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Education through Technology: Bridge IT Evaluation Report

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Centre for Research and Development Evaluation Team

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Four persons compiled this report and included the Evaluation Coordinator Joseph Tumushabe, assisted by Lydia Sandi, Johannes Mulokozi and Maurice Egbert Sekabila.

List of Acronyms

AIDS	Acquired Immuno-Deficiency Syndrome
BIT+LS	Bridge IT + Life Skills
BRN	Big Results Now
EDGE	Enhanced Data for GSM Evolution
FAWE	Forum for African Women Educationalists
IT	Information Technology
IYF	International Youth Foundation
MoEVT	Ministry of Education and Vocational Training
NPC	National Project Coordinator
PEDP	Primary Education Development Program
TAMISEMI	Tawala za Mikoa na Serikali za Mitaa (Prime Minister's Office Regional Administration and Local Government (PMORALG)
TEHAMA	Teknolojia ya Habari na Mawasiliano
TOT	Training of Trainers
TV	Television
USAID	United States Agency for International Development

Contents

Executive Summary

Introduction

Bridge IT-Tanzania, a project of International Youth Foundation (IYF) in partnership with Ministry of Education and Vocational Training (MoEVT), Forum for Africa Women Educationalists (FAWE), Nokia Corporation, Nokia Institute for Technology (INdT), Pearson Foundation and Vodacom Tanzania commenced operations in 2007. The main goal is to significantly increase the educational quality and achievement in mathematics, science and life skills among primary school pupils, through the innovative use of cell phones and digital technology. Implemented in 150 schools, 17 districts and 7 regions across the country; the project has reached over 100,000 pupils and significantly improved the capacity of teachers to use information technology (IT) to teach pupils. Although officially closed in March 2012, the key elements of the project, notably teaching and learning using IT continues in the pilot schools where they were introduced. Bridge IT is an innovation that has a major potential to sustainably improve educational quality, through close collaboration of different partners with the MoEVT.

Purpose and Use of Evaluation

This evaluation set out to (i) Analyze the Bridge IT's **effectiveness** and **efficiency** in improving teachers and pupil's performance in mathematics, science and life skills; (ii) Assess its sustainability in the pilot schools; and (iii) Identify and recommend options for Bridge IT institutionalization and the potential for replication in other districts of Tanzania based on evidence.

Key evaluation questions

The evaluation sought information on (i) the extent set targets, objectives and /intermediate results of the project were achieved over the project's four-year time frame; (ii) Whether Bridge IT project provided an opportunity to improve teaching/learning methodologies in schools; (iii) The extent gender issues were incorporated into the project, whether there was women's empowerment such as improving teacher performance, and focus on increasing learning gains with emphasis for girls in the Bridge IT methodology implementation; (iv) Challenges and lessons learned during implementation and innovative strategies and interventions resulting from implementation of the Bridge IT project; (v) The extent program interventions were successful, lessons to draw from the use of Bridge IT to inform school curriculum design in general and for teaching science, mathematics and life skills in primary schools in particular; (vi) Positive or negative (unintended) results; and (vii) Whether resources were used in a responsible way.

Evaluation Design and Methodology

Bridge IT Project was implemented in 150 schools across 17 districts and 7 regions of Mtwara, Lindi, Dar es Salaam, Coast, Tanga, Kilimanjaro and Dodoma. The sampling design for this evaluation was dictated by earlier studies conducted on the project in 2009 and 2011. As in the 2011 evaluation, to reduce the margin of error, while keeping costs and time into consideration 18 Bridge IT schools and 18 control schools were presented resulting into a margin of error of ±18% at the school level. This high margin of error however was off-set by the large number of students who took the math and science tests in the 5^{th} and 6^{th} grades in both the 2011

Summative Evaluation and this study permits valid statistical comparisons between Bridge IT and the control schools with a 95% confidence levels and 5% margin of error.

Following negotiations with the MoEVT[1], it was agreed that performance assessment tests carried out in 2011 Summative Survey should be implemented only in a limited number of schools and covering a reduced number of questions. Thus in addition to all the Bridge IT schools covered in 2011, one control school per each of the 9 study districts was covered. The only exception was in Ilala district Dar es Salaam and Korogwe District in Tanga where owing to the larger numbers of Bridge IT Project schools, two control schools were sampled per district.

In sum, findings pertaining to student performance in math and science for the academic year have a high degree of reliability; findings pertaining to school--level performance should however be interpreted with a much lower degree of confidence.

In total 2687 Standard 5 and 6 pupils (1724 Bridge IT and 963 from control schools) participated in the study. The sample had a margin of error of ±18% in relative terms to the total project beneficiary population. However given the large number of students who took the math and science tests in Standard V and VI, valid statistical comparison between Bridge IT and the control schools with a 95% confidence level and 5% margin of error has been realized.

In addition to document review (Section 2.4) and the science and mathematics test for pupils, fieldwork consisted of self-administered attitude questionnaires for pupils and teachers. To select a set of 30 questions in science and mathematics to include in the test from the 100 questions earlier set in the Summative Evaluation of the 2011 survey, an education and examining expert for the mid-primary cognitive domain was engaged. In both subjects, the selected questions were arranged from simple to complex and were testing knowledge, understanding, comprehension and synthesis.

In addition, the evaluation used unstructured interviews with district-based education officers and inspectors; key informant interviews with Bridge IT teachers and classroom observations (Annex 3-8).

Findings

Bridge IT Project initiation in all districts involved equipping schools, training teachers, launching the program, creating new videos and accompanying lesson plans, monitoring and evaluation. It also required mobilizing district level stakeholders, parents and school management. The project was implemented in 150 primary schools in 7 regions of Tanzania Mainland. By mid-2009, the project had benefited 38,108 standard five and six pupils. Since 2009, more than 50,000 new pupils have attended Bridge IT training, each for two years. Thus the project target of 10,000 students was attained and an estimated 72,850 pupils[2] had each benefitted from 2 years of Bridge IT methodology teaching by July 2013.

[1] The MoEVT were of the view that the test in science and mathematics be abandoned altogether since it would disrupt normal school functioning. However, assessment of performance was crucial to the overall objective of the study.

[2] There were 43 Bridge IT primary schools in Dar es Salaam and 107 in the other 6 regions. On average Primary schools in Dar es Salaam have 120 pupils in Standard 5, and schools in the region have on average 50 pupils

A total of 15 school inspectors and 267 teachers (53% female) were trained in three centers of Dar es Salaam, Mtwara and Tanga through 4-day seminars. Training covered how to download lessons from the mobile phones and connect these to the television sets in class; review and understand guidelines, lesson plans, timetable and usage of equipment[3] ; and new techniques such as how to use teaching materials, control strong emotions and listen to students in need of help/support. Project trained teachers in turn trained an additional 1,244 teachers in 2008/2009. Self-administered questionnaire findings in this study revealed about two-thirds (68%) of the Bridge IT trained teachers had in-turn trained other teachers and, overall 88% of the teachers were satisfied with the training methods used by their respective trainers.

On average both male and female pupils in Bridge IT schools perform better than their counterparts in non-Bridge IT schools in science and mathematics. While this was only marginal for boys, average performance in Science and Mathematics subjects was not only higher for girls compared to boys in Bridge IT schools, but even higher compared to the performance of boys and girls in Non-Bridge IT schools. Thus Bridge IT methodology indicates a potential for improving girls' learning and understanding of science and mathematics. These are subjects which have traditionally been poorly done by girls in Tanzania.

Nearly 90% of the classroom observations show that teachers speak so that all pupils in the class or groups could hear, maintain eye contact with class or group, speak to the children in a motivating manner, use the normal vocabulary know and use student's names, listen carefully to all students and encourage silent students to speak. This is not withstanding the fact that the current survey was conducted in August 2013 and almost a year and a half after the Bridge IT project had officially closed.

The main challenges to success of the project to date are the decline in monitoring and supervision to the program, lack of fresh subject content, facility and equipment decline, inadequate furniture and, especially for Dar es Salaam, large numbers of pupils in classrooms that cannot easily be accommodated in the redesigned Bridge IT rooms. Others are staff turnover and inadequate community contribution to the program.

It is noteworthy that between the 2011 Summative Evaluation and this survey, there has been limited decline, and in some cases improvement in the manner in which Bridge IT trained teachers manage lessons. In all but one of the 18 Bridge IT schools studied, there was persistent demand for continuation of the methodology. Similarly, in studied control schools and among district officials, it was recommended the methodology should not only be continued, but expanded in scope to cover other classes than Standard V and VI.

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enrolled in Standard 5 every year. Given that 38108 pupils were in Bridge IT by mid-2009 and an additional 3 years 2010 – 2012 enrolled more pupils in these classes an estimated minimum of 37,740 new enrollees in Dar es Salaam (estimated 15,480) and the other 6 Bridge IT pilot project regions (19,260) had enrolled in Standard 5 over the period 2010-2012.

[3] The Bridge IT program involved the installation of a program on Nokia cell-phones with support from Vodacom.

Conclusions

This project has demonstrated considerable success in introducing technology into the teaching of science and mathematics. Targets for teacher training, selecting and establishing Bridge IT methodology in schools, enrolling pupils and ensuring the teaching of science and mathematics using technology were all attained within the initial 2 years of project start-up.

This study has revealed that teachers and pupils can quickly and within limited resources adopt the use of technology in teaching and learning within resource-poor settings in Tanzania. Benefits of the methodology include enhancing understanding of subjects among students and teachers; boosting confidence of pupils, especially girls; and demystifying the myths that math and science subjects are 'difficult,' especially for girls. It was also reported that the use of the methodology has led to reduction of truancy (absenteeism), enhanced understanding life skills as a subject and improved pupil's ability to use technology. Other benefits reported include reduction of the teachers' burden, improving cooperation among teachers and pupil to teacher relations. In the majority of schools (14/18) covered in this survey, the Bridge IT methodology continues to be used, despite a year and a half of limited access to fresh video supplies. In the 4 schools, where equipment failure had temporarily stopped video usage, there were expectations that the project coordination office would get the equipment repaired and/or replaced soon.

Studies will be necessary to introduce Bridge IT in other parts of the country where the resources such as energy supply remains a challenge. Likewise studies in adopting cheaper mechanisms for delivering the lessons will be necessary and should take into consideration the rapid changes in technology and access of teachers and pupils to mobile phone technology and the networks. The suitability and practical ability of scaling up the project to cover all other subjects, as well as more schools, especially in areas that do not have easy access to electricity, will need to be explored with all stakeholders at all levels.

Overall, while a financial audit of this project was out of the scope of this study, the fact that (i) all studied Bridge IT schools had in place facilities, equipment and staff that were still applying the methodology one and a half years after the closure of the project; (ii) the high degree of support and enthusiasm and attendance of Bridge IT classes among pupils and teachers; (iii) the flexibility used by teachers to innovate so as to sustainably use the methods when faced with challenges; (iv) the teachers that have continued to train others to use the methods are positive indicators of sustainable and efficiency in usage of resources.

Recommendations

To sustain and scale-up the use of technology methodology in teaching and learning, calls for policy direction and sustained government commitment to investment, as well as mobilizing stakeholders at all levels (national, regional, municipal and district councils) to understand the benefits of the program. Government and her partners will also need to harness the potential of private sector investment towards supporting high costs of initial investment in primary education. Other key recommendations include sustaining the repair of equipment, improvement of furniture, sustaining monitoring and support supervision and, above all, supply of teaching materials in form of videos. Resources permitting, there is need to sustain operations in pilot schools and also expand into new districts.

1.0 Introduction

1.1 Background

In September 2007, the International Youth Foundation (IYF) entered into a cooperative agreement with USAID Tanzania, to implement the Bridge IT program in Tanzania. The IYF implemented Bridge IT in partnership with the Ministry of Education and Vocational Training (MoEVT), Forum for African Women Educationalists (FAWE), Nokia Corporation, Nokia Institute for Technology (INdT), Pearson Foundation and Vodacom Tanzania. The main goal was to significantly increase the educational quality and achievement among pupils at primary school level, in mathematics, science and life skills, through the innovative use of cell phones and digital technology.

In undertaking the implementation of the Bridge IT Project, the IYF and her partners, set out to improve the educational quality, through three key objectives, namely:

1) To work with the MOEVT and other partners to launch and expand Bridge IT in Tanzania and integrate it into the education system, at low and affordable costs, with the aim of reaching out to the greatest number of children and teachers possible;

2) to improve teacher performance in Bridge IT classrooms, as determined by changes within the quality of interaction, teaching and learning in the classroom; and

3) to increase learning gains among upper primary students in math, science, and life skills in Bridge IT classrooms, with a particular emphasis on girls.

The Project was designed to achieve three targets including:

1. Reach out to 150 schools and 10,000 students with education content and training;

2. Improve teacher performance by 20%, as determined by the Teaching and Learning Quality Assessment instrument, which measures quality of interaction and instruction; and

3. Increase learning gains among primary students in math, science and life skills by 20%, as compared to a control group.

The objectives, target results and outcomes expected of the Bridge IT pilot project are indicated in Table 1:

Table 1: Bridge IT Objectives, Results and Outcomes:

Goal and Objectives	Results	Outcomes
Goal: To increase educational quality and achievement among boys and girls in primary schools in math, science, and life skills through the innovative use of cell phones and digital technology.		
Objectives 1. To work with the Ministry of Education and Vocational Training (MOEVT) and others to launch and expand Bridge IT in Tanzania and	(a) 150 schools and 10,000 students reached with education content and training through	(i) Technical Feasibility study on technology component completed.
		(ii) 150 schools outfitted with reception package (TV, set top box, etc.).
		(iii) Expansion plan for additional uses of Bridge IT technology developed.

Goal and Objectives	Results	Outcomes
integrate it into the education system, at low and affordable costs, in order to reach the greatest number of children and teachers possible	Bridge IT.	
2. To improve teacher performance in Bridge IT classrooms, as determined by changes within the quality of interaction and instruction in the classroom.	(b) Teacher performance will improve by 20%, as determined by the Teaching and Learning Quality Assessment instrument, which measures quality of interaction and instruction.	(i) Teacher training needs assessment completed.
		(ii) 20 pilot school teachers trained in use of Bridge IT and lesson plans, and certified as peer trainers.
		(iii) Additional 130 school teachers trained in use of Bridge IT technology and lesson plans as part of pre-service/in-service training program.
		(iv) Training institutionalized in MoEVT teacher training system through use of teacher training modules developed.
3. To increase learning gains among upper primary students in math, science, and life skills in Bridge IT classrooms, with a particular emphasis on girls.	(c) Increase learning gains among primary school students in math, science and life skills by 20%, as compared to a control group.	(i) Curriculum map of Pearson Knowledge Box content in math, sciences and life skills and MoEVT curricula requirements completed.
		(ii) Educational input master plan created.
		(iii) Capacity building training completed for local video content providers.
		(iv) Adaptation/ localization of Pearson Knowledge Box content in math, sciences and life skills completed.
		(v) Video content and lessons plans pilot tested in 20 schools.
		(vi) Video content and lesson plans used in 150 schools.

The introduction of the Bridge IT program was to simplify learning and teaching, especially in standard five and six in subjects of mathematics, science and life skills. The main target was to make students like these subjects because there was a strong belief that the subjects were difficult for most pupils. The project was officially closed at the end of March 2012.

1.2 Purpose and Use of Evaluation

This evaluation purpose is to analyze (i) the project's **effectiveness** and **efficiency** in improving teachers and pupil's performance in mathematics, science and life skills , (ii) assess its sustainability in the pilot schools (iii) identify and recommend options for Bridge IT's institutionalization and the potential for replication in other districts of Tanzania based on evidence. The evaluation assesses the extent to which project targets and objectives were achieved. In addition, the evaluation explorers the level of success of program interventions and provides lesson learned in the use of Bridge IT in the school curriculum. It highlights and documents challenges and lessons learned during implementation. The evaluation findings will be presented to the MoEVT and her partners in primary education, and hopefully, contribute substantially to the necessary review and scale-up of science, mathematics and life skills education.

