never	0.8	1.1	0.0	1.2	2.2	4.9	4.0	3.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Indicator 2.2 tracks the proportion of girls that have considered their future plans (either pursuing a career or acquiring higher education context) and discussed them with their families.

The girls were asked how the introduction and use of computers in their schools has changed the way they looked at their future. To this 33.1% of the girls said that they were more interested in completing primary school, 37.4% said that they were more interested in completing secondary school 53.4% said they were more interested in acquiring a higher level of education while 50.4% said that they were more interested in acquiring a career after school. Nearly all the girls (99.8%) in the intervention schools who were interviewed at endline had considered the career they wanted to pursue after completing school with 38.5% of them saying that they wanted to become doctors and 23.1% teachers, while others mentioned interest in other careers. Compared to the data collected in the termly assessment in November 2015, the proportion of girls that are more interested in acquiring a higher level education or pursuing a career has increased by 2.5% and 7.8% respectively. This is potentially due to the limited exposure the girls had in content targeting this change in their future plans.

The girls were also asked whether they had discussed their future plans with their parents to which 69.8% answered positively. Out of those 974 girls, 71.8% said that their mothers were present during the discussion in contrast to 44.0% who said their fathers were present. The vast majority of the discussions held (93.6%) were about the girls' need to spend more time on school work instead of delaying marriage. This again suggests that marriage is a topic that is not easily discussed between the girl and her family. Since November 2015 the proportion of girls that have discussed their future plans with their families has stayed the same meaning that more targeted activities would be required to address such issues.

Indicator 2.3 tracks the girls' opinion of the project impact on their education and outlook. When the girls in the intervention schools were asked what they have learnt through the project, 85.5% mentioned numeracy, 76.2% literacy and 14.5% basic computer skills. Compared to the baselines figures there is an important increase in the proportion of girls that feel they learn numeracy and literacy which means that more girls were exposed to the project activities and appreciated the impact it has on their education. On the other hand, the proportion of girls that felt they learn basic computer skills has decreased considerably potentially due to the fact that they are not being taught ICT lessons in the lab.

When asked whether the use of computers in their schools has changed the how they felt about school, 60.5% of the girls in the intervention schools said that they were more interested in attending

school while 67.8% said that t they found school more exciting. Although there has been improvement in both metrics (12.6% and 5.0% respectively), the targets set haven't been reached.

Project contribution

Career aspirations are connected to girls' raised self-esteem and how they see themselves within the wider education system. We've found that access to online resources via the portal have broadened girls' horizons, allowing them to gain exposure to the world outside of their immediate community. iMlango is also providing girls with a greater sense of educational purpose, which contributes towards an increased interest in career aspirations and a stronger desire to continue their school career (when possible).

The Girl Clubs are becoming more integrated into the fabric of daily school life. They represent the main way in which girl-specific issues can be openly discussed and addressed in a safe space. In some schools, community members have begun to become active participants in the Clubs, whereby harmful social norms are addressed directly as a two-way learning dynamic is established. Head teachers often attribute successes in tackling social issues - such as teen pregnancy - to the Clubs, and how they've encouraged heightened community involvement in addressing these problems.

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iii)   Sustainability

Due to the compressed implementation time that the project had, the project built mostly on existing activities that the schools were undertaking in the area of child clubs. Many of the schools already had some kind of child club running either specifically for girls or mixed, however the activities were not necessarily targeted towards raised self-esteem and career aspirations of girls. The operation of child clubs will naturally continue in the schools: moving beyond the Good School Toolkit and focusing on other activities and content.

In order to make this activity more robust and sustainable, in the next phase the child clubs will be implemented in the iMlango schools by Discovery Learning Alliance (DLA). DLA will provide training to child club mentors in the schools and provide a wide range of content targeting the girl issues that are relevant to Kenya.

Project contribution – Success story

<u>Chui & Simba iMlango Child Club Success Story – How child clubs initiated a project in school to sustain iMlango and care for its girls</u>

Mariakani town straddles the Mombasa – Nairobi Highway on a flat coastal plan. It is a fast growing town and has a fairly cosmopolitan outlook due to its position as a resting point for travellers on the busy highway. It is a fast growing hospitality centre with rapidly expanding settlements.

This is the home of Mariakani primary school. The school has established two iMlango child clubs; *Chui club* for boys, and *Simba club* for girls. Each club has its leaders elected by the group members and are separately run but with similar objectives, to extend knowledge and skills using the iMlango portal.

A photo of Simba iMlango girls only club

The members are assigned measurable tasks which must be accomplished in the given period. The leaders ensure the assignments are undertaken with the main resource being the iMlango student portal. These tasks are done competitively with high performers rewarded with credits/certificates.

The iMlango child club leaders are also tasked with the role of ensuring access of members to the iMlango portal during breaks, weekends and other suitable periods. Online magazines, poems and stories are also key resource items for the

pupils.

As competency grows, the Club reports that students are developing a culture of independence in seeking knowledge and subsequent application in their daily lives. The Clubs enable free time to be constructively utilized and the enthusiasm for knowledge is growing.

Members of the clubs are tasked as role models for "source of knowledge".

One of the topics the clubs learned from life skills was "What is a good learning environment?" The club members narrated how boys now care for the girls, how they want to keep the environment clean and ensure the child club doesn't stop running. They have initiated a project to plant trees which will grow big and help to make their school more beautiful; and by planting trees they hope to stop environmental degradation in the school. They plan to sell the trees to the local nurseries which are a vital source of plants and already have a market in the school and surrounding areas. This is a very lucrative business in Mariakani, Mombasa and its environs.

A photo of Chui boys only child club

A photo of Simba girls' only iMlango child clubs planting trees in the school compound

The school also has sweet potato gardens which have been established to provide know how to the learners and serve as sources of revenue. The clubs run these gardens separately in a spirit of competition. The revenue generated will help the school sustain the iMlango project by paying the electricity bill and helping the girls and boys in both Chui and Simba child clubs to remain in school.

When there is no power in school the club members cannot access the computer lab so they take such opportunities to plant, check their nursery bed and to develop other skills e.g. art and drawing; which has been included as an assignment. Pupils have found this a great form of self-expression by sketching cartoons, pictures of animals, people and scenes.

These clubs are now introducing a new approach to learning where the children seek out knowledge and are sources of knowledge for their peers.

Art by Kelvin one of the members of Chui club
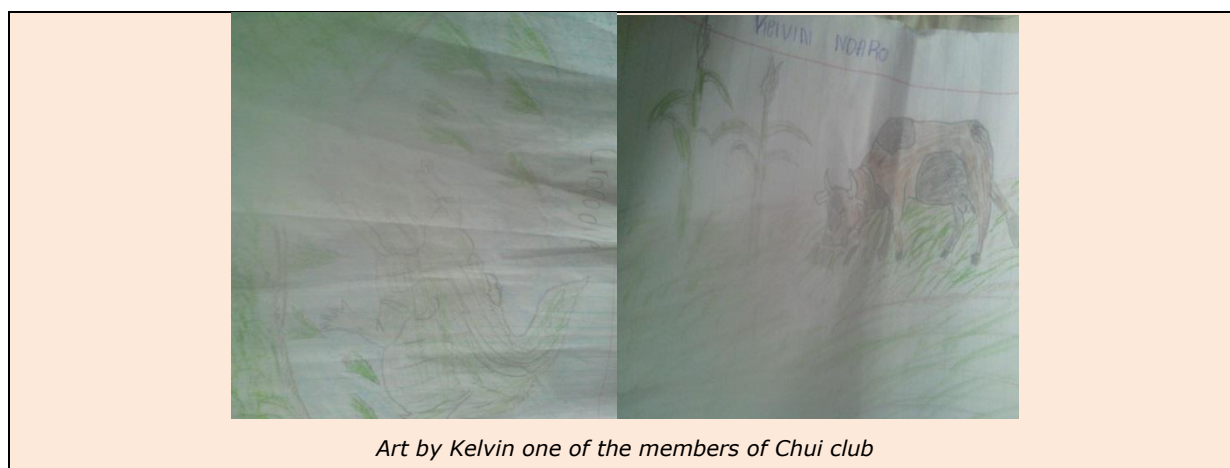
2.4.1.3   Output 3: Improved learning and engagement in ICT by girls

Table 68: Project performance against Endline targets in Logframe Output 3

Output and Output indicators	Activities	Baseline level	Endline target	Endline achieved	Source
Output 3: Improved learning and engagement in ICT by girls					
3.1 Progress rate of girl students using Maths-Whizz Tutoring in the recommended way (i.e. between 30 and 90 minutes per week)	The main contributing activities are: • Provision and maintenance of satellite internet ICT infrastructure in the schools; • Provision and maintenance of individualised Maths-Whizz licenses as well as teacher resource for whole class teaching; • Development, provision and maintenance of the learning portal and the content available through it.	0.575	1.2	Overall: 0.87 Girls: 0.82 Boys: 0.91	Maths-Whizz reporting system; only applicable for Group A and C
3.2 Average time spent on Life Skills content by girl students either as whole class or individualised access per month (measured in hh:mm:ss)		N/A	30 mins	Group A: 00:11:27 Group C: 00:20:47	iMlango portal reporting; only applicable for Group A and C
3.3 Average exposure time to the iMlango portal per girl student each week (measured in hh:mm:ss)		N/A	30 mins	Group A: 01:02:52 Group C: 00:56:40	

i)   Activities, methodology and design

The activities that contribute to this Output are common with the ones of Output 1 and have been described in Section 2.4.1.1.

The indicators for this Output were measured through the Math-Whizz central reporting system and iMlango platform that track the resource usage of all students and teachers.

ii)   Findings

Use of technology certainly improved the engagement of girls in education. Learning also improved, though to a lesser extent than was hoped by endline. It seems likely that this was due to the challenge of time on task, which may have resulted in marginal learning gains across the many areas of content on the portal rather than greater improvements in a few.

Indicator 3.1 was greater than the baseline value, suggesting that the rate of learning mathematics has been improved, though not to the target level. The project contribution suggests that to achieve the target progress rate, usage needed to exceed 59 minutes per week instead of the recommended 30. Figure 37 shows that for girls within the recommended usage bracket, the average usage is just below 40 minutes per week. If the time on task had been greater, it is possible that this average would have been closer to meeting the target.

Indicator 3.2 was not achieved by endline. As noted in Output 2, the project placed a significant focus on maths and literacy, which resulted in an under-representation of life skills content and scope. This was driven by limited time on task, exacerbated in particular by large school populations. There has been little development to the life skills content section on the portal, and once the content available (the Good School Toolkit and the Handwashing guide) is completed, there is little value in repeated use. This is reflected in the portal data, which shows that girls average 2.3 sessions on the Good School Toolkit. It is worth noting that the Handwashing guide was designed by a Girls' Child Club from an iMlango school, Utithini Primary. This was subsequently digitised and made available on the portal for all teachers and children, which shows an instance of project engagement with target beneficiaries in innovative content creation.

Only 8.8% of girl respondents said that they used the Good School Toolkit in the child clubs, with story books (67.4%) and Maths Whizz (63.1%) dominating individual computer activities. This correlates with the low amount of time spent on Life Skills content, with girls averaging 7 minutes 19 seconds on the Toolkit. Teachers spent on average 19 minutes 52 seconds on the Toolkit with 1,827 log-ins across 204 schools. The Toolkit aims to ensure a school develops 'good teachers', a 'good learning environment' and 'good administration', therefore facilitating the need for teacher involvement and teacher/pupil interaction. As there is a partial focus on the teacher, and teacher's time on Life Skills is not measured in the logframe, there is a degree of underrepresentation on time spent on Life Skills content.

The project achieved the indicator 3.3 target of 30 minutes of average weekly portal usage for girls in both Group A and C schools. Group A achieved more than double the weekly target time on portal. Despite some challenging contextual factors (e.g. electricity problems, drought, KCPE examinations in third term - refer to 2.4.2 for fuller analysis), schools generally managed to structure computer access adequately well. The field teams made a concerted effort at the start of the school year to ensure appropriate ICT lab timetables were created and implemented in each school.

Project contribution

For those students meeting recommended Maths-Whizz weekly usage, *indicator 3.1* states that by the end of the project we would expect them to achieve a progress rate of 1.2. Progress Rate is the expected change in a student's Maths Age over the course of a year; it is based on the increase in their Maths Age over a given period. For example, if your Maths Age increases by 0.2 years during one quarter of the year, your progress rate for that period is 4 x 0.2 = 0.8.

By calculating the Maths Age of students in each Standard at initial assessment, we can model their expected annual growth in the absence of intervention. Specifically, Figure 36 shows the difference between students' Maths Ages and actual ages (their *Delta*) at initial assessment. Students in standard 1 on average had a Maths Age of 2.9 years below their actual age. This difference gets larger as we move up the Standards, reaching a peak gap of 4.6 years below in Standard 6. Converting this change into a Progress Rate gives a baseline annual Progress Rate of 0.575. In other words, in each year of schooling, without intervention, Kenyan students make 0.575 years' progress, thus falling 0.425 additional years behind their international peers. In Standards 7 and 8 the difference begins to decrease. In-field observation suggests that this is likely caused by lower-attaining students dropping out of education. Moreover, those that remain are given additional attention as they

approach the KCPE exams.
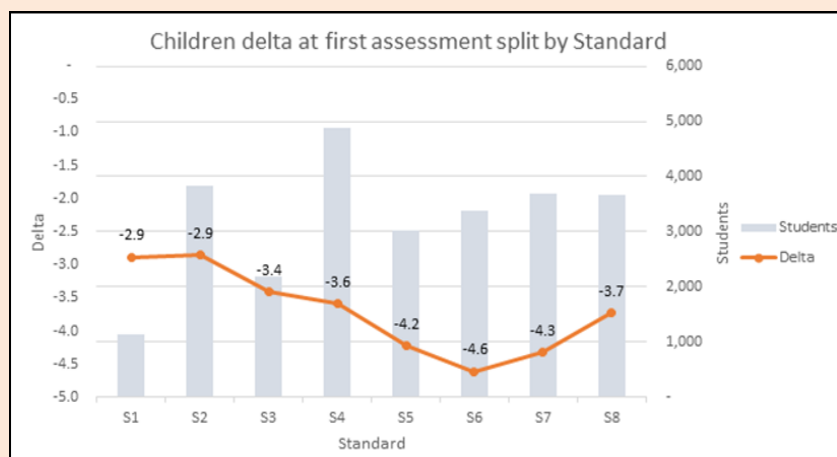
Figure 36: Average difference between actual age and Maths Age (Delta) after the Maths-Whizz initial assessment

In Term 3 of 2016, students meeting the recommended usage had a Progress Rate of 0.87 (see Figure 37). Female students had a Progress Rate of 0.82 and male students 0.91. While below the target Progress Rate of 1.2, this is still a substantial improvement over the baseline result of 0.575, demonstrating that accelerated learning has taken place. To achieve the target Progress Rate of 1.2, a linear regression on the Term 3 2016 data (Figure 38) indicates that an average of 59 minutes of weekly usage is required.

Since term 3 of 2015, Progress Rates of female students have been consistently lower than those of male students. Figure 39 indicates that female students meeting recommended usage have a lower average usage than male students. This may go some way to explaining the difference in Progress Rates.

Throughout 2016, Progress Rates for students meeting recommended usage have increased, which reflects a sustained, data driven effort to improve the project implementation. Insight from analysis and in-field observation has led to a series of updates for Maths-Whiz to better tailor the product to the learning environment of iMlango students. This insight also actively informed our field team's practices.

An example of a Maths-Whizz update that resulted in a 10% increase in Progress Rate was saving the progress of incomplete lessons. Data analysis had identified that many students were failing to reach the end of Maths-Whizz lessons. Each time they logged in, they would have to start their current lesson from the beginning again. In field observation confirmed this to be the case, often due to power cuts or simply reaching the end of that class' computer lab time. An update to Maths-Whizz was released to record progress in incomplete lessons. The next time the student logged in, the lesson adapted to their previous performance, presenting shorter content to ensure mastery before moving on.

One change of field team practice that led to an increase in Progress Rate was emphasising the importance of students completing their initial assessments individually. This change was implemented after data analysis showed students struggling in lessons after completing the assessment. In field observation revealed that students were completing their assessments in small groups. Completing the assessments in groups was inflating students' scores, so when it came to completing lessons on their own the content was too difficult.
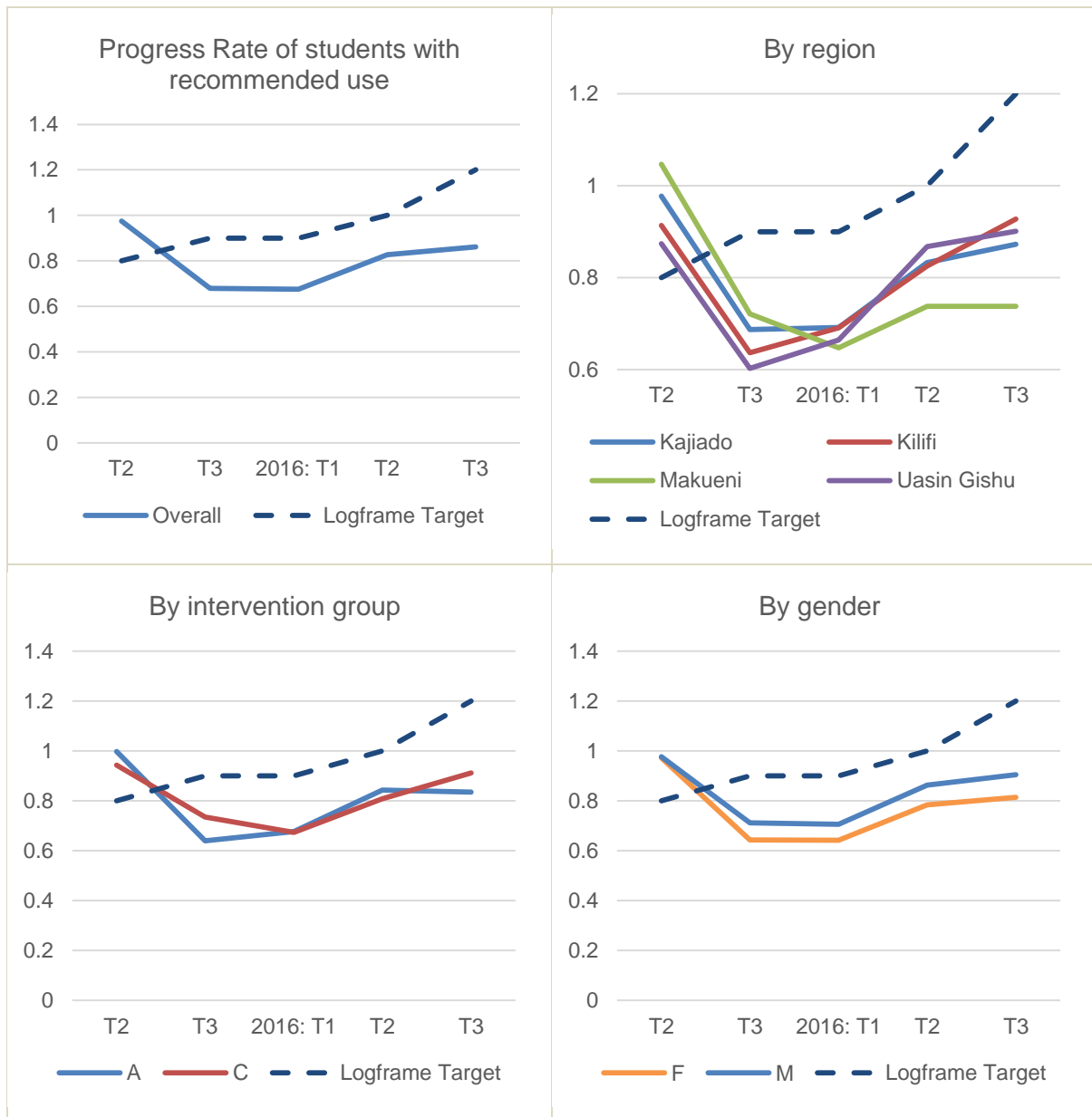
Figure 37: Maths-Whizz Progress Rates of students with 30-90 minutes of use each week on average[6]

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[6] Term 1 data is not include as only 20 students met the recommended usage, so the data was deemed unreliable
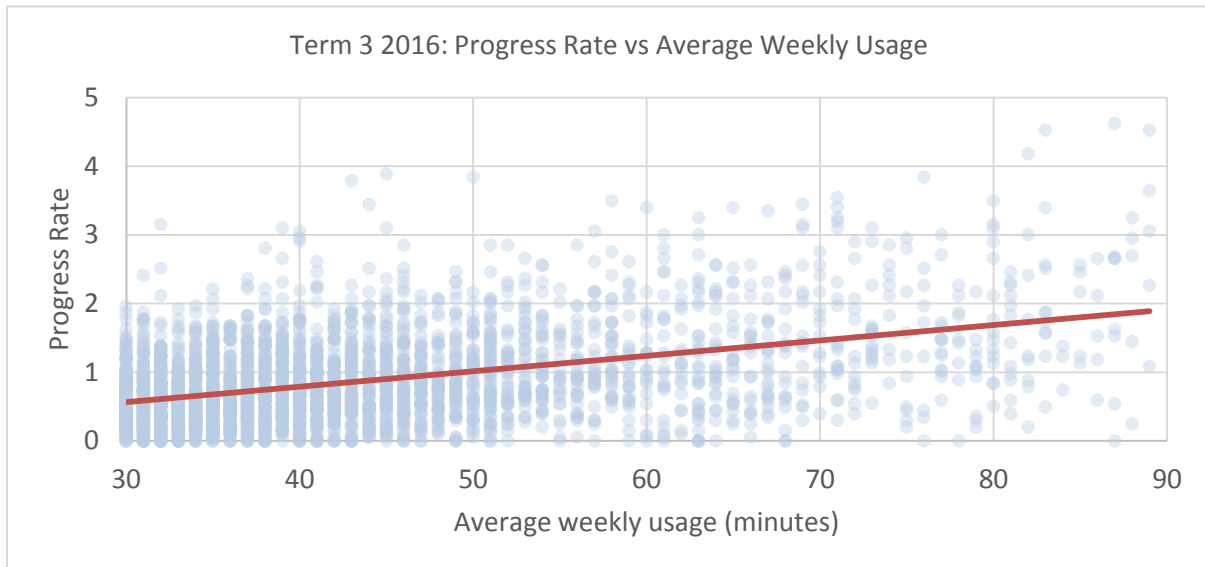
Figure 38: Maths-Whizz Progress Rate against average weekly usage for students meeting recommended usage in Term 3 2016[7]
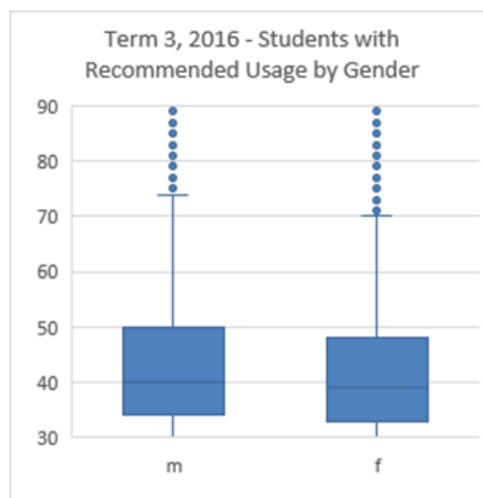
Figure 39: Distribution by gender of average weekly usage of Maths Whizz for students that met the recommended usage criteria in Term 3 2016

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[7] Three data points are not visible in the graph (30, 8.4), (33, -2.8) and (56,8.12). Negative improvements can come about if a student is reassessed during the term.

