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GRAIDUP PILOT PROGRAMME

IMPACT OF GRAIDUP ON CLASSROOM TEACHING & LEARNING

Report | June 2020

Graidup Pilot Programme: Impact of Graidup on Classroom Teaching and Learning

A pilot programme conducted by TLM Ghana Limited in three (3) public basic schools in the Central Region of Ghana. The goal was to measure the impact of Graidup educational tablet and app on classroom teaching and learning. Graidup is an educational app that uses animations and games to teach school lessons .

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Report of the Graidup Pilot Programme: Impact of Graidup on Classroom Teaching and Learning

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TLM Ghana Limited

The Educational Engineers

TLM Ghana Limited is an e-learning development company. It is registered under the laws of Ghana and is currently based in Accra, Ghana. Our latest product is designed to making understanding of topics easy and fun for children. At TLM Ghana Ltd, we exploit state-of-the-art technologies to make teaching easy and learning fun. Learning doesn't have to be boring. We leverage what children love to do already and turn them into a powerful teaching and learning tool.

Content

1	Executive Summary
1 - 4	Introduction
5	Purpose
6 - 11	Methods
11 - 19	Analyses and Results
20 - 24	Summary of Teachers' Observation in the Classrooms
24	Active Participation and Attention
25	Child-centred Teaching Approach
26	Interesting and Exciting Lessons
27	Knowledge and Understanding
27 - 28	Summary
28 - 29	Recommendations and conclusion
30	References

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EXECUTIVE SUMMARY

In recent times, access to basic education in terms of enrolment has improved significantly in Ghana. However, pupil's academic achievement appears to be low. This pilot programme was designed to make a case that the introduction of state-of-the-art learning platforms into the education sector could facilitate the quality of education and subsequently impact learning achievements.

Specifically, this project assesses the performance of primary students before, during and after they have used Graidup educational tablets and app (Graidup) to study. Three primary schools from the Assin South District were chosen as case studies for the project. Overall, the results of the study suggest that pupil's performance increased after they have used Graidup for their lessons.

Additionally, qualitative observation by teachers showed that the use of Graidup for teaching and learning promotes interesting lessons, active participation and facilitates child-centred teaching. Improving student's achievement at the basic level requires that government introduce and install new technologies such as Graidup in every basic school in the country. Further suggestions and implications for policy and practice are discussed.

INTRODUCTION

Education undoubtedly has a significant impact on the quest to develop a nation's future human capital for rapid economic development. Ghana's educational strategies concentrate on access to education through the provision of free and compulsory basic education for all (Ministry of Education, 2011). Successive governments have rolled out several educational programmes and policies to achieve access to basic education.

Programmes including Free Compulsory and Universal Basic Education (FCUBE), Quality Improvements in Primary Schools (QUIPS), Basic Education for All (EQUALL), National Literacy Acceleration Programme (NALAP) and Free Senior High. School Policy were all geared toward improving access to education and increase enrolment. For instance, between 2003 and 2006 the Gross Enrolment Rate (GERs) in Ghana increased from 87% to 94% and the Junior High School (JHS) enrolment rate from 73-77% (USAID 2009). Similarly, GERs exceeded 100% for kindergarten and primary and

over 85% for JHS in 2018 (Ghana Education Sector Analysis 2018). While access to basic education has been enhanced tremendously over the past years, there are still questions regarding as to whether the increase in enrolment has been matched by an improvement in performance (Ankomah et al, 2015).



Government intervention has resulted in an increased enrolment. This picture taken was Assin Achiase Catholic Primary School class 2 during normal classes. This class has an enrolment of 42 pupils with one teacher. This number is above the internationally accepted standard. Technology is therefore needed to increase the effectiveness of teaching and learning.



Classroom setup of Assin Asamankese District Assembly Primary school class 3 (left) and class 1 (right). Total enrolments are 48 and 43 for class 3 and class 1 respectively. Each class has one teacher.

National Education Assessment (NEA) reports indicate that English and mathematics achievement of primary students in 2016 was low. For instance, in 2016, NEA reports showed that 29% and 28% of primary 4 and primary 6 pupils respectively attained

minimum competency in English and only 37% of primary 4 pupils and 38% of primary 6 pupils achieved proficiency levels in English. For Mathematics, 45% and 29% of the primary 4 and primary 6 pupils respectively achieved below minimum competence. Only 22% of primary 4 pupils and 25% of primary 6 pupils achieved proficiency levels in Mathematics (Ministry of Education, 2018).
The educational sector has therefore made several efforts in terms of infrastructure and human capital to improve the falling educational standards, yet there is low level of performance in our schools.

Thus, policy makers are still fascinated about what really accounts for the low outcomes across basic schools in the country. Consequently, it is important to introduce innovations and modern technology in the educational sector to help children to achieve the quality education we are agitating for. These educational interventions include the introduction of the state-of-the-art self-learning software applications to facilitate remote learning. Fortunately, TLM Ghana Limited has introduce an interactive educational software application



Picture taken from Assin Asamankese T. I. Ahmadiyya Basic School class 3 with total enrolment of 51 pupils. As can be seen, the teacher is limited to blackboard and chalk. This makes it very challenging when explaining complex concepts. With animations, things become simpler as pupils can utilize their visual channel effectively.