1.3 Key Evaluation Questions

The evaluation set out to address the following key questions:

(i) To what extent were targets for the project objectives and /intermediate results achieved over the project's four-year time frame?

(ii) Did Bridge IT project provide an opportunity to improve teaching/learning methodologies in schools?

(iii) To what extent were gender issues incorporated into the project? Did the Project consider women's empowerment such as improving women teachers' performance? Was there emphasis towards increasing learning gains with emphasis for girls?

(iv) What were the challenges and lessons learned during implementation (including any innovative strategies and interventions) that resulted from Bridge IT project?

(v) How successful were program interventions? What lessons were learnt with regard to use of Bridge IT in the school curriculum?

(vi) Were there any unintended results (positive or negative)?

(vii) Were project resources used in a responsible way?

1.4 Scope of work

The evaluation team's responsibilities included:

- Review all existing project documents and reports and assess the project's performance in achieving targeted goals.
- Develop gender-responsive evaluation design that includes mixed methods approach to gather both quantitative and qualitative information that is based on sound social science methods and tools used in a manner to minimize potential biases.
- Recruit, train and make available a team of consultants with one serving as a Team Leader to coordinate the overall evaluation efforts and be responsible for editing and compilation of evaluation report.
- Prepare and deliver to USAID/Tanzania a detailed work plan, which will contain a detailed schedule of activities, including a detailed outline of responsibilities and proposed sites to be visited during the field work portion of the evaluation for each contractor for review and approval.
- Provide USAID the draft travel agenda.
- Undertake fieldwork in at least four regions and ten rural and urban selected districts supported by the project in coordination with USAID.
- Gather and analyze data from interviews, new surveys, or other proposed methods to triangulate findings.
- Submit a quality draft report to USAID/Tanzania for review and comments.

2.0 Evaluation Design and Methodology

2.1 Evaluation Sampling Design

Bridge IT Project was implemented in 150 schools across 17 districts and 7 regions of Mtwara, Lindi, Dar es Salaam, Coast, Tanga, Kilimanjaro and Dodoma. The sampling design for this evaluation was dictated by earlier studies conducted on the project in 2009 and 2011. For the 2009 evaluation a sample of 15 schools was used, with a 90% confidence level resulting in a margin of error of ±20. In the 2011 evaluation consideration was made to reduce the margin of error to ±10%. It was noted this would require a sample of 47 schools out of 150. However, cost and time considerations did not allow for such a large sample. Thus the partners in the 2011 study agreed to use roughly a middle point between the two margins of error with a sample of 28 schools. This would have resulted in a margin of error of approximately ±14% and a 90% confidence level. However in the end, data were collected from a total of 18 Bridge IT schools and 18 control schools. The reduced sample size increased the margin of error to ±18% at the school level, but the large number of students who took the math and science tests in the 5th and 6th grades permitted valid statistical comparisons between Bridge IT (BIT and the control schools with a 95% confidence levels and 5% margin of error.

To ensure comparison of results with the 2011 Summative Evaluation, this evaluation employed a similar quasi-experimental evaluation design covering all the Bridge IT schools included in the sample of 2011 survey which had a margin of error of to ±18% at the school level were included in this study.

Following negotiations with the MoEVT[4], it was agreed that performance assessment tests carried out in 2011 Summative Survey should be implemented only in a limited number of schools and covering a reduced number of questions. Thus in addition to all the Bridge IT schools covered in 2011, one control school per each of the 9 study districts was covered. The only exception was in Ilala district Dar es Salaam and Korogwe District in Tanga. In these two districts, owing to the larger number of Bridge IT Project schools, two control schools were sampled per district.

In sum, findings pertaining to student performance in math and science for the academic year have a high degree of reliability; findings pertaining to school-level performance should however be interpreted with a much lower degree of confidence.

[4] The MoEVT were of the view that the test in science and mathematics be abandoned altogether since it would disrupt normal school functioning. However, assessment of performance was crucial to the overall objective of the study.

Table 2: List of study sample schools			
Region	*District*	*School name*	
		Bridge IT	*Non-Bridge IT*
Kilimanjaro	Mwanga	Kilongwe & Kalambacha	Mwangondi
	Moshi	Ashira & Azimio	Kaloleni
Lindi	Kilwa	Masoko	Mkwanyule
Dodoma	Chamwino	Chamwino Ikulu	Mkapa
Coast	Bagamoyo	Mdaula & Msorwa	Mbaruku
Dar es Salaam	Ilala	Bunge, Muhimbili, Airwing & Ilala	Minazi Mirefu, Mnazi Mmoja
	Temeke	Mji Mwema, Sandali	Maweni
Tanga	Korogwe	Boma	Mbeza Mazoezi, Magunga
	Tanga	Chumbageni, Maweni & Ukombozi	Mnazi Mmoja

Thus, out of the 150 Bridge IT schools 18 were covered in the study as were 11 Control schools. All Bridge IT and control schools in the study had been covered in the 2011 project Summative Evaluation. Selection of the same schools as in the 2011 Summative Evaluation was aimed at enabling alignment of performance results and classroom observations in Bridge IT schools and control schools over the two studies.

Fieldwork consisted of interviews with district-based education officers and inspectors of the Bridge IT project, key informant interviews with teachers, science and math tests with pupils in Standard V and VI, classroom observations and document reviews.

The sample had a margin of error of ±18% in relative terms to the total project beneficiary population. In total 2687 Standard 5 and 6 pupils (1724 Bridge IT and 963 from control schools) participated in the study. Given the large number of students who took the math and science tests in Standard V and VI, valid statistical comparisons between Bridge IT and the control schools with a 95% confidence level and 5% margin of error were realized.

2.2 Data Collection Methods

The evaluation applied a mixed method approach for data collection, including review of key project documents and reports of baseline Evaluation of 2009 and the Summative Evaluation conducted in July 2011. Key informant interviews of leaders at national, district and school levels were carried out as well as interviews with teachers. In addition, a semi-coded questionnaire survey of teachers and pupils, classroom observations and performance tests in Science and Mathematics were conducted among pupils in Bridge IT project and control schools.

Like the selection of schools, several of the tools used in this study were aligned to the 2011 Summative evaluation to enable comparison of findings. Aligned tools included the Classroom Observations Checklist, Teachers' attitude Questionnaire Pupil's Attitude Questionnaire and Math and Science Tests for Pupils. This was further informed by the fact that while the pupils that

undertook the tests in 2011 will have transited to Standard Seven or Secondary, the teachers and methods remained.

At district level, a total of 8 district education officers[5], 9 district-based school inspectors and 9 Bridge IT Coordinators, were interviewed with a key informant interview guide. Within the selected Bridge IT and control schools, 1724 Standard 5 and 6 pupils in the 18 Bridge IT schools and 963 pupils in the same classes of 11 Control schools, found on the day of the survey, participated in completing an attitude questionnaire and a Mathematics and Science Test. The attitude Questionnaire, math and science tests were all translated into the local Swahili language.

All the schools that participated in this evaluation (Table 2) had also been included in the summative evaluation conducted in 2011.

2.3 Evaluation team

To ensure rapid data collection and minimize interruption of the school calendar, it was necessary to have all data collection in one week across all the regions. A team of 14 field assistants were thus recruited to seek respondents' consent, carry out interviews at the district and school levels, initiate and supervise the completion of the pupils' and teachers' attitude questionnaires, introduce and supervise pupil's tests, and undertake classroom observations. None of the members of the evaluation team was associated with the Bridge IT program design or implementation to minimize interviewer bias. The team was centrally trained in Dar es Salaam. Fieldwork was coordinated by the Team Leader and two Senior Supervisors who coordinated all field teams on a day to day basis through phone and internet contact where possible.

Training included a detailed explanation of the purpose and objectives of Bridge IT Project and of the evaluation. It also included a review of the methodology. Pre-testing at district, school and classroom levels was undertaken in Ilala District and two Bridge IT and 2 control schools were covered in the pre-test. Fieldwork was carried out by 14 field assistants who were divided into nine sub-groups, each covering one district. Six (6) people undertook qualitative and quantitative data entry. Later, a team including the Evaluation Coordinator, two Research Assistants and a Photography Documentation Expert carried out a photo-tour of four districts in 8 selected Bridge IT schools that had been covered in the study.

2.4 Fieldwork

In all regions, data collection started with the introduction of the evaluation and the evaluation team through presentation of a letter of introduction from the MoEVT. Letters of introduction to the districts from the Regional Administration offices were thereafter prepared and presented to the District Executive Directors. These, in turn, introduced the Evaluation teams and the purpose of the evaluation to the technical officers and sampled schools.

In each case, team members allotted to each district undertook interviews of district education officers and inspectors before proceeding to the schools to carry out the school-based field activities with head teachers, teachers and pupils of sampled Bridge IT and control schools.

[5] One district education officer in Dar es Salaam was unavailable for interview despite two recall visits.

Data collection in each school included requests to teachers to complete the teacher perceptions and key informant interviews, administration of the Science and Mathematics tests and Classroom Observations. The attitude questions and tests were distributed to the respondents (for pupils and teachers) and answered under supervision of the study team's Field Assistants. Fieldwork was undertaken through the above activities in Dar es Salaam on 29th and 30th August, 2013 by the entire study team and in Bagamoyo, Dodoma, Kilimanjaro, Lindi and Tanga between 2nd and 6th September, 2013.

2.4.1 Teacher perception and Key Informant interviews

In all Bridge IT schools, a teacher key informant interview guide, as well as a Teacher Perception Questionnaire, were administered to Bridge IT trained teachers of Standard V and VI. The tool sought information on their experience and perception of the quality of Bridge IT methodology, its application and effects on teaching and learning; teacher-pupil interaction and student's application of Bridge IT methods in learning; challenges and recommendations for teaching science and mathematics; and resultant gender-related changes among the pupils.

2.4.2 Science and Mathematics Tests

As noted in Section 2.1 a total of 2687 pupils in Standard 5 and 6 completed an Attitude Questionnaire and a 30-Objective Question Test in Mathematics and Science. Of these, 1724 (64.2%) were from 18 Bridge IT schools; and 963 (35.8%) from the 9 control schools.

The selection of the 30 science and mathematics questions to include in the test from the 100 questions earlier set in the Summative Evaluation of the 2011 survey was carried out by an independent education officer involved in curriculum development and examination setting. The test included a sample of questions covering the mid-primary cognitive domain arranged from simple to complex testing knowledge, understanding, and comprehension with a few questions on synthesis for both subjects.

2.4.3 Classroom Observations

In the whole study, Bridge IT schools, classroom observations were carried out in Standard V and Standard VI using a Classroom Observation Guide.

Prior to administering the math and science tests, data collectors made classroom observations using an observation checklist (Annex 3) that was similar to the one used in the September 2011 Summative Evaluation. With 12 sections, divided into three groups with four sub-sections, each of the checklists had a series of statements in which the observer noted a "yes" or "no" mark after observing a particular phenomena or behavior in the class. It sought to establish whether the condition existed or was noted during a full class period when the observation was made.

Teachers were informed about the observations, just before the data collectors entered the classroom, and asked to carry on normal teaching activities. Data collectors sat at the back of the classroom and did not interfere with class activities. Each observation covered one full class period in science, mathematics or Life skills.

As per requirements of the class observation guide, data collectors completed the full enrollment for boys and girls in each Bridge IT class and proceeded to count the actual numbers recorded in the register as well as those physically present in class at the time of the observation. These data were later used to calculate enrollment ratios of the Bridge IT and control schools as well as attendance rates by gender.

2.4 Document Review

As part of the preparatory and analysis stages of this evaluation, key project documents were reviewed. Documents reviewed include:

(i) Bridge IT Annual Implementation Plan;
(ii) Bridge IT Technical application Document 2007;
(iii) Bridge IT program description;
(iv) Bridge IT activity fact sheet;
(v) Bridge IT summative evaluation report -2011;
(vi) Bridge IT project performance reports and the ; and
(vii) Bridge IT Annual report 2008 – 2009.

In addition, the USAID-Approved Basic Education Indicators document was also reviewed.

2.5 Data Analysis, including gender analysis

Data entry was carried out in Dar es Salaam at the Centre for Research and Development office, using a template designed with access. Quantitative data analysis was undertaken with SPSS. Frequencies and cross-tabulations and measures of central tendency for performance in Mathematics and Science for Bridge IT and Control schools were run separately for Standard Five and Six and for Gender. Qualitative data notes were transcribed, typed, translated from Swahili to English and analyzed thematically. The interpretation of notes and quantitative data, as well as comparison, with the earlier survey findings in the earlier surveys is presented in Chapter Three.

2.6 Constraints and Gaps

The main constraint of this evaluation was its timing. Initially scheduled for mid-May 2013, the timing coincided with the closure of schools for the mid-year holidays. Moreover, by this time the study had not been cleared by the MoEVT[6]. In addition, the National Bridge IT Project Coordinator in the MoEVT had been promoted and transferred, disrupting the coordination function for the evaluation.

In the process of clearing the study, it was suggested by the directorate of Primary Education in the MoEVT, that aspects of the study, that involved conducting a Science and Mathematics test with Standard V and VI pupils, be dropped with a reason that the test would disrupt normal functioning of the studied schools. In the end, it was decided that the full 100 Mathematics and Science question test be reduced to only 30 questions. The change in approach meant a comparative assessment of the study with the Summative Evaluation of the project undertaken in 2011, with regard to performance of pupils was not feasible without access to the earlier data sets.

[6] The authorization was obtained at the end of August Y2013.

Moreover, while this evaluation covered the sampled 18 Bridge IT schools, that participated in the 2011 study, for this survey, it only covered 11 schools of those covered in the 2011 Summative Evaluation, implying a higher margin of error for the Control schools.

Finally, this evaluation was undertaken one and a half years after financial and technical support for the Bridge IT Project had stopped, and the project was running on its own initiative. In effect, the study is an assessment of the surviving aspects of the Bridge IT project after it had ceased operating, and given the lag in time, the interpretation of findings should be made in this light.

3.0 Findings

Bridge IT Project was designed as a pilot project to cover 150 primary schools and 10,000 students with education content and training; improve teacher performance by 20%, and increase learning gains among primary students in math, science and life skills by 20%, as compared to a control group. This evaluation set out to assess the extent to which the targets for the project objectives and /intermediate results (Table 1) were achieved over the project's time frame; the manner in which Bridge IT project provide an opportunity to improve teaching/learning methodologies in schools, gender issues were incorporated into the project and the challenges and lessons learned during implementation.

This Chapter explores the extent to which the project objectives were attained and the manner in which the project results were attained. It also examines the perceptions of different stakeholders in the project about the project, the lessons the project generated for the teaching of science and math in primary schools and the way the project has shaped perceptions and learning gains of boys and girls in the covered subjects.

3.1 Project Achievements

The project achievements in this evaluation are measured on the basis of the project targets and evidence provided through review of records, interviews with stakeholders and the other assessment activities explained in Chapter Two.

3.1.1 Project Coverage

In the first year (2007-2008), the project was piloted in 20 schools and rolled out in 2008/2009 to cover an additional 130 schools. Schools that were covered had to have an educational need, access to electricity, a Vodacom 2.5 EDGE or 3G cellular network, and within the 17 districts and 7 regions selected for the Bridge IT project. Initiation of the project in all districts involved equipping schools, training teachers, launching the program, creating new videos and accompanying lesson plans, monitoring and evaluating the project[7].