Project contribution – Success stories

Fatuma (13), Mwareni Primary (Group C – Kilifi)

Fatuma is a 13-year-old girl at Mwareni Primary in Kilifi. Fatuma is from a large family, she has two brothers and two sisters. She is currently in her final year of primary school and is preparing for her KCPE exams. Fatuma wants to go to Precious Girls – Riruta for secondary education, but to do so she must achieve top marks. She is motivated and working hard towards her target of 350 out of 500 points. After secondary school, she hopes to be a journalist.

Fatuma recognises Maths-Whizz as vital part of her improvement in mathematics. She describes how through Maths-Whizz, she has learnt multiple methods to approach each problem. Before project iMlango she disliked maths, she was struggling and scoring 30% in tests. With the help of Maths-Whizz she is steadily improving, and is now consistently scoring 50% in tests. She is also much more engaged with the subject.

Fatuma's Maths-Whizz progress report reflects this improvement (see Figure 40). For just over a year she has used Maths-Whizz for 25 minutes a week, slightly below the recommended usage, and has managed to achieve a 1 year improvement in Maths Age. Without Maths-Whizz, students in Kenya were calculated to make an improvement of 0.56 years in Maths Age over the course of a year. With just 25 hours of personalised simulated tutoring she has learnt at an accelerated rate and has made excellent progress towards being able to join Precious Girls - Riruta.
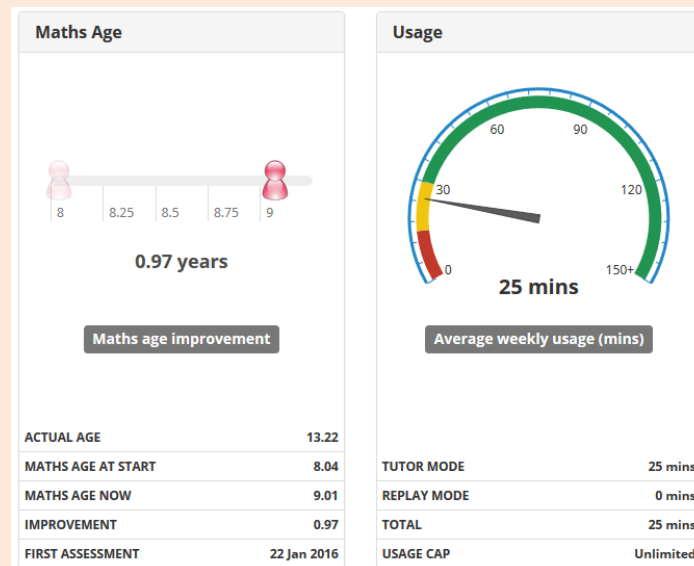
Figure 40: A section of Fatuma's full history Maths-Whizz report

Figure 41 shows Fatuma's maths ability profile. We see that she started Maths-Whizz with a gap in her knowledge about fractions. Over the year, this gap has been covered, and her knowledge of fractions is beginning to catch up with that of the other topics. Fatuma has made excellent progress in pencil and paper topics, improving by more than a year and a half in just over a year.
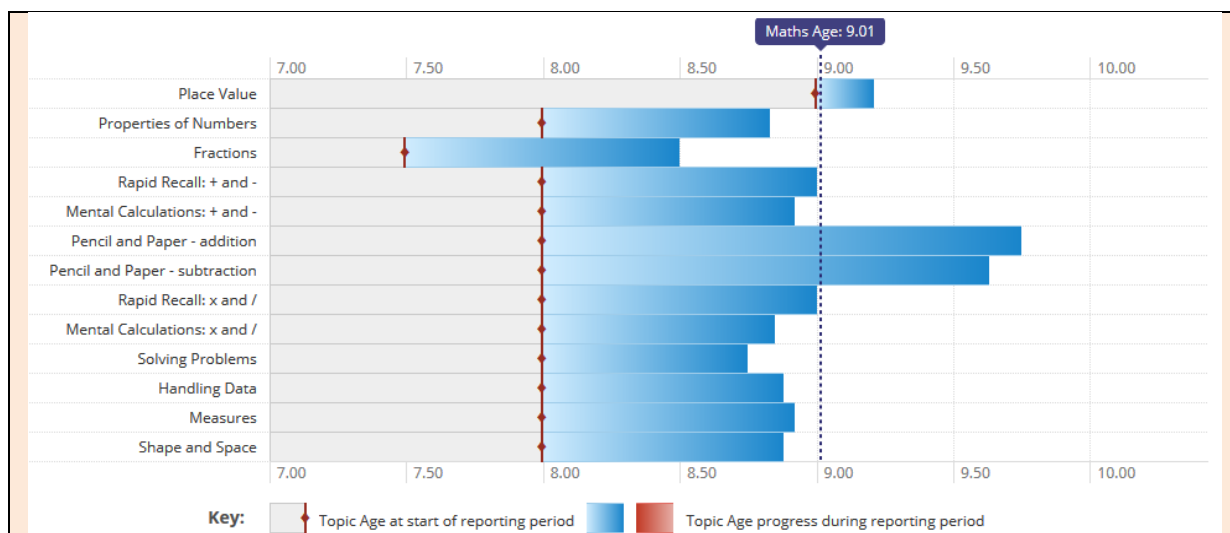
Figure 41: Fatuma's progress in each topic during her time on Maths-Whizz

<u>Kibiko Primary (Group A – Kajiado)</u>

Kibiko Primary is one of the leading schools both in progress and in its leadership. Teachers rigorously follow the timetable both for individualised and whole class learning. They have wholeheartedly embraced the intervention and follow the best practice guidelines to the best of their ability. Last term, the school had the top usage in Kajiado West sub-county with an average of 24 minutes per week.

Kibiko Primary is no different from any other school in terms of its challenges and everyday struggles. The school's headteacher, Mrs Josephine, observes: *"unfortunately we have started this [academic] year on a wrong foot because we have no power due to unpaid bill but once we sort it out, we will pump efforts on classes to utilise this service since we now have evidence that this intervention changes the mindset of students that subjects like mathematics are not hard and can be tackled successfully"*.

"It is not until I saw the school results that I came to believe that what goes on in the lab is truly reflected in our course work. Some of the teachers told me last year that we were seeing improvement in Mathematics and English", she started the conversation. She continued to reflect with excitement on the 2016 Standard 8 performance. *"The project started when this class was in Standard 6 and so they have had time to interact with it, and for sure, a comparison of the 2015 and 2016 mean scores are telling of improved performance by 17 points even while the number of students seating the final exams increased by 23 candidates. Mathematics improved by 4.2 points"*.

A look at the mean scores displayed in her office for the last three years shows a continuous improvement in learning outcomes that Mrs Josephine apportions largely to the iMlango intervention. *"We are really grateful to iMlango project"* - were her words as she analysed school's results.

Subjects' mean score shows that the school has registered further improvement in 2016 to its initial success in 2015. Maths has been the most improved subject in the school.

Years	2014	2015	2016
Maths	40.11	42.63	46.91
English	55.33	56.28	57.24

The success of the intervention in Kibiko Primary is largely due to the exemplary leadership of Mrs Josephine and her dedicated team of teachers. While the school is facing the same challenges that are present in other schools, with committed support from the project's field teams, they have found a way to provide continuous and consistent access for students to Maths-Whizz thus enabling them to benefit from individualised tutoring.

Project contribution

Indicator 3.2 captures the time per month spent by each girl on the life skills content of the portal. The table below presents the average time spent per girl for each of the 3 months of Term 3 2016 which is our endline period.

Table 69: Average time spent per month per girl on life skills content split by group

Month	Group A	Group C
September	00:12:48	00:13:56
October	00:16:46	00:16:12
November	00:04:48	00:32:12
Average	00:11:27	00:20:47

The main difference in access between Group A and C is in November which might reflect the use of equipment in Group A to prepare the students for exams using individualised learning rather than running child club activities and using the life skills content. With the challenge of limited time on task and the shortened third term due to the KCPE exams the schools were not able to reach the target for this indicator.

Indicator 3.3 tracks the time spent on a weekly basis by each girl on the portal accessing the learning resources available. Figure 42 shows the average time per week achieved per girl in Groups A and C for every week of the endline period which is Term 3 2016. Both Groups have surpassed the endline target of 30 min per week per girl.

Table 70: Number of girls reaching the target for weekly portal usage

Group	Total number of girls	Average Time of Total in Term 3	Total >=30 min
A	12,264	04:04:39	10,482
C	14,416	03:00:55	11,576

85% of girls in A schools are achieving the recommended minimum of 30 minutes a week on portal, with 80% of C school girls. The below scatter plot shows that there is a positive multiplicative trend between average attendance and average time on portal, indicating that a higher attendance results in a greater chance of more time on the portal. As noted throughout the report (specific section: 2.3.1), average attendance has remained sub-optimal. At endline, average A school attendance for girls was 80.8%, whilst average C school girls' attendance was 75.1%. The diverging attendance rates between A and C schools partly explains the difference in portal times between the two intervention groups (C has 26.1% less overall time than A), which is consistent with our observations that poor attendance undermines pupils' ability to maximise their educational output. Therefore, this correlates with the Group A vs. Group C trend that we have seen for Maths-Whizz. Despite C schools' collectively low attendance, it is impressive that average portal use has remained consistently high.
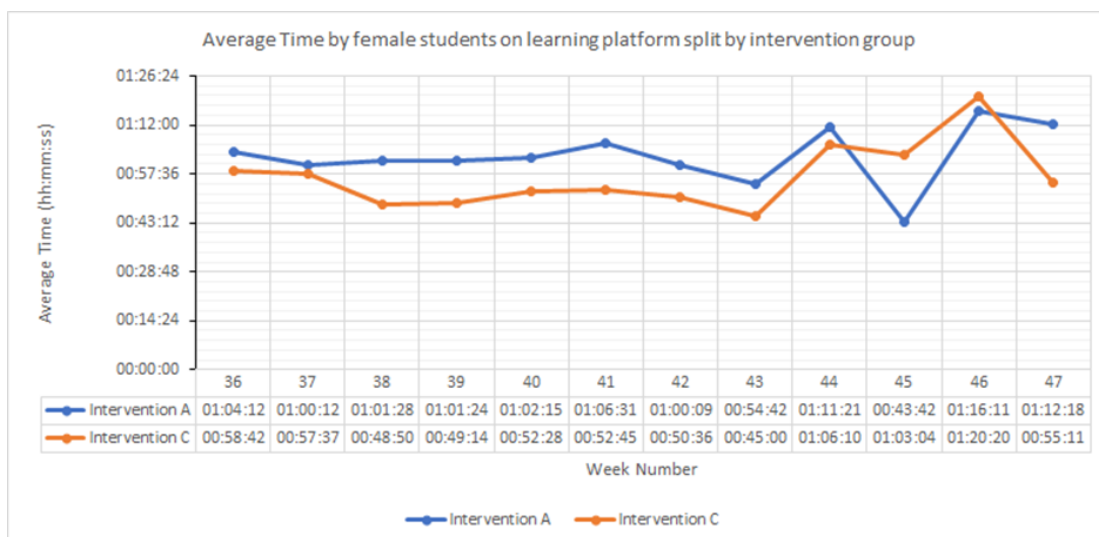
Figure 42: Average time spent by girls on the portal per week over the endline period, split by intervention group
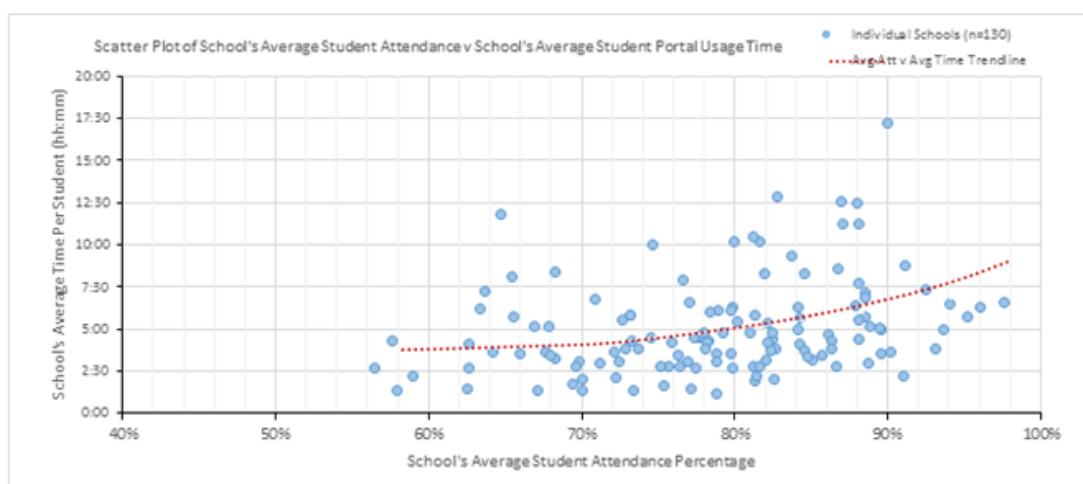
Figure 43: Scatterplot of school's average student attendance vs. school's average student portal usage time

iii)   Sustainability

The most critical factor in being able to sustain and improve the achieved results is the careful scheduling of activities and learning in the school. Findings indicate that time on task is one of the main limitations to achieving learning outcomes. So far, the project's field teams have assisted the schools at the beginning of the school year to create appropriate timetables for use of the ICT lab and the whole class resources. However, this has not been enough as the schools have not been able to reach the targets for Maths-Whizz and life skills usage given the limited number of computers available. Therefore, in the next phase of the project the use of the ICT lab will be prioritised in a way that maximised the learning gains for students. More specifically, it will be targeted more towards the Upper Primary to support students in preparation for the KCPE exams. Another activity that would be valuable is the introduction of catch up sessions for struggling students attending Upper Primary.

Regarding access to life skills, as mentioned under Output 2, improving the way the child clubs operate, focusing them more on delivery of whole class content outside the school timetable should improve the students' gains without increasing the target usage time.

2.4.1.4   Output 4: Learning outcomes linked with financial incentive

Table 71: Project performance against Endline targets in Logframe Output 4

Output and Output indicators	Activities	Baseline level	Endline target	Endline achieved	Source
Output 4: Learning outcomes linked with financial incentive					
4.1 Percentage of students (out of those that received the stipend) who have improved their attendance (by any measure) during stipend period	The main activity under this output is the provision of electronic stipends to the parents of students with poor attendance and the setup of the merchants where parents are able to spend the stipend.	N/A	50%	Overall: 55.2% Group A: 53% Group B: 57%	Attendance monitoring system data correlated with the list of stipend recipients; only applicable for Group A and B
4.2 Percentage of students (out of those that received the stipend) who have improved their attendance by at least 10% during stipend period (out of those that showed improvement)		N/A	50%	Overall: 67.4% Group A: 64.1% Group B: 69.7%	

i)   Activities, methodology and design

The stipend programme was designed to boost the attendance of students that were struggling to go to school and test the link between attendance and learning outcomes. According to the evaluation framework, stipends were only made available to Group A and B schools. In the remainder of the section a brief overview of the stipend programme is presented.

Student selection: The methodology followed for selecting thee subset of students to take part in the stipend programme was:

1. Selection of girls whose attendance was less than 70% according to the attendance monitoring system;
2. Selection of a small number of boys (up to 10%) whose attendance was less than 50% according to the attendance monitoring system;
3. Selection of a small number of children advised by the school (Up to 10%) to ensure school cooperation;
4. Exclusion of any children selected based on attendance that the schools advised were not in need compared to other students.

It is worth noting that the above methodology was tweaked on a school by school basis due to differing circumstances and pupil numbers. Before the final selection was made, a consultation took place with the head and senior teachers - giving the school a sense of inclusion and ownership.

Merchant on-boarding: Merchants that were close to the school and sold appropriate goods (various food supplies, personal hygiene items and potentially uniforms) had to be selected for parents to spend the stipend at. School head teachers were consulted as to the suitability of a particular merchant to be included in the programme. Once selected, and agreement from the merchant was in place, the on-boarding form was completed. The merchant was then added to the host database and given a unique merchant ID and settlement ID.

Issue of smartcards to the parents of stipend beneficiaries: After the student selection was finalised, the parents/guardians had their identities verified and were given a personalised smartcard. Each stipend card given to the parent is linked to their child's attendance card in the sQuid host database enabling analysis to be undertaken. Finally, the parents were informed of the go-live date and that they will receive 500 KES (roughly £4) every two weeks during term time. The stipend was issued on a 'semi-conditional' basis – it was explained to parents what the objective was, being to have their children better able to attend school regularly, and this effect was tracked in the data. It was felt that given the type of geographic and weather challenges identified in this report, a harsh

conditionality of acceptable attendance level might be very hard to apply. The stipend was thus allowed to find its natural level of effect.

Merchant association, set up and merchant training: Each merchant is "associated" to an Android Tablet loaded with the sQuid Payment application enabled. Using the IMEI (Terminal ID) as the unique identifier, the tablet is associated to the merchant in the host database. This is standard sQuid operating procedure and enables them to link all top ups and transactions that take place on the tablet specific to a merchant. In addition, each tablet has a mobile data SIM, which enables direct connection to the host to send and receive top ups, transactions and other messages. The field team delivers the tablet to the merchant and trains them on how to use it as well as giving basic troubleshooting advice.

Stipend generation and loading on smartcards: The sQuid Kenya Finance team supplies a data file containing the parent cards to be topped-up for a specific school/merchant to the UK Operations Team. The file is verified before the top-ups are processed via the Administrator (Admin) portal, this process is repeated each time the stipend loads are made. Strict end-to-end digital controls are in place to mediate transactions.

The indicators for this Output were measured through the sQuid attendance monitoring system that tracks the attendance of all students receiving stipend in the Group A and B schools. Supporting information has been collected at endline from the interviews with parents receiving the stipend and FGDs.

The table below shows the distribution of interviews with parents receiving the stipend by intervention group.