"Graidup" based on Ghana Education syllabus for pupils from class 1 to 6 to improve quality learning. The Graidup is based on Mathematics, English, and Science syllabi and it comes with inbuilt animations, smart e-books, quizzes and games all designed with cartoons. Graidup app comes on kids tablets and it is also on Google Play Store, which can be downloaded on any android device. Graidup has a potential to improve quality education in the basic schools across the nation.





Screenshots showing the amazing features of Graidup educational tablet and app. Each tablet comes fully loaded with Graidup contents that can be accessed offline. Content is in the form of animated videos, eBooks and quiz games. All these contents are fully accessible offline. This offers a huge advantage to children in remote areas where access to internet is limited.

PURPOSE

Given that the Graidup makes learning easier, interesting and enjoyable for children, this pilot project was conducted to assess the performance of basic school pupils' before, during and after they have used Graidup to study in the classrooms. This project was designed to inform management, policy makers, customers and investors on how technology can change the educational discourse on quality education in Ghana.



Children of Assin Asamankese T. I. Ahmadiyya Basic School happily playing during break-in classes.

The study provides evidence that the use of Graidup could assist children to learn in both at home and in school to be able to perform favourably. We believe that if teachers and students utilise Graidup during lessons, the gap between increase in enrolment and outcomes in term of performance will be reduced.





Assin Achiase Catholic Primary School class 1 classroom. This class has a total enrolment of 35 pupils. It was the class with the lowest enrolment among all the schools we visited.

METHODS

This pilot project was conducted between 2018 and 2019 for one full academic year. We selected three basic schools in the Assin South District in the Central Region of Ghana as case studies. We were interested in this district because the Assin South District is a rural community with moderate educational resources and performance compared to other districts in the Central Region and Ghana at large.

Permission was sought from the district directorate of education and headteachers of these three schools. We then randomly selected six classes (i.e., Class 1 to 6) from these three basic schools for the pilot project. The six classes were supplied with the TLM Ghana's Graidup tablets.



The Chief Executive Officer of TLM Ghana Limited, Mr. Eric Aggrey, (left) hands over Graidup educational tablet to a teacher from Assin Achiase Catholic Primary School during a short ceremony as part of the pilot programme.



The Chief Executive Officer of TLM Ghana Limited, Mr. Eric Aggrey, (centre) hands over Graidup educational tablet to the Headteacher of Assin Asamankese District Assembly Primary School during a short ceremony as part of the pilot programme.

The TLM team distributed 30 Graidup tablets each to the three basic schools to be distributed to the kids during the lessons. The teaching staff of each school received 3 Graidup tablets each, 2 for district education officers and 2 for TLM facilitators as a form of motivation for their involvement in the project. In total, 207 students participated in the study. The teachers and the headteachers gave consent to use the Graidup devices to teach during the case study period.

The Graidup facilitators trained the class teachers how to use Graidup during their lessons. Because Graidup is based on the Ghana Education Syllabus, it was easy for the teachers and the pupils to use Graidup tablets during English, Science, and Mathematics lessons. During the lessons a Graidup facilitator monitors the performance of the pupils and records their activities accordingly.

After each lesson, the teachers complete the Graidup school project supervision form to express their views concerning the behaviour and performance of the students toward the use of Graidup during the lessons.



The Chief Executive Officer of TLM Ghana Limited, Mr. Eric Aggrey, (left) hands over Graidup educational tablet to the Headteacher Assin Asamankese T. I. Ahmadiyya Basic School during a short ceremony as part of the pilot programme.



The Headteacher happily shows off one of the tablets.



A teacher shows how to use Graidup tablet to his pupils in Assin Achiase Catholic Primary School. The photograph was taken few days after the tablet was given to the schools.



A teacher shows her pupils how to use Graidup tablet in Assin Asamankese District Assembly Primary School.



The Headteacher of Assin Asamankese T. I. Ahmadiyya Basic School explain to his pupils how Graidup works. The children can be seen enthusiastically paying attention.



A teacher shows his pupils how to use Graidup tablet in Assin Asamankese District Assembly Primary School. Picture was taken during one of our regular monitoring visits.



With Graidup tablets, children can be seen learning by themselves in the classroom. As shown in the picture, two pupils are watching Graidup animated lesson.

ANALYSES AND RESULTS

We examined the performance of the pupils before, during and after they have used Graidup to study. Each analysis is based on the result of one academic year. "Before" means the pupils performance data of the 2017/2018 academic year. "During" is the 2018/2019 academic year during which Graidup tablets were used for learning. "After" is the records of the 2019/2020 academic year.