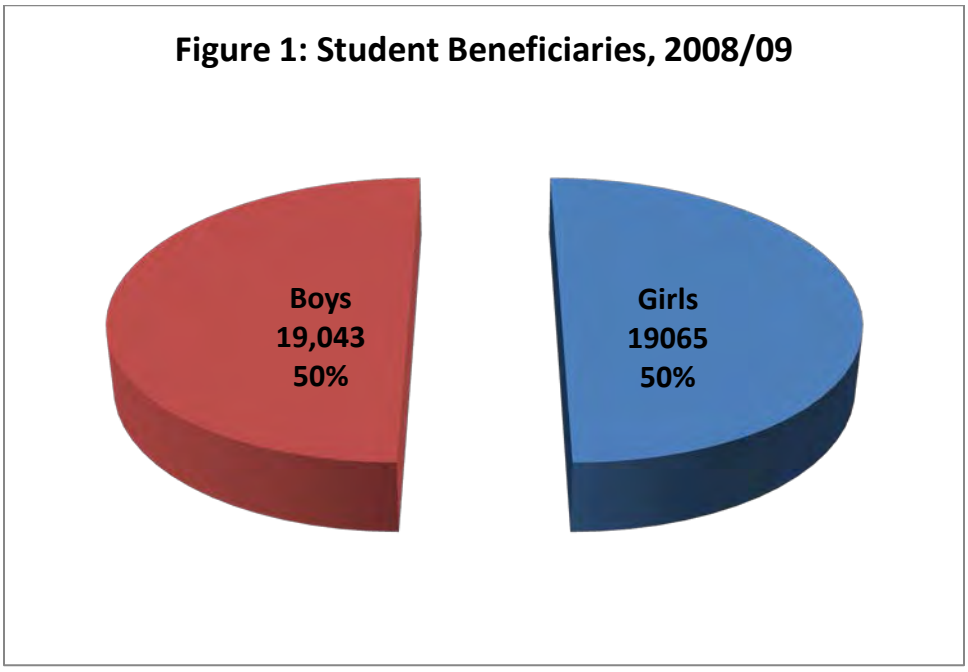
In late 2008 and early 2009, all 150 schools had one of the classrooms renovated and equipped. This included minor renovations of one classroom in each school to make it an IT room, through mobilizing parents and school management[8] to fit security grills, furniture, windows, fans and secure doors where necessary. After installation of equipment, the project was handed over to schools. Initially, the teachers received programs from the main server in Dar es Salaam, but later these were downloaded and installed in their cell phones. In April 2009, the project was launched at Mwenge in Dar es Salaam.

In 2009, USAID granted IYF a 15-month project extension. This extension provided additional time and resources for the project to continue tracking results, enhance its training and

[7] IYF, 2009, Annual Report October 2008 - September 2009, USAID/IYF

[8] Sub-village, village and ward leadership and school committees were trained through seminars.

educational materials, and build the capacity of MoEVT staff, district government officials and individual schools and communities to take over the project after this period.



Source: annual project report 2008-2009

In terms of coverage, the project was implemented in all the 150 targeted primary schools in 7 regions of Tanzania Mainland. At the start, due to the high demand of students to enter the program, the enrollment was limited to Standard VI students. By mid-2009, the project had benefited 38,108 standard five and six pupils (Figure 1). Since 2009, more than 50,000 new pupils have attended Bridge IT training, each for two years. Thus, the project target of 10,000 students was exceeded with the addition of more time. Overall, an estimated 88,500 students had by the time of this survey in August 2013 benefitted from the Bridge IT methodology for 2 years.

3.1.2 Teacher Training

Bridge IT had, as a key objective, to improve teacher-performance as determined by changes within the quality of interaction and instruction in the classroom. The target was to improve by 20% teacher performance as determined by the teaching and learning quality assessment instrument, which measures quality of interaction and instruction. Indicators of success with regard to teacher-training include (a) A teacher training needs assessment completed (b) 20 pilot school teachers trained in use of Bridge IT and lesson plans, and certified as peer trainers (c) additional 130 school teachers trained in use of Bridge IT technology and lesson plans as part of pre-service/in-service training program and

Table 3: Trained teachers and inspectors, 2008-2009

	Female	*Male*	*Total*
Teachers			
Math & Science	137	130	267
Life Skills	15	5	20
Inspectors	4	11	15

Source: annual project report 2008-2009

(d) Training institutionalized in MOEVT teacher training system through the use of teacher training modules developed.

In-service teacher training was undertaken in 2008, 2009, 2010 and 2011 for 3 to 4 days to adopt the Bridge IT methodology and improve efficiency in teaching among the beneficiaries. At the start, the project selected ten of the best teachers and district inspectors from among the 43 teachers and inspectors earlier trained in the pilot phase (2008). These were trained for a week as master trainers[9]. The Master trainers, thereafter, carried out a series of training of teachers (ToT) workshops in three training centers in Dar es Salaam, Mtwara and Tanga in which 15 school inspectors and 267 teachers[10] were trained (Table 3). The training was through seminars starting with head teachers and two (2) teachers per school and 53% of teachers trained were female.

Following this training, the 15 trained district inspectors and Master trainers trained additional 1244 teachers in 2008/2009 making an average of 8 teachers per school. Since 2009, a series of refresher trainings for teachers have been carried out in workshops with supportive supervision of project coordinators.

Findings from this evaluation indicate that 32% of the interviewed Bridge IT teachers were trained master teachers, 65% were trained by master teachers. More than two-thirds (68%) of the trained teachers reported they had trained other teachers in the methodology. Overall, 88% of the teachers were satisfied with the training methods used by their respective trainers (Table 4).

All (100%) teachers interviewed with key informant interviews in the Bridge IT Pilot Project schools reported teacher training was beneficial, efficiently delivered, with methods and language that was easy to understand. Equipment and materials (videos) to facilitate teaching and learning by doing were available. Teachers were trained on how to download lessons from the mobile phones and connect to the television in class; review and understand guidelines, lesson plans, timetables and usage of equipment,[11] and new techniques, such as how to use teaching materials, control strong emotions and listening to students in need of help/support.

Table 4: Trained teachers in Bridge IT schools by source of training in 2011 and 2013

	Description	*2011*	*2013 (n=44)*
1	Trained to be a master teacher	22%	32.4%
2	Trained by master teachers	66%	64.7%
3	Trained by a fellow teacher (not master teacher)	27%	29.4%
4	Trained other teachers to use Bridge IT	82%	67.6%
5	Training to use Bridge IT was appropriate	91%	88.2%

[9] Master trainers were trained in application of the Bridge IT program, including conducting interactive teaching session, enhancing students understanding through the use of Bridge IT videos, troubleshooting when equipment issues arise, facilitation skills for training adults including fellow teachers.

[10] 2 From each of the 130 newly selected schools.

[11] The Bridge IT program involved the installation of a program on Nokia cell-phones with support from Vodacom.

3.1.4 Gender attitudes changes to science and math learning

The third main objective of Bridge IT Pilot Project was to increase learning gains among upper primary students in math, science, and life skills in Bridge IT classrooms, with a particular emphasis on girls. The target was to increase learning gains among primary school students in math, science and life skills by 20%, as compared to a control group. Project expected outcomes for this objective were (a) curriculum map of Pearson Knowledge Box content in math, sciences and life skills and MOEVT curricula requirements completed; (b) educational input master plan created; (c) Capacity building training completed for local video content providers; (d) Adaptation/ localization of Pearson Knowledge Box content in math, sciences and life skills completed; (e) Video content and lessons plans pilot tested in 20 schools and Video content and (f) lesson plans used in 150 schools.

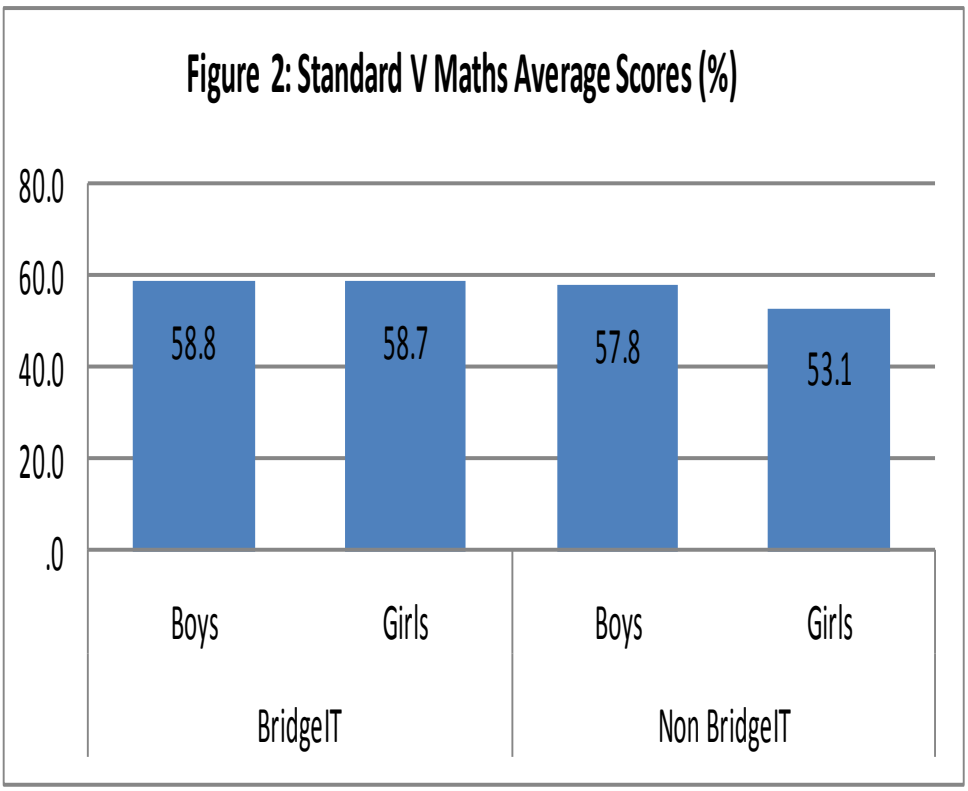
Table 5: Standard V and VI Mean Performance Scores by Gender[12]

			Standard V		*Standard VI*	
			N	*Mean*	*N*	*Mean*
Bridge IT	Male	Math	623	8.8	443	6.2
		Science	623	8.2	443	7.6
	Female	Math	777	8.8	510	6.3
		Science	777	8.3	510	8.0
Non-Bridge IT	Male	Math	215	8.7	162	6.0
		Science	215	7.4	162	7.6
	Female	Math	308	8.0	222	5.5
		Science	308	7.3	222	7.5

Prior to the pilot project, pupils' performance in beneficiary schools was mixed, but reported generally poorer than after the introduction of the project in beneficiary schools. A test of 15 science and 15 math questions was conducted in both Bridge IT and Control schools in Standard V and VI. One emerging effect of Bridge IT methodology application is the improvement of performance for beneficiaries of the pilot project compared to the pupils in the control schools especially for girls. While among the boys the difference in performance in either science or mathematics was only in Standard 5 Science, for the girls it is notably higher for Bridge IT schools in both mathematics and science and for both Standard 5 and 6 (Table 5).

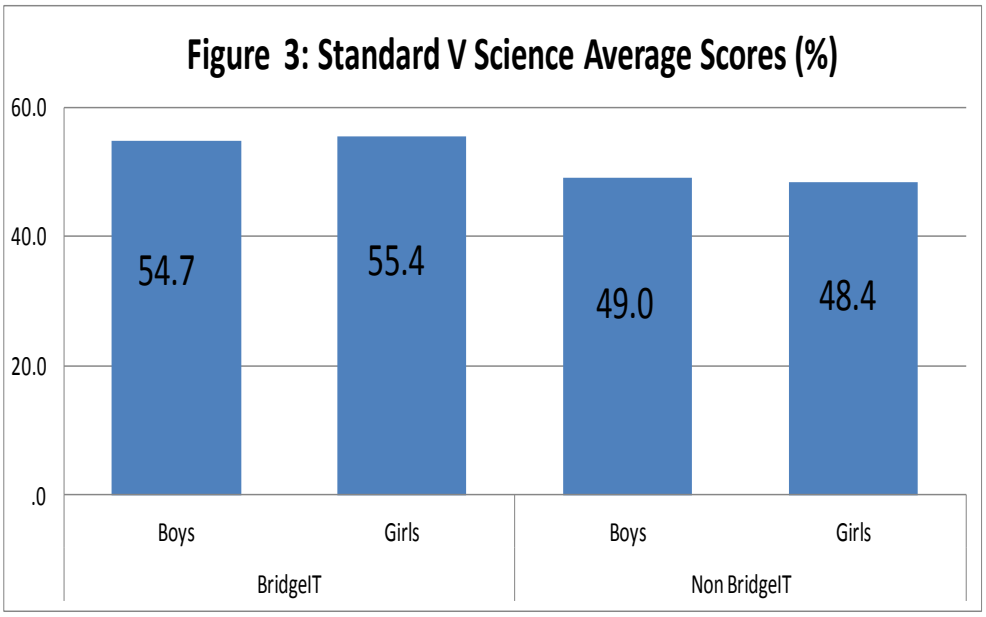
Assessment of performance by gender shows that on average (a) both males and female pupils in Bridge IT schools performed better than in the control schools for both standards V (Figures 2 and 3) and Standard VI (Figures 4 and 5), and (b) Average performance in Science and Mathematics subjects is not only higher for girls compared to boys in Bridge IT schools, but is higher compared to their counterparts in control schools, including boys and girls. In comparison, in Control schools boys' average higher performance in Mathematics and Science subjects is still registered for both Standards V and VI (see also Table 5). These differences in comparison of single gender performance for both Standard V and VI reveal a statistically significant difference in performance for girls in Bridge IT compared to Control schools (the p-values for both less than 0.05, assuming 95% level of significance) in both Standard V and VI, and for both math and science (Figures 2 – 5). For the boys, the higher performance in science and math is not statistically significant, except for Standard V science.

[12] Questions answered correctly over 15.