Table 72: Distribution of interviews with parents receiving the stipend by intervention group

Group	Frequency	Percentage %
A	179	44.9
B	220	55.1
Total	399	100.0

ii)   Findings

56% of stipend recipients increased their attendance by any measure as shown in Figure 44. As discussed below, limited household financial capacity means that school costs, such as uniform, are often too great, particularly when economic hardship makes consistent food consumption a challenge. The stipend has proved most successful with recipients who already had a poor attendance, suggesting that financial shortcomings have a detrimental effect amongst poor attenders' ability to go to school. The stipend's success also demonstrates that a relatively small financial package (1,000 KES a month) can make a significant difference in attendance, with 68% of pupils who increased their attendance doing so by at least 10%.

The methodology was designed in such a way that schools were made to actively participate in the identification process, to avoid potentially negative consequences arising from an exclusively project-led selection. As a result, the schools (collectively) chose a cohort of the recipients, who didn't necessarily have poor attendance. The stipend has proved to be less effective in improving these pupils' attendance, which demonstrates that financial barriers are less addressable amongst strongly attending recipients, due to other factors impeding maximum attendance. In October 2016's termly assessment report, 65.2% of girls cited 'sickness' as the main reason for missing school, for example. It is unlikely that a stipend of 500 KES every two weeks would be able to adequately address problems associated with sickness (broad a term as that may be), which is a widespread problem amongst pupils and would suggest that reaching near to 100% attendance is highly challenging. Only 26% of girls enrolled at endline had attendance >95%, which is a notably low figure, and reaffirms the difficulty in reaching maximum attendance over the course of a term.

83% of the parents that have a child benefiting from the stipend and were interviewed about it live in households with 5-12 members as presented in the table below. 62.4% of the respondents said that 4-7 of those were their children. Large families are the norm, with 56.7% of stipend families having more than 7 members per family, often resulting in more household dependents.

Table 73: Number of people living in the households benefiting from the stipend

Number of people living in the household	Frequency	Percentage %
2	6	1.5
3	10	2.5
4	28	7.0
5	65	16.3
6	64	16.0
7	64	16.0
8	40	10.0
9	36	9.0
10	28	7.0
11	15	3.8
12	19	4.8
13	8	2.0
14	6	1.5
15	4	1.0
16	1	0.3
17	1	0.3
20	2	0.5
21	2	0.5
Total	**399**	**100.0**

Through interviews with teachers, head teachers, parents and key informants in the communities during baseline survey and termly assessments, household poverty – underscored by a lack of money – was a recurring issue that contributes to parents' inability to pay or expenses of their children's education. During the endline survey, lack of money for education expenses was cited by majority of the respondents as the reason children drop out of school. These poverty conditions were associated with difficult climatic and economic conditions that reduced income-earning opportunities. For example, casual job opportunities are erratic and high cost of living for most parents.

> "A parent will opt to discontinue the child from school because the money is not enough i.e. They would rather take care of the family with that money rather than pay school fees." (Baseline FGD Fathers, Sigowet Primary)

> "Most of these girls come from poor families and they lack amenities such as sanitary towels, uniform and shoes, this makes them feel out of place and inferior to the rest" (Baseline KII, Assistant Chief, Barani Primary)

Scarcity of food was associated with drought, in some areas. Because of this, some parents gave more priority to availing food to their family rather than paying school fees.

> "There are many children who have done Class 8 but have not gone to secondary because of lack of fees, so it's not all parents. For instance here at our place in Makueni, there is a lot of drought, if it is money you had set aside, maybe now you use it to buy food like now, maize is dried up and there is no food in the fields and so a lot of money will be spent on food as opposed to being set aside for the child." (Endline FGD Old mothers, Kiambani Primary)

> "Sleeping without food, girl unable to concentrate in class" (Baseline KII, Elder, Benyoka Primary)

Asked their view on the stipend, all the 11 (100%) of headteachers from Group A and B who responded to this question at endline said that the stipend was helpful. Asked whether they find the stipend helpful, 97.7% of the parents/guardians of the stipend beneficiaries said that they did find it helpful. And when asked what they spend the stipend on, 99.5% of the respondents said that they spend the money on food, 80.7% on household items like soap and toothpaste and 50.9% on school stationery. Therefore, the stipend has successfully mitigated one of the key barriers to education: inadequate financial capacity.

Regarding the stipend impact on education, all the headteachers from Group A and B who answered the stipend related questions said that there was an improvement in school attendance as a result of the stipend and 36.3% that there was an overall improvement in grades for students. On other benefits of the stipend, 63.6% of the headteachers said that parents were able to meet some of the needs of their children and 72.7% said that availability of the stipend had resulted in fewer cases of absenteeism. Among the issues that lead to girls missing school is lack of necessary supplies and/or food. For example, in focus group discussions with mothers lack of money for girls needs was mentioned as an issue that leads to girls missing school.

> *"At times you find that the girls do not have good school uniform, the parent has not bought them body oil and when her skins dries up and looks bad and she is easily lured into relationship and drops out of school." (Endline FGD Younger mothers, Ndabaranach Primary)*

When asked the effect that absenteeism has on students who miss school for a longer period, 48.4% of the teachers who were interviewed during the endline survey said that it could lead to loss of interest in education. Through provision of the stipend the project aimed at addressing absenteeism as a way of keeping the girls in school. Provision of the stipend was based on absenteeism and through the electronic monitoring system students who missed school more often were identified targeted as stipend beneficiaries.

In addition it would be helpful if the parents/guardians who are selected as stipend beneficiaries are provided with adequate information regarding the duration of time within which to expect the financial incentives. It is also important to regularly monitor the merchants and to ensure that they adequately meet the needs of these parents, particularly with respect to price hiking. In the instances where price hiking was identified by the project, merchants were adequately handled, and there have been no repeat offenses. Other merchants were reported to make decisions for parents on which items they ought to pick. Still some parents spoke of going to the merchant on several occasions and being informed that their cards had not been credited with money. 57.0% of the parents interviewed at endline reported that the stipend did not come in time. This was due to poor communication with the stipend recipients, as card value upload process has always been carried out on time, suggesting that recipients are not always aware of when they should be receiving the stipend.

Project contribution

Figure 44 shows that 56.3% of those receiving the stipend increased their attendance by any measure. Those that had a baseline attendance of <60% saw the biggest improvement in their attendance, with 100% improving their attendance by any measure. There is county variation, and with the exception of Makueni's A schools and girls in B schools (possibly due to lower poverty levels in Makueni's iMlango schools), all recipient groups saw at least half of their cohort record an improvement in their attendance as a result of the stipend.

The stipend's effectiveness demonstrates that financial issues are often central to pupils' poor attendance - especially amongst those with low baseline attendance. This corroborates parents' claims that factors relating to poverty are often the biggest hindrances to sending their children to school. Whilst Kenya's Free Primary Education (FPE) policy has reduced primary school costs, schools still aren't free; parents are made to burden the extra costs for their children's continued enrolment. Parents still have to provide for school uniform, stationary, and school maintenance contributions, which are often – combined – too financially great to manage. In the case of girls, sanitary towels and pads need to be purchased as well; a lack of which can lead to absenteeism.

Figure 45 shows that 68.4% of those who have improved their attendance because of the stipend

have seen an increase of at least 10%. The significant gains in attendance indicate that it is possible to get a pupil's attendance to near-average levels through a financial stimulus. This underscores how the lack of financial capacity – as little as 1,000 KES a month too little – can completely undermine a child's ability to attend school regularly.

Apart from the impact of the stipend on attendance levels, the additional benefits are:

- *Simple functionality* – the process works very well, and is easy to understand for both the merchants and the parents. The system does not require biometric identification or a PIN, and there have been no cases of fraud to date.
- *No loss of cards* – there are over 10,000 stipend beneficiaries and we have not had any reported card losses.
- *Data generation and actions* – ability to monitor when recipients are spending their money, and how much they're spending in each purchase. Coupled with field team observations, we can quickly identify any problems that arise from the initiative. For example, we found that a few merchants were artificially hiking their prices due to their monopoly power over stipend recipients. The problem was dealt with swiftly, a warning was issued to the merchants in question, and there have been no incidences of repeat offences.
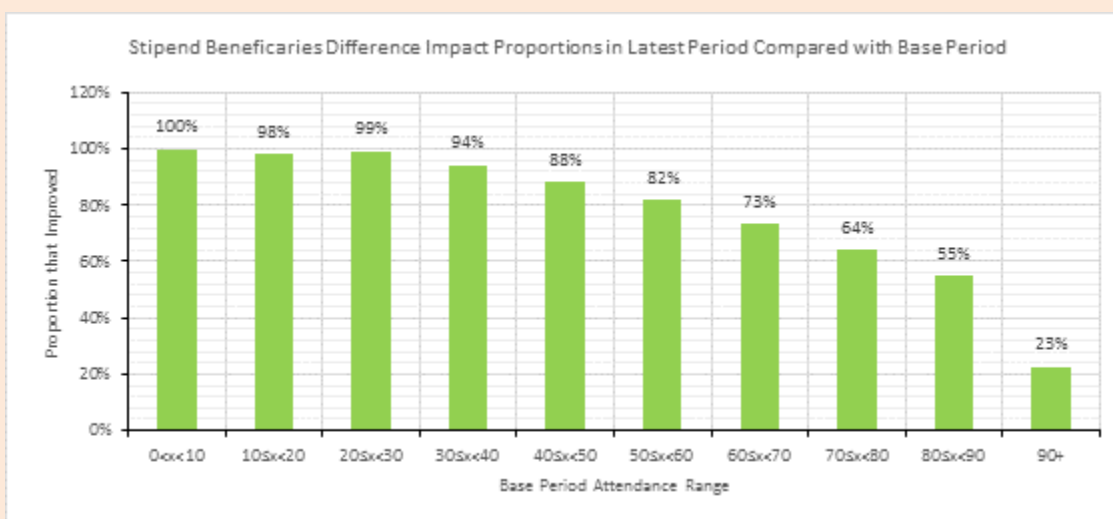
The above chart demonstrates that the stipend is most effective amongst pupils with low baseline attendance, with widespread positive impact observed in the worst attending pupils (<60%). This shows that a financial barrier is, at least in part, preventing pupils from regularly attending school, and that a small financial stimulus assists households with expenditure issues. Pupils with strong attendance (>85%) saw less of an impact, indicating that other, "environmental" factors (i.e. beyond the scope of family-level decision-making) often prevent maximum attendance being reached. A daughter's unexpected pregnancy, drought, and illness all negatively affect attendance levels, and the girl and her family have reduced agency in overcoming these barriers to engender high attendance.
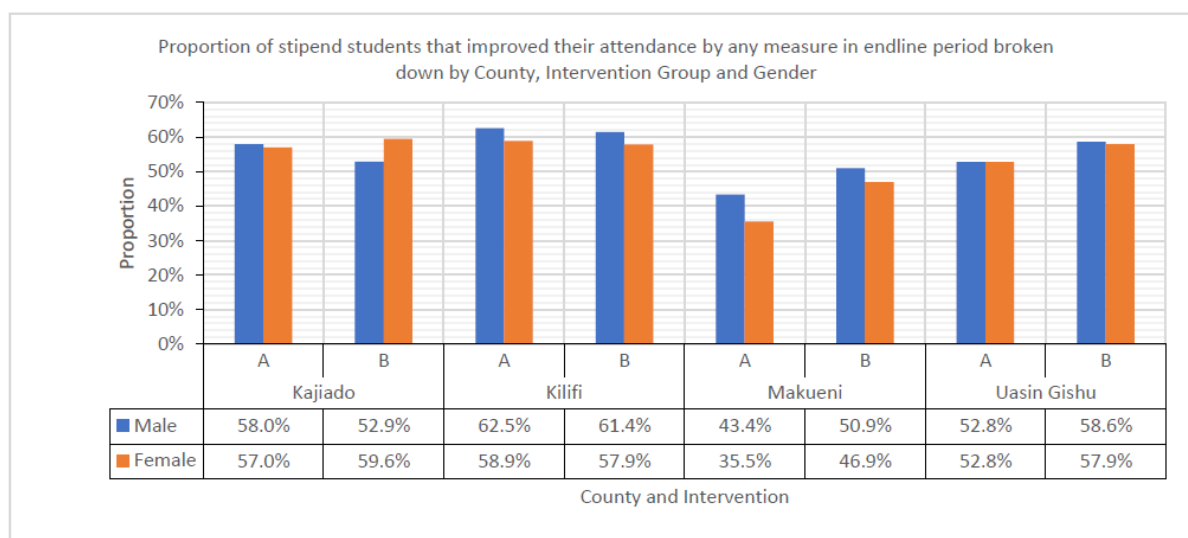
Figure 44: Proportion of students that improved their attendance by any measure disaggregated by County and intervention group
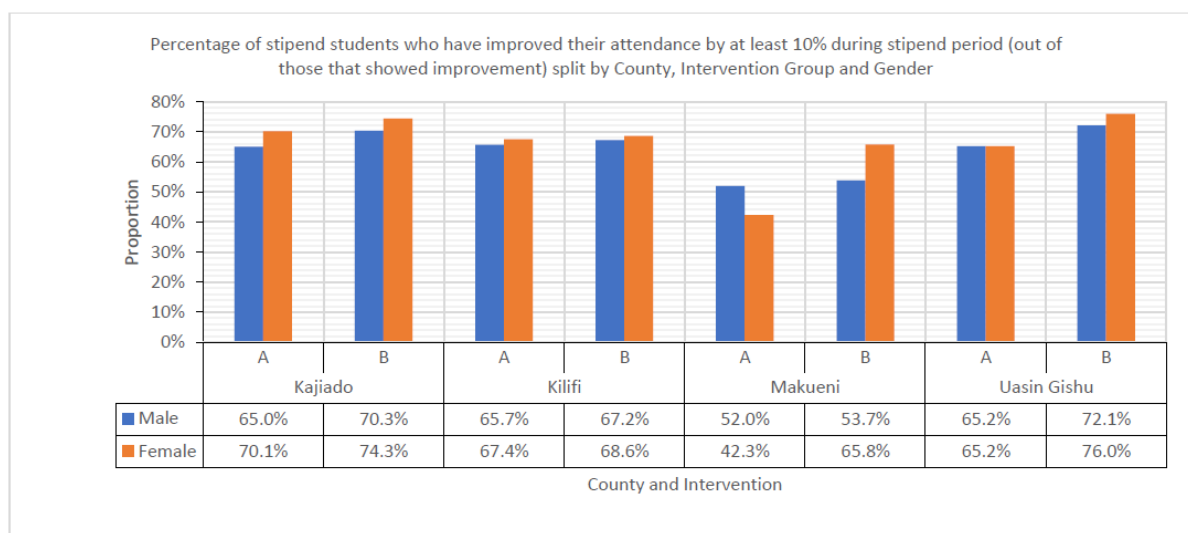
Figure 45: Proportion of students that improved their attendance by at least 10% disaggregated by County and intervention group

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Project contribution – Success stories

Sisters Mary (13) and Sharon (12), St. Columban's Primary (Group A – Turbo, Uasin Gishu)

Mary is a 13 years old pupil at St Columban's Primary, currently in Class 6 East. Her sister, Sharon (12), is also a pupil in the school, in Class 6 West. Both pupils are beneficiaries of the iMlango Support Initiative Program in the school. They are children of a single mother who they lost to HIV/AIDS complications in 2012. They live as squatters on Kenya Railways land in Turbo trading centre with their grandmother, Violet and other cousins, also pupils at St. Columban's Primary. Sometimes, their aunt, Esther, visits them to assist their grandmother with house hold chores.

Sharon is living positively with HIV virus. She goes for her medication at least twice every month at Moi Teaching & Referral Hospital (MTRH) – AMPATH section in Eldoret town. The hospital is 35 kilometres from their home and her grandmother has to struggle to ensure that Sharon gets the drugs in good time. Her grandmother explains how challenging it is for her to support all her grandchildren. She says that some of them don't even know where their parents are, and she is the only parent they know. She expresses her heartfelt gratitude to iMlango for supporting two of her grandchildren.

"I can never be grateful enough to God for bringing iMlango to help me support my grandchildren. They will now never miss going to school." she says.

She admits that she would at times ask the older children to do some casual labour in order to get at least one meal in a day. She further explains how she saw her grandmother struggle to feed and pay their school fees and how she felt sad when she thought no one else cared. She is happy now that none of them will miss classes because of lack of food.

"Nilifurahi nilipojulishwa kuwa nitapata msaada kutoka iMlango. Nilikua nimefikiria kuacha shule ndio nisaidie nyanyangu nyumbani" (I was happy when I came to learn that I am one of the pupils benefiting from the support initiative. I had felt like leaving school so as to help my grandmother at home) Mary says.

She says that iMlango is now her biggest motivator as she can now learn with computers. She aspires to work hard and become a doctor. She would love to help the sick and create health awareness in her community. She admits that she has been weak in Mathematics, but learning it from Maths-Whizz has been helping her understand addition, subtraction, division and multiplication better.

Happy (16), Mayowe Primary (Group A – Malindi, Kilifi)

Happy is a sixteen-year-old Standard 8 graduate from Mayowe Primary, emerged the best performing girl in 2016 KCPE examinations. She stays with her father, mother, and her sister who is in Standard 6 at Mayowe Primary as well. Two of her elder sisters, Esther and Gladys, dropped in Standard 6 and were married off. Her father, Mr Benard, apart from being a casual worker in a quarry, he rears cattle and raises chickens. Her mother Chizi used to do casual work in a quarry until 2015 when she developed a lung problem and stopped. The produce they get from farming is not enough to sustain them for a long time because her father spends most of his income on her sick mother. Sometimes well-wishers support them financially since they stay in a homestead for the extended family.

Happy is among the support initiative beneficiaries. Through this, her parents would buy her stuff such as food, school uniform, stationery, soaps, and other basic goods. This allowed Happy to enrol in the boarding wing as her father struggled to raise her levies. The teachers volunteered to teach in the evenings and the pupils were provided with a room to sleep where those you can afford it spread mats or mattresses on the floor. Happy couldn't afford a mat, but that was less of her problems and she was determined to excel in her studies now that she had more time to read and only went home during weekends to assist her mother with household chores.

Her former class teacher, Mr Justin, says, "*Happy's perception towards education changed in third term 2015. This was after the introduction of child clubs where her fellow classmates encouraged her to work hard. During child clubs, happy was freely to discuss issues affecting her and then she would get solutions from other girls and teacher and she has since worked very hard.*"

Happy scored 359 out of 500 marks in KCPE achieving the following grades; English 62% (B+), Kiswahili 75% (A), Maths 81% (B), Science 71% (B) and SSR 70% (B). She got an admission letter to Waa Girls Boarding Secondary School which is one of the best County schools in Kilifi.

iii)   Sustainability

The stipend initiative was introduced in order to test its effectiveness in overcoming some of the barriers to school attendance when it is targeting the specific sub-group of poor attenders. As a result, the stipend was never intended to be sustainable after the end of the project. By its nature, a cash transfer programme is not compatible with long-term financial viability. This partially drove the rationale behind the microfinance intervention that is planned to be introduced in the next phase of the project. Gradually phasing out the stipends, whilst simultaneously increasing the amount of loan recipients will ensure a more sustainable economic empowerment model that eventually operates throughout the project.

Parents/guardians who participated in FGDs conducted during termly assessments spoke of the possibility of starting income generating activities at the community level in order to be able to sustain the positive impact of the stipends.

2.4.1.5   Output 5: New technology is implemented for collecting attendance data which serves greater understanding of marginalisation

Table 74: Project performance against Endline targets in Logframe Output 5

Output and Output indicators	Activities	Baseline level	Endline target	Endline achieved	Source
Output 5: New technology is implemented for collecting attendance data which serves greater understanding of marginalisation					
5.1 The level of deviation between electronic record and spot check data (termly in the intervention schools and relative to control group attendance records)	The main contributing activities are the setup and provision of attendance cards (for students, teachers and parents) and terminals as well as the operation & maintenance of the attendance monitoring back end system.	N/A	Less than 10% deviation	5.4% in the intervention schools	Attendance monitoring system data and spot checks
5.2 Proportion of head teachers who say the attendance data is useful in managing attendance issues		N/A	40% of headteachers	100%	Headteacher interviews

i)   Activities, methodology and design

sQuid receives the transacted attendance data daily, as the Android tablets sync automatically to the host database (provided there is an internet connection). Roll-call is taken daily, allowing for accurate assessments of absenteeism and informed targeted interventions for struggling pupils.

The head teachers receive the weekly attendance reports through e-mail. The reports are divided into classes, accounting for all 8 standards. Each pupil's name and smartcard serial number is presented alongside their attendance for the week. The head teacher can quickly discern both broad level attendance patterns at a class level, or specific attendance issues on an individual basis. He/she can then engage the relevant teachers and try to devise suitable actions to address the problem(s).

The field officers receive the same weekly attendance reports as the head teachers, so they're also aware of each school's attendance patterns and problems. On the monthly visit to the school, the field officer will then engage the head teacher on the functionality of the reporting, and whether it's being used to good effect. The field officer can then assist the school in particularly challenging cases of pupil absenteeism as and when is necessary.