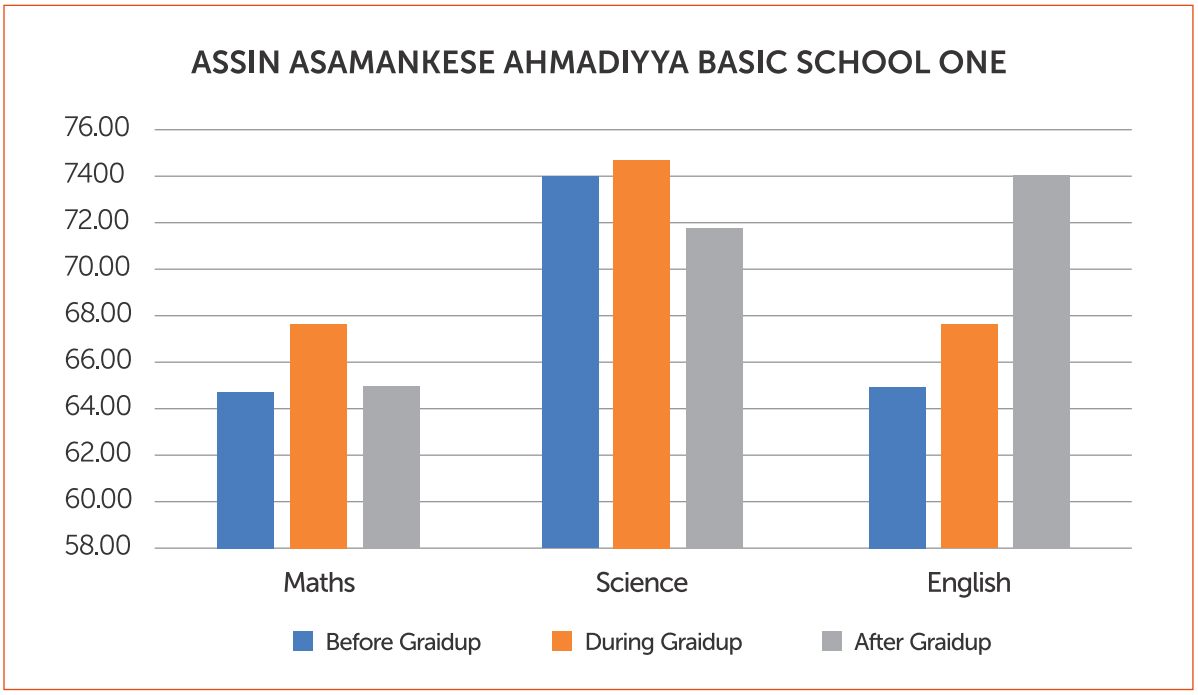
During the time of compiling this report, the 2019/2020 academic year has not ended. Therefore, the after records constitute 2 terms instead of 3. These data were collated from the School Based Assessment and entered into Microsoft Excel and Statistical Package for Social Science (SPSS 24.0).

First, all the quantitative analyses were conducted using Excel and SPSS. Second, we tabulated the observation of teachers during the lessons. It must be noted that "class 2" was not included in the quantitative data analyses because of many missing data from the School Assessment Records. The results are summarized in the subsequent sections.



Assin Asamankese T. I. Ahmadiyya Basic School building

Figure 1. Average Performance on the use of Graidup by Basic School One



Source: Field Data

Figure 1 shows the performance of Assin Asamankese Ahmadiyya Basic School One on the use of Graidup. We ascertained the performance of the pupils before, during and after the use of Graidup for Mathematics, Science and English lessons. As indicated in Figure 1, the average scores for Mathematics were higher during (67.6) compared to before (64.7) and after (64.9) they have used Graidup for their lessons.

The average performance was about the same for the pupils before and after the use of Graidup.

With respect to Science lessons, the pupils scored higher during the use of Graidup in class (74.6) relative to before (73.9) and after (71.7) the use of Graidup in class. The average performance for English was significantly high after (73.9) they have used Graidup compared to before (64.9) and during (67.6) the use of the device. As expected, the pupils performed favourably during the class compared to before the use of Graidup.

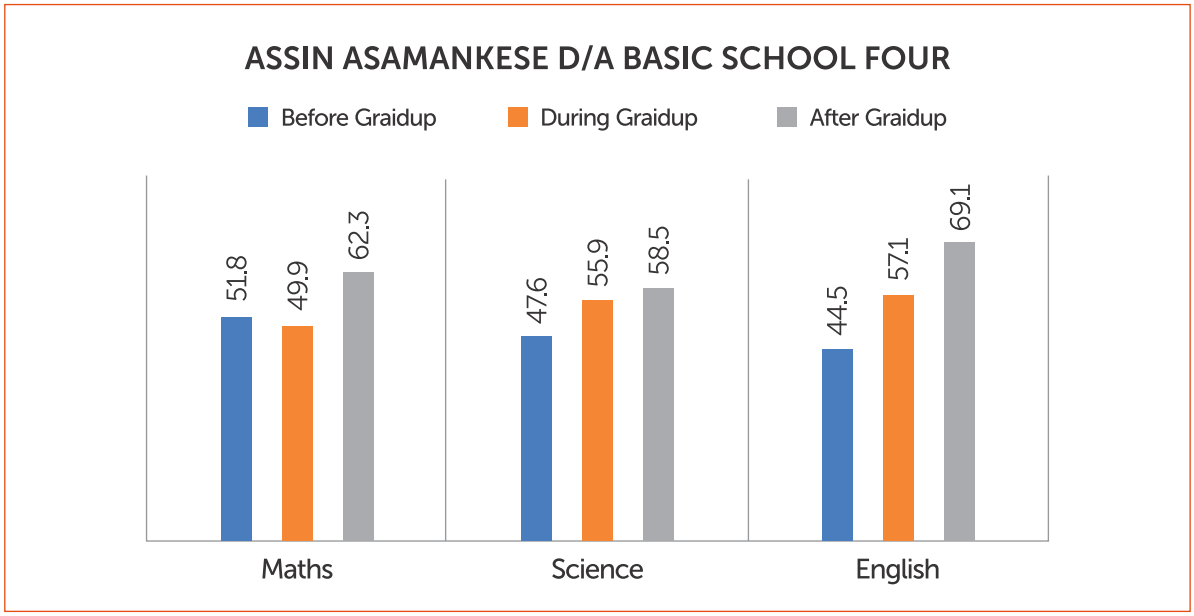


Pupils happily learning on Graidup tablets.