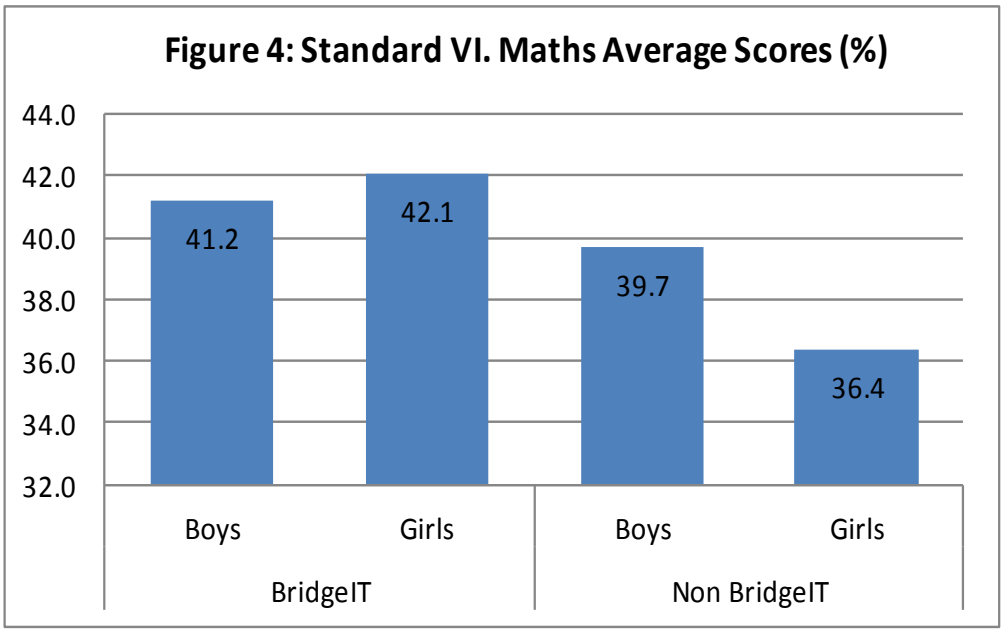
Boys (BridgeIT vs Non-BridgeIT)
t- value = 0.766; Degrees of freedom = 836; p-value = 0.444,

Girls (Bridge IT vs Non- Bridge IT)
t- value = 4.648; Degrees of freedom = 1083; p-value = 0.000



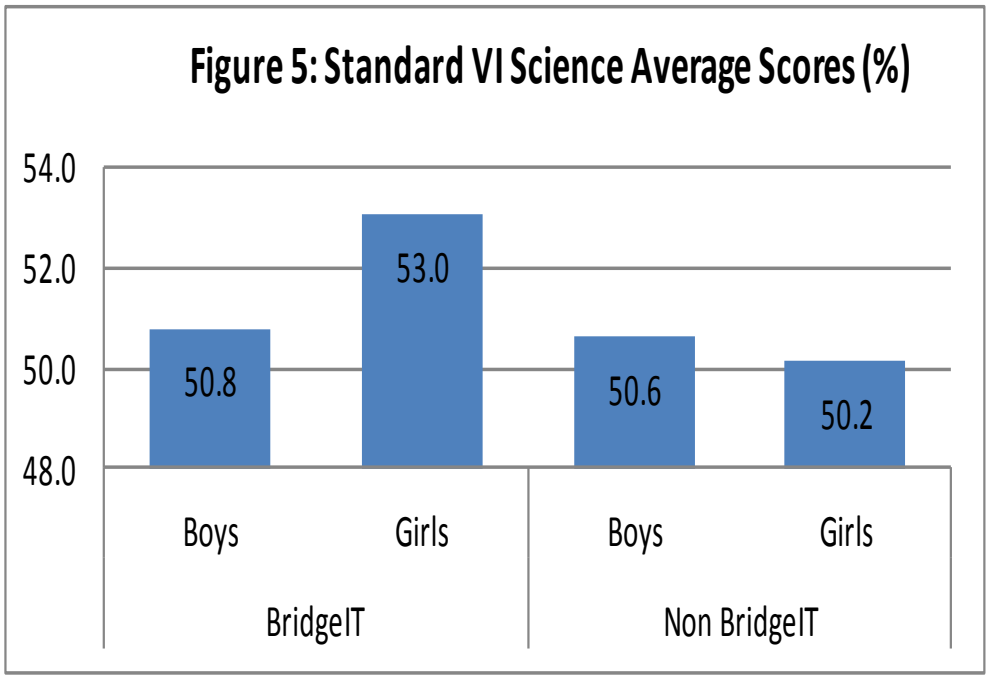
Boys (BridgeIT vs Non- BridgeIT)
t- value = 3.863; Degrees of freedom = 836; p-value = 0.000

Girls (BridgeIT vs Non-BridgeIT)
t-value = 5.725; Degrees of freedom = 1083; p-value = 0.000



Boys (BridgeIR Vs None BridgeIT)
t- value = 0.881; Degrees of freedom = 603; p-value = 0.379

Girls (BridgeIR Vs None BridgeIT)
t-value = 3.991; Degrees of freedom = 730; p-value = 0.000



Boys (BridgeIR Vs None BridgeIT)
t- value = 0.110; Degrees of freedom = 603; p-value = 0.0.912

Girls (BridgeIR Vs None BridgeIT)
t- value = 2.164; Degrees of freedom = 730; p-value = 0.031

Table 6: Standard V Mean Average performance in Bridge IT and Control Schools by region and gender (marked out of 15)								
Region	*Gender*	*Subject*	*Bridge IT*			*Control Schools*		
			n	*Mean*	*SD*	*n*	*Mean*	*SD*
Dar es Salaam	Male	Math	269	9.5	16.9	269	8.0	16.9
		Science	269	9.0	16.9	269	7.4	16.9
	Female	Math	389	9.5	17.9	389	7.0	17.9
		Science	389	8.9	17.5	389	6.7	17.5
Coast	Male	Math	32	5.8	15.4	32	8.5	15.4
		Science	32	4.7	18.3	32	6.3	18.3
	Female	Math	29	6.7	18.5	29	8.0	18.5
		Science	29	6.0	14.6	29	6.4	14.6
Dodoma	Male	Math	26	8.2	12.8	26	9.2	12.8
		Science	26	7.3	13.6	26	9.1	13.6
	Female	Math	32	7.6	11.6	32	7.9	11.6
		Science	32	7.1	15.4	32	7.8	15.4
Lindi	Male	Math	41	8.2	16.8	41	7.6	16.8
		Science	41	7.8	22.1	41	7.3	22.1
	Female	Math	35	8.1	12.4	35	7.3	12.4
		Science	35	8.3	19.7	35	5.3	19.7
Kilimanjaro	Male	Math	76	9.8	16.9	76	8.6	16.9
		Science	76	9.4	19.4	76	8.4	19.4
	Female	Math	119	8.8	20.7	119	7.7	20.7
		Science	119	8.7	20.4	119	8.0	20.4
Tanga	Male	Math	179	8.2	12.4	179	9.8	12.4
		Science	179	7.3	15.4	179	7.9	15.4
	Female	Math	173	8.0	15.7	173	9.1	15.7
		Science	173	7.4	17.7	173	8.6	17.7

An assessment of the regional differentials in performance indicates that in Bridge IT schools, on average, in both Standard Five and Six, girls performed better than boys in Mathematics in Dodoma, Lindi, Kilimanjaro and Tanga. In Standard Five, the difference was relatively high in Kilimanjaro and Dodoma, and marginal in Lindi and Tanga (Table 6). In marked contrast, performance in Standard Five for the Control schools indicates that across all regions, boys' performance is better than that of girls. In Standard Six (Table 7) boys performance in Mathematics in Control schools remains better than that of girls except in Coast, Lindi and Tanga.

Table 7: Standard VI Mean Average performance in Bridge IT and Control Schools by region and gender (marked out of 15)

Region	*Gender*	*Subject*	*Bridge IT*			*Control Schools*		
			n	*Mean*	*SD*	*n*	*Mean*	*SD*
Dar es Salaam	Male	Math	194	7.0	21.2	38	7.3	19.3
		Science	194	8.1	18.2	38	7.8	21.2
	Female	Math	201	7.1	19.6	58	4.5	12.7
		Science	201	8.7	17.7	58	7.3	14.7
Coast	Male	Math	47	4.7	13.0	24	6.7	18.9
		Science	47	7.4	18.1	24	7.2	19.3
	Female	Math	58	4.2	12.7	16	6.8	15.8
		Science	58	6.4	18.4	16	7.7	14.8
Dodoma	Male	Math	25	5.5	18.3	19	5.3	14.4
		Science	25	7.8	12.2	19	7.1	12.2
	Female	Math	35	6.3	18.2	32	4.8	10.6
		Science	35	8.1	14.9	32	7.0	13.3
Lindi	Male	Math	59	5.8	17.5	5	4.0	14.9
		Science	59	7.4	15.1	5	5.6	12.1
	Female	Math	70	6.6	17.7	24	5.3	9.8
		Science	70	7.8	16.2	24	6.8	10.6
Kilimanjaro	Male	Math	118	6.1	15.2	41	4.9	14.2
		Science	118	7.3	14.9	41	7.4	16.6
	Female	Math	146	5.4	16.7	51	4.9	11.0
		Science	146	7.6	14.9	51	7.2	16.2
Tanga	Male	Math	194	5.6	21.2	35	5.9	18.5
		Science	194	7.0	18.2	35	8.3	15.1
	Female	Math	201	6.5	19.6	41	7.5	17.6
		Science	201	7.7	17.7	41	9.1	14.3

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Within the Bridge IT schools, in Standard six girls performed better than boys in science across all regions except in Coast and Kilimanjaro. In science Standard Five girls performed better than boys in all regions except Dar res salaam, Dodoma, and Kilimanjaro, with the difference in Dar es Salaam being only marginal. In Standard Six, girls performed better than boys in science in all regions except Coast. In control schools on the other hand, boys' performance was better than that of girls in science across all regions for except in Coast, Lindi and Tanga for both boys and girls.

Qualitative interviews with teachers in all Bridge IT schools, however, suggest that teachers, district-based education officers and inspectors of the project, who undertook its monitoring, do not perceive the gender differences in performance, between boys and girls, although there is general agreement that girls have improved their performance considerably compared to the period prior to the introduction of the methods.

> *Girls seem to perform better than boys in recent years and I think I can connect that to the program …They love the subjects and they did better than the boys … They loved science subjects and, in general, those schools that were beneficiaries of the program … perform well in national exams. The only problem with Bridge IT is that they only involved few schools in the project.*
>
> Bagamoyo Education Officer

In Mdaula Primary School, teachers were of the opinion that the improvement for girls has been much more significant and their interest in learning Mathematics and Science has improved a lot. In terms of performance, formerly boys took the lead in mathematics and science examination results, but this is no longer certain and the reverse sometimes happens.

> *"Bridge IT lessons are understood by both boys and girls though the improvement for girls has been much more significant and their interest in learning Math improved a lot … Boys have benefited too as they are no longer stubborn and playful as they concentrate and understand when they are in the IT room … Formerly, boys took the lead in examination results, but now, it's the reverse. When a boy or girls precedes, the other gender comes next".*
>
> Mdaula PS Teacher

It was reported that:

- Teachers were trained to encourage the mixing of both boys and girls and to ask questions equally to both the female and male.
- Sometimes there is competition among boys and girls therefore they are separated and given an exercise so that they can surpass boys in the end the winners receive gifts.
- Video content shows no gender bias and this has encouraged participation, perception, creativity and confidence of both boys and girls.
- Girls have become smart and neat since they learn it as a subject in life skills and practice it.
- Life skill videos have also helped to provide answers to gender related questions including relationships of girls to boys; and understanding of HIV and AIDS.
- Videos that show girls taking on leadership roles or narrating and explaining within a paternalistic culture have been received positively across the board by teachers and both male and female pupils further enhancing gender related culture transformation.

As a consequence of the above, science and mathematics subjects, traditionally deemed to be difficult for girls in particular, have ceased to be the challenge they had been.

3.1.5 Classroom Attendance

Attendance of Bridge IT lessons remains high and, according to teachers, the program has led to improvement in overall school attendance for the classes (Standards 5 and 6) covered.

As observed in the 2011 Summative Evaluation report, at least two or more visits in a month to the schools, or even weekly, are necessary to assess reliability of attendance data. This was not feasible under this study or the one of 2011 for budgetary reasons. Making a record of the attendance, when taken by a teacher without verification by a researcher, is unreliable, as inflation of the records is not a rare occurrence.

3.2 Monitoring and Evaluation

In all districts, coordinators and inspectors were trained in assessing and reporting program progress, the lesson and teaching plan for the whole[14] teaching tools/ materials and methodology to be used and completion of the subject log-books,[15] and classroom observation of teacher-pupils' interaction. Initially, a team of three individuals from IYF, FAWE and MoEVT monitored the progress of the teachers and the program. Regional meetings of teachers addressed implementation challenges and discussed lessons learned. Each district appointed one school inspector to be their Bridge IT focal person.

Table 8: Support to Teachers

QN	*Description*	*BIT 2011*	*BIT 2013*[13]
6	Receives appropriate support from head teacher and colleagues	85%	88.2%
7	Shares Bridge IT resources with teachers and classes from other schools	42%	20.6%
8	Receive visits from school inspectors	97%	82.4%
9	Gets prompt responses from Bridge IT Helpdesk	91%	55.9%
10	Receives support from district inspectors	91.7%	76.5%

A Bridge IT Help Desk was also established to respond to teachers' challenges and questions, classroom strategies, peer training, use of the lesson plans and other project-related areas. During project implementation, coordinators received funds to facilitate monitoring and, accordingly, 100% of the teachers in the 2011 Summative Evaluation reported they received support visits from inspectors. Supportive supervision from the Bridge IT help desk and inspectors had declined considerably by the time of this study (Table 8).

Annual performance monitoring was conducted since 2008 by international and local experts, and findings helped to strengthen project implementation. Thus, external and internal evaluation

[13] A total of 44 teachers were interviewed

[14] The subject preparation with regard to a particular topic.

[15] That shows the records of when the teacher started teaching a particular topic and when it was finished and hence ensures teacher's accountability, as well as helping to fill in for a teacher that gets an emergency where his/her fellow teacher can assist to teach on their behalf.

of the program was undertaken in the course of Bridge IT implementation by individuals and groups, including Bridge IT professionals, the MoEVT and researchers[16].

3.3 Sustainability

Assessment of the enduring content of teacher training reveals that, between 2011 and the final evaluation time, there has been limited decline and, in some cases, improvement in the manner in which teachers in Bridge IT schools conduct their lessons. Nearly 90% of the classroom observations show that teachers speak so that all pupils in the class or groups could hear, maintain eye contact with class or group, speak to the children in a motivating manner, use the normal vocabulary students know and call out student's names, listen carefully to all students and encourage introvert students to speak out (Table 9). On the other hand, there are areas that require improvement including a decline in form of posters and illustrations on the wall which have declined from 73% of classrooms in 2011 to 44% of classrooms currently, children's work in the classroom has declined from 67% to 24% and the sitting arrangement to allow for ease of movement and interaction among pupils and between the pupils and teachers (Table 9). The cause of the latter are not clear, but it is an area that will require intervention from coordinators and subsequent training. Others stakeholders may need to be included, such as expanding the number of classrooms or changing and modifying furniture to allow for ease of group work.

Table 9: Teacher Communication

Description		*2011 BIT*	*2013 BTLS*[17]
The Teacher …			
QN 47	Speaks so that all pupils in the class or group can hear	97%	88.2%
48	Maintains eye-contact with Class or group	97%	88.2%
49	Speaks to children in a motivating manner	100%	88.2%
50	Talks to the children using simple language that most children understand.	97%	88.2%
51	Communicates in the local language students can understand	6%	47.1%
52	Knows and calls out students' names	85%	82.4%
53	Writes legibly on the blackboard so all students can see & understand	94%	88.2%
54	Listens carefully to all students	85%	88.2%
55	Encourages shy students to participate by calling on them.	76%	85.3

[16] From USA and South Africa, and later professors of this program from Philippines.
[17] A total of 44 teachers were interviewed

3.3.1 Changing attitudes to sciences and math teaching

Teachers reported that demand for Bridge IT video teaching remains high. Satisfaction with the teaching job among Bridge IT teachers has grown from 71% to 79% and similar trends are noted with regard to satisfaction with school facilities, which have increased over the last 2 years, from 43% to 53%. The satisfaction with the Bridge IT education model, in general, has improved, from 76% to 91% of all the Bridge IT teachers (Table 10).

Table 10: Classroom environment

QN	*Description*	*2011*	*2013*[18]
Teacher Satisfaction			
16	With job	36%	79.4
17	With school facilities	33%	52.9%
18	With Cell phone and video equipment	70%	73.5%
19	With Bridge IT education model	82%	91.2%
Class interactive and pupil activities			
20	Posters and illustrations on the wall	73%	44.1%
21	Display of children's work in the Classroom	67%	23.5%
22	External noise does not interfere with communication and classroom	69%	67.6%
23	Cooperative atmosphere between students and teacher	97%	91.2%
24	Adequate light for pupils to see blackboard and read books	100%	91.2%
25	Pupils have an unobstructed view of the television	70%	52.9%
26	Posters/diagrams on the walls, have a gender balance	61%	29.4%
27	U-shape seating arrangement	97%	29.4%
28	Seating arrangements can be altered to encourage group work	97%	50%
29	Classroom clean and tidy floor	82%	73.5%

The demand for the project from the non-participating schools within the selected Bridge IT districts is high, both within the public and private sector, though both the demand and response has differed from district to district, according to education officers and inspectors. Likewise, qualitative assessments show that there is increased demand and support for the Bridge IT model from pupils and schools who are out of the pilot project. Control schools are demanding for the extension of the program to their schools. From the beginning of the project, some schools needed this program and they were able and willing to buy generators or to install solar power, but they were told that was not possible to be included in the project at the time.