The indicators for this Output were measured through the sQuid attendance monitoring system that tracks the attendance of all students vs. the endline spot check data provided by Advantech. Another source was the headteacher interviews that were conducted at endline and among others explored issues around attendance management.

ii)   Findings

Indicator 5.1 tracks the level of deviation between the electronic attendance monitoring system and the spot check data in the intervention schools. For indicator 5.1, the project reached its target of <10% deviation between the spot check and electronic attendance monitoring. The deviation between the control schools' manual registers and the spot check was 14.6% This has proved the project's initial hypothesis that the electronic attendance monitoring is more accurate than the handwritten registers normally conducted in Kenyan primary schools. The attendance monitoring equipment takes no longer than the usual register, and observationally, the teachers were all able to operate the system with no problems.

Indicator 5.2 evaluates how useful headteachers are finding the attendance data shared with them on managing attendance issues. A total of 37 head teachers were interviewed in selected intervention schools across the four Counties at endline. Out of the 31 headteachers that said they receive the

reports, 28 said that they look at them. All 28 stated that they find the attendance useful. The views of these headteachers are presented in Figure 46.

We also sought to find out from the headteachers if the attendance monitoring system made a difference in school attendance. 31 of the 37 (83.7%) had noticed that since the school started using the electronic register students attended school more regularly.

Project contribution

For indicator 5.1 the project has consistently been below its target of 10% deviation between the headcount spot check and the attendance system data in the intervention schools. Selecting a random sample of 20 intervention schools where Advantech conducted a spot check in January 2017, we have compared the head count information captured in the spot check with the attendance monitoring system data as shown in Table 75. The average deviation between the two sources of data for the endline is 5.4% which is well below our target.

In control schools, the standard deviation between the spot check and manual register is far higher. Poor practice in the school registration process is still observable, with high error rates, incomplete data, and post-event filing by teachers. The diverging deviations between the intervention schools (electronic) and the control schools (manual) indicate that the electronic attendance reporting is significantly more accurate than the manual register. Using again a random sample of 20 control schools where Advantech conducted a spot check in January 2017, we compared the deviation of the head count data from the physical register kept in the schools as presented in Table 76. The average deviation between the two sources of data in the control schools is 14.6% which proves the effectiveness of the digital attendance monitoring system compared to the physical handwritten register records.

Table 75: Deviation of endline spot check from attendance system data in intervention schools

School Name	Group	County	Standard	Head Count	sQuid Record	Absolute Difference (%)
AIC Namanga	A	Kilifi	6	88	81	8%
Bale	A	Uasin Gishu	6	77	82	6%
Chepkurum	B	Kajiado	6	68	64	6%
Kachororoni	B	Kilifi	6	60	60	0%
Kasidi	B	Kajiado	6	112	107	4%
Kiliku	C	Makueni	6	49	49	0%
Kizurini	C	Kilifi	6	112	100	11%
Marikebuni	A	Uasin Gishu	6	39	35	10%
Kajiwe	B	Kilifi	6	155	138	11%
Mavindu	C	Makueni	6	96	94	2%
M'mbarakachembe	C	Kilifi	6	89	93	4%
Mukaa	A	Makueni	6	75	76	1%
Mutulani	A	Makueni	6	51	48	6%
Mutweamboo	B	Kilifi	6	64	58	9%
Mwandondo	C	Kajiado	6	55	59	7%
Nduundune	B	Kilifi	6	56	55	2%
Oloosurutia	C	Kilifi	6	160	154	4%
St.Peters Kapkechui	A	Kilifi	6	35	39	11%
Tsagwa	A	Uasin Gishu	6	54	53	2%
Ziwa	C	Uasin Gishu	6	95	94	1%
Mean Absolute % Difference - 5.4%						
Mean Absolute Difference - 4.35						

Table 76: Deviation of endline spot check from register data in control schools

School Name	Group	County	Standard	Head Count	Register Record	Absolute Difference (%)
			Spot Check Analysis (Control Schools)			
Alhuda Muslim	D	Kajiado	6	87	88	1%
Boga Machuko	D	Kilifi	6	81	81	0%
Dida	D	Kilifi	6	33	33	0%
Dungicha	D	Kilifi	6	53	53	0%
Emali	D	Makueni	6	110	110	0%
Enzai	D	Makueni	6	101	101	0%
Gandini	D	Kilifi	6	104	104	0%
Isambani	D	Makueni	6	46	41	11%
Kaaboi	D	Uasin Gishu	6	36	38	6%
Kalongo	D	Makueni	6	64	64	0%
Kapnasu	D	Uasin Gishu	6	72	72	0%
Kavatanzou	D	Makueni	6	53	53	0%
Kipsinende	D	Uasin Gishu	6	40	41	3%
Kiu	D	Makueni	6	58	0	100%
Mumetet	D	Uasin Gishu	6	69	65	6%
Ngong Township	D	Kajiado	6	193	93	52%
Segero	D	Uasin Gishu	6	37	0	100%
Tsangatsini	D	Kilifi	6	140	159	14%
Tututha	D	Makueni	6	53	53	0%
Watamu	D	Kilifi	6	84	84	0%
Mean Absolute % Difference - 14.6%						
Mean Absolute Difference - 9.1						

Project contribution – Case study

Mayowe primary is located about 25 kilometres from Kilifi town in Ganze subcounty. It has a population of 522 pupils (257 girls & 265 boys), with an average of sixty-five pupils in each standard. The main economic activity for most of the parents in this community is firewood-selling, which they collect from Nzovuni and Salaweni forests. Mayowe Primary school was ranked 23 out of 29 schools in Ganze subcounty in 2015 K.C.P.E examination. This is an improvement on 2014 where they scored 200.41, compared to 221 marks in 2015.

According to the head teacher, Mr. Justin, iMlango has contributed immensely to the improvement of grades in this school. "You see, since introduction of monitoring attendance, pupils feel like the government is monitoring them and as a result parents ensure the pupils attend school more consistently, unlike other years. Minimization of this absenteeism has contributed to improvement in marks for this school. In addition, pupils are eager to learn computer studies and they make sure they come to school to access computer lab. They are becoming aware of careers like computer science which was not in our minds. Apart from that they also ensure they come to school to learn ICT."

Mr Justin uses his daily attendance report. "I noticed through the data there are three girls in class six who are friends and have been missing school two days in a week. I made an effort to follow up with them and decided to call them in the office. It is then when they confirmed to me they were pregnant. I was not surprised because in this school an average of three girls drop out of school due to pregnancy every year", Mr. Justin said.

The head teacher highlighted some of the factors that contribute to the absenteeism of the girl child in school. "The main issues are pregnancy, poverty and peer pressure", he said. He explained girls are usually in need of necessities, such as clothes, which their parents cannot afford to provide for them because of economic marginalisation. "The boda boda (motor bike) riders take advantage of these girls by enticing them with food and fancy clothes, which often leads to cases of impregnation. However, in the recent past things have taken a whole new direction because even the fellow pupils (boys) impregnate the girls. The action takes place mostly during night events."

Mr. Justin gave an example of the mourning sessions that are mostly held at night to raise funds for the burial of the deceased members of the society. This is when the young boys and girls go out of their morals and engage in underage sex, with standard six girls being the most in this situation. These girls are aged between 12 and 16. The head teacher provided the list of the girls who were pregnant:

- Rachel, a standard seven girl. She is 14 years old and stays with her parents who are not happy about it.

- Serah, a standard six girl who is 13 years old. She lives with her parents in a nearby village which is about four kilometres from the school.
- Zawadi, a standard six girl who is living with her mother.
- Saumu, a standard seven girl who had gotten married.
- Furaha, a standard seven girl who was also living with her mother in a nearby village. However, after getting pregnant she was married to a 17yr old standard 8 boy in the same school. The parents were content with the decision of Furaha getting married.
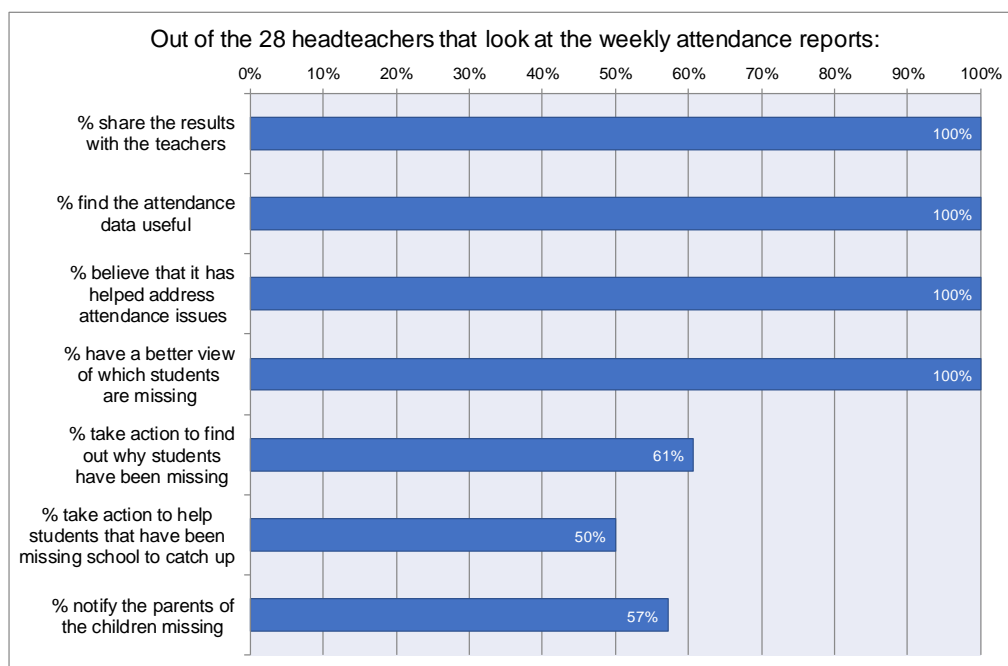
Figure 46: Headteacher views weekly attendance reports

Project contribution – Improving school management capacity

Over the course of the project we have seen a constant improvement in head teachers' responses on whether they find the attendance monitoring reports useful in managing absenteeism. This has culminated in 100% of head teachers in the sample agreeing that the attendance reports are useful, far exceeding the Endline target of 40%.

Once the head teachers became comfortable with the electronic attendance reports and how they're received (some head teachers didn't have an existing e-mail address, for example), we've observed a steady progression towards positive responses in the termly survey we carry out. This shows that once the head teachers are familiar with the technology (i.e. the initial barrier to appreciating the technology), head teachers derive significant value from the reports, using them to help with pupil absenteeism.

In Q12, the head teacher of Mayowe Primary in Kilifi, Mr Justin, identified via the attendance reports 3 girls whose attendance was worsening. He observed that the 3 girls were in the same class (Standard 6) and it transpired that they were friends. After following up with them, he found that they were all pregnant. The school and field officer have worked to support the girls through this period, and have tried to get them to re-enrol after delivery. So far, the girls have not managed to find the necessary childcare, but we continue to maintain a dialogue with them in the hope that they'll soon be able to re-enter school.

iii) Sustainability

During the project the schools have been supported by the field team to integrate taking attendance using the electronic monitoring system as efficiently as possible. Therefore given that the financing of the activity is covered, the schools will continue to use the system.

A problem that came up was the issuing of attendance smartcards (and consequently a digital account) for new students or for replacing lost and faulty ones. The project has introduced an application accessed in the attendance tablets where the teachers can register new students electronically - reducing the time it takes for the students' digital account to be created.

Regarding the use of the weekly attendance reports by headteachers, the first steps have been completed and the headteachers are already reporting positive views. Additional steps need to be taken to ensure that all headteachers read the reports they receive, understand them, share the data with their teachers and use them to identify and follow up incidents of poor attendees. In the latter stages, the project has started engaging the County representatives so that they are aware of what is happening in the schools and intervene in cases that need it. This is an important step that needs to be explored in the next phase of the project.

2.4.1.6   Output 6: Long term sustainability of the intervention

Table 77: Project performance against Endline targets in Logframe Output 6

Output and Output indicators	Activities	Baseline level	Endline target	Endline achieved	Source
Output 6: Long term sustainability of the intervention					
6.1 Potential sponsors who indicate interest in supporting the iMlango programme (measured on a weighted engagement scale)	The main activities contributing to this output are the project dissemination activities as well as part of the project management activities.	N/A	Average score 0.7	0.36	Evaluated as part of the Sustainability and Marketing Plan and consortium reporting
6.2 Identification of commercial mechanisms by the Consortium members which support the on-going use of the iMlango programme (measured on a weighted maturity scale)		N/A	Average score 0.6	0.50	
6.3 Number of sponsors engaged		N/A	20	20	

i)   Activities, methodology and design

> ***Project contribution***
>
> As part of the commercial sustainability mechanisms for iMlango, two tables are tracked on a quarterly basis;
>
> 1) Sponsor engagement tracker
>
> The table below presents the different stages that an interaction with a potential sponsor can go through from identification up to the signing of a contract. The different stages are linked the percentage likelihood of the opportunity maturing and an engagement scale rating. The average engagement rating is then reported in the Logframe under Output indicator 6.1.

Table 78: Sponsor weighted engagement scale

Stage ID	Stage Name	Likelihood %	Engagement rating	Stage Description
A	Speculative	0%	1/9	Identification of potential sponsor
B	Approach Made	0%	2/9	Contact by email or telephone with relevant party at the identified potential sponsor
C	Initial engagement	0%	3/9	Exchange of information by email or telephone
D	Confirmed Interest	5%	4/9	Extensive discussion or face-to-face meeting held with potential sponsor during which interest is confirmed
E	Qualified Prospect	10%	5/9	Level of funding available understood or sponsor has requested a concrete proposal
F	Proposal Submitted	20%	6/9	Proposal for funding scheme submitted to potential sponsor
G	Positive Post proposal feedback	50%	7/9	Positive interest to the submitted proposal from the potential sponsor
H	Negotiations	90%	8/9	Negotiations for contracting as per submitted proposal
I	Agreement for funding reached	100%	9/9	Contract signed with prospective sponsor
X	Lost / Dead	0%	N/A	Proposal rejected by potential sponsor and

2) Commercial mechanism maturity tracker

Similarly, to the sponsors' opportunity pipeline, the various commercial mechanisms that have been identified have been captured in a spreadsheet. The table below presents the different maturity stages of a commercial mechanism. The different stages are linked with maturity rating. The average maturity rating will be reported in the Logframe under Output indicator 6.2 and it is a high level summary of our progress towards Sustainability.

Table 79: Commercial mechanisms weighted maturity scale

Stage ID	Stage Name	Maturity rating	Stage Description
A	Speculative	1/5	Identification of commercial mechanism
B	Design	2/5	Technical design or plan for integration with existing components
C	Test/Pilot	3/5	Pilot of the mechanism to ensure functionality
D	Evaluation	4/5	Sufficient data to evaluate the impact of the commercial mechanism
E	Income generation	5/5	Commercial mechanism generates income
X	Not successful	N/A	Commercial mechanism failed to generate income

ii)   Findings

Project contribution

Indicator 6.1 tracks the potential sponsor that the consortium is engaging with on a weighted engagement scale. In the following table we present the sponsors that we approached and evaluate their engagement level using the scale in Table 78.

Table 80: iMlango sponsor engagement tracker

	Potential sponsor	Partner	Engagement rating	Comments
1	USAID	AVA/SQU/WHZ	4	USAID is a significant donor, active in education initiatives. Early dialogue has confirmed interest in data aspects of iMlango programme. Discussion held between AVA and Andrew Karlyn confirmed interest for iMlango especially the Community Wi-Fi deployments. USAID is sponsoring Tusome, now approved for distribution in iMlango portal
2	Irish Aid – Department for Foreign Affairs and Trade	CAM	N/A	Camara met with the Irish Ambassador in Nairobi – Kenya is not currently a priority country
3	Mastercard	SQU	3	sQuid is engaged in a payments initiative with MC in the humanitarian sector. MC is interested in the stipend payments activity. A possible overlap of some iMlango locations with disaster vulnerable communities is being considered.
4	World Food Programme Kenya	SQU	3	WFP administers feeding programmes via schools where challenges exist in ensuring resources are delivered. The attendance and wallet capabilities applied in the iMlango schools are of interest to WFP.
5	Kenya Ministry of Education, Science and Technology	ALL	4	We are working closely with the MoE ensuring a continuing relationship since they are a key potential sponsor for the iMlango programme. They have great interest in the data rich nature of the project and its educational outcomes. We are holding regular meetings with them. This may lead to commercial support.
6	Kenya Ministry of Information, Communications and Technology	AVA	4	Meeting held with Cabinet Secretary Joseph Mucheru, Private Secretary Victor Kyalo and Director of ICT John Sergon regarding opportunities for roll out in rural Kenya.
7	WILLIS	SQU	3	We have identified the interest of the insurance sector in opening up new micro-finance opportunities. This is an early stage conversation.
8	Dell	CAM	5	Camara currently working with Dell Giving on two schools in Kenya.
9	Vodafone	WHZ	3	Early stage partnership exploration related to their "Classroom in a box" initiative.
10	Individual private schools in Kenya	WHZ	3	Funded twinning concepts are being explored with the Brookhouse International School (Nairobi) and the Aga Khan Academy (Nairobi).
11	Kenya Power	SQU	N/A	There may be an opportunity to support schools with some form or bill payment. The initial approaches will be regional and we are seeking support from Education Department regional officers.
12	Longhorn Publishing	SQU	4	Longhorn has been looking to leverage online activity for its education content. Their digitised curriculum-aligned revision content has now been integrated into

				the learning platform; exploring commercial mechanisms.
13	JICA Foundation	WHZ	3	The Japan International Cooperation Agency (JICA) is advancing its activities around the pillars of a field-oriented approach, human security, and enhanced effectiveness, efficiency, and speed. Positive meeting with Samuel Kibe, Head of JICA, Kenya. JICA are working directly with the Kenyan government and if the government decides to engage, JICA sponsors. This indicates that we can't directly work with JICA but through the government. Conversations continue.
14	Symantec	CAM	3	Early stage discussions about sustaining iMlango beyond March 2017.
15	Segal Foundation	CAM	3	Camara had a discussion with the Segal Foundation (http://segalfamilyfoundation.org/) who have a strategic focus on Kenya, Tanzania and Zambia. A follow up discussion will be scheduled.
16	Arimus Media	SQU	4	Advanced discussions with Arimus Media (the creators of the Great Debaters' Contest, and partner of the iMlango Junior Debaters' Contest) over the involvement of several sponsors in 2018.
17	Equity Bank	AVA	4	Discussions with Equity Bank regarding Community Wi-Fi hotspots as part of the Avanti's ECO programme www.avantiplc.com/eco
18	Coca-Cola	AVA	2	Discussions with Coca-Cola regarding Community Wi-Fi hotspots as part of the Avanti's ECO programme www.avantiplc.com/eco
19	Save the Children UK	AVA	2	Discussions with Save the Children UK regarding Community Wi-Fi hotspots as part of the Avanti's ECO programme www.avantiplc.com/eco
20	Li Ka Shing Foundation	WHZ	2	Initial discussions on 'adopting' activities in iMlango schools have taken place. http://www.lksf.org/

The endline weighted target score for partner engagement has not been reached as the project faced difficulties in engaging with partners to secure additional funding. Although almost all the sponsors approached were interested in the project and wanted to find out more information about iMlango, they also expected proof about the project impact. As we didn't conduct a midline survey to be able to evaluate formally the project impact we were unable to engage further with the sponsors. In addition, most of the sponsors are more receptive to the idea of integrating specific iMlango activities in their existing or prospective projects compared to sponsoring a project they haven't helped shaping.

Indicator 6.2 tracks the potential commercial mechanisms with a weighted maturity scale. In the following table we present the commercial mechanisms selected and evaluate their maturity level using the scale in Table 79.

Table 81: iMlango commercial mechanism maturity tracker

	Potential commercial mechanisms	Partner	Engagement rating	Comments
1	Community internet access linked to payments	AVA/SQU	3	We have successfully installed the 9 community Wi-Fi sites. The integration mechanism between Avanti and sQuid that enables payment based on internet usage is completed and has been successfully tested.
2	Access to school and community population for research through digital questionnaires	AVA/SQU	3	The piloting of the literacy quiz in the schools has proved that the mechanism works.
3	Merchant community Wi-Fi centres	AVA/SQU	3	The design of such centres in merchant locations has been completed, site survey was completed in 5 merchant locations and installations complete.

4	eCommerce based on internet access	AVA/SQU	2	The design of the payment mechanism is complete.
5	Advertisements on portal	SQU	1	This is an early stage evaluation.
6	iMlango Junior Debaters Contest	SQU	3	The iMlango Junior Debaters Contest is a debating competition that is being developed in partnership with sQuid and Arimus Media whom operate the Great Debaters Contest as seen on Kenyan television. The aim is to get further engagement and improve literacy levels of students within iMlango schools and the contest is run through the iMlango portal. The goal is to find sponsors for the continuation of the contest. We are currently rolling out the first round of the competition in the Counties and validating that the solution works as designed.