Assin Asamankese District Assembly Primary School building for classes 4 to 6.

Figure 3. Performance on the use of Graidup by Basic School Four



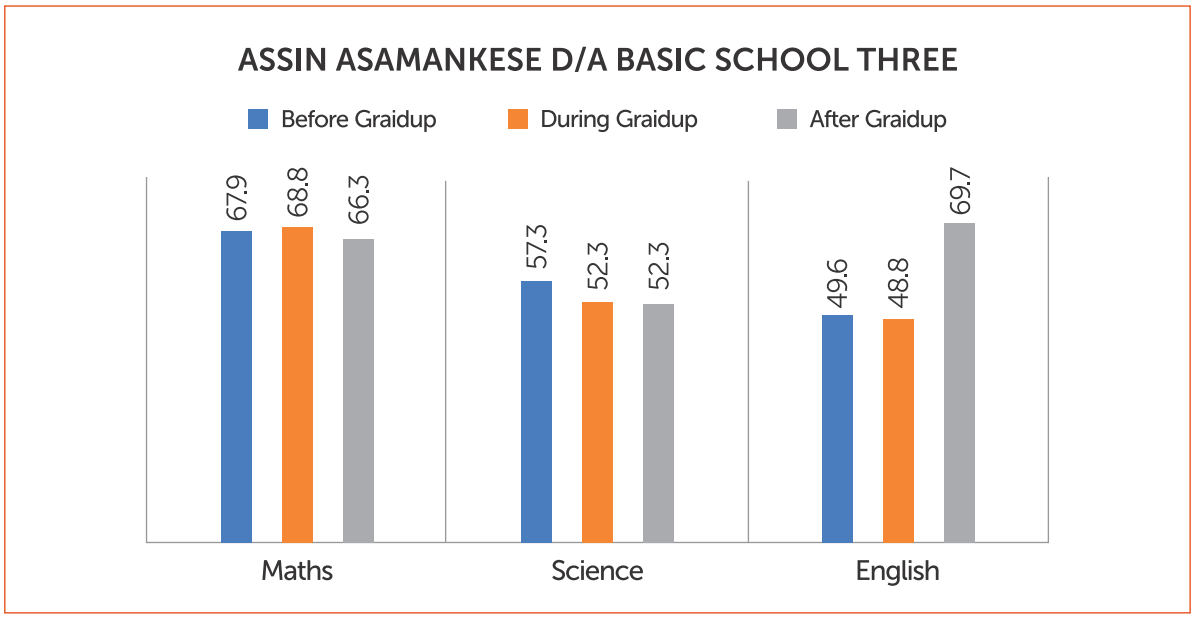
Source: Field Data

Figure 3 presents the average performance of the pupils in Basic School Four. As shown in the figure, average performance was high after the use of Graidup for all the subjects. While performance during the use of Graidup was high for Science and English, performance before the use of Graidup was high for Mathematics.



One of the buildings of Assin Asamankese District Assembly Primary School.

Figure 2. Performance on the use of Graidup by Basic School Three



Source: Field Data

Regarding Basic School Three (Figure 2), performance for during the class appears to be higher for Mathematics compared to before and after the use of Graidup for lessons. For Science, the pupils performed favourably before the use of Graidup and performed similarly during and after the use of the app.

With regards to English lesson, the pupils scores were about the same for before and during the use of Graidup but performed significantly higher after they have used Graidup tablets to study.



A female teacher demonstrating a lesson on Graidup tablet to pupils in the classroom. Picture taken during monitoring visit.