Within all Bridge IT schools, other subject teachers and classes, not using the Bridge IT methodology, are calling for the methodology and pupils of those classes to be taught using the methodology:

> *"Because when they are taught, they watch videos and listen. For example, teaching the blood circulation system using this becomes easy for the students to understand".*
>
> Teacher, Ilala

[18] A total of 44 Bridge IT classroom observations made

3.4 Challenges

Progress and sustainability of the program has been mixed. In a few schools (4/18 studied), the technology, including telephones and TV sets, are not used as much as before. In one of the 18 Bridge IT schools studied Bridge IT trained teachers have stopped using the methods, while in three schools teachers have since been transferred to schools or posts that have nothing to do with the project. However, the main challenges that is affecting sustainability of implementation of the Bridge IT project is equipment breakdown and inadequate repairs, inability to sustain supplies of videos and inadequate monitoring and supervision after the closure of the project. Others include inability of some communities to make effective contribution to support the project. In Dar es Salaam, also there was a high number of students in classrooms and demand more attention to infrastructure expansion.

3.4.1 Monitoring and supervision

As of the time of evaluation, project funding had stopped and the government's usual school inspection budget did not effectively accommodate the regular inspection as was the case under the project. The key informant interviews with both teachers in schools and district level officers reported lack of effective supportive supervision as a key barrier to sustainable teaching using Bridge IT methodology. Thus, in this evaluation, only 82% of the teachers reported getting support visits from inspectors compared to 97% in 2011 and 77% received support from monitoring visits by coordinators and inspectors from the district headquarters compared to 92% in 2011 (Table 8).

Table 11:Classroom Observation: Facilities and materials

		Type of School	
Description		*2011*	*2013*[19]
30	School has adequate storage space for teaching/ learning materials	85%	58.8%
31	Each child has enough space to work	88%	67.6%
32	Classroom has a working TV to videos	88%	79.4%
33	Cell phone has a functional security cable	91%	73.5%
34	Classroom has a functional cell phone hooked up to TV	88%	55.9%
35	Materials for enrichment and extra help (ref. books, maps, diagrams) available.	58%	38.2%
36	All children have note books or slates	61%	73.5%
37	Enough textbooks available for each child	34%	23.5%
38	There is a useable blackboard and chalk	100%	91.2%

Both teachers in schools and district level officers reported lack of effective supportive supervision as a key barrier to sustainable teaching using Bridge IT methodology. Results of the decline in supportive supervision are indicated in the decline in application of methods in this evaluation compared to 2011 (Table 10) and a notable decline in the reported number of teachers that are receiving response from the Bridge IT help desk and sharing resources.

3.4.2 Facility and equipment decline

Despite the high enthusiasm by teachers and pupils for usage of the methodology, classroom observations of Bridge IT facilities show a general trend in the decline compared to the time of

[19] A total of 44 Bridge IT classroom observations made

the Summative Evaluation of 2011 (Table 11). In the classroom observation, it was noted that compared to the 2011 summative evaluation equipment failure has adversely affected about 20%-25% of the teachers and classroom operations in Bridge IT schools (Table 10). Coupled with equipment failure, power cuts and failure of the cell phones to charge, has been a challenge to most Bridge IT schools. Several schools reported equipment failure and inadequacy of replacement system as a challenge. Lack of an efficient repair mechanism for equipment compounds the challenge. In this study, four of the 18 Bridge IT schools covered had either a television or cell phone not working, because of lack of repair or replacement for a minor part.

In some schools, teachers have adopted innovative approaches to meet this challenge. For example, in three schools where the network cable got spoilt or stolen, the alternative was to use CDs/DVDs before obtaining a replacement. However, in the absence of clear instructions on what to do in case of equipment breakdown and lack of response from the central coordinating authority, a lot of this depends on individual school administration and the teacher's initiative. However, the CDs/DVDs take long time and also have poor audio-visual output.

3.4.3 Infrastructure

Inadequate infrastructure applies in particular to Dar es Salaam where there is limitation in classrooms to accommodate the number of pupils. The government recommends a maximum of 40 pupils per class; Bridge IT methodology requires a change in seating arrangements to a U-shaped form to enhance visibility, pupil-teacher interaction and group participation. However, in Dar es Salaam, in particular, there are schools with more than 140 pupils in one classroom. Moreover, in all schools there is one Bridge IT classroom, and teaching the three subjects for several classrooms and streams of pupils becomes a challenge. Sharing classrooms facilities not only for Bridge IT lessons but between Bridge IT covered and non-covered subjects endangers the safety of the delicate nature of the equipment. A teacher from a Dar es Salaam school reported lack of desks to sit on and the hot and humid weather without air conditioning as a practical challenge.

3.4.4 Teacher training

Challenges to teacher training were largely logistical in nature, including the tight scheduling of training activities, inadequacy of training equipment, power-cuts with no backup and phone breakdown. Others were inability of some of the trainers to use teaching aids with a large number of trainees and long distances travelled to the training events without participants getting adequate transport fare, accommodation and meals[20]. During the Korogwe, Kibaha and Mtwara training seminars transport and accommodation arrangements for trainees were also reportedly unsatisfactory.

3.4.5 Staff-turnover

Although only a few schools have been affected by teacher transfers, this is a challenge that is facing schools where Bridge IT methods have been introduced. Teacher transfers and retirement have caused interruptions and waste in the program where some of the trained teachers have either been transferred to schools where Bridge IT methodology is not applied and their

[20] A teachers monthly salary in Tanzania is about USD 150-200.

replacement have not been trained. Others, who were trained, have already retired and the new teachers have not yet been trained.

3.4.6 Content

Three key challenges were faced by teachers and schools using Bridge IT methodology with regard to subject content. First, there has been a gap in content improvement, especially after the end of the project in March 2012. Second, several topics in the curriculum are not yet available in Bridge IT videos; there are no new incoming videos or some videos are not available. Third, some videos are too short and they are not audible enough. Others have poor quality pictures and some video clips are not easily downloaded and difficult to play. As a result, teachers have been forced to repeat available videos leading to pupil fatigue and boredom. Some teachers also reported lack of synchronization of the lesson plan and videos to match with the Bridge IT methods.

3.4.7 Inadequate Community contributions

Notwithstanding the fact that one of the objectives of the project was to "deepen the collaboration with the MoEVT and local communities to build their management capacity in order to expand and enrich Bridge IT in Tanzania and lay the foundation for long-term sustainability of the project", in half of the schools assessed it was reported that local community support from community and parents towards Bridge IT project such as in meeting maintenance costs was not forthcoming. Likewise, inspectors noted lack of prioritization of the methods at district and regional administration levels. This was attributed to inadequate sensitization of the potential of the method in making positive changes in the quality of learning, teaching and gaps in policy direction towards its application.

4.0 Conclusions and Recommendations

4.1 Conclusion

4.1.1 Primary beneficiaries in the Bridge IT project including pupils, teachers.

School administrators and inspectors have noted that not only was the Bridge IT project a very useful innovation at a time when grades in primary and secondary schooling are facing a challenge but also as a means of making schooling attractive and more meaningful for pupils. Even in non-participating schools where teachers, administrators and community leadership are aware of the ongoing program, the demand for Bridge IT methodologies is high. Some local governments and private schools have suggested resourcing components of the program if only the Bridge IT materials and videos can be availed to all schools.

Program expansion has not been possible for different reasons. First it was designed as a pilot and though it has been accepted and indicated a high level of demand and considerable success especially for the girls' achievements in science and math, its future is yet to be decided between the Government of Tanzania and her partners. Second, without funding and support and follow-up from the central government there is limited motivation at the district level to scale-up the methodology. But the majority of schools (14/18 in this study) are identifying innovative ways of sustaining the Bridge IT methodology.

4.1.2 Lessons learned in implementation of Bridge IT

This study was conducted 18 months after the end of funding for the project in March 2012. In effect it's an assessment of the sustainability of the Bridge IT methodology beyond development partner support. The sustainability of Bridge IT methods depends on access and durability of the technology, adequate and sustained supply of videos, the ability of the MoEVT to maintain quality supportive supervision for teachers and implementing schools

Bridge IT has proved a highly popular model among pupils and teachers. Despite setbacks in form of reduced supportive supervision, and lack of fresh videos after the end of the project funding 18 months prior to this evaluation, teachers continued to apply the methodology, students' participation and attendance had not fallen. An assessment of the frequency and state of application of Bridge IT methodologies among trained teachers in a sample of 18 studied schools revealed that in most schools, mathematics is taught using Bridge IT methodology throughout provided the topic being covered is available in the videos and other materials of the project. Mathematics is taught everyday of the week. Science is taught about twice every week and the application of Bridge IT methods in both subjects depends on the availability of videos covering the topic. Life skills as a subject taught using Bridge IT methodology is in fewer schools (less than a quarter of the Bridge IT schools covered in this study). For these subjects, in all schools, except one school in Dar es Salaam, all teachers expressed willingness and demand to have the subjects taught using Bridge IT methods. Even where access to the Bridge IT room is limited, teachers reported having to defer their lessons to well after the timetable schedule, for the purpose of having unlimited access to the facilities.

The time lag between the end of the project and the time of this study notwithstanding, between 62% and 74% of Bridge IT classrooms continue to use the available videos and methodologies as provided while the project was active. There is also a push factor from pupils that have accessed Bridge IT methods. It was reported in about two-thirds of the schools that teachers find a problem reverting to traditional methods of teaching as pupils dislike being taught with traditional methods. So when there is technological failure or videos are not available, it becomes a big problem to teach pupils who hate the traditional method.

4.1.3 Benefits of Bridge IT Project methodology

Use of the Bridge IT methodology several attendant benefits and lessons from the perspective of teachers, education officers, inspectors and Bridge IT coordinators as explained in the different key informant interviews summarized below. The challenges to the program are presented in Chapter Three of this report. The benefits of the program, several of which are supported by evidence from Chapter 3 and the rest drawn from discussions and interviews with primary beneficiaries include:

(a) Enhancing understanding of subjects: Pupils see the reality of things, remain attentive while teaching is ongoing, understand the subject much faster, easily and clearly, conclude earlier and keep memory of what they see. This has in turn made subjects taught more enjoyable and boosted their performance. Pupils who view and discuss the videos understand and are able to memorize them better than those who do not. The same applies to hitherto poorly internalized subjects and topics such as AIDS, which has led to the reduction of stigmatization of AIDS among pupils. In one school in Dar es Salaam, the topic on geometry was very well understood and helped pupils to make their own shapes easily by using boxes.

Reports from Inspectors and teachers further reveal that across all schools in the study where Bridge IT methodology has been adopted, levels of performance have increased as revealed in a test to Bridge IT schools and control schools where Bridge IT schools are generally performing better and pupil-motivation to learn has increased (Figures 1-4). In one school in Temeke district the pass rate in Science has increased from 83% to 95%.

> *"The method stimulates pupil participation during teaching, pupils have become creative; the teaching and learning process becomes interactive. Pupils have become more attentive, there is tranquility in class and pupils' creativity and intuition is high"* (Teacher Msolwa PrimarySchool, Bagamoyo).

(b) Enhancing confidence among pupils: In Bridge IT implementing classrooms pupils' confidence has increased. The fact that generally Bridge IT pupils performed better than the control school counterparts and that girls in Bridge IT schools in particular had more significant better performance than their counterparts in control schools provides preliminary evidence of the significance of Bridge IT methodology in enhancing pupils' confidence and assertiveness. Teachers' interviews and attitudes indicated that:

> *"… both girls and boys are more assertive and probe a lot in class … pupils now believe in themselves and their ability to express themselves has increased …the level of response to oral questions has risen … the spirit of working hard in class activities has become high and success in examinations has increased*

considerably and … slow learners capacity to participate is enhanced and they fully participate through listening and watching videos."

(c) Changing perceptions of difficulty of subjects: Key informant interviews with teachers and inspectors in all districts indicate that perception of science and mathematics subject as being hard among the pupils has been reversed and the penchant for these subjects has been boosted increasing the popularity and consultation with Bridge IT teachers. As one math teacher from Bunge Primary School in Ilala District noted:

"Children usually come to my office to remind me of class time, this shows that children are eager to learn".

In Ilala Primary School, Ilala District a teacher reported that:

"Pupils from other classes are not taught using Bridge IT methodology so they tend to watch through the windows, for example, if they see how their fellows express themselves they wish also to be part of the class and express themselves as well."

(d) Reduction of truancy (absenteeism): Absenteeism has reduced because pupils like Bridge IT videos and they don't like to miss class or else they miss the videos and lessons. For example Masoko and Kivinje primary schools reported school attendances prior to the introduction of Bridge IT were low but after Bridge IT Project attendance has increased

.

(e) Understanding life skills as a subject: The Bridge IT project has enhanced the quality of teaching and learning life skills as a subject at primary level. Some teachers reported it is the only program which is focusing on supporting teaching life skills to students at primary schools. In primary schools where the subject is taught, its popularity is such that (i) students remind the teacher of the time for learning (ii) where it is scheduled for teaching after the school has closed students are willing to stay at school to learn (iii) Bridge IT teachers of life skills in particular are consulted more by the pupils who open up to them whenever there is a problem rather than other teachers (iv) Teachers report that pupil's anti-social habits such as quarreling, fighting and theft have decreased. (v) Pupils attending the Bridge IT methodology are able to sit, discuss, help, teach and educate each other on specific topics even when the teacher is absent from class.

(f) Enhancing pupil's ability to use technology: Pupils can now operate the teaching and learning technology introduced by Bridge IT. This is particularly significant for pupils hailing from poorer backgrounds whose access to technology at home is limited.

(g) Reduction of Teachers' burden: Bridge IT methodology reduces the burden to the teacher because the videos prove sufficient in enabling pupils to understand the covered topics. This has reduced the teachers' burden for preparatory work including preparing teaching aids and verbal communication. Teachers listen and watch videos instead of reading the books, writing on the blackboard and teaching at the same time. In addition the method encourages the use of participatory learning and teaching enabling many pupils to learn simultaneously.

(h) *Teacher to teacher cooperation:* Teacher training and the project strengthened positive relationships among trained Bridge IT teachers and promoted cooperation as teachers exchange videos and ideas on teaching and trouble shooting on a day-to-day basis. Across the board teachers report the Bridge IT methodology simplified work through the use of the videos and cell

phones; enhanced teacher-pupil interaction and cooperation and enabled teachers to access to a package of materials for teaching including materials, lesson plans.

(i) Improving Pupil progressive assessment and addressing challenges: With Bridge IT methodology a teacher's time is liberated to enable monitoring of pupils performance. Currently, a teacher is sure that the pupils have understood after showing the video.

(j) Expansion of teachers' knowledge base and expertise: Through training the teacher's expertise to apply technology in teaching and their daily lives has been tremendously improved. In the course of viewing the videos and applying them as well as participatory exercises with pupils, teachers' understanding of the subjects they teach has been boosted.