The endline weighted target score for commercial mechanism maturity has not been reached although significance progress has been made. The commercial mechanisms that the project partners have identified could not all be explored with the schools due to focus on delivering the educational outcomes. The focus was mainly on developing, installing and testing the community Wi-Fi which aims to leverage the paid internet usage in the community to offset part of the operating costs in the schools.

Indicator 6.3 refers to the number of potential sponsors engaged by the consortium partners. The endline target for engaging 20 sponsors has been achieved and the list of partners can be found in Table 80.

2.4.2 Findings: Contextual factors and unintended effects

2.4.2.1 *Contextual factors influencing project implementation and results*

Schools were carefully chosen based on marginalisation factors, as well as a requirement for electricity in order for the project to be implemented. Lack of electricity could be seen as a further marginalising factor however throughout the period of the programme a very significant national programme for electrification of all schools was underway in Kenya. We therefore do not consider electrification is a cross cutting factor in the assessment of the project.

A national strike by teachers coming in the third term of 2015, had an effect on the project owing to teacher absence in schools. It is worth noting that the strike lasted a whole month and third term being the term when students sit the national KCPE exams (Standard 8 and Form 4), teachers in most of the schools upon resuming were reported to have paid more attention to the candidates. This can be seen as a draw back to the gains that the project could have made in terms of students learning.

The communities which were selected to benefit from the project were selected on the basis of marginalisation. Further to this, Kajiado, Kilifi and Makueni all experience greater climatic adversity than Uasin Gishu. Whereas these three counties experience prolonged periods of drought, Uasin Gishu county tends to have more regular weather patterns, and can be said to be more food secure. For example, the Maasai community in Kajiado practises pastoralism and it is common for families to migrate in search of water and pasture. Owing to the drought, hundreds of pastoralists have been reported migrating to other areas. And although at endline no data was collected on this, the data collection team working in Kajiado were informed that some children had stopped going to school since their parents had moved to other areas taking them along. One of the chiefs interviewed at endline referred to the situation in Kajiado.

"One is lack of funds because most of them are poor due to the long droughts, the animals die and 80% (of them) rely on animals. And when the livestock die they become poor and in that process they lack funds to educate their children. Another problem is long distance from school. The small livestock that the parents of the girl have are far and they cannot move from where the pastures are to the nearest school because of those challenges." (Endline KII Chief, Magadi)

Schools also faced a challenge with electricity; in some of the schools power had been disconnected owing to non-payment of bills, others had power outages while others reported low voltage that could not help run the computers. Electricity issues have a direct impact on the availability of the internet and learning resources given that the vast majority of the schools do not have a solar solution in place. Asked how often power issues prevented them from accessing the online learning resources, 64.9% of the 185 teachers in intervention schools that were interviewed said that they experience power issues a few times per month, 23.2% once per week and 6.5% every day. The frequency of power issues across the groups is shown in the table below:

Table 82: Frequency of power issues in the schools – teacher questionnaire

Frequency of power issues	Group A (n=62) %	Group B (n=62) %	Group C (n=61) %	Total (n=185) %
Never	3.2	11.3	1.6	5.4
A few times per month	74.2	50.0	70.5	64.9
Once a week	14.5	30.6	24.6	23.2
Every day	8.1	8.1	3.3	6.5
Total	100.0	100.0	100.0	100.0

In Group A and C similar proportion of teachers reported that they have power issues from every day to once per week (22.6% and 27.9% respectively) which provides an explanation for the average VSAT and server uptime statistics presented by the project in Table 61. In Group B the figure is even higher (38.7%), however because they are not using individualised learning its impact is more limited.

Project contribution

The following contextual factors hindered the implementation and results of the project:

Approval of content: Working in MoE schools has meant that we have always had to ensure our content is KICD approved. Approval processes for this have been lengthy and challenging. We have also found that content that was not curriculum aligned was not being used as frequently by teachers.

KPCE exams: In some cases, we have seen an increase in portal usage during the time of KCPE exams, noting that students have been using the portal for exam revision. In other cases, we have seen that usage has reduced as teachers have encouraged students to use the more traditional methods of revision via school books.

High teacher turnover rates: This is a challenge we have come across in all counties. It has meant that refresher training has been absolutely necessary, and is an integral part of the support mechanism to teachers.

Inability to hold 'holiday study clubs': To limit the occurrence of learning loss and encourage use of the learning resources we wanted to implement 'holiday clubs' using the ICT labs in the schools. However, we were not permitted to do this as it is against the law for teachers to hold classes outside of the school term.

2.4.2.2 Policies, programmes and actions of other organisations influencing project implementation and results

During baseline, teachers from the 127 schools were asked whether there were any active projects or initiatives in the school, with 95 (74.8%) reporting such activity. Some of these projects/initiatives included feeding programmes and the provision of sanitary towels to girls. Lack of sanitary towels is one of the reasons already discussed as causing girls to miss school. The provision could thus positively impact on the iMlango results.

The Kenya government is in the process of rolling out the Digital Literacy Programme (DLP) which aims to provide primary students with digital learning tools via a tablet. A number of iMlango intervention schools have been selected by local county officials. In some of the schools, students had already been issued with the digital tools and had started using them. They also provided greater access to the iMlango platform. It is worth noting that the timing of the computer rollout has only begun to take effect in the latter part of 2016, so the impact is probably very small.

2.4.2.3 Additional and unintended effects of the project

From interviews with parents, key informants in the communities, teachers, and even the girls the project was very well received and was viewed to be quite beneficial to students. Some parents during focus groups discussions talked of how much they had appreciated the project saying that now that their children were learning ICT in school, they (parents) had been relieved of having to possibly pay for ICT classes for them.

Some parents from control schools and some from the Group B schools (whole class teaching) reported transferring their children to full intervention schools which had computer labs so that they too could benefit. In an informal conversation with a head teacher in one of intervention C schools in Makueni, he said that his school had in one term received a total of 50 students whose parents wanted them to benefit from the digital learning tools in the school.

In some schools, the availability of computers and lunch programmes were perceived to attract children from other schools that did not have these facilities, in spite of the distance. This implied that students had to wake up very early in the morning to make it to school in good time. This came out in one of the FGDs conducted during the endline evaluation.

> "not less than 8 kilometres, maybe around four to five kilometres and where you might find that the school is a day school, it performs well and you don't have fees for boarding so you hope to take your child there, so at the end of the day, a child wakes up at 4:30 a.m. and then walks to where they are going and in most cases you find that at 5 o'clock, they are within, so when we are from patrol, it forces us to carry some of them on motorbikes at least because we have found them on the road and it is early morning, there is that risk of long distance and then it is early morning. (KII, Mukuyuni)"

One of the effects of the digital learning tools particularly for the A and C schools with computer labs vs. the B schools with whole class learning facilities has been the consumption and affordability of electricity. Usage of the computer labs has led to higher power bills. Some of the head teachers said the bills at times are far higher than the amount the government allocates to the schools to cover this expense. In some schools there have been incidents of disconnection due to non-payment, resulting in interruption in use of the digital learning tools. Head teachers in some of the schools where power had been disconnected said they would try and find ways to meet the bills, a few of the head teachers on the other hand said it was a big challenge for the school with some saying it was more so because of the economic status of the community. Most of the head teachers however were positive that their schools would manage to meet the costs of the project.

Some teachers talked of additional workload as a result of the introduction of the computers in the school and viewed this activity as an extra task that their regular duties did not allow time for them to handle.

"What motivates us teachers? We are overwhelmed in the first place, we have the regular timetable program, we got to be there and again we find ourselves that we got to be here. It is so overwhelming. Personally, I want to speak on my own behalf, I have a lot of interest in ICT even in this program. In my personal opinion, I wouldn't like calling for you employing somebody to facilitate and to run the program [but] we are like cut off from the program or I am cut off from the program." (FGD Teachers, Kiliku Primary)

2.4.3 Findings: Gender equality

Provision of and equal access to the digital learning platform for both girls and boys was one way of helping to address gender disparities which existed in the community. The majority (92%) of the teachers who were interviewed in intervention A and C schools where the project has computers labs said that all the students in the school they teach have access to computers. Asked whether all students benefit from whole class teaching, 81.8% of the teachers in intervention A, B and C schools said that all the students benefit from this mode of learning therefore an indication that no gender benefits more from the project. In addition, when asked if access to the computers was for their learning, 65.3% of students in intervention A and C schools said they had access while 85.4% of students in intervention B schools said that they benefit from whole class teaching. Further, according to the classroom observation data that was collected from 25 schools, there was not gender bias detected meaning that both girls and boys were treated equally. The teachers who said that some students did not benefit from e-learning, they indicated that these were students from particular classes both male and female.

All the participants in FGDs reported that computers were well received by the school community, particularly teachers and children (class 1-8). Every week, children attend computer sessions at least twice. The children access the computers using their individual username and password, and in all interviews, there were no perceived advantages of a certain gender over the other.

"Interviewer: Do boys have the equal computer access as the girls?
All: Yes
Interviewer: Or are the girls given more time than the boys?
All: No" (Endline FGD Girls, Kalamba Primary)

The majority of the respondents said they knew about iMlango, and exhibited various levels of their understanding. This was exemplified by mentioning different components of iMlango especially the computers and the electronic attendance card used for registration.

All those participating in FGDs supported iMlango and asked if it could expand its scope.

"…this iMlango project has reached here in Kenya and it has done a very good thing to highlight the plight of the girl child. For instance, this year's results, the girl child were very empowered through this project so the girls intend to learn more to help the community." (Endline FGD Older mothers, Kiambani Primary)

For some participants, education would make the girls independent and even empower them to support their families. Girls who were not educated and therefore did not have jobs were considered a "burden" for their parents and husbands. An excerpt from fathers in Gede illustrates this.

"…that helps her because even as she leaves school she has her documents. She can walk into any place even to an office and get employed and so be able to support herself instead of being dependent on her husband. They have the ability to support themselves." (Endline FGD Fathers, Gede Primary)

All the girls' FGDs indicated that girls valued education mainly because they could get good jobs to support themselves and their families. Girls were also concerned about future marriage life and noted that uneducated girls were more vulnerable. Being educated and having a job meant getting money for their own uses and basic decision-making, as well as being concerned by whether the men they were married to were educated or uneducated.

Thus by supporting the education of girls, the project could be said to have increased their chances of completing their education and therefore empowering them and increasing their chances of getting good jobs after completion of their education.

In addition all students in intervention A and B schools were targeted as stipend beneficiaries and the boys and girls who met the selection criteria were selected and have been benefiting from the stipend. During some of the termly assessments that were conducted, parents/guardians of stipend beneficiaries were interviewed and one observation that was made was that most of the respondents were female and they were the custodians of the stipend card. At endline 400 parents/guardians of stipend beneficiaries were interviewed out of which 83.5% were female. The custodians of the stipend cards were the ones who made decisions on how the money was going to be spent and they in fact when asked listed some of the things that they spend the stipend.

Some teachers raised concerns about the emphasis on empowering the girl-child because they felt that the boys are also marginalised and they shouldn't be overlooked from the project.

Project contribution

iMlango's focus, per the GEC directive, is to focus on the girl-child. However, the programme's two core components – attendance monitoring and educational content delivered through the learning platform – target both girls **and** boys. We have always maintained that equitable access to the core equipment is crucial in minimising unintended consequences that might emerge if, for example, the boy child wasn't offered e-learning opportunities via the computers. When implementing new components into the project, such as the stipend or the child club, we have always consciously tried to avoid marginalising boys at the expense of girls. Whilst the stipend primarily targets the girl child, we also support the families of a sample of poorly attending boys. The drive of the girl/child clubs has been on girls, but where possible we've encouraged the creation of a boy equivalent as well.

We do acknowledge that there exist boy-specific problems at the primary school (such as drug and alcohol abuse or dropping out of school to become boda-boda drivers), however we encourage head teachers and teachers to address boys' absenteeism in tandem with girls', as we've found that preventing dropout is the best way to combat the negative pitfalls typically associated with adolescence.

2.4.4 Findings: Innovation

The use of digital learning tools in the target schools was an innovative way aimed at improving education outcomes of the targeted girls and enhancing education completion rates for these girls. Absenteeism is reported to have a negative effect on education outcomes, and the electronic attendance monitoring provides headteachers with the capability of identifying and dealing with cases of absenteeism. Headteachers in particular have responded positively to the attendance reports generated by the attendance monitoring system. Some girls, when asked about the changes that availability of computers have had on their view of education, said that they found school more exciting while others are said that they were more interested in attending school. Parents too said that they had noticed a greater interest in school on their children as a result of the introduction of computers with some saying their children did not want to miss school even when they were sick.

Project contribution

The innovations for iMlango are not per se from the individual components that were used to support the project, but rather the combination of these elements in a new context. To our knowledge there are no other EdTech projects that take the same holistic approach to combining electronic attendance monitoring, internet delivered personalised tutoring and other content in a way which delivers not only learning but rich sets of data that can be used to understand behaviour and performance of the learning system as a whole. These were combined in the project with traditional international development interventions such as teacher training, capacity building, support and community engagement.

In addition to the collective innovation of these elements the project has also innovated around:

- The application of the Whizz personalized tutoring service in a new low resource context. The project team has had to adapt the operation of the service to take into account the localized challenges of the physical environment (e.g. power outages), and ways of supporting teachers and school leadership to make the most of the resources and maximize "time on task" which is one of the key determinants of learning gains. As presented in Figure 36, the application of Whizz in this context has provided some revealing data benchmarked against international standards for numeracy skills of students of various ages at primary level not available in this depth previously.

- Simulated tutoring offers a scalable method to meet the educational needs of each individual student. The tutoring algorithm identifies knowledge gaps and delivers the appropriate lesson to each student. Those that were at risk of dropping out are able to catch up with their peers, and gifted students are exposed to content that challenges them and pushes them forward. Previous approaches might offer digital content, but do not address the challenge of differentiating to meet the needs of every student.

- Development of tools and processes to support the monitoring and management of the technology platform / network consisting of satellite equipment, computers, servers etc. to maximize the availability of the learning resources for the benefits of the teachers and learners.

- Adapting the sQuid digital payment transaction system to capture pupils' attendance data on a daily basis. This provides the project management with real-time data on school, class and individual attendance levels. We can quickly identify problems, and engage the relevant school if a problem emerges. Attendance data also helps to build pupils' academic profiles that feed into the in-depth analysis of the project results.

- Aggregated Live monitoring and evaluation of all aspects of the project starting from connectivity and data usage through to attendance monitoring and the learning progress has brought innovation within ICT for Education projects to the next level. Data richness has provided valuable insights from student to school, to county to project level. A further innovation is the analysis of combined data sets from project partners around attendance, internet usage, access time on learning content and Whizz service.

- The delivery of standardised debate topics through the Junior Debaters' Contest to pupils across 205 schools was made possible through widespread access to the online portal. We are able to remotely upload the questions and allocate a defined window in which pupils can respond, before collecting all of the answers and sending them to Arimus Media for marking. Everything is done electronically, ensuring the process is efficient whilst precluding the need to collect individual responses from each school that participated.

- The stipend programme was designed to boost the attendance of students that were struggling to go to school, and to test the link between attendance and learning outcomes. According to our evaluation framework, stipends were only made available to Group A and B schools. The stipend was issued on a 'semi-conditional' basis – it was explained to parents what the objective was: to have their children better able to attend school regularly, and this effect has been tracked in the data. It was felt that given the type of geographic and weather challenges identified, a harsh conditionality of acceptable attendance level might be very hard to apply.

- Sustainability interventions such as the provision of community internet access services which have led to the Avanti ECO initiative now being rolled out in East Africa and soon in other African countries.

The next phase of iMlango through GEC-T will allow us to refine some of these innovations, now with the benefit of the end line data which can be used to calibrate the real time data coming from the various systems of the iMlango partners.

2.5 How sustainable are any changes the project has led to?

2.5.1 Has the project put in place mechanisms that allow changes to marginalised girls' attendance and learning to be sustained?

In order to assess whether the project has put in place mechanisms that allow the sustainability of the changes brought up, it is important to address the following questions:

- Is the project integrated with the teaching process in schools? (Are there the necessary facilities in the schools? Is the content aligned to the curriculum? Are teachers trained? etc.)
- Did the intervention identify and address barriers that are preventing marginalised girls from attending school?
- Did the project bring about change in mindset of headteachers/teachers?
- Which components of the project do the teachers value the most?

Is the project integrated with the teaching process in schools?

According to the results from the endline survey, only 41% of the headteachers think that their school has the necessary facilities for students to learn. In terms of use, 78% responded that they use teaching resources in the classroom. On the contrary to this, 34% of the teachers replied that they use the computers less than once a month while 24 % said every day and 24% replied once a month. Furthermore, only 13% of the teachers replied they use the internet to prepare for lessons. These figures indicate that more study is needed to identify the reasons behind the low level of reported use of the equipment provided through the project.

When it comes to teachers' training, 77% of the teachers said that they attended the iMlango training while only 42% believe that they have the adequate skills to use computers for teaching. On the other side, 76% of head teachers responded that teachers in their school have the required skills needed to teach the students effectively.

Did the intervention identify and address barriers that are preventing marginalised girls from attending school?

In order to ascertain the sustainability of the project, identifying and addressing barriers that prevent girls from accessing education is vital. During the baseline, teachers were asked to identify reasons that they think prevent girls from attending school and they have identified a number of barriers which are presented below.

Table 83: List of barriers preventing marginalised girls from attending school as reported by teachers at baseline

Reason for missing school	Frequency	Percentage %
Needed at home to help with home duties (Farming, looking after livestock, other IGA)	198	74
Didn't think the teacher would be there/ teacher absence	128	48
School fees	89	33
Lack of school uniforms or other school materials	49	18
Sickness	18	7
Concerns about violence/ bullying/ harassment on the way to school or at school	14	5
Distance to school was too far (migration of pastoralist households)	4	2
Other	119	45

Even though these barriers were identified by teachers during the baseline survey, the contribution of the project towards addressing these barriers was not given due attention on the endline survey. No questions related to these barriers were asked during the endline survey hence, the impact of the project on minimising the barriers is not exactly clear.

Did the project bring about change in mindset of headteachers/teachers?

The other question to address on the sustainability of the project is whether the project bring about change in mindset of headteachers and teachers on marginalised girls education. Again, this question is not also captured both in the baseline and endline surveys which makes measuring the change in mindset very difficult.

Which components of the project do the teachers value the most?

Headteachers were asked which components of the project they value the most and 60% replied that the literacy component is the most important for them while 54% chose the attendance monitoring system. The headteacher responses are presented below.

Table 84: Most valuable components of the project as identified by teachers

iMlango components	Frequency	Percentage %
Literacy	22	60
Attendance monitoring	20	54
Internet	15	41
Maths-Whizz	15	41
Life skills	11	30
Teacher training	10	27
Stipend	2	5

In order to assess the sustainability of the project, the sustainment of each component should be examined in detail.

Project contribution

The key measure for Outcome 4 for our project is our engagement the MoE, County officials and the schools themselves. The field team has been conducting monthly visits (c4,630 in total, please refer to the logframe for breakdown) to the schools to discuss with the headteachers and teachers about their progress and issues as well as to encourage them to be active in the project.

County officials have been engaged from the beginning of the project in order to gain access to the schools with the field teams disseminating data about the progress of the school in their Counties and trying to get them actively involved. So far local MoE has been trained on Maths-Whizz data and usage, and have been provided with log-ins for the Maths-Whizz central reporting system. Some of the DEOs have since also expressed an interest in receiving data reports that cover attendance, enrolment and transition. We aim to start disseminating this data to the local MoE through the field teams in the next phase of the project, as we seek to build up government capacity whilst simultaneously engendering enhanced ownership of iMlango. This will hopefully consolidate our drive towards programmatic sustainability, as we recognise the DEOs are central stakeholders in the project and are therefore key in helping us to achieve our long-term objectives.

From the beginning of the project we have created and retained a very close relationship to the MoE recognising both that we need their approval to operate in their schools but also that they are one of the main gatekeepers for sustainability. The MoE has responded positively to the project being implemented in their schools and they have showed interest in its progress. During the first phase of the project the MoE formed the iMlango Committee which includes representatives from various MoE departments. A representative from the committee is attending the quarterly monitoring visit in Kenya and provides feedback to challenges that the project has faced. This important relationship will continue in the next phase of the project and we believe that the MoE will be willing to help sustain

some of the activities in the schools after the end of the funding.