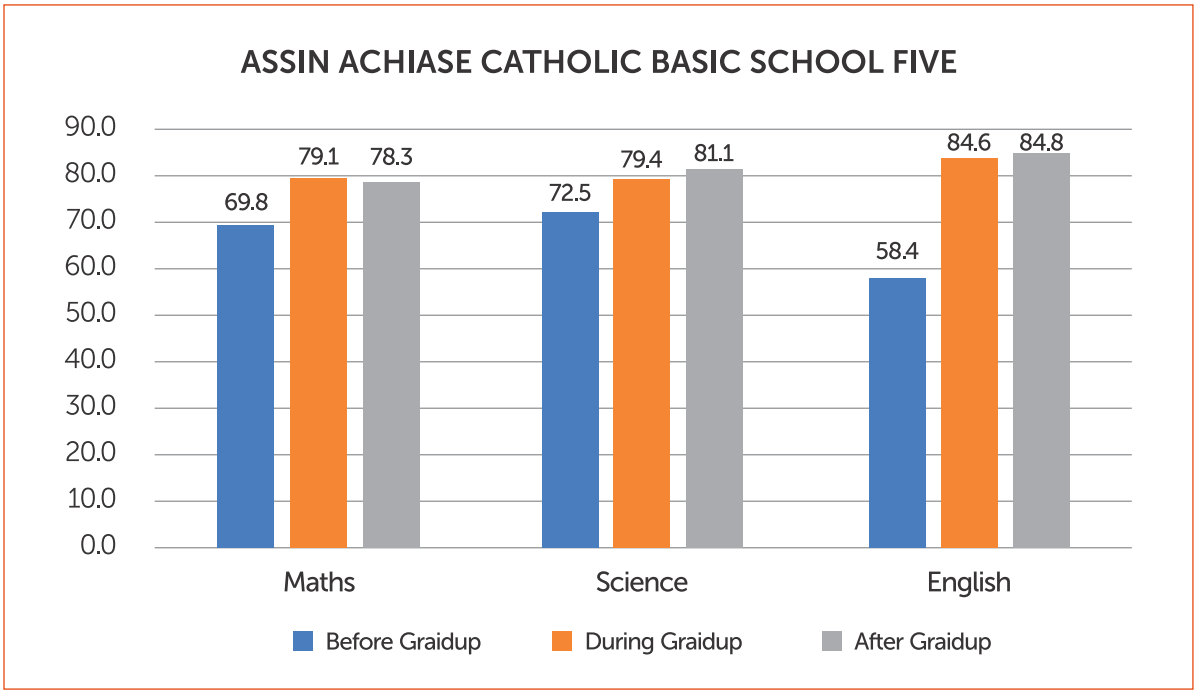


Children in Assin Achiase Catholic Primary School with their Graidup tablets during normal classes. As can be seen, the children are actively participating in class. Due to the large class sizes, the children are paired to use a tablet.



Assin Achiase Catholic Primary School building.

Figure 4. Performance on the use of Graidup by Basic School Five



Source: Field Data

Regarding the average performance of Basic School Five (Figure 4), the pupils scored somewhat higher during the use of Graidup compared to before and after the use of the application for Mathematic lessons. However, the average performance after the use of the Graidup app was also higher compared to before the use of the app for Mathematics class. For Science, the pupils performed favourably after they have used

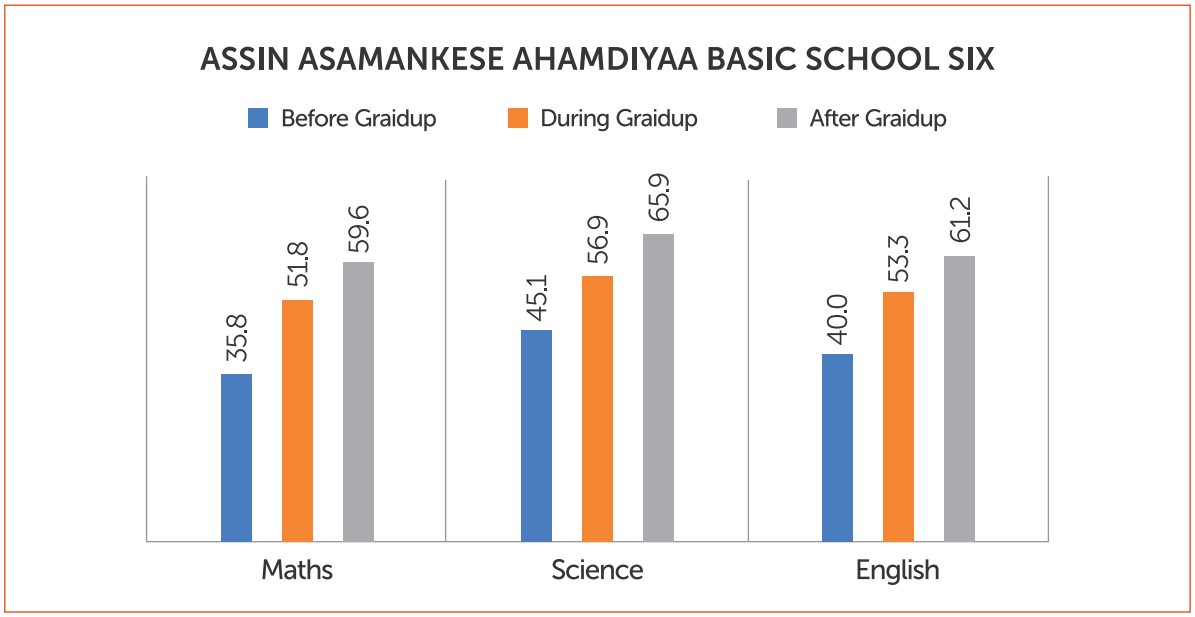
the app relative to before and during the use of the app. As expected, the scores for during the use of Graidup tablets were higher than before they have used the app for the Science class.

As shown in Figure 4, with respect to English lessons, performance of the pupils was low before the use of Graidup but the performance during and after the use of Graidup were similar but higher than the performance before the use of the Graidup tablets.



Pupils of Assin Asamankese T. I. Ahmadiyya Basic School playing during break in classes.