> *"As teachers, we get access to new knowledge that was unknown before and clarity about stuff that was only known theoretically or vaguely."*
>
> Teacher, Kilongwe Primary School, Mwanga District

(k) Improvement of Teacher-pupil relations: The training has to a large extent improved teacher-pupil interaction; it facilitates cooperation between teachers and pupils and teachers are better liked by pupils. More than 85% of all Bridge IT teachers showed positive communication skills on most aspects of classroom practices (Table 11).

(l) Ease of Applying Bridge IT: The Bridge IT methods correspond with the curricula in the subjects covered by the methods. This does not only simplify teaching activity but also makes integration into the science and math lesson planning easy.

4.2 Recommendations

This pilot project has demonstrated that teachers and pupils can quickly adopt the use of technology in teaching and learning in resource poor settings of Tanzania. However, to sustain this methodology and scale it up, calls for policy direction and sustained government commitment to investment. It also requires mobilizing stakeholders at all levels (national, regional, municipal and district councils) to understand the benefits of the program. Government and her partners will also need to harness the potential of the private sector investors towards supporting the high costs of initial investment in primary education for life-long gains of working with beneficiary pupils and teachers. Thus policy direction is critical as a basis for expansion of the program beyond the pilot phase and resource injection to ensure the necessary changes in the system and the realization of benefits.

However, for this to happen, challenges outlined in Chapter Three need to be addressed and the program further improved. Recommended changes by teachers, inspectors and education officers include:

(a) Financing Bridge IT: The central government should finance the program within the Primary Education Development Program (PEDP). This is likely to involve the Ministry of Education working together with other ministries such as PMORALG[21] to ensure faster implementation of the program. A formal engagement in form of meetings, a workshop or both between government and her partners should be organized to discuss the future of the Project. Such a

[21] *In Swahili abbreviated as TAMISEMI*

meeting should also identify aspects of leveraging the support of local councils, ward executives, parents and the private sector in contributing to technology expansion in the schools as well as other means of support to the program.

(b) *Class for commencing of Bridge IT:* Bridge IT teaching methodologies should be used from standard one to the end of primary schooling[22].

(c) *Facilities, equipment and Furniture:* Class furniture should be improved with tables and chairs replacing fixed benches and desks to allow for re-organization for group discussions and U-Shape arrangements. In some schools, laboratories will need cabinets to keep files and equipment such as cell phones and remote controls. In addition, stable power sources including solar, inverters should be provided either as the primary or backup once there is a power cut. There should be a solar power to schools with no electricity supply. In the long run, equipment should be improved and every class should start using its own TV and Mobile set. Alternatively, DVD, CD or flash players, which are more easily available, should be used rather than phones, and if possible introduce projectors other than TV sets. In addition, for a program of this magnitude, it is inevitable that equipment will break down and repairs will be necessary. Considering the number of people affected when equipment breaks it is important to have in place an efficient 24-7 repair company to fix telephones, television sets and power supply equipment. This is an aspect that needs to be emphasized as it caused concern in a number of schools where Bridge IT methodology was applied.

(d) *Expansion to non-participating schools:* Some districts are in position to purchase cell phones and television sets for their schools which have electricity. But there are many schools that are not on the national grid which will need to be supported with solar power. Other schools cannot afford to pay electricity bills. The MoEVT promised to supply cheap telephones, which can be able to download the videos, but delivery on the promise remains outstanding. While several district councils may be in position to pay for electricity and support the program, they need to be sensitized to make the program a priority.

(e) *Teacher Training:* Teacher training needs to be progressively improved with new topics as technology changes and new global developments occur daily. There is a need for training of new teachers and re-fresher training not only to fill gaps created by transfers and promotions but also if the program is to be expanded to cover more classes and schools. One of the challenges in the pilot phase was for Bridge IT teachers to be required to use their meager resources to facilitate transport and accommodation during the training. This puts a strain on teachers and the program school or district administration should provide for in-service teacher training within the budgets as a priority.

(f) *Coordination and Monitoring*: Initially as the program enters the expansion phase there will be a need for close physical supportive supervision in all implementing districts. However as the program takes hold and teachers and coordinators skills for online reporting improve this cost should reduce considerably. Some of the district councils lack vehicles or fuel and allowances for initial coordination and supportive supervision. The government and her partners should provide the necessary logistical support to district councils to ensure effective implementation of the program.

(g) *Content:* Teachers and school administrators recommend that (i) more subjects should be included, for example: Geography, History, English, Civics, Social Skills, and ICT[23]. (ii)

[22] *This recommendation was given by several head teachers and teachers although some recommended the starting of the methods in Standard III*

[23] In Swahili abbreviated as TEHAMA

Regarding videos and the content it was recommended by teachers that colored videos should be used more; all videos should correspond with the reality of Tanzania circumstances and there should be less cartoon videos; more videos should be supplied and changed from time to time as children get tired of them; Discussion questions should be included with the videos so that teachers should not have to entirely use their own questions to give to pupils. (iii) The lesson plan should be comprehensive but also give teachers room for modification. There should be more communication and exchange of content and discussions among those schools that have Bridge IT program to assess the promising performers and exchange ideas for improvement.

(b) *Performance Assessment:* While this study and its predecessors in 2011and 2009 included pupils cognitive assessment of the subject content in Mathematics and Science as at the time of study, the ultimate goal of investment in the Bridge IT project is to increase understanding and performance in the covered subjects. The best way of doing this is to make a follow-up of students performance at the end of the primary school cycle and tracing those students that were exposed to Bridge IT methodology or not and finding out how many enrolled in Secondary schools and still do well in these subjects. Though falling out of the scope of this evaluation, such a study will reveal the ultimate value of investing in learning through the use of technology.

Annex 1: Scope of Work

SOW: Performance Evaluation of Bridge IT Cooperative Agreement #621-A-00-07-00018-00 Evaluation service to USAID Bridge-IT project in Tanzania

Purpose

USAID/Tanzania requires contractor to perform an **end of program** evaluation of the Bridge*it* project. The primary purpose of the evaluation is to assess the project's effectiveness and efficiency in improving teachers and student's performance in mathematics, science and life skills; assess institutionalization within MoEVT and assess potential for replication in other districts of Tanzania based on the evidence provided. The evaluation will address the following;-

(i) Assess the extent to which targets for the project objectives and /intermediate results were achieved over the project's four-year time frame.
(ii) Evaluate whether Bridgeit project provided an opportunity to improve teaching/learning methodologies in schools.
(iii) Examine the extent to which gender issues were incorporated into the project including women's empowerment such as improving teacher performance (for objective two) and increased learning gains with emphasis for girls.
(iv) Highlight and document challenges and lessons learned during implementation (including any innovative strategies and interventions) that resulted from Bridge*it* project.
(v) Explore the level of success of program interventions and provide lesson learned in the use of Bridge*it* in the school curriculum.
(vi) Assess whether or not the resources were used in a responsible way.
(vii) Assess any unintended results (positive or negative)

2: Program Background

In September 2007 the International Youth Foundation (IYF) was awarded a cooperative agreement by USAID/Tanzania to implement the Bridge*it* program in Tanzania, after a successful initial implementation of the Bridge*it* program in the Philippines. In Tanzania, IYF is implementing Bridge*it* in partnership with the Ministry of Education and Vocational Training (MoEVT), the Forum for African Women Educationalists (FAWE), the Nokia Corporation, the Nokia Institute for Technology (INdT), the Pearson Foundation and Vodacom Tanzania. The main goal of the Bridge*it* program is to significantly increase the educational quality and achievement among the students at primary school level in mathematics, science and life skills through the innovative use of cell phones The project has reached over 15,000 students and has been implemented in 150 schools across the country. The program continues to improve educational quality through close collaboration with the MoEVT and other stakeholders to integrate Bridge*it* into the education system in a cost effective way and to include significant capacity building activities for transferring skills.

Overall Program Objectives:

- *1:* To deepen the collaboration with the MoEVT and local communities to build their management capacity in order to expand and enrich Bridge*it* in Tanzania and lay the foundation for long-term sustainability of the project;

- *2:* To create a system for integrating Bridge*it* approaches into Tanzanian primary school classrooms to improve teacher performance, as determined by changes within the quality of interaction and teaching and learning in the classroom
    - *Teacher performance will improve by a statistically significant margin, as determined by the Teaching and Learning Quality Assessment instrument, which measures quality of interaction and instruction.*

- *3:* To increase learning gains among Standard V and VI students in Mathematics, Science, and Life Skills in Bridge*it* classrooms, with a particular emphasis on girls.
    - *Standard V & VI students' learning gains in math, science, and life skills will increase by a statistically significant margin.*

3: Performance Information Sources

The contractor shall review all existing project documents and reports - including:

(i) USAID Approved Basic Education Indicators
(ii) Bridge*it* Annual Implementation Plan.
(iii) Bridge*it* Quarterly Reports
(iv) Bridge*it* Performance Monitoring and Evaluation Plan.
(v) Bridge*it* internal evaluation
(vi) Baseline information

These documents will be provided to the successful bidder by the COR.

4: Methodology

The contractor will review all available documentations, and assess their performance in achieving targeted goals. The contractor should generate the highest quality and most creditable evidence that corresponds to the evaluation questions being asked. Available data to be provided to the evaluation team are enlisted under performance information sources.

In addition, the contractor will also need to gather data from interviews, new surveys, or other proposed methods to triangulate findings. The contractor will be required to develop an evaluation design and data collection methods; using a mixed methods approach to gather both quantitative and qualitative information that is based on sound social science methods and tools used in a manner to minimize potential biases. Furthermore the contractor will be required to develop a gender responsive evaluation design and data collection methods. The proposed evaluation design and data collection methods will be submitted to USAID/Tanzania 5 business days after signing of the task order in the consultative meeting.
The evaluation team will need to closely coordinate with the COR for the logistics in the fieldwork. The contractor will be responsible for scheduling its own appointments, hotels, etc. USAID/Tanzania will offer limited support including contact information for primary implementers, and a list of officials to interview. The review intends to answer some of the following questions:

Capacity of the MoEVT to maintain and expand work

(i) What can be learned from the design and implementation of Bridge*it* program as a low cost model? (Do the curriculum/materials comply with MoEVT guidelines for ICT?)

(ii) Were there any synergies or linkages with other parties' e.g., USAID-supported programs?"

(iii) Have project activities been appropriate and effective in contributing to improved capacity of the school management committees to strengthen community participation?

(iv) Were the technical areas of Bridgeit project appropriate for follow-on programming? If not what were the gaps and why?

Teacher Training support

(v) How effective was the interventions in reaching/achieving the program intended objectives?

(vi) Did the project succeeded in improving technical and management capacity of teachers?

(vii) Were there any notable improvements in performance? State how the situation was before and after the project with particular reference to girl's results.

(viii) Highlight and document challenges, lessons learned and best practices (including any innovative strategies and interventions) that resulted from the Bridge*it* program and pupil performances.

Teachers and students performance results

(ix) Were there any notable improvements in performance? State how the situation was before and after the project with particular reference to girl's results.

(x) Highlight and document challenges, lessons learned and best practices (including any innovative strategies and interventions) that resulted from the Bridge*it* program and pupil performances.

Gender equality and women's/girls' empowerment

(xi) What change or impact did the program had in addressing gender equity?

Relevancy

(xii) To what extent did the Bridge*it* activities and outputs consistency with the overall goal and objectives?

(xiii) Were the activity costs as planned or did they exceed or were they lower than expected and why?

The evaluation shall provide an opportunity for the involvement of key stakeholders of the project such as District Education Officers, parents, school teachers, communities and other key officials involved in the program. It is expected that the findings of this evaluation will be based on the views of the project stakeholders, available data and other project information.

Field visits: The project was implemented in seven regions of Tanzania Dar es Salaam, Pwanial, Lindi, Mtwara, Dodoma, Tanga and Kilimanjaro. The Contractor will be supposed to visit at least four regions and ten selected districts supported by the project in coordination with USAID. The selected districts will included a representative sample of Urban and Rural districts and should represent variety along the following dimensions: geographical location; technical focus of activities. The COR shall provide assistance when required to arrange for meetings at National and regional/district level.

Where possible the Contractor will be accompanied by a staff member from USAID/Tanzania. The site visits will involve interviews with both Regional and District education authorities including Regional/ District Education Officer, Heads of schools, teachers, parents and pupils. The purpose of these site visits in addition to seeing the program implementation is to gain a better understanding of the degree of coordination, collaboration with Government at national and district levels.

5. Evaluation Contractor Composition Qualifications and Participation

The contractor will provide a team of consultants with one serving as a Team Leader who will coordinate the overall evaluation effort and be responsible for editing and compilation of evaluation report. At least one member of the team will have an advanced degree in either field of education or monitoring and evaluation with a minimum of five-year professional experience in project evaluation and monitoring, project design and implementation, education, and community mobilization. Gender mix and gender analysis skills (e.g. on gender equality, women's girls' empowerment, constructive male involvement to support the process etc.) will be an added advantage to the evaluation team. Also care should be taken to ensure that evaluators have no potential biases or vested interest in the evaluation outcomes. At least one member of the team must be fluent in Kiswahili.

6: **Deliverables**
The contractors shall provide the following deliverables;-

(i) A Work Plan
The work plan, which will be due to USAID/Tanzania for review and approval within 5 days after signing the contract, will contain a detailed schedule of activities including a detailed outline of responsibilities for each contractor. It will also specify which proposed sites will be visited during the field portion of the evaluation.

(ii) Along with the work plan, the contractor shall also provide USAID the draft travel agenda.

(iii) **Evaluation Design, Methodology and tools.**

Final draft of evaluation design tools will be submitted and discussed at the consultative meeting for approval three days after signing the contract.

(iv) Reporting procedures and standards:

Contractors will submit a quality draft report to USAID/Tanzania for review and comments, five business days prior completion of evaluation The evaluation report shall have the following criteria;-

The evaluation report should represent a thoughtful, well-researched and well organized effort to objectively evaluate what worked in the project, what did not and why.

- Evaluation reports shall address all evaluation questions included in the scope of work.
- Evaluation methodology shall be explained in detail and all tools used in conducting the evaluation such as questionnaires, checklists and discussion guides will be included in an Annex in the final report.

- Evaluation findings will assess outcomes and impact on males and females and changes or impact in bridging identified gender gaps as per project objectives.

- Limitations to the evaluation shall be disclosed in the report, with particular attention to the limitations associated with the evaluation methodology (selection bias, recall bias, unobservable differences between comparator groups, etc.).

- Evaluation findings should be presented as analyzed facts, evidence and data and not based on anecdotes, hearsay or the compilation of people's opinions. Findings should be specific, concise and supported by strong quantitative or qualitative evidence.

- Sources of information need to be properly identified and listed in an annex.

- Recommendations need to be supported by a specific set of findings.

- Recommendations should be action-oriented, practical and specific, with defined responsibility for the action.

Format for the evaluation report should include the following;-

1. Executive Summary—concisely state the most salient findings and recommendations (1.5pgs);
2. Table of Contents (1 pgs);
3. Introduction—purpose, audience, and synopsis of task (1 pgs);
4. Background—brief overview of Bridge*it* project in Tanzania, USAID project strategy and activities implemented in response to the problem, brief description of Bridge*it* , purpose of the evaluation (2–3 pgs);
5. Methodology—describes evaluation methods, including constraints and gaps (1 pgs);
6. Findings/Conclusions/Recommendations—for each objective area; and also include data quality and reporting system that should present verification of spot checks, issues, and outcome (17–20 pgs);
7. Issues—provide a list of key technical and/or administrative, if any (1–2 pgs);
8. Lessons Learned
9. References (including bibliographical documentation, meetings, interviews and focus group discussions).

Final report will be submitted electronically and in hard copy to the COR five business days after completion of evaluation, and shall be in English, no longer than 30 pages (excluding annexes).
The report should be single spaced, Times New Roman, size 12 font in Microsoft.
References (including bibliographical documentation, meetings, interviews and focus group discussions).
All annexes including the evaluation methods, schedules, interview lists and tables should be succinct, pertinent and readable.