Parents in the community of the schools have generally been engaged; during the project we have seen incidents of community mobilisation to ensure the intervention is running smoothly in the schools. For example, some parents have been contributions for additional electricity costs at the schools, raising money to maintain and improve the ICT lab or school infrastructure (e.g. generator for when there's a power outage). We believe that this is going to be sustained as it reflects their view about the impact of the project on their children's education. Further to this, the field teams have engaged regularly with the recipients of the stipend initiative to get their feedback.

As a project we tried to align as much as possible with the MoE activities that relate to our activities in the schools. We have therefore integrated Tusome in the portal so that the schools are able to access the content digitally and build on their capacity to integrate ICT in learning.

The most recent DLP programme that delivers tablets to primary schools is another example of our attempts to align with ministry projects. Because some of our schools have already received the tablets, we have successfully tested that the iMlango learning activities can be delivered over them. We have therefore encouraged the teachers to use the resources through the tablets as well which provides additional leverage for the project.

2.5.2 How likely is it that the projects' benefits will be sustained?

At endline, we attempted to establish whether there was a willingness amongst headteachers to keep the project running by asking if their schools would be willing to make a contribution to the costs. The majority (83.8%) of the headteachers said that they would be willing to contribute. When asked how they would secure such a contribution, 80.7% of the head teachers that would be willing to contribute to the running costs of iMlango said that they would ask the parents to contribute, and 29% said that they would secure contribution from the MoE.

Project contribution

As reported in the previous section, there have been communities that have mobilised to cover operating costs so that the project can continue to work unhindered. This is a very positive indicator that they value the intervention and they want to contribute what they can to continue the project activities for the benefit of their children.

Lastly, the project has been confirmed to continue under GEC-T which provides additional 4 years of intervention and the opportunity for the project to explore further mechanisms for sustainability.

In the last phases of the project we have seen that teachers in some of the schools are acting as iMlango champions providing training and support to the other teachers in their school. The identification and capacity building of these iMlango champions will be an important activity of the next phase of the project to ensure complete and sustainable knowledge transfer in the schools.

2.5.3 To what extent has the project leveraged additional investment to sustain its activities?

Project contribution

As a Strategic Partnership we provided 50% matched funding for the project which consisted of both in-kind and cash contributions; the split per quarter is shown in the table below. These values are also reported in Outcome 4 of the logframe.

Table 85: Matched contribution from the consortium

Quarter	Cash contribution (£)	In-kind contribution (£)	Total Matched contribution (£)
Q1	£637,562	£2,224,451	£2,862,013
Q2	£440,805	£1,516,490	£1,957,296
Q3	£809,688	£877,028	£1,686,716
Q4	£770,151	£338,028	£1,108,179
Q5	£535,697	£251,501	£787,199
Q6	£406,994	£245,874	£652,869
Q7	£412,172	£237,088	£649,261
Q8	£380,771	£507,426	£888,197
Q9	£1,203,347	£287,350	£1,490,696
Q10	£474,419	£237,320	£711,739
Q11	£381,041	£218,104	£599,145
Q12	TBC	TBC	£625,538
Total: £14,018,848			

Apart from the consortium's contribution we haven't been able to secure any additional funding from other sources. In Section 2.4.1.6 we have presented the potential sponsors we have engaged with and the current status of the discussions with them as well as the various commercial mechanisms that will help subsidise activities in the schools going forward.

3   Conclusions

In this section we summarise the main findings from the project endline and provide answers to the main questions that the ToC set out to explore as presented in Section 1.1.2.2.

3.1 Project impact on outcomes

Can iMlango in its totality improve student learning (for marginalised girls in particular) and engagement in ICT (improve digital literacy through utilisation of the learning platform). In particular, does individualised online tutoring in maths have a measurable impact on learning outcomes?

The endline findings indicate that the project had some positive impact on leaning outcomes.

The project has delivered positive impacts at the output level, which unfortunately haven't been demonstrated at the outcome level. The evaluation structure was based on three different intervention groups. Because of sample size limitations in these three groups the project was not able to detect the target improvements. Although the targets for the learning outcomes haven't been reached there is evidence suggesting that for some girls and schools there were successes. Most notably, Group A schools achieved 0.16SD improvement in numeracy, which is directionally positive although limitations in sample sizing and statistical significance exist. The project analysis in Section 2.2.2 indicates that when Maths-Whizz is used in the recommended way then it can improve the girls' numeracy by the targeted 0.4SD. Looking at all the intervention groups as a whole [in comparison to the control group] the evidence does not demonstrate improved learning however this should be interpreted with caution as the groups are very different and it is likely that there are averaging effects.

The girls that were interviewed also reported that they had learnt something new as a result of use of the digital learning tools. 85.5% of the interviewed girls at endline said that they have learnt numeracy and 76.2% literacy. This is important as improving numeracy and literacy was the main focus of the project.

As seen in the results from the girls' assessments there was improvement in the performance for some intervention groups against control schools in spite of the teachers' strike in 2015, which disrupted school activities and negatively impacted upon time on educational content. It is worth noting however that the project life was short and one could again conclude that with a longer duration, the project would have contributed to greater improvements in performance.

Does a financial incentive for families, linked with attendance by marginalised girls, increase learning outcomes?

According to project data, students who received the stipend showed an improved attendance; 56% of stipend recipients increased their attendance by any measure in Term 3 2016 and 68% of the student with increased attendance showed at least 10% improvement. This improvement was also verified both by parents and teachers at endline. Parents who participated in FGDs during the June-July 2016 termly assessment spoke of the benefits they had had seen as a result of the stipend:

> *"Yes because when a child is hungry they cannot go to school due to hunger and will not perform well. If a child misses even a pen they don't feel motivated to go to school but when provided with the school necessities they will go to school and will perform well. I must say this support came at the right time." (June-July 2016 termly assessment, Fathers FGD, Oloolua Primary)*

> *"Since the iMlango stipend there has been a lot of improvement and children are not missing going to school, they are also benefiting with food." (June-July 2016 termly assessment, Fathers FGD, Kakoneni Primary)*

Based on the qualitative evidence, it could be said that financial incentive linked with attendance can contribute to improved learning outcomes for marginalised girls. From the information gathered from the teachers and the parents, although useful, a greater amount would allow families to address costs more comprehensively. This may help ensure that students benefiting from the stipend do not miss out as a result of non-payment of education expenses, such as exam fees or expenses for PTA teachers and other non-government employees in the school.

In addition it would be helpful if the parents/guardians who are selected as stipend beneficiaries are provided with adequate information regarding the duration of time within which to expect the financial incentives. It is also important to regularly monitor the merchants and to ensure that they adequately meet the needs of these parents, particularly with respect to price hiking. In the instances where price hiking was identified by the project, merchants were adequately handled, and there have been no repeat offenses. Other merchants were reported to make decisions for parents on which items they ought to pick. Still some parents spoke of going to the merchant on several occasions and being informed that their cards had not been credited with money. 57.0% of the parents interviewed at endline reported that the stipend did not come in time. This is due to poor communication with the stipend recipients, as card value upload process has always been carried out on time, suggesting that recipients are not always aware of when they should be receiving the stipend.

Can electronic attendance monitoring be effectively used in schools and can it assist in improving the education outcomes of students?

As reported by teachers and head teachers, student absenteeism from school may cause a decline in grades for the affected students. Electronic attendance monitoring can assist in improving the educational outcomes and as reported by head teachers attendance data helped them to keep track of which students were away and also enabled them to follow up in order to find out the reasons for absenteeism.

On attendance some girls reported that as a result of use of the digital learning tools they found school more interesting while others reported that they were more interested in attending school. This was given more weight by parents who participated in the FGDs with some reporting since the project started, their children never wanted to miss a day in school.

> *And even they help children a lot because a lot of children do not want to miss school because of these computers and are adamant not to miss because of that swiping, because if they swipe they tell us that you will know that they are in class when you are in Nairobi and even when they miss, you will still from there so many don't to miss school and they have really helped us a lot (Endline FGD Mothers, Kiambani Primary)*

In order for the attendance monitoring system to be effective, there is a need to ensure that it runs smoothly so that the data collected is accurate and students are not missed out when attendance is being taken. This has largely been achieved by ensuring that all the students were issued with attendance cards in a timely manner, and faulty cards were also replaced quickly. It would be very important too to ensure that that the tablets are enough and that they are in good working condition. A few of the teachers interviewed reported that this mode of taking attendance data was quite time consuming, as the tablets had to be moved around the school to cover all classes.

> *"Including that, if that is included, the tablet that we use to take attendance, the pupils daily attendance, the tool is very insufficient, I wish we could have a tablet surplus so that it makes the work of a teacher easier, you can imagine a whole school like this with one computer teacher or two, it makes the teacher run from one classroom to the next and the next, it is time consuming and interferes with the learning of the other classes. I wish there could be a tablet per classroom the teacher in that classroom. When a class teacher is given and serve for herself she will know when to serve in the morning and afternoon, otherwise only two for a whole school, No!" (Endline FGD Teachers, Central Primary)*

3.2 Project findings on outputs and sustainability

Does access to ICT assist teachers in delivering learning?

Even though teachers were successful in delivering learning using technology, overall confidence in ICT is mixed. The intervention teachers were very positive towards digital learning tools; of the intervention teachers surveyed, 84.4% said that digital learning tools made teaching easier.

77.8% of the interviewed teachers in intervention schools said that they had used a projector and laptop for whole class teaching, with Group B schools having almost 10% more teachers conducting whole class sessions supported with digital resources than Groups A and C.

Exploring the possibility of weaknesses of training, 58.4% of teachers did not feel like they had the necessary skills to use computers for teaching. This suggests that while the training provided gave teachers basic competency in using the technology, they are not yet confident enough. We believe that this confidence will come with time and effective refresher training.

Can content (accessible through ICT) which is targeted at marginalised girls raise their self esteem, career aspirations, and knowledge of the outside world?

The project has achieved improvement in the girls' confidence however not to the desirable extent.

Analysis of the results of the perception scorecard shows that the intervention groups have improved more than the control schools based on the overall average scorecard score; Group A has improved by 3.3%, Group B by 4.6%, Group C by 2.1% and Group D by 1.5%. The topics in which girls showed the most improvement were regarding questions on whether their school and teachers had the necessary facilities and skills respectively to teach them. Also more girls in the intervention schools agreed that their parents encourage them to marry when they are ready to do so and showed slight improvement in confidence of asking questions in the classroom.

The girls were asked how the introduction and use of computers in their schools has changed the way they looked at their future. To this 33.1% of the girls said that they were more interested in completing primary school, 37.4% said that they were more interested in completing secondary school 53.4% said they were more interested in acquiring a higher level of education while 50.4% said that they were more interested in acquiring a career after school.

The impact of the child club activity on the output indicators is limited because they were used in the schools as an opportunity to study Maths and Literacy further rather than specifically use the life skills content. This is verified by the fact that just 20.8% of the interviewed girls attending the child club said that the sessions have made them more confident. Further to this, when asked about the activities taking place during child clubs time, 67.4% (223) of the girls in the intervention schools that attend the child club sessions said that they read stories in the portal, 63.1% (209) that they used Maths-Whizz and 8.8% (29) that they used the Good School Toolkit.

Does the iMlango programme create a long-term sustainable model for deploying and delivering ICT services that in the long run achieve positive results for the above measures (or to facilitate other measures)?

Regarding sustainability the head teachers interviewed reported that their schools would be willing to contribute in order to meet the cost of the project, while regarding the stipend head teachers, key informants in the communities and parents interviewed talked of a need to start income generating activities for the parents who have been beneficiaries of the stipend so that they may have some resources to meet the cost of their children's education. Some headteachers have fully embraced the project and wish to have it sustained. Adu Primary in Kilifi County and Barsombe Primary in Uasin Gishu are two schools that were found to have greatly embraced the project. This was reflected in the way their computer labs were well kept with all the computers having specially made covers to protect them from dust and their desire to explore sustainability options.

4   Recommendations

Based on the evaluation we conducted for the project, we have the following recommendations presented in the table below.

Table 86: Recommendations from external evaluator

#	Recommendation/Action	Timeline for action	Actionee
1	Create awareness about the project to the entire target community.	To be addressed in the next phase	iMlango consortium
2	Inform target community about project closure and way forward	By 31st March 2017	iMlango consortium
3	Inform parents/guardians whose children have been beneficiaries of the stipend that about when to expect stipend to end	By 31st March 2017	iMlango consortium
4	Disseminate findings of the data collected to the beneficiaries. This ought to be on a regular basis	To be addressed in the next phase	iMlango consortium
5	Headteachers and teachers should be encouraged to enforce the use of English as the communication language between the children in the school following MoE policy on language of instruction.	To be considered for future programmes	MoE and schools
6	Electronic monitoring system was found to be time consuming. We recommend that a way forward is sort and communicated to schools heads in order to help sort out this issue.	To be addressed in the next phase	iMlango consortium
7	It is recommended that surveys and other project assessment activities be conducted in the middle of the school term. This is because if it is too early in the school term, the schools will not have settled and there may be limitations that come with it. If the timing is at the very end of the school term, most schools will be busy end of term exams and there might be disruptions or delays experience by field teams.	To be addressed in the next phase	iMlango consortium
8	There would be need for the external evaluator to conduct regular monitoring visits to the sites.	To be addressed in the next phase	iMlango consortium
9	The is need for a team on the ground that promptly responds to issues raise by project beneficiaries for example parents/guardians of stipend beneficiaries of headteachers whose school are experiencing challenges with the digital learning tools including breakdown of computers.	To be addressed in the next phase	iMlango consortium
10	Ensure that the selection of stipend beneficiaries takes into consideration the feedback from the school and the community in order to avoid cases of students that are missing from school for reasons that can't be influenced by the project.	To be addressed in the next phase	iMlango consortium
11	Information collected from both teachers and parents indicated that the equipment in the schools are insufficient especially taking into consideration the high numbers of students. It would be helpful if this could be taken into consideration in future projects.	To be addressed in the next phase	iMlango consortium

A1. Annex 1: Logframe

The updated logframe (GEC Avanti Revised Logframe for endline 180317.xlsx) has been submitted to the FM as attachment to the endline report.

A2. Annex 2: Outcomes Spreadsheet

The following outcome spreadsheets have been submitted to the FM as attachments to the endline report:

- ***Outcomes_Spreadsheet - GROUP A - Avanti 080517.xlsx***: this includes the results for Group A vs. Group D considering standardised total scores for Maths and Literacy

- ***Outcomes_Spreadsheet - GROUP B - Avanti 080517.xlsx***: this includes the results for Group B vs. Group D considering standardised total scores for Maths and Literacy

- ***Outcomes_Spreadsheet - GROUP C - Avanti 080517.xlsx***: this includes the results for Group C vs. Group D considering standardised total scores for Maths and Literacy

A3. Annex 3: Changes to project design

In the table below we outline any changes made to the project since the proposal.

Table 87: Intervention types and changes to interventions

Intervention types	Planned at proposal stage (X)	Added?	Removed?	When?	Describe change and rationale
Refresher training		X		1st: May - June 2016 2nd: September 2016	Ensuring teachers remain comfortable with the technology is important to maintain technical competency in the schools. Also provides new teachers (staff turnover) with the requisite skills, particularly where they haven't received much training.
Prizes (transition from stipends)	X		X		Due to the delayed roll out of the stipend programme and we decided to continue with stipends until the end of the project.
Twinning and mentoring activities	X		X	December 2015 – after the budget amendment	Due to the intensity of the activities in the schools we decided to remove this activity to enable the teachers to focus on the learning outcomes.
Stipends for boys		X		During the design of the stipend programme	When we were designing the stipend programme the feedback from the schools was that there were boys that had immediate need of the stipend as well. In order to be inclusive and avoid negative backlash we dedicated a small percentage of the stipends to boys with poor performance.
Installation of 10 additional schools (including a special school in Kilifi)		X		January 2016 (go-live date of additional schools)	The MoE noted that the randomisation process has resulted in some areas within Uasin Gishu being under-represented in the intervention. Being conscious that maintaining county level support within our intervention areas is essential, we requested to add these schools in order to ensure good county level balance and protect the project from the possible impact of political interference.
Scale up of intervention to cover additional students in the schools		X		January 2015	After the baseline we realised that the schools are larger than originally anticipated. iMlango is a whole school project so we had to scale up our activities accordingly and in cooperation with the FM.
Extension of the project duration by 1 year		X		January 2015	Due to the logistics of installations there was a limited timeframe for implementation. We therefore requested on additional year of intervention to increase learning outcomes.

A4. Annex 4: Endline research methodology

1. Process

The endline data collection was conducted by Advantech Consulting which is the External Evaluator for the iMlango Project. A good number of the enumerators who were selected to take part in the endline survey had been involved in baseline data collection while others had taken part in termly assessments that were conducted after the baseline survey. As a result, they had a good understanding of the project and the target communities with some of the enumerators having worked in the same County since baseline. The selection criteria of the enumerators were based on prior experience in data collection. The enumerators were taken through a five day training aimed at equipping them to undertake the iMlango endline survey including its requirements. They were trained on all the data collection tools which were going to be used including the test, how to administer the test and the method of replacement for the girls who would be found missing. In addition and in order to protect the study participants, all the enumerators were required to have undertaken training in research ethics and submitted a copy of the certificate to Advantech. With the exception of the household survey, which was targeting household heads with children who are students in the target schools.

Most of the members of the data collection team had prior experience as qualitative researchers and it was on this basis that they were selected. Since they were expected to undertake all data collection activities for the endline evaluation, they were trained on all the data collection tools and how to carry out each of these activities. Specifically on qualitative data collection, they were trained on effective moderation of Focus Group Discussion including probing for responses, effective note-taking and how to vet participants in order to get only those who are eligible for inclusion.

Qualitative data was audio recorded and notes taken during the proceedings. This was then transcribed and translated after which it was analysed using Nvivo, a software tool that is used for analysis of qualitative data. FGD participants were given numbers and during the discussions they were not referred to by their names. This was to ensure confidentiality. In addition to this, data was stored in Advantech offices and only those working on the project and authorised to view that data had access to it.

Data from the survey was collected using mobile phones which were installed with a relevant software tool and was submitted to a server at Advantech offices where it was checked for possible discrepancies as a measure of quality control. As for the data on girls' assessment, this was keyed in by staff who had prior experience and who were based at Advantech offices where they were regularly supervised and guided accordingly to minimise any possibility of errors.

2. Attendance

The external Evaluator conducted spot checks on twice. Once during the June-July 2016 termly assessment when spot checks were conducted in 30 schools and at during the endline evaluation when spot checks were conducted in a total of 127 schools. Spot checks had also been conducted in October and November 2015. Each time a spot check was conducted, data from the attendance register was also recorded.

Limitations and discrepancies exist in the data even as observed when spot checks were being done. While numbers from head count ought to have been verified using the school attendance registers, this was not always possible owing to the fact that these attendance registers were not always up to date.

3. Learning

The tests administered mirrored those that were administered at baseline with the same skills that were tested at baseline being tested at endline. Prior to the endline evaluation, piloting had been conducted whereby there were two tests for numeracy and two for literacy after which one the tests was selected to be administered at endline.

English, which is the language of instruction, was the language of the test. Literacy tests were administered one-on-one whereas the numeracy test was done by students individually and timed at forty minutes.

4. Sampling

a. Evaluation design

The evaluation used randomised control trial where some of the schools were treatment and others acted as control schools.

In order to select half of the schools for evaluation we went through a matching exercise to ensure the chosen schools to sample from are similar to the schools that we choose not to sample from. The matching ensured that the sampled beneficiaries would be representative of the whole population of beneficiaries.

In order to be able to create pairs of matched schools, we collected school level data through a school survey in the initial list of 400 schools.

School level data used for matching school pairs
The characteristics we measured in the initial school survey included;
1. School size (above 450, as an indicator of larger schools and likely to have similar issues) - Boy:girl enrolment ratio – in the range of 50:50 (+/- 10%) – this ensures a degree of likeness.
2. Existence of Poverty Support Programmes as a manifestation of marginalisation e.g. a school feeding programme means that children cannot get enough food at home (poverty), worming indicates poverty through poor access to healthcare, sanitary towels indicates parents may not be able to afford these essential items; hygiene indicates lack of access to good quality water at home.
3. Duration of Poverty Support Programmes indicates consistent chronic problem, with the risk that the situation continues.
4. Number of Identified issues of marginalisation by the school – the head teacher identifies socio-cultural factors that affect attendance such as FGM, Early marriage, pregnancy, requirement for work.
5. Attendance score provided by the head teacher.

We didn't use exam result data as part of the school matching because the primary objective of the matching is that a school should be of similar size, with similar girl marginalisation factors.

Methodology for calculating a 'likeness score' on the Likert scale
For each of the measures 1-4, we applied a score 1-5, and an overall weighting of 30%; 30%; 30%; 10%. We didn't take the attendance score into consideration, because the attendance records were poor and teachers were likely to have given a high attendance score.