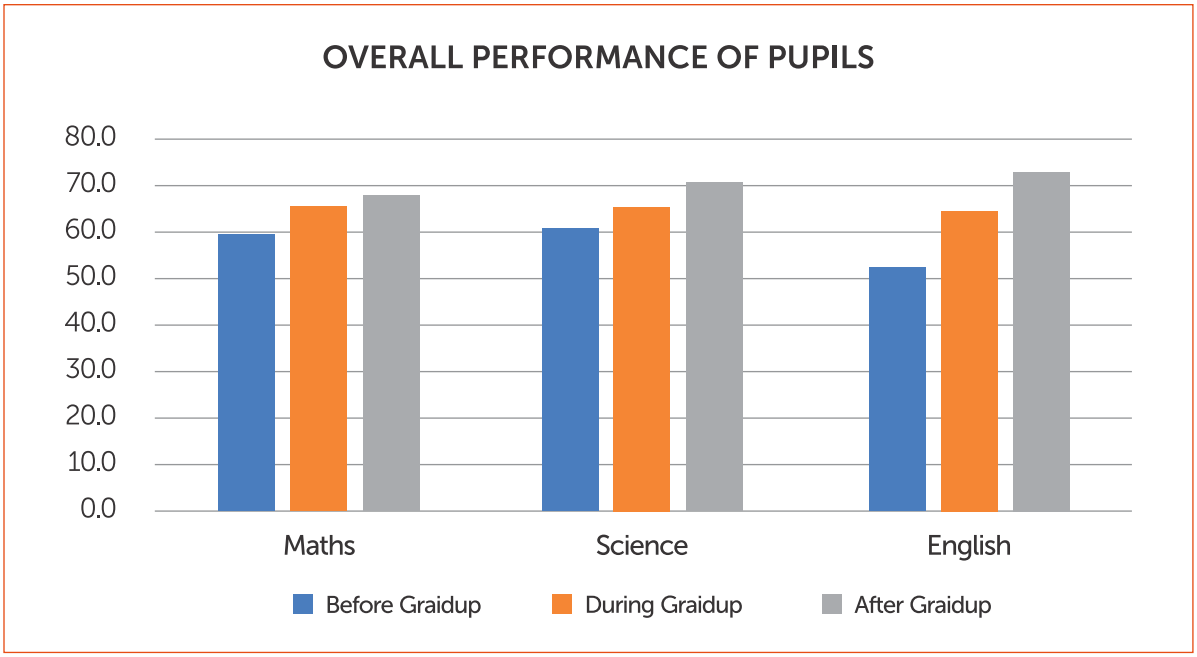
Figure 5. Performance on the use of Graidup by Basic School Six



Source: Field Data

Concerning the performance of Basic School Six (Figure 5), the pupils scored significantly higher after the use of the Graidup app for all the subjects under consideration. Similarly, performance was also higher for all the subjects during the use of the app compared to before the use of the app.

Figure 6. Overall performance on the use of Graidup by all Classes



Source: Field Data

Figure 6 presents the overall performance of the use of Graidup for all classes. We combined the classes and performed the analyses. Results show that performance of the pupils improved significantly after they have used Graidup to study for the Mathematics, Science, and English classes.

SUMMARY OF TEACHERS' OBSERVATION IN THE CLASSROOMS



Pupils and their teacher performing an activity on Graidup educational tablet during classes.

The teachers were asked to express their opinions regarding the use of the Graidup tablets in class. Their observations were based on the following 8 questions:

(1) How many pupils went out during the lesson?,

(2) How many questions were asked by teachers?,

(3) How many minutes did it take for the first pupil to go out after lesson has ended?

(4) How many pupils asked teacher questions during lesson?,

(5) How many times did pupils ask questions during the lesson?,

(6) How many pupils answered the teacher's questions?,

(7) How many minutes did it take for the last pupil to enter the class after lesson starts?,

(8) How many pupils raised their hands to answer questions?

Summary of the results are presented in the tables below.

TABLE 1. ASSIN ASAMANKESE AHMADIYYA BASIC SCHOOL

Qualitative Assessment	L1 N=46	L2 N=51	L3 N=53	L4 N=36	L5 N=23	L6 N=23	L7 N=37	L8 N=37	L9 N=38	L10 N=35	L11 N=36	L12 N=34	L13 N=33	L14 N=33
(1) How many pupils went out during the lesson?	0	0	2	3	0	0	0	0	0	2	0	0	0	2
(2) How many questions were asked by teachers?	8	12	8	14	4	9	13	12	15	18	14	9	9	14
(3) How many minutes did it take for the first pupil to go out after lesson has ended?	0	2.29	5	0	0	0	1.43	0	6	3	2	4	0	0
(4) How many pupils asked teacher questions during lesson?	0	5	3	0	0	0	3	3	0	0	0	0	0	3
(5) How many times did pupils ask questions during the lesson?	0	3	2	0	0	0	3	3	0	0	0	0	0	2
(6) How many pupils answered the teacher's questions?	5	10	6	9	2	5	10	10	7	13	8	0	4	8
(7) How many minutes did it take for the last pupil to enter the class after lesson starts?	0	1	2.16	4.16	0	0	0	0	46	4	1	2	0	0
(8) How many pupils raised their hands to answer questions?	30	16	21	21	6	13	20	21	18	24	19	21	7	10

Note: L = **Lesson**; N = **Number of students in class**

Table 1 summarizes the qualitative observation of teachers at Assin Asamankese Ahmadiyya basic school during the use of Graidup in their classes. As shown in Table 1, pupils were less likely to go out during the lessons and were more likely to enter the class early before lessons starts. The range of questions teachers asked was between 4 and 18 per lesson. While between 4 and 30 pupils raised their hands to answer the teacher's questions, 0 and 13 actually responded to the teacher's questions. Overall, we could conclude that Graidup facilitates class participation and attention.