NOTE: USAID/Tanzania will conduct a meeting with the Consultants to provide background information, and a list of key stakeholders to interview, among other things. The contractors will also need to present the evaluation design and methodology prior to selection.

7: Time schedule

This evaluation is expected to take 35 days in total, from the day of signing the contract to the day of the submission of the final report.

Task/Deliverables Duration

Task/Deliverables	**Duration**
Review background document and developing a work plan including travel agenda.	3 days
Meet with USAID/Tanzania Education team	0.5 day
Meeting with MoEVT officials	0.5 day
Developing Evaluation design methods and tools	2 days
Data collection and analysis phase	20 days
Initial findings	3 days
Out brief with USAID	1 day
Submission of draft report	2 days
Final report preparation and submission	3 days

Estimated time span for activities in Tanzania {November - December, 2012}.

8. Evaluation Logistics:

The contractor will need to closely coordinate with COR for the logistics of fieldwork. It will be up to the team to cover its own office space, car, equipment. The team will be responsible for scheduling its own appointments, hotels, etc.

Annex 2: Supplementary Finding from Classroom Observations

Table 11: Available facilities			
QN	**Description**	**2011 BIT**	**2013 BTLS**
11	Lunch program for children (1-from community 2-from outside organization	46%	26.5%
12	Separate toilet facilities for boys and girls	100%	85.3%
13	The toilet facilities are clean (Go take a careful look!)	84%	38.2%
14	Classroom is secure (windows, watchman and doors can be locked)	91%	88.2%
15	There is reliable clean water	72%	55.9%

Table 12: Questioning skills			
QN	*Description*	*2011 BIT*	*2013BTLS*
61	The teacher gives opportunity to all students, boys and girls, to present	97%	61.8%
62	The teacher poses questions clearly and one at a time	94%	79.4%
63	The teacher provides specific useful feedback after an incorrect	88%	83.3%
64	The teacher asks questions that require more than a simple answer	85%	67.6%
65	The teacher affirms a correct oral response, probing as necessary to	73%	79.4%
66	The teacher waits sufficient time for students to respond	79%	82.4%

Table 13: Teachers practice feedback and remediation			
QN	*Description*	*2011 BIT*	*2013 BTLS*
67	The teacher moves about the classroom during class work to check students, and reduce the psychological distance	79%	70.6%
68	The teacher checks for understanding before assigning practice	64%	88.2%
69	The teacher regularly marks and provides feedback, written or verbal, on students' work.	73%	73.5%
70	The teacher can prepare activities for children of different abilities	46%	58.8%

Table 14: Grouping and group works			
QN	*Description*	*2011BIT*	*2013 BTLS*
71	The teacher sometimes works with particular subgroups of students	72%	52.9%
73	Students sometimes work independently in groups on activities	75%	64.7%
74	The teacher circulates among the groups to help and monitor activities	76%	58.8%
75	Students sometimes work in a co-operative learning group situation is distinct from working individually in small groups	79%	64.7%
76	Generally, there is gender balance in the groups organized by the teacher.	88%	58.8%

Table 15: General teaching methods			
QN	*Description*	*2011 BIT*	*2013 BTLS*
77	Verbal – linguistic (Using written and spoken words)	82%	64.7%
78	Logical – mathematical (Using numbers/abstract patterns problem	76%	82.4%
79	Spatial – visual (Using visual imageries/graphic diagrams)	70%	47.1%
80	Musical – rhythmic (Using rhyme/rhythm/repetition	50%	41.2%
81	Body Kinesthetic-movement (Using physical movement/games	55%	20.6%
82	Interpersonal – people skills (Using group, leadership, co-operative skills	79%	44.1%

Table 16: Classroom Atmosphere			
QN	*Description*	*2011 BIT*	*2013 BTLS*
83	The teacher talks to the children in a positive and friendly way	88%	55.9%
84	There appears to be a supportive learning environment in the classroom	97%	91.2%
85	The children seem to respect the teacher	97%	76.5%
86	Generally the teacher uses participative teaching methods	100%	88.2%
87	The teacher uses positive verbal and non-verbal communication	97%	88.2%
88	The children appear to enjoy being at school	100%	88.2%
89	In general, boys and girls appear to be treated equally	100%	85.3%
90	The children seem to respect their peers	97%	88.2%

Annex 3: Teacher Attitude Instruments, Teacher Interview

1. Carefully read each statement
2. Circle your answer
3. Make sure to circle only one answer
4. When finished, check to make sure you have answered all the questions
5. Enumerator will fill items 1---6 and then hand the questionnaire to the teacher

1	School Name			
2	School Number			
3	District			
4	Type of School	1---BIT 2 BIT+LS 3=Con		
5	Grade	Std.5	Std.6	5 & 6 Both
6	Gender	Male		Female
7	Have you shown Bridge IT videos in your class?43	Yes		No
8	How many days ago did you show the last video?	No. days		
9	A teacher should be serious and not joke too much?	Yes		No
10	Students should be encouraged to speak as much as possible	Yes		No
11	Only teachers should use tools and resources for demonstrations.3	Yes		No
12	Teaching boys and girls sometimes requires different strategies34	Yes		No
13	Students should only speak when called upon44	Yes		No
14	Videos can be distracting 11	Yes		No
15	Boys understand videos better than girls 38	Yes		No
16	Students should do independent group work at least twice a week 3	Yes		No
17	Students should learn how to use tools and resources 12	Yes		No
18	It is better to teach without videos 39	Yes		No
19	Boys and girls understand the videos equally well 0	Yes		No
20	Use of technology can enhance learning among students	Yes		No
21	Videos help both boys and girls to learn	Yes		No
22	Students frequently break or destroy resources	Yes		No
23	Videos work well together with other teaching aids.	Yes		No
24	Girls are more reluctant to participate in class than boys	Yes		No
25	Cell phones are unreliable for showing videos	Yes		No
26	The videos integrate well into lesson plans	Yes		No
27	Videos are just for entertainment and not for learning	Yes		No
28	Girls understand videos better than boys	Yes		No
29	Students learn better and faster with video lessons	Yes		No
30	Students learn better when they work together in groups	Yes		No
31	Boys and girls should be encouraged to participate equally in class	Yes		No

Annex 4: Bridge*it* Project Performance Evaluation

Classroom Observation (post-test)

Instructions:

- Prior to doing the observation of a complete math class and a science class, complete items 1 through 41.
- For item 13, get the enrollment figures from the teacher's class list, and then determine the number of boys and girls present for item 14; count the number of students yourself. Do not depend on what the teachers may tell you.
- For items 13 and 14, ask the teacher to show you the attendance records, so you can see if it is kept on a daily basis and mark in item 15.
- **For items 15-41, ask the teacher the questions and record the answers yourself. Do not give the teacher this form to fill out.**
- For item 22, fill in the date as day/month/year—ddmmyy
- If you do not see a particular behavior, it did not occur, so mark it as NO. In other words do not leave anything blank.

School _____number

1.	Jina la mchunguzi					
2.	Tarehe ya uchunguzi	**C2.1** Day		**C2.2** month		**C2.3** Year
3.	Jina la shule	**C3**				
4.	Jina la wilaya	**C4**_____DistNum				
5.	Mahali shule ilipo-kijijini\mjini	1=rural		2=urban (circle location)		
6.	Aina ya shule	1=BIT		2=BIT+LS		3=control
7.	Muda gani umeanza kufanya uchunguzi?	**C6.1**	Hour	**C 6.2**	min	
8.	Muda gani umemaliza uchnguzi?	**C7.1**	Hour	**C 7.2**	min	
9.	Darasa\madarasa gani yanayofundishwa?	5=standard		6=standard (circle standard)		
10.	Jina la mwalimu					
11.	Ulishawai kuhojiwa wakati wa utafiti wa awali wa mradi huu	1=yes		2=no		
12.	Masomo yapi yanayofundishwa?	1=math		2=science (circle subject)		

	Class Enrollment	**Total**	**Boys**	**Girls**
13.	Ni wanafunzi wangapi wameandikishwa darasani?(kwa mkondo unaochunguzwa tu)	**C=10T**	**C=10B**	**C=10G**

14.	Ni wanafunzi wangapi waliohudhuria leo?(Idadi halisi ya waliopo)	**C11T**	**C11T**	**C11G**
15.	Is a register of attendance updated on a daily basis	**1. yes**	**2. no**	
	Teacher Background and Qualifications			
16.	Is this teacher male or female?	**1. M**	**2. F**	
17.	Mwalimu anaishi kwenye jamii?(mwendo wa saa moja kwa kutembea)	**1=yes**	**2=No**	
18.	Mwalimu ana kazi nyingine,Kuna shughuli nyingine ya kukuingizia kipato? Taja ……	**yes**	**2. no**	
19.	Ni kwa muda gani umekuwa unafundisha?	**Years**		
20.	Una kiwango gani cha elimu? Shahada Stashahada ya elimu Daraja A Daraja B Daraja C	 **1. Deg** **2. Dip** **3. A** **4. B** **5. C**		
	Training and Support			
21.	Ulipata mafunzo ya bridgeIT?		**yes**	**no**
22.	Lini ulipata mafunzo ya bridgeIT?	**Tarehe: 22.1 dd 22.2 mm 22.3 yy**		
23.	Je ulipewa mafunzo ya kuwa mkufunzi mkuu wa bridgeIT?		**1. yes**	**2. no**
24.	Je ulipewa mafunzo ya bridgeIT na wakufunzi wakuu?		**yes**	**no**
25.	Je ulipewa mafunzo ya bridgeIT na mwalimu mwenzako (siyo mkufunzi mkuu)		**yes**	**no**
26.	Je ulishawahi kuwafundisha walimu wengine jinsi ya kutumia mbinu hii ya bridgeIT?		**yes**	**no**
27.	Unadhani kwamba mafunzo ya kutumia bridgeIT yalikuwa yanafaa?		**yes**	**no**
28.	Unafikiri mwalimu mkuu na walimu wenzako wanakupa ushirikiano stahili shuleni?		**yes**	**no**
29.	Unafikiri wakaguzi wa shule katika wilaya yako wanakupa ushirikiano stahili? ?		**yes**	**no**
30.	Huwa unatembelewa na wakaguzi wa shule?		**yes**	**no**
31.	Je unapata msaada wa haraka kutoka ofisi ya bridgeIT?		**yes**	**no**
32.	Je unatoa vifaa vyako vya bridgeIT kwa walimu na madarasa katika shule nyingine?		**yes**	**no**
	Available Facilities			

33.	Chakula cha mchana kwa wanafunzi (1- kutoka kwenye Jamii 2- kutoka mashirika ya nje)	**yes**	**no**
34.	Separate toilet facilities for boys and girls.	**yes**	**no**
35.	The toilet facilities are clean (Go take a careful look!).	**yes**	**no**
36.	There is reliable clean water.	**yes**	**no**
37.	Classroom is secure (windows, watchman and doors can be locked).	**yes**	**no**
	General Satisfaction		
38.	Je unaridhika na kazi yako? Kama ni hapana toa maelezo	**yes**	**no**
39.	Je unaridhika na miundombinu ya shule?(Majengo, zana za kufundishia	**yes**	**no**
40.	Je unaridhika na vifaa vya bridgeIT yaani simu na video na video?	**yes**	**no**
41.	Je unaridhishwa na ufundishaji kwa njia ya bridgeIT?	**yes**	**no**
	Classroom Environment		
42.	There are posters and illustrations on the wall. (either teacher's work or commercially produced)	**yes**	**no**
43.	There is a display of children's work in the classroom.	**yes**	**no**
44.	If there are posters/diagrams on the walls, do they have a gender balance?	**yes**	**no**
45.	There is a cooperative atmosphere between students and teacher.	**yes**	**no**
46.	There is adequate light for each child to be able to see the blackboard and read their books.	**yes**	**no**
47.	The children have an unobstructed view of the television	**yes**	**no**
48.	External noise does not interfere with communication and classroom activities	**yes**	**no**
49.	Seating arrangement facilitates participation by all the students (U- shape)	**yes**	**no**
50.	Seating arrangements can be altered to encourage group work	**yes**	**no**
51.	The classroom is clean and tidy.	**yes**	**no**
	Facilities and Materials		
52.	The school has adequate storage space for teaching/learning materials.	**yes**	**no**
53.	Each child has enough space to work (crowded together or have some open space for working).	**yes**	**no**
54.	The classroom has a working television to show BridgeIT videos	**yes**	**no**
55.	The cell phone has a functional security cable	**yes**	**no**
56.	The classroom has a functional Nokia cell phone with hookup to TV	**yes**	**no**
57.	There are materials available for enrichment and extra help	**yes**	**no**
58.	All children have workbooks, note books or slates	**yes**	**no**

59.	There are enough textbooks available for each child	**yes**	**no**
60.	There is a useable blackboard and chalk	**yes**	**no**
	Observation of Students		
61.	Children pay attention when the teacher gives instructions.	**yes**	**no**
62.	Children ask questions (both boys and girls)	**yes**	**no**
63.	Boys ask more questions than girls.	**yes**	**no**
64.	Girls ask more questions than boys.	**yes**	**no**
65.	Boys and girls are given equal time and attention.	**yes**	**no**
66.	Most of the children (more than 80%) participate in class activities.	**yes**	**no**
67.	All children are given the opportunity to present ideas/answers to the class.	**yes**	**no**
68.	Children who need help get that help from the teacher or their peers.	**yes**	**no**
69.	The children are given responsibility for tasks within the classroom.	**yes**	**no**
	Teacher Communication		
70.	The teacher speaks so that all children in the class or group can hear.	**yes**	**no**
71.	The teacher maintains eye-contact with class or group.	**yes**	**no**
72.	The teacher speaks to children in a motivating manner.	**yes**	**no**
73.	The teacher talks to the children using normal vocabulary that most students can understand.	**yes**	**no**
74.	The teacher communicates in the local language. (in addition to Swahili)	**yes**	**no**
75.	The teacher knows and uses students' names.	**yes**	**no**
76.	The teacher writes legibly on the blackboard so that all of the students can see and understand.	**yes**	**no**
77.	The teacher listens carefully to all students.	**yes**	**no**
78.	The teacher encourages silent students to participate by calling on them.	**yes**	**no**
	Lesson Planning and Implementation		
79.	The teacher has materials, supplies, and equipment for the lesson ready at the start of the lesson.	**yes**	**no**
80.	The teacher enters the class with a written plan.	**yes**	**no**
81.	While teaching, the teacher makes use of the available space in the classroom instead of remaining in front.	**yes**	**no**
82.	A BridgeIT video was shown during the observation.	**yes**	**no**
83.	If yes, the teacher prepared the students for the video lesson.	**yes**	**no**
84.	Upon completion of the video, the teacher carried out related activities.	**yes**	**no**