From the scoring, we expected that there will be a statistical difference between a 1-2, 2-3, etc., and therefore any school within an integer range can reasonably be described as similar to another school in that range. The flatter the distribution of scores, the less similar the whole group, although schools with scores within 0.5 point can reasonably be described as matched.

b. Sampling strategy

At baseline, a total of 1,786 girls were tested, which included girls from class 1 to 6. However at endline a total of 682 girls were tested. These are only the girls in class 6 owing to the fact that class 4 had been dropped.
The girls who were not available in the schools to be tested were replaced by girls from the same class who were randomly selected. The replacement criteria were the same for the intervention as well as control schools. With this uniformity in the way the sampling was done, there does not appear to be any possible bias in one group over another. It is worth noting that replacement of girls was done based on the fact that a girl tested at baseline was not available at endline. For this reason

where it may appear like there were more replacements in one group compared to the other this was because more girls from that group could not be re-contacted. The high attrition rate could be attributed to a number of factors as reported by teachers. These include, transfer of targeted girls to other schools as well as girls repeating classes. The girls who were in the same school but had repeated classes were not tested. This was done in order to avoid performance that could have been markedly different from those of the girls in class 6. This was based on the understanding that most of those students who are made to repeat classes are deemed not to be ready for the next level based on their performance.

The tables below show the sample size of tested girls both at baseline and at endline.

Table 88: Sample composition at baseline & endline (sorted by grade)

Standard	Baseline sample		Endline sample (recontacted at Endline + substitute girls Endline)		Aggregate (Baseline + Endline)		Cohort - recontacted at Endline girls only	
Frequency in %	treatment	control	treatment	control	treatment	control	treatment	control
Out of school	0	0	0	0	0	0	0	0
Standard 1	520	170	0	0	0	0	0	0
Standard 2	101	0	0	0	0	0	0	0
Standard 3	520	170	385	295			298	87
Standard 4	102	0	0	0	0	0	0	0
Standard 5	102	0	0	0	0	0	0	0
Standard 6	101	0	0	0	0	0	0	0

Table 89: Sample composition at baseline & endline (sorted by district/region)

County	Baseline sample		Endline sample (recontacted at Endline + substitute girls Endline)		Aggregate (Baseline + Endline)		Cohort - recontacted at Endline girls only	
Frequency in %	treatment	control	treatment	control	treatment	control	treatment	control
Kajiado	200	20	67	10			42	4
Kilifi	585	92	209	46			131	23
Makueni	271	156	100	78			62	43
Uasin Gishu	435	72	136	36			65	15

Table 90: Sample composition at baseline & endline (sorted by test delivered)

Test delivered	Baseline sample		Endline sample (recontacted at Endline + substitute girls Endline)		Aggregate (Baseline + Endline)		Cohort - recontacted at Endline girls only	
Frequency in %	treatment	control	treatment	control	treatment	control	treatment	control
Literacy	505	170	505	170			298	85
Numeracy	505	170	507	85			300	85

5.   Matching of treatment and control group (not applicable to pre-post methodologies)

Table 91 compares the groups of re-contacted and substitute girls tested at endline. The variables used are the average literacy and numeracy score for every intervention group separately.

6.   Contamination and compliance

All the girls in the iMlango intervention schools had exposure to the iMlango digital learning platform.

However, girls in intervention A and C schools, which are the schools with computer labs appeared to have benefited more compared to those in intervention B where whole class teaching is being used. This can be seen from the teacher responses gathered from interviews with teachers. When asked whether all the students have access to use of computers, 115 (92%) of all the teachers in intervention A and C schools said that they do with only 10 (8%) of the teachers saying that not all the students have access to use of computers in the school.

There was, as part of the intervention the aspect of the stipend and for this not only the girls in the target schools benefited. The stipend was allocated to some girls and boys from intervention A and B schools. Selection was based on school attendance using attendance data and the boys and girls who were seen to have missed school for longer period were targeted as stipend beneficiaries.

There is no evidence of contamination of the control group. However from informal talks with teachers and parents from the target communities, the data collection team were informed that some parents from control schools and some from intervention B schools where there were no computers labs were said to have transferred their children to schools with computers labs so that they could get an opportunity to benefit from these resources. Some parents too were reported to have transferred their children to schools that benefited from the stipend in the hope that they too would benefit from stipend. Though no data was collected around this, these transfers are not viewed as an issue that could have contaminated the control group.

7.   Approach to estimating learning outcomes

At baseline, girls in class 1 and class 3 were selected as the cohorts to be tracked through the projected duration but in the course of the project, class 1 was dropped. At endline the cohort girls, who were now in class 6 were tested and it was found that some of them were missing. The main reasons why they could not be found were because some of them had transferred to other schools, while others though in the same school had repeated and thus they were not in class 6.

8.   Qualitative research approach

Qualitative data was collected from various groups and individuals from the target population. This included Focus Group discussions and in-depth interview with key informants. A total of 24 Focus group discussions were held. The groups included mothers (disaggregated into older mothers and younger mothers), fathers, teachers as well as in-school girls in selected intervention schools across the four Counties.

At endline qualitative data collected by the external Evaluator was specifically for the evaluation. During the termly assessments carried out earlier by the External Evaluator, qualitative data had been collected as part of on-going monitoring activities. The same qualitative methods used at baseline were used at endline where focus group discussions were conducted with parents, teachers, and in-school girls whereas in-depth interviews were conducted with key informants from the target communities. The qualitative data collected was purely to complement the qualitative data.

9.   Qualitative research sampling and analysis

Qualitative data was collected using focus group discussions guides that had been developed to suit each of the groups that was going to participate while interviews with key informants were conducted using an in depth interview guide in which there were questions on the topics of interest.

The qualitative data collected yielded a lot and helped provide more information/explanation and thus expounding the information obtained through the quantitative data. All the focus group discussions and key informant interviews were tape recorded, transcribed and those conducted in any other language other than English were translated into English. The data was then analysed base on the following themes using Nvivo a software that is used for analysis of qualitative data:

1. Attitude towards education
    1.1. Positive
    1.2. Negative
    1.3. Neutral/Mixed/Others
2. Girls expectations and attitude towards education
    2.1. To support themselves
    2.2. To support family
3. Marginalization
    3.1. Poverty/SES
        3.1.1. Lack of money to meet educations expenses
        3.1.2. Lack of money for girls needs e.g. sanitary towels
        3.1.3. Lack of food/food shortage
4. Perceptions of schools in communities
    4.1. Attitudes (including quality of education)
        4.1.1. Positive
        4.1.2. Negative
    4.2. School set-up/infrastructure
        4.2.1. Staff capacity (student-T/A ratio; training; skills; gender ratio; qualifications)
        4.2.2. Learning resources (e.g. books, desks)
        4.2.3. Buildings and equipment (e.g. classes)
        4.2.4. Accessibility (Distance/mode of transport/catchment population)
        4.2.5. Communication and electricity (e.g. availability)
    4.3. Parents and school administration role
        4.3.1. Meetings (attendance/content/outcome)
        4.3.2. Extent of parent/teachers involvement
    4.4. Learning environment (i.e. role of violence)
    4.5. Perceptions of quality of education/learning
5. Role of technology/computer
        5.1.1. Accessibility (gender specific/for all)
        5.1.2. Impact on workload (teachers)
        5.1.3. Impact on school attendance/performance (students)
6. Social-cultural issues affecting girl child education (GCE)
    6.1. Responsibilities at home/child labor
    6.2. Insecurity
        6.2.1. Potential threats and motives (who are they e.g. touts)
        6.2.2. Strategies to handle threats (e.g. 'satellites')
    6.3. Gender/child preference in schooling
        6.3.1. Existent/valued
        6.3.2. Non-existent/not valued (treated equally)
        6.3.3. Other
    6.4. Early pregnancies, marriages and FGM
        6.4.1. (non)existing practices
        6.4.2. Impact on school attendance
        6.4.3. Perceptions of marriage and education
    6.5. Peer pressure/negative influence (child sex tourism)
    6.6. Social relations (self-esteem/confidence)
7. Factors affecting boy child education
    7.1. Drugs and alcohol
    7.2. Rebellion/indiscipline

    7.3. Responsibilities at home/child labor

    7.4. Rite of passage/circumcision

    7.5. Poor parenting/lack of guidance from parents

    7.6. Too much emphasis put on girl child education

8. Career aspirations (girl child education)

    8.1. Perceptions of higher learning

    8.2. Career choices (doctor, teacher, pilot, lawyer)

    8.3.   Enablers/bottlenecks to future careers

    8.4.   Value of education on future careers

9. Perceptions of GCE/iMlango awareness & anti-early marriage laws

    9.1. Supportive

    9.2. Non-supportive

    9.3. Others

10. Interventions supporting GCE (iMlango)/completion

    10.1.   Examples (Guidance & counseling; mentorship, community sensitization)

    10.2.   Parents/family members

    10.3.   Community/partners

    10.4.   Government

    10.5.   Schools/teachers

Any other emerging themes were also captured during the analysis.

No difficulties were experienced in collecting qualitative data and apart from the fact that some participants could have been a bit shy to express their opinions fully among others.

10. Research ethics and child protection

The entire data collection team was trained prior to commencement of data collection. Most of them had had prior experience in research including working among vulnerable populations. In addition it was required for all of them to have had taken a course in research ethics and produce a certificate before going out to the field. The course in research ethics contains details about protection of research participants and the need to minimise risks. This too formed part of the training.

Table 91: Endline comparability of the girls lost and re-contacted

	Intervention (Endline)						Control (Endline)					
	Substitute (N of observations)	Re-contact (N of obs)	Mean score Substitute	Mean score Re-contact	Difference	P-value of the difference	Substitute (N of obs)	Re-contact (N of obs)	Mean score Substitute	Mean score Re-contact	Difference	P-value of the difference
Mean Literacy score – Group A	77	94	44.8	51.7		2.07						
Mean Literacy score – Group B	61	109	52.6	52.8		0.07	85	85	48.2	48.1		-0.05
Mean Literacy score – Group C	68	97	44.4	50.8		1.98						
Mean Numeracy score – Group A	76	93	51.1	56.5		2.17						
Mean Numeracy score – Group B	61	109	50.6	52.7		0.66	85	85	48.3	49.7		0.53
Mean Numeracy score – Group C	68	97	47.7	49		0.43						

A5. Annex 5: Beneficiary tables

In the following tables the project has provided a breakdown of the project beneficiaries.

Table 92: Direct beneficiaries

Beneficiary type	Total project number	Total number of girls targeted for learning outcomes that the project has reached by Endline	Comments
Direct learning beneficiaries (girls) – girls in the intervention group who are specifically expected to achieve learning outcomes in line with targets. If relevant, please disaggregate girls with disabilities in this overall number.	56,561 girls that are in risk of dropping out of school	Total number of girls with learning outcomes: 96,778	We assume that the girls are in danger of dropping out if their average termly attendance has dropped below 75%. The total number of girl beneficiaries includes all the girls registered in the sQuid attendance monitoring system.

Table 93: Other beneficiaries

Beneficiary type	Number	Comments
Learning beneficiaries (boys) – as above, but specifically counting boys who will get the same exposure and therefore be expected to also achieve learning gains, if applicable.	99,073	This includes all the boys registered in the sQuid attendance monitoring system.
Broader student beneficiaries (boys) – boys who will benefit from the interventions in a less direct way, and therefore may benefit from aspects such as attitudinal change, etc. but not necessarily achieve improvements in learning outcomes.	N/A	
Broader student beneficiaries (girls) – girls who will benefit from the interventions in a less direct way, and therefore may benefit from aspects such as attitudinal change, etc. but not necessarily achieve improvements in learning outcomes.	N/A	
Teacher beneficiaries – number of teachers who benefit from training or related interventions. If possible /applicable, please disaggregate by gender and type of training, with the comments box used to describe the type of training provided.	4,613	This includes all the teachers working in the iMlango schools and registered as teachers in the portal.
Broader community beneficiaries (adults) – adults who benefit from broader interventions, such as community messaging /dialogues, community advocacy, economic empowerment interventions, etc.	10,497 families 115 merchants	This includes the number of families that receive a stipend as part of the support initiative.

Table 94: Target groups – by school[8]

School Age	Project definition of target group (Tick where appropriate)	Number targeted through project interventions	Sample size of target group at Endline
Lower primary	X	14,042	0
Upper primary	X	42,519	682
Total:		56,561	682

Table 95: Target groups – by social group

Social Groups	Project definition of target group (Tick where appropriate)	Number targeted through project interventions	Sample size of target group at Endline
Disabled girls			
Orphaned girls			
Pastoralist girls			
Displaced girls			
Slum-dwellers			
Child labourers			
Poor girls	X	c.28,280	
Disadvantaged caste/ethnic minority			
Affected by HIV/AIDS			
Young mothers/expecting			
Street Children			
Other (please describe)	X (This refers to girls that are educationally marginalised)	Educationally marginalised c.56,561 Socially marginalised c.22,620	682
Total:		56,561[9]	682

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[8] This breakdown refers to the split of the target group in 2016.
[9] We assume that girls can be economically, educationally and socially marginalised at the same time.

Table 96: Target groups – by school status

Educational sub-groups	Project definition of target group (Tick where appropriate)	Number targeted through project interventions	Sample size of target group at Endline
Out-of-school girls: have never attended school			
Out-of-school girls: have attended school, but dropped out			
Girls in-school	X	56,561	682
Total:			682

A6. Annex 6: Summary of quantitative data

The table below provides a description of the key variables used in the dataset "9003_Avanti_endline girls in-school assessments (merged data) 220317.xlsx" submitted by the project.

Table 97: Summary of quantitative data-sets

Variable	Variable name in data-set	Data-set	Comments
Final literacy score, Endline	Column AO	9003_Avanti_endline girls in-school assessments (merged data) 220317.xlsx	*This is the absolute score achieved by the girls at endline (maximum score 40)*
Final literacy score, Baseline	Column V		*This is the absolute score achieved by the girls at baseline (maximum score 20)*
Change in literacy score, Baseline to Endline (if horizontally merged data-set)	N/A	N/A	N/A
Literacy sub-task variables (multiple) for Baseline and Endline (including timing variables if used)	Column X (baseline) and Column AQ (endline)	9003_Avanti_endline girls in-school assessments (merged data) 220317.xlsx	*These scores are the words read per minute by the girls in the reading passage that was included in the literacy test. At baseline the length of the passage was 100 words and at endline 179 words.*
Final numeracy score, Endline	Column AF		*This is the absolute score achieved by the girls at endline (maximum score 32)*
Final numeracy score, Baseline	Column N		*This is the absolute score achieved by the girls at baseline (maximum score 10)*
Change in numeracy score, Baseline to Endline (if horizontally merged data-set)	N/A	N/A	N/A
Numeracy sub-task variables (multiple) for Baseline and Endline	Columns P-T (baseline) and Columns AH-AM (endline)	9003_Avanti_endline girls in-school assessments (merged data) 220317.xlsx	*These columns contain the scores in the individual sections of the maths test. Each section covers specific skills – addition, subtraction, multiplication, division, problem solving and fractions.*
Treatment / Control status	Column F		*This column specifies which group the girl belongs to – Groups A, B and C are intervention schools and Group D control group.*
Recontacted / substituted / lost status	Column AB		*This column specifies if the girl was re-contacted at endline, if she was a substitute or lost. If the student was lost then there is no endline score available. If the student is a substitute then there is no baseline score available.*
Endline Grade	Column AA		*Our cohort was attending Standard 6 during endline*

Variable	Variable name in data-set	Data-set	Comments
Endline age	N/A	N/A	N/A
Baseline Grade (if present)	Column K	9003_Avanti_end line girls in-school assessments (merged data) 220317.xlsx	*Our cohort was attending Standard 3 during baseline*
Baseline age (if present)	N/A	N/A	N/A
School / community code (used for clustering)	Column D	9003_Avanti_end line girls in-school assessments (merged data) 220317.xlsx	*This column contains the school code of the school that the girl tested attends. These unique codes were assigned to the schools at baseline and have been retained unaltered.*
Enrolment status Endline	N/A	N/A	N/A
Enrolment status Midline (if present)	N/A	N/A	N/A
Enrolment status Baseline (if present)	N/A	N/A	N/A
Attendance (if within data-set)	N/A	N/A	N/A
Details of any control variables used in regressions	N/A	N/A	N/A
Other variables used for analysis of learning, enrolment or attendance	N/A	N/A	N/A

A7. Annex 7: External Evaluator declaration

Name of Project: Project iMlango

Name of External Evaluator: Advantech Consulting

Contact Information for External Evaluator:

Names of all members of the evaluation team:

I JOSEPH WARUINGI hereby affirms that ADVANTECH CONSULTING LTD (ADVANTECH) has no previous affiliation or relationship with the PROJECT IMLANGO, Girls' Education Challenge Fund, PwC, Coffey, DFID or the stakeholders interviewed as a part of this evaluation.

I JOSEPH WARUINGI certify that the independent evaluation has been conducted in line with the Terms of Reference and other requirements received.

Specifically:
All of the quantitative data was collected independently (Initials: JW)
All data analysis was conducted independently and provides a fair and consistent representation of progress (Initials: JW)
Data quality assurance and verification mechanisms agreed in the terms of reference with the project have been soundly followed (Initials: JW)
The recipient has not fundamentally altered or misrepresented the nature of the analysis originally provided by ADVANTECH (Initials: JW)
All Evaluation Manager (EM) guidance on data cleaning has been followed (Initials: JW)
All data has been uploaded to the EM's SharePoint system in the instructed shape and format (Initials: JW)
All child protection protocols and guidance have been followed (Initials: JW)
Data has been anonymised, treated confidentially and stored safely, in line with the GEC data protection and ethics protocols (Initials: JW)

JOSEPH WARUINGI
_____
(Name)

ADVANTECH CONSULRING LTD
_____
(Company)

ADVANTECH CONSULRING LTD
_____
(Date)

A8. Annex 8: Data collection tools used for Endline

The following data collection tools that have been used at endline have been sent as an attachment with the report:

- Household Survey
- Learning tests for Literacy and Numeracy
- Girl questionnaire
- Girl perception scorecard
- Teacher questionnaire
- Headteacher interview
- Classroom observation
- KIIs – village elders, Chiefs and Assistant Chiefs
- FGDs with mothers (younger and older)/fathers
- FGDs with girls
- FGD with teachers
- Interview with parents receiving the stipend

A9. Annex 9: Project Management Response

1. Project's response to key findings

In the table below we present the main findings of the endline report and our comments on them:

Table 98: Project's response to findings

ID	Finding	Comments
1	The Education technology underlying iMlango was embraced enthusiastically by the communities and the schools	Much more groundwork was required with the communities than we expected, but it achieved engagement, and enabled iMlango to build trust.
2	Attrition rates at the endline were very high which limited the ability of the project to assess the educational outcomes per group effectively.	At the time of writing, the project is set to continue, which will provide the opportunity to structure next stage M&E to better manage these assessment complexities, particularly around the evaluation cohort's attrition rate.
3	There was some learning progress in numeracy	Although there were limitations with the sample size due to student attrition, there was indication of progress captured for numeracy and literacy. More specifically, Group A achieved a 0.16SD improvement although the result was not statistically significant.
4	Levels of marginalisation are extremely high, and fragility - as demonstrated by the drought situation in Kilifi - has a knock-on impact in education of girls (and boys)	The ToC has been observed even in fragile communities, but it is important to be realistic about timescales and the level of improvement that can be achieved. In effect, just two years of impact have been delivered so far, and a longer-term strategy is needed.
5	Engagement by teachers and head teachers has a critical effect on the impact that iMlango education tools can make on children	iMlango put in significant effort to support teachers, but progress was sometimes slow. The level of teacher turnover in schools was not factored and this probably contributed to slower overall progress that we hoped in our original ToC.
6	Alignment with Ministry of Education is important when introducing new education tools	iMlango addressed this well at Ministry and local DEO levels. As relationships strengthened – particularly at the local level – we observed greater programmatic support from the DEOs, opening new avenues for innovative cooperation.
7	Attendance monitoring is a useful tool in exposing complex girl (and boy) school attendance profiles in rural schools	The data system has opened up a new level of understanding of girl (and boy) attendance behaviour. We have not had time to comprehensively cluster and design solutions for the different types of attendance behaviour yet, but this issue needs to be developed and shared - especially with the MoE.
8	Time on task is crucial in maximising education technology's effectiveness	Initially, we did not envisage how difficult it would be to get some schools to fully utilise the assets available to them. This is likely a function of teacher confidence and skills and adaptability. These factors need to be addressed as part of implementing Ed Tech in such environments with adequate sensitisation and training
9	Some progress toward sustainability has been made, with school and community-level initiatives emerging	Our sustainability ambitions were too great initially for the relatively short intervention time. However, the seeds for sustainability have been sown, and several schools have already begun to adopt and implement sustainability initiatives.
10	Stipends were well received and largely resulted in an improvement in girls' attendance	Some marginalisation factors are too great for a small value stipend to overcome, but generally they worked very effectively. This demonstrates that financial barriers can be key hindrances to strong attendance. The project took a consultative approach with parents for the purpose of stipends, rather than a strict conditional/directed approach, and this ensured ease of implementation. The digital payments system was embraced very well by the

ID	Finding	Comments
		communities, despite very low levels of literacy.
11	Stipend implementation through a digital system enables control of price hikes	We saw only very little evidence of price hiking, and the superior analytics coupled with on-ground interactions by the field team ensured good controls. There have subsequently been no repeats of hiking.
12	It is important to deliver a girl focused programme in a context which does not create exclusion issues for boys	Our decision to operate iMlango as a whole school initiative, whilst retaining clear project objectives on girls, has been vindicated. This has helped in the delivery of an 'equitable culture' throughout iMlango's initiatives.
13	Some significant marginalising factors for girls were exposed in the programme: teenage pregnancy, early marriage, adverse home conditions, absenteeism due to home pressures etc.	iMlango had only limited resources to address these issues, given its focus on Ed Tech delivery. Our initiatives in Child Clubs were adapted to bring greater focus, but we were not able to address Life Skills issues as fully as we would have liked. Our ToC is probably still correct, but we need more time to develop in these areas.
14	Internet, computers and ICT have become part of the local lexicon	We have established that an online system can genuinely work effectively – even in remote settings - and brings some advantages vs. local 'on-computer' delivery, especially in being adaptable and offering new services.
		Some teachers and parents have said that through learning computer-based '21st century skills', their children are afforded greater opportunities in later life – particularly in searching for a job in an increasingly digital economy.