TABLE 2. ASSIN ASAMANKESE D/A PRIMARY

Qualitative Assessment	L15 N=46	L16 N=43	L17 N=35	L18 N=45	L19 N=39	L20 N=33	L21 N=31
(1) How many pupils went out during the lesson?	0	3	0	1	0	0	0
(2) How many questions were asked by teachers?	12	14	7	9	13	10	14
(3) How many minutes did it take for the first pupil to go out after lesson has ended?	0	0	2	0	0	0	0
(4) How many pupils asked teacher questions during lesson?	2	0	3	0	0	3	0
(5) How many times did pupils ask questions during the lesson?	1	0	5	0	0	2	0
(6) How many pupils answered the teacher's questions?	8	9	6	13	19	8	10
(7) How many minutes did it take for the last pupil to enter the class after lesson starts?	0	4	0	2	0	0	0
(8) How many pupils raised their hands to answer questions?	24	23	12	15	23	14	21

Note: L = **Lesson**; N = **Number of students in class**

Table 2 provides a summary of observation by teachers at Assin Asamankese D/A Basic Primary school. According to Table 2, it could be observed that pupils were reluctant to go out during lessons with Graidup. Teachers ask between 7 and 13 questions per class, majority of pupils (between 12 and 24) raised their hands to answer the questions asked by their teachers. Again, between 6 and 19 students actually answered the teacher's questions.

TABLE 3. ASSIN ACHIASE ROMAN CATHOLIC PRIMARY SCHOOL

Qualitative Assessment	L21 N=31	L22 N=51	L23 N=36	L24 N=33	L25 N=35	L26 N=52	L27 N=39	L28 N=41	L29 N=40	L30 N=53	L31 N=53	L32 N=44
(1) How many pupils went out during the lesson?	0	0	4	3	0	2	2	0	0	3	0	0
(2) How many questions were asked by teachers?	14	6	6	10	15	14	7	6	8	19	7	5
(3) How many minutes did it take for the first pupil to go out after lesson has ended?	0	2	0	0	0	0	2	5	0	0	5	2.8
(4) How many pupils asked teacher questions during lesson?	0	3	3	0	0	1	0	0	0	2	9	0
(5) How many times did pupils ask questions during the lesson?	0	3	3	0	0	1	0	0	0	0	0	0
(6) How many pupils answered the teacher's questions?	10	8	8	13	12	14	11	5	13	14	13	3
(7) How many minutes did it take for the last pupil to enter the class after lesson starts?	0	3	2.3	0	6	1.8	3	0	0	3	1	0
(8) How many pupils raised their hands to answer questions?	21	15	13	15	23	21	17	12	19	28	23	11

Note: L = **Lesson**; N = **Number of students in class**

Table 3 presents the qualitative evaluation by teachers of Assin Achiase Roman Catholic Primary School. As shown in Table 3, students were less likely to vacate the classroom during lessons. While teachers asked between 5 and 19 questions during class, pupils asked less questions but were prepared to answer the questions raised by the teachers as between 11 and 28 students raised their hands and 3 and 14 students answered the teacher's questions.

Furthermore, four core themes were developed from the analyses of the teachers' observation. These themes show the extent to which the use of Graidup facilitated teaching and learning in class. Themes that emerged from the observations are presented and discussed.

ACTIVE PARTICIPATION AND ATTENTION

While classroom participation results in high level of energy and enthusiasm in class, poor students' participation and attention can also lead to students' boredom and teachers' frustration. Active participation and attention fosters pupils to make necessary connections between concepts and real-life situations.



Teacher explaining lessons to his pupils on a blackboard. This is the standard (and the only teaching tool in most cases) way of teaching before Graidup was donated.

Given that Graidup has several activities, which elicit participation, teachers observed that the pupils were very active and paid attention when Graidup devices were used during class time. These were reflected in questioning and answers during lessons.

For example, pupils were less likely to vacate class, and many raised their hands to answer questions asked by their teachers during the lessons when the Graidup tablets were being used. Some of the teachers expressed the benefits of Graidup to active participation and attention in class:The pupils were actively involved in class by contributing to questions and answers very well during the lesson, which helps them to understand the lesson better and that they were able to perform well on their class exercise when Graidup was used for the lessons (Issah).Pupils were active in participating in the lesson after watching the videos on the Graidup device (Wilson).

CHILD-CENTRED TEACHING APPROACH

Child-centred places emphasis on the holistic development of children in that it focuses on all factors, which contribute to preparing children for school and in future. Child-centred teaching inspires students to explore what they are most curious about. With child-centred teaching, children direct their own learning; fostering a curiosity that will stick with them for life.

Given that Graidup provides the avenue for students to learn to direct their fascinations, ask questions, play quiz games and work on their own, Graidup technology in class promotes child-centred teaching. Thus, assisting children to become more independent. Some teachers expressed these benefits as captured in the following statement; Graidup makes the teaching of lessons more child-centered, which is good for a holistic development of the children (Sarah).



School children actively learning on Graidup tablet.

INTERESTING AND EXCITING LESSONS

Teachers are not only wanting to find various ways to present learning materials clearly for students to understand but are also focused on making students learn. Thus, it is the aim of every teacher to make his/her lessons interesting for children to be able to understand the lesson being taught. Teachers may achieve these aims through connecting learning to real life situations, engaging children in all kinds of intelligences, encouraging movements in class, and integrating technology into teaching and learning.