	Questioning Skills		
85.	The teacher gives opportunity to all students, boys and girls, to present Individual and group work to the class.	**yes**	**no**
86.	The teacher poses questions clearly and one at a time.	**yes**	**no**
87.	The teacher provides specific useful feedback after an incorrect, Incomplete, or non-response in a helpful way (praise, further probing).	**yes**	**no**
88.	The teacher asks questions that require more than a simple answer. (more than yes/no or a single word or number)	**yes**	**no**
89.	The teacher affirms a correct oral response, probing as necessary to enhance learning.	**yes**	**no**
90.	The teacher waits sufficient time for students to respond. (A rule of thumb—count 1 to 5.)	**yes**	**no**
	Practice, Feedback and Remediation		
91.	The teacher moves about the classroom during class work to check performance of all students, and reduce the psychological distance.	**yes**	**no**
92.	The teacher checks for understanding before assigning practice.	**yes**	**no**
93.	The teacher regularly marks and provides feedback, written or verbal, on students' work.	**yes**	**no**
94.	The teacher can prepare activities for children of different abilities.	**yes**	**no**
	Grouping		
95.	The teacher sometimes works with particular subgroups of students.	**yes**	**no**
96.	Students sometimes work independently in groups on activities.	**yes**	**no**
97.	The teacher circulates among the groups to help and monitor activities.	**yes**	**no**
98.	Students sometimes work in a co-operative learning group situation. (This is distinct from working individually in small groups.)	**yes**	**no**
99.	Generally, there is gender balance in the groups organized by the teacher	**yes**	**no**
	General Teaching Methods		
100.	Children experience a variety of activities in the different learning styles so they can actively involve at least six of their intelligences.	**yes**	**no**
101.	Verbal – linguistic (Using written and spoken words)	**yes**	**no**
102.	Logical – mathematical (Using numbers/abstract patterns problem solving)	**yes**	**no**
103.	Spatial – visual (Using visual imageries/graphic diagrams)	**yes**	**no**
104.	Musical – rhythmic (Using rhyme/rhythm/repetition)	**yes**	**no**
105.	Body Kinesthetic-movement (Using physical movement/games)	**yes**	**no**
106.	Interpersonal – people skills (Using group, leadership, co-operative skills)	**yes**	**no**
	Classroom Atmosphere		
107.	The teacher talks to the children in a positive and friendly way.	**yes**	**no**

108.	There appears to be a supportive learning environment in the classroom.	**yes**	**no**
109.	The children seem to respect the teacher.	**yes**	**no**
110.	The children seem to respect their peers.	**yes**	**no**
111.	The teacher uses positive verbal and non-verbal communication.	**yes**	**no**
112.	The children appear to enjoy being at school.	**yes**	**no**
113.	In general, boys and girls appear to be treated equally.	**yes**	**no**
114.	Generally the teacher uses participative teaching methods.	**yes**	**no**

Below write a brief narrative about the class you just observed (include teachers' comments if any):

Annex 5: Tests Administered to Students, Standard V

SEHEMU A: Mtazamo wa Mwanafunzi

Soma maelezo yafuatayo kwa makini na kisha chagua jibu sahihi kwa kuzungushia neno Ndiyo au Hapana au kuandika idadi ya siku ama filamu (video)

	Darasa	DRS.5	DRS.6
1.	Je, wewe ni mvulana au msichana?	Mvulana	Msichana
2.	Umeshawahikuonafilamu(video)ikitumikadarasani?	Ndiyo	Hapana
3.	Kama ni ndiyo, umeshawahi kuona filamu (video) ngapi?	Idadi	
4.	Kama ni ndiyo, ni siku ngapi zimepita tangu uone filamu(video) ya mwisho?	Idadi ya	
5.	Wazazi wangu ndio husababisha niende shuleni lakini mimi sipendi kwenda.	Ndiyo	Hapana
6.	Napenda kucheza michezo shuleni	Ndiyo	Hapana
7.	Filamu(video) zinazotumika darasani hunichosha.	Ndiyo	Hapana
8.	Kufanya kazi na wanafunzi wenzangu hunisaidia kuelewa vizuri zaidi.	Ndiyo	Hapana
9.	Ni mara chache sana mwalimu hunitaja jina darasani.	Ndiyo	Hapana
10.	Filamu (video) hizi hunichanganya zaidi.	Ndiyo	Hapana
11.	Mwalimu hutusaidia kuelewa vema somo linalotumia filamu (video).	Ndiyo	Hapana
12.	Napenda kufanya kazi na wanafunzi wenzangu katika vikundi.	Ndiyo	Hapana
13.	Kwa kawaida hunyosha mkono kujibu maswali darasani.	Ndiyo	Hapana
14.	Ningependa kuendelea na masomo ya sekondari.	Ndiyo	Hapana
15.	Filamu (video) hufanya somo la Hisabati kuwa rahisi.	Ndiyo	Hapana
16.	Filamu (video) hunisaidia kuielewa somo la Sayansi kirahisi.	Ndiyo	Hapana
17.	Ninafurahia kwenda shuleni.	Ndiyo	Hapana
18.	Mwalimu wa somo la hisabati huwashirikisha wavulana zaidi kuliko wasichana.	Ndiyo	Hapana
19.	Mwalimu wa somo la sayansi huwashirikisha wavulana zaidi kuliko wasichana		
20.	Baada ya kumaliza elimu ya msingi ningependa kufanya kazi.	Ndiyo	Hapana
21..	Baada ya kumaliza elimu ya msingi ningependa kuoa/kuolewa.	Ndiyo	Hapana
22.	Mwalimu ndiye hutawala maongezi yote darasani.	Ndiyo	Hapana

SEHEMU B: HISABATI

CHAGUA JIBU SAHIHI KWA KUANDIKA HERUFI KATIKA KISANDUKU

1. 5634 + 2245 = (A) 7879 (B)7778 (C) 8797 (D)7877 ☐	**2.** 649462 + 3749 (A) 211356 (B)787400 (C) 6352 (D)653211 ☐
3. 889 - 726 = (A) 208 (B)163 (C) 137 (D)108 ☐	**4.** 376 x 3 (A) 2127 (B)1128 (C) 4316 (D)526 ☐
5. 1985 x 9 = (A) 2007 (B)8765 (C) 17865 (D)2151 ☐	**6.** 3069 ÷ 99 = (A) 99 (B)48 (C) 31 (D) 51 ☐
7. Gawanya kipeuo cha pili cha 144 kwa kipeuo cha pili cha 16 (A) 9 (B)27 (C) 3 (D) 313 ☐	**8.** $4\,^{1}/_{2} - 3\,^{3}/_{4}$ = (A) ¼ (B) 3/6 (C) -2/5 (D) $^{3}/_{4}$ ☐
9. 0.13 - 0.07 (A) 0.6 (B) 0.06 (C) 0.8 (D) 0.02 ☐	I. Orodhesha namba shufwa iliyopo kati ya 19 na 21 (A) 20 (B)18 (C) 22 (D) 17 ☐

II. Tafuta thamani ya $7 + \sqrt{225}$

(A) 52 (B)42

(C) 32 (D) 22 ☐

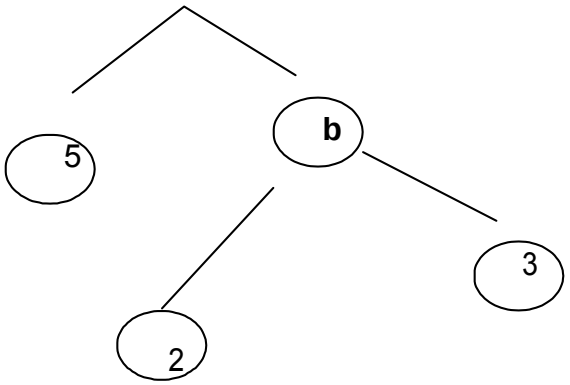
III. Tafuta namba mraba ya 18 (A) 324 (B)248 (C) 524 (D)369 ☐	IV. Tafuta wastani wa 85, 25, 46 (A) 52 (B)24 (C) 72 (D) 102 ☐

V. Sophia huchapa maneno hamsini kwa dakika, Je atachapa maneno mangapi kwa saa moja?

(A) 58 (B)3000

(C) 2850 (D)3001 ☐

VI. Tafuta **b**; 30



(A) 4 (B) 12

(C) 6 (D) 8 ☐

SEHEMU C: SAYANSI STD V

CHAGUA JIBU SAHIHI KWA KUANDIKA HERUFI KATIKA KISANDUKU

2 yafuatayo ni mambo yanayofanaya mfumo wa mzunguko wa damu isipokuwa; (A) Damu yenyewe (B) Moyo (C) Mate (D) Mishipa ya damu ☐	3 Kazi ya vyakula vifuatavyo mwilini matunda na mboga za majani ni; (A) Kujenga mwili (B) Kutia joto (C) Kulinda mwili (D) Kuupa mwili nguvu ☐
4 Njia nzuri ya kuepuka maambukizi ya Ukimwi_____ (A) Kutumia kondom kila napofanya (B) Kuwa mwaminifu kwa mpenzi tendo la ndoa mmojatu asiyeambukiswa. ☐ (C) Kuacha kabisa kujamiiana (D) Majibu yote (A), (B) na (C) ni sahihi	5 Tunafanya majaribio ya kisayansi ili:- (A) Kutatua tatizo (B) Kujifurahisha (C) Kujichangamsha (D) Majibu yote ni sahihi ☐
6 Viumbe hai vimeundwa kwa:- (A) Chembe sahani. (B) Tungamo (C) Damu (D) Seli ☐	7 Mishipa inayotoa damu kutoka kwenye moyo huitwa; (A) Ateri (B) Kapilari (C) Vena (D) Vena Kava ☐

8 Njia rahisi ya kupika chakula kwa haraka katika mafuta ya moto ni; (A) Kuchemsha (B) Kukaanga (C) Kuoka (D) Kupika na mvuke	9 Metamofosisi ni; (A) Hatua za kufa kwa mdudu (B) Hatua za kuzeeka kwa mdudu (C) Hatua za kukua kwa mdudu (D) Hatua za kutembea kwa mdudu
10 Kazi ya kulinda miili yetu isishambuliwe na magonjwa ovyo hufanywa na _____ (A) Chembe hai nyekundu za damu. (B) Chembe hai nyeupe za damu. (C) Chembe hai sahani za damu. (D) Ute mzito wa damu	11 Dalili mojawapo ya kupunguza uzito kwa 10% bila sababu maalamu ni mojawapo kati ya dalili kuu ya ugonjwa wa; • Kaswende • Kwashiakoo (C) Ukimwi (D) (D) Kisonono
12 Kazi ya maji mwilini ni; _____ • Kuharibu chakula • Kusaga chakula • Kufanya chakula kiwe kigumu (D) Kusafirisha chakula mwilini	13 Chakula cha mtoto mdogo chafaa kiwe na (A) Wingi wa wanga (B) Wingi wa protini (C) Wingi wa vitamini (D) Wingi wa mafuta
14 Sehemu kubwa ya mwili wa binadamu ni; • Mifupa • Nyama (C) Maji (D) Ngozi	15 Vituvyote vinavyomzunguka mwanadamu ni; • Nyumba • Mazingira (C) Wanyama (D) Ndege
16 Kuwepo kwa chumvichumvi baharini husababishwa na; • Chumvi nyingi iliyopo katikati ya baharí • Madini ya chumvi yanayobebwa na mito na kuingia baharini • Chumvi nyingi zinazotupwa baharini • Vinyesi vya wanyama na binadamu	

Annex 6: Tests Administered to Students Standard VI

Section A: Mtazamo wa Mwanafunzi

Soma maelezo yafuatayo kwa makini na kisha chagua jibu sahihi kwa kuzungushia neno Ndiyo au Hapana au kuandika idadi ya siku ama filamu (video)

	Darasa	DRS.5	DRS.6
1.	Je, wewe ni mvulana au msichana?	Mvulana	Msichana
2.	Umeshawahi kuona filamu (video) ikitumika darasani?	Ndiyo	Hapana
3.	Kama ni ndiyo, umeshawahi kuona filamu (video) ngapi?	Idadi	
4.	Kama ni ndiyo, ni siku ngapi zimepita tangu uone filamu (video)	Idadi ya	
5.	Wazazi wangu ndio husababisha niende shuleni lakini mimi sipendi kwenda.	Ndiyo	Hapana
6.	Napenda kucheza michezo shuleni	Ndiyo	Hapana
7.	Filamu (video) zinazotumika darasani hunichosha.	Ndiyo	Hapana
8.	Kufanya kazi na wanafunzi wenzangu hunisaidia kuelewa vizuri zaidi	Ndiyo	Hapana
9.	Ni mara chache sana mwalimu hunitaja jina darasani.	Ndiyo	Hapana
10.	Filamu (video) hizi hunichanganya zaidi.	Ndiyo	Hapana
11.	Mwalimu hutusaidia kuelewa vema somo linalotumia filamu	Ndiyo	Hapana
12.	Napenda kufanya kazi na wanafunzi wenzangu katika vikundi.	Ndiyo	Hapana
13.	Kwa kawaida hunyosha mkono kujibu maswali darasani.	Ndiyo	Hapana
14.	Ningependa kuendelea na masomo ya sekondari.	Ndiyo	Hapana
15.	Filamu (video) hufanya somo la Hisabati kuwa rahisi.	Ndiyo	Hapana
16.	Filamu (video) hunisaidia kuielewa somo la Sayansi kirahisi.	Ndiyo	Hapana
17.	Ninafurahia kwenda shuleni.	Ndiyo	Hapana
18.	Mwalimu wa somo la hisabati huwashirikisha wavulana zaidi kuliko wasichana.	Ndiyo	Hapana
19.	Mwalimu wa somo la sayansi huwashirikisha wavulana zaidi kuliko wasichana	Ndiyo	Hapana
20.	Baada ya kumaliza elimu ya msingi ningependa kufanya kazi.	Ndiyo	Hapana
21.	Baada ya kumaliza elimu ya msingi ningependa kuoa/kuolewa.	Ndiyo	Hapana
22.	Mwalimu ndiye hutawala maongezi yote darasani.	Ndiyo	Hapana

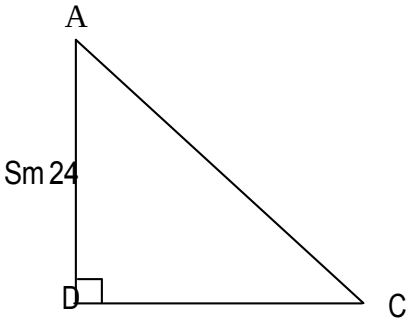
SEHEMU B: HISABATI STD VI : CHAGUA HERUFI ILIYO SAHIHI

1. 175 X 14 =

2. 200 - 41.86 =

(A) 2451 (B) 2450 (C) 2575 (D) 2452	(A) 241.86 (B) 158.14 (C) 341.8 (D) 241.96
3. $1.44 \div 0.12 =$ (A) 12 (B) 6.6 (C) 6 (D) 1.2 ☐	**4.** $15 \div 3/4 =$ (A) $5/4$ (B) $1\,1/4$ (C) 20 (D) 60 ☐
C. Tafuta KKS cha 18, 32 na 25 (A) 3 (B) 5 (C) 2 (D) 1 ☐	D. Papaa alitumwa sokoni akiwa na shilingi 6000/= kununua yafuatayo, Nazi 6 @ Shs 120/=, Karoti mafungu 4 @ Shs 150/=, nyanya 5 @ Shs 240/=, vitunguu mafungu 6 @ mafungu 2 Shs 200/=, Je manunuzi hayo alirudisha Shs ngapi? (A) Shs 3860 (B) Shs 2880 (C) Shs 1741.60 (D) Shs 4121 ☐

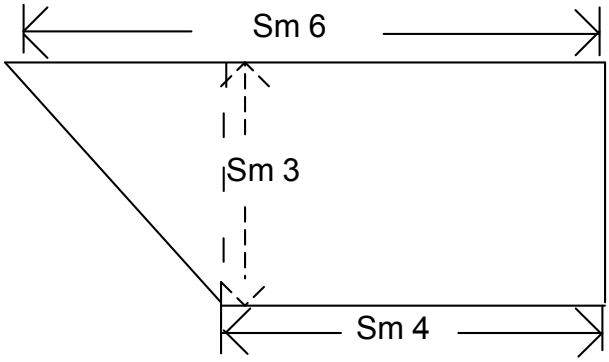
E. Eneo