2. Project's response to the external evaluator recommendations

In this section we will respond to the recommendations made by Advantech:

Table 99: Project's response to the external evaluator recommendations

#	External Evaluator Recommendation/Action	Action to be taken by consortium
1	Create awareness about the project to the entire target community.	We will continue to work with all local stakeholders to engender support for iMlango. We will also make a more concerted effort, through the field teams, to involve the community in the project through workshops and discussion groups and disseminate findings and progress of the project to demonstrate efficacy.
2	Inform target community about project closure and way forward	We had informed the schools and communities that the project was ending in March 2017, however because the second phase of the project was not confirmed we couldn't be sure about the way forward.
3	Inform parents/guardians whose children have been beneficiaries of the stipend that about when to expect stipend to end	Now that the next phase of the project is confirmed we will inform the parents/guardians about stipend timeframes.
4	Disseminate findings of the data collected to the beneficiaries. This ought to be on a regular basis	We will improve on information and data provision to beneficiaries and stakeholders from our side, and will look to formalise procedures.
6	Electronic monitoring system was found to be time consuming. We recommend that a way forward is sort and communicated to schools heads in order to help sort out this issue.	We have observed that in the classroom, the electronic attendance monitoring takes a similar amount of time as the manual register. Regarding sharing the tablets around, we will look to replicate what has been working well in the strongly performing schools in the schools that are having difficulties.
7	It is recommended that surveys and other project assessment activities be conducted in the middle of the school term. This is because if it is too early in the	We will conduct future assessments in the middle of term, rather than at the start or the end.

#	External Evaluator Recommendation/Action	Action to be taken by consortium
	school term, the schools will not have settled and there may be limitations that come with it. If the timing is at the very end of the school term, most schools will be busy end of term exams and there might be disruptions or delays experience by field teams.	
8	There would be need for the external evaluator to conduct regular monitoring visits to the sites	We will discuss with the external evaluator to conduct such visits (clarification on what specifically they will monitor) in conjunction with their termly assessment reports.
9	The is need for a team on the ground that promptly responds to issues raise by project beneficiaries for example parents/guardians of stipend beneficiaries of headteachers whose school are experiencing challenges with the digital learning tools including breakdown of computers.	The various project partners' field teams are already mobilised to deal with exactly these sorts of issues, and will continue to do so whilst we look to transfer greater ownership to the schools and communities themselves.
10	Ensure that the selection of stipend beneficiaries takes into consideration the feedback from the school and the community in order to avoid cases of students that are missing from school for reasons that can't be influenced by the project.	We will explore revising the stipend methodology to refine selection based on feedback and evidence from the first phase of the project.
11	Information collected from both teachers and parents indicated that the e-learning resources were insufficient especially taking into consideration the high numbers of students in the schools. It would be helpful if this could be taken into consideration in future projects.	We have found that several schools with large student populations have still managed strong average times on portal, indicating that even if seemingly difficult, the resources can be used effectively.

3. Lessons learnt

Lesson 1: Time on Task
Various factors such as power, computer-child ratio and others limit the amount of face time available for each child in the existing lab set up. This has prevented many children from receiving their recommended learning access, in particular their recommended 45 minutes per week on Maths-Whizz individualised tutoring To address this issue in GEC-T we have a multi-pronged approach:

- We have engaged and aligned implementation with the National Digital Literacy programme in which, on average, 50 tablets will be supplied to each primary school across Kenya (estimated by December 2017 ahead of GEC-T). These are already arriving in some iMlango schools and have been tested successfully with iMlango internet and portal access and for individualised learning. This means that device capacity, at no extra cost to the project has in some cases doubled or tripled.
- Notwithstanding the above, to ensure support for the transition, we will prioritise individualised learning and provide maximum support to teachers of those grades for Standards 4-8 in order to maximise learning outcomes and hence exam results, that in turn would empower students to transfer to secondary schools. We will continue with our revision classes, provide revision tips and guidance as well as more support to further enable students and teachers to raise confidence in their exam preparation activities. At the same time, inclusivity of lower grades will be supported through DLP access to ensure learning progresses at a faster rate from the early years, preparing students for transition through primary and ultimately into secondary schools in the future.
- A network management system will provide live data on computer access and ensure that device issues are quickly alerted and addressed by the field teams to ensure more consistent and complete computer operationality is in place to further enhance time on task
- Individual device access will continue to be focused on individualised tutoring while stand-alone content will be weighted towards teacher led whole class learning with the projector.
- In GEC 1 we have identified the level of school engagement with the intervention is a key factor affecting success of the intervention. We will identify low engagement schools during GEC-T and develop strategies to increase the level of support.

Lesson 2: Fieldwork and community initiatives are vital for supporting ICT

- Teacher skill levels are low, data competence (report handling) is very low therefore we will continue to implement Refresher training on a quarterly basis. We have already seen a high correlation between refresher training and school deployment of iMlango tools and resources.
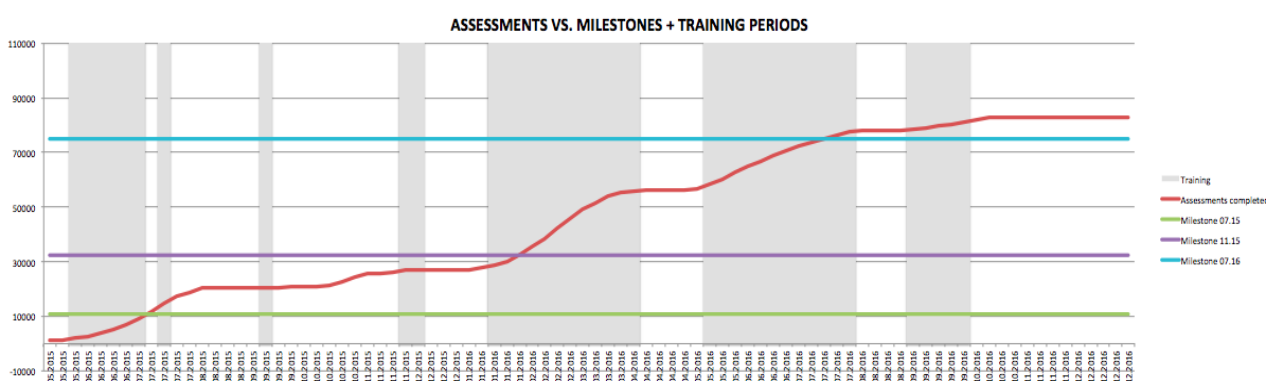
- To enforce the above champion teachers will be identified and encouraged to proactively knowledge share, distributed online courses developed within the Camara Learning Academy are being explored, both of these designed to build sustainability into teacher support and capacity building beyond the life of the project.
- Head Teachers are key influencers as to whether the project is successful in their school. To better engage these individuals, we would like periodically bring them together to share challenges and success stories. Through doing so, we also hope to improve communication about the project to its beneficiaries.
- Communities are supporting iMlango; the initiative has had an effect beyond the individual students. This has enabled iMlango to understand some of the social and contextual issues that are faced by girls and households in these rural communities. With the grounding and trust we have earned in the communities, we are well placed to launch an MFI.

Lesson 3: Stipends

The stipend element of the programme has seen a positive effect on attendance with parents recognising the importance of learning and responding to the semi-conditional status – their children are attending school more frequently. We will consider revising our selection methodology: continue providing stipends to the families of the poorest students, but improve the targeting and increase the conditionality. We have learnt that financial support has benefitted our attendance rates and we will be applying these lessons learned when implementing the MFI.

The stipend's success amongst the worst performing pupils demonstrates that the financial barrier is a significant inhibitor for good attendance levels. Similarly, that the stipend's impact diminishes rapidly amongst pupils with good attendance suggests that these pupils face different barriers to education, particularly in attaining >95% attendance. Poor attendance levels completely undermine a child's ability to achieve a full cycle of education, so raising attendance levels amongst the worst attending is a priority in terms of providing financial support. Better targeting of social and educational barriers will be considered in the next phase of the project, especially how certain barriers impact upon the different attendance profiles of pupils.

At project inception we weren't fully aware of the attendance problems most schools face. Through data analysis supported by in-field observations, we have begun to develop a far more comprehensive picture of the project-wide issue of low attendance and how this impacts upon pupils' capacity to achieve improved learning outcomes. We will continue to discern the main barriers to attendance, and we'll work with the schools to work out how best to address problems on an individualised basis.

Lesson 4: Sustainability
We've found that schools can often struggle with the creation of their own sustainability plans, in terms of both finance and capacity. However, there have been some very encouraging examples (below), and we have begun to assist the struggling schools. Although sustainability takes several forms (financial, capacity, relevant ownership, community involvement in formal education outcomes), it is always underpinned by strong engagement with local stakeholders. Most importantly, the schools and communities themselves need to value the project for sustainability to be fully achieved, and the signs at this stage are positive.

Financial: electricity bills need to be covered by the schools. For example, Malindi HGM Primary's (Kilifi County) head teacher, Mr. Mwangala, has prioritised paying electricity bills to ensure iMlango runs without disruption. He has been successful in paying the school's electricity bill every month to date and HGM Primary is consequently well positioned going forward. This supplementary income is generated through an ICT training programme that they run in the school: the ICT teacher trains secondary school graduates in basic computer literacy, at KSH1,000 per month. In December 2016 they trained fifteen pupils, which covered electricity bills and security officers' wages. Aside from generating extra income for maintenance costs, the school is engaging with the community and is transferring relevant ICT (and '21st century') skills to children who otherwise wouldn't have access to iMlango – showing that the programme's benefits aren't limited to just the pupils enrolled in the schools. Going forward into the next phase of the project, we will be looking at ways in which income generation is implemented in all schools; we have been discussing our sustainability plan as a consortium for the next phase.

Capacity: we have also encouraged schools to consider their own capacities. Schools have started to implement their own initiatives to build these capacities, so that they can better deal with the technical aspects of the project. In December 2016, Mulumini Primary (Makueni County) decided to train up its Board of Management (BoM) so that its members are familiar with basic computer functionalities. This relieves some of the pressure on the ICT teacher, whilst providing the school with greater internal support structures – hopefully lessening the need for technical field visits. Increased community buy-in for the project is another positive that has emerged from this initiative, with the BoM actively engaging with the more technical side of iMlango. Going forward into the next phase we would like to align all schools with teacher training materials as we have seen the positive impact and increase in confidence of teachers who have improved ICT skills.

Lesson 5: Time spent on learning resources has contributed to improved KCPE scores
There is a statistically significant link between how engaged Group A schools are on the learning platform (i.e. total time spent) and their Standard 8 2016 KCPE results. Learning platform engagement in schools accounted for 12.2% of the total variation in the school's mean KCPE results, which means that the remaining 87.8% is attributable to other factors, e.g. general quality of teaching. We believe that, given the average time spent on portal, the figure of 12.2% represents a strong impact on KCPE results. This demonstrates that the learning resources provided by the project directly impact upon pupils' educational attainment, and that more time spent on them equates to a better chance of performing well at KCPE.
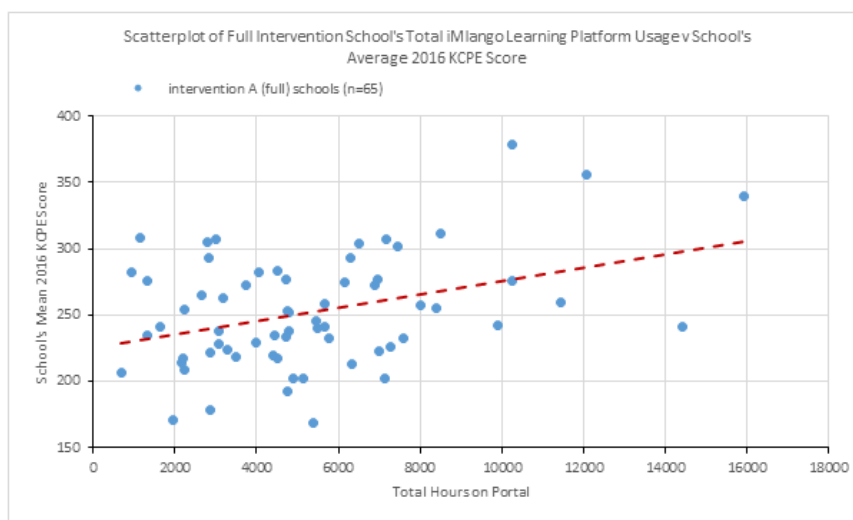
Giving pupils the best possible opportunity to achieve a good KCPE score is one of the core aims of the iMlango project, as we try to help girls (and boys) to complete their full cycle of education. This has become even more central to the project now within the context of the next phase focusing on transition and there is an opportunity to help all pupils across the 4 counties who perform poorly in their KCPE limiting their chances of gaining admission to a secondary school.

As discussed throughout the report, and in the first lesson learnt (in page 152), time on task is crucial in maximising project effectiveness particularly with regard to learning outcomes. We have now generated two years' worth of data from the project, and we have begun to discern patterns and trends in the data sets. Disseminating the findings from the data to the relevant local stakeholders, especially the school management hierarchies, the local MoE officials, the local community and parents, will hopefully engender stronger engagement, translating into increased willingness to support the project. We will also make a more concerted effort to assist the schools that are struggling with time on task, particularly around issues concerning efficient timetabling.

A10. Annex 10: Endline Report Communication and Dissemination Strategy completed by project

1. Introduction

The purpose of this section is to set out our strategy for communicating and disseminating the Endline findings to key audiences.
It is structured as follows:

- Objectives of the Strategy
- Target Audiences
- Communications Methods
- Stakeholder Analysis
- Specific events / opportunities

2. Primary Objectives

The objectives of this communications and dissemination strategy are to:

- Contribute to the wider evidence base to inform future education policy and practice by others outside the project's environment; particularly around use of "EdTech" and the growing interest around the application of technology in development sector as a means to "leapfrog" more traditional methods;
- inform key stakeholders that may be involved in the decisions about the continuation, succession, scale up or sustainability of the project by identifying which types of interventions or activities add the most value; and
- lobby and advocate for wider policy change at local, national and international levels.

3. Target Audiences

With this in mind the following table provides an analysis of the key stakeholders relevant to meeting the above objectives.

The audience can broadly be divided into:

- DFID, including GEC but also other parts of DFID
- Other international donors and educationalists as well as Education Ministries from other countries
- Kenyan Government stakeholders, both central and regional
- Groups directly impacted by the intervention including head teachers, teachers, parents and students
- Staff, colleagues and investors from the organisations involved in delivering the project.

4. Dissemination Methods and Materials

We plan to use the following methods to disseminate the project findings:

- Conference papers: Academic style papers submitted to specialist conferences on education in a developing context for example eLearning Africa and UKFIET.
- Summary of endline report: A version of this document adapted for external audiences available on the partner websites.
- Project Fact Sheets: Detailed (two sided) fact sheets on specific aspects of the project to be provided at exhibitions and via website. These will be targeted at "experts" in the field.
- Child friendly fact sheets will be provided for beneficiaries in our schools and their parents to promote the benefits of active engagement in the project.
- Video, updated promotional video including key findings / impacts. Hosted online and also used in relevant exhibitions and meetings.

- Dedicated iMlango event to promote the findings of the project to the wider community including potential supporters and donors. We are considering hosting two such events in 2017, one in the UK and one in Kenya.
- Face to face meetings / presentations: Materials produced by the project, including fact sheets and presentation materials, will be used to support face to face meetings with potential stakeholders.
- Press/news release: Promoting the availability of summary document and key findings.

Table 100: Target audience analysis for dissemination of project results

Stakeholder	Description	Anticipated key interests	Methods
DFID	Individuals directly involved in the GEC Fund. Other parts of DFID including country offices and education advisors, Digital Africa team.	The learning impact of the intervention vs. other projects Lessons learned and how this will be reflected in GEC-T Value of real time data Depth of data available from the intervention in addition to normal M&E	Presentations, facts sheets, face to face meetings
Education specialists in the international development community including from other donors	Organisations and individuals who are interested in the effectiveness of the project. Will include other GEC projects, probably not already focussed on the application of technology in education. Includes public donors (USAID, SIDA, GIZ etc) or private donors who may or may not already fund projects that capitalise on the use of Educational Technology	The learning impact of the intervention Lessons learned and how these can be applied in other contexts Value of real time data Depth of data available fro the intervention in addition to normal M&E	Conference papers, exhibitions, website
EdTech specialists	As above but with specific interests in the effectiveness of educational technology. Will be relative experts in the application of technology in education.	As above but greater emphasis on specific components of the intervention	Conference papers, exhibitions, website, iMlango event
GOK / MoE / ICT	Ministry of Education in Kenya has provided access to schools and supported teacher training. Interest in the effectiveness of iMlango in their schools, potentially to scale up via future phases of the Digital Literacy Programme (DLP)	Impact on KCPE results and demonstration of impact on learning Lessons learned and how this can be taken into account in the GOK Digital Literacy Programme Insights into attendance Effect on teacher skills with respect to general teaching and computer literacy	Conference papers, exhibitions, website, iMlango event
DEOs	Local representatives in counties including the education County support officers (CSO). Target group should include DEOs from other regions of Kenya as well.	Impact on KCPE results and demonstration of impact on learning Insights into attendance Access to data to help manage schools	Fact sheets, summary document

Stakeholder	Description	Anticipated key interests	Methods
KICD	Approved the content for the programme. They are developing some of their own content too. They may perceive the project as a threat or they may be interested to learn of the impact EdTech can have generally	Demonstration of how the online platform can assemble different content types Behavioural observations that help influence KICD decision-making	Summary document
Head Teachers subject teachers	Influence of project in schools and also to the parents and the communities	Impact on learning and how it can benefit KCPE exam results Key behaviours that drive success in those schools which have embraced iMlango	Tailored fact sheet
Parents	Supporting school education and contributing towards some costs to sustain the project	KCPE results for their children Computer literacy for their children	Fact sheet
Children	Focus of the intervention	How use of iMlango resources can help improve their learning.	Child friendly fact sheet / poster
Strategic partners	Co investors in the project alongside DFID	The learning impact of the intervention vs. other projects Lessons learned and how this can be reflected in GEC-T and other programmes conducted by the partners.	Summary document, presentations

5. Events

A set of prospective dissemination opportunities is summarised in the table below:

Table 101: List of identified events for dissemination of project results

Event	Date	Website	City
Education Innovation Africa Forum	7-8 Jun 2017	Education Innovation Africa	Nairobi
EdTech X Europe	20-21 Jun 2017	http://edtechxeurope.com/	London
World Congress on Education	17-19 Jul 2017	http://worldconedu.org/	Dublin
UKFIET	5-7 Sept 2017	https://www.ukfiet.org/conference/call-for-abstracts-and-submission-guidance/	Oxford
eLearning Africa	27-29 Sept 2017	eLearning Africa	Mauritius
Innovation Africa	23-25 Oct 2017	Innovation Africa	Maputo, Mozambique
mEducation Washington	October 2017 TBC		Washington DC
BETT Show 2018	Jan 2018	http://www.bettshow.com/	London

Event	Date	Website	City
Mobile Learning Week	March 2018	http://www.unesco.org/new/en/mlw	Paris
AID & International Development Forum 2018	TBA 2018	http://www.africa.aidforum.org/	TBA
CIES 2018	TBA 2018	http://www.cies2017.org/	TBA
Global Education & Skills Forum (Varkey) 2018	TBA 2018	http://educationandskillsforum.org/	Dubai