Given that Graidup is an interactive platform, both teachers and students find teaching and learning to be easier and simpler with Graidup. Graidup is made up of several activities, which will engage them in all kinds of intelligences. Consequently, some of the teachers observed that the pupils were interested in the lessons they were teaching, and they were more excited when they use Graiudp during the lessons. Some of the teachers observed that:

Graidup really helped, because the pupils concentrated during the lesson and they were excited to watch the cartoons on the Graidup tablets, which aided them to ask a lot of questions during and after the class (Richard).



Some user interfaces of Graidup showing some of the lessons on the tablet.

The lesson was very interesting, and the pupils were actively involved in the lesson and by using the Graidup tablets the pupils understood the lesson better (Ntiedu).

KNOWLEDGE AND UNDERSTANDING

Impacting knowledge to pupils is key to every teaching activity. Limited knowledge about the world, leads to low capacity to learn more about it. Children learn better when they are able to connect new information to what they already know. It is therefore better to teach children how to discover facts on their own.

Self-learning based on appropriate teaching and learning materials promotes cognitive development of children. Thus, Graidup device provides background knowledge for children to understand concepts by connecting them to real-life events. This was captured by some teachers;

Lessons were excited and vital information was being learnt by the kids. I believe that continuing practicing on Graidup could improve the performance of the pupils and they will be very brilliant (Stella).

After helping the pupils to use the Graidup tablets, they were able to answer the questions on the topic "Materials Plants use for their food". Thus, the self-learning platform could promote cognitive development of the children (Philip).

SUMMARY

In the past few years, Ghana has devoted substantial resources to the educational sector and has exceeded in the international benchmarks for Gross Enrolment Rates as well as outperforming most of west African counterparts. Ghana has seen consistent rise in educational enrolment, but the outcomes in terms of performance has been poor raising concerns of the quality of education provided in our schools.

As a result, technological devices that will contribute to the performance of students are required. TLM Ghana Limited has develop an interactive Graidup application based on Ghana Education Service syllabus to cover Mathematics, English, and Science to bridge the gap between educational access and performance.

The Graidup app was piloted in three primary schools in the Assin South District to examine the performance of pupils before, during, and after they have used Graidup to study. Most of the results were consistent with our expectations. Specifically,

findings show that pupils' performance on the three subjects (i.e., Mathematics, English, and Science) improved tremendously after they have used Graidup to study.

Also, the results of some of the subjects deviated from our expectations. For instance, basic school one from Assin Asamankese Ahmadiyya performed better for Mathematics and English during the use of Graidup compared to before and after the use of the device. Similarly, performance on Mathematics and Science of basic school three of Assin Asamankese D/A Primary was low after the use of Graidup compared to before they have used the device to study.

These findings may be due to the inconsistent use of the device by teachers during the lessons. Despite the advantages of the Graidup app, teachers and instructors of the schools that we sampled for the study tend to stick to the old methods of teaching. Specifically, some of the teachers were reluctant of using the app during their lesson.

Additionally, some of the schools have electricity and those who have experienced intermittent power outages. In most cases the devices were out of power during the lessons, which made it impossible for them to use them during some of the lessons. These are some of the reasons, which may have contributed to the level of inconsistencies in our expectations.

Nonetheless, overall results show that the use of Graidup for teaching Mathematics, Science and English contributed to the performance of the students despite the few contradictions in our predictions.

RECOMMENDATIONS AND CONCLUSION

At the basic education level there has been significant improvement in access to education and the challenge going forward is to ensure that quality of teaching and learning is achieved. We believe that with the implementation of innovation and technology in our basic schools, the objective of quality education will be achieved. We provide the following recommendations;

- We encourage all teachers to improve upon their pedagogical skills by incorporating Graidup technology in their teaching and learning activities.

- We recommend to all district and municipal education offices to provide electricity to all basic schools to assist them to use technology during teaching and learning activities.
- Given that the Graidup is based on the Ghana Education Service syllabus, we entreat the government to make an attempt to procure this technology to be installed in all public basic schools across the nation to augment teaching and learning activities.
- Home learning and parental support are also important for students' performance. Since Graidup is self-learning device and can be used with or without internet, we encourage all parents to procure Graidup devices for their children to facilitate self-learning at homes.
- Teacher motivation and training is critical in the quest of achieving quality education. The government should invest in motivating the teachers as well as training them in new technological methodology of teaching.
- In recent times pupils seem not to have motivation and enthusiasm to learning as most of them are interested in watching TV and browsing on the internet at the expense of reading and completing their homework. Graidup has features that will make kids more interested in using the device than to watch TV. Thus, parents are encouraged to assist their kids to use technology that will contribute to their academic development.
- We suggest the establishment of District Teaching and Learning Material Fund (DTF) in every district in Ghana to assist in procuring teaching and learning materials including Graidup devices for students in every school across the country.

In conclusion, basic education in Ghana has been significantly progress in terms of enrolment and access but the improvement in quality has stagnated over the years. This is the reason why TLM Ghana has developed an interactive user-friendly "Graidup app" which is interesting and easy-to-use to improve quality of teaching and learning.

In this pilot project we found that children were very happy and excited when they were using Graidup during their lessons and that Graidup made them smarter and improves their performances.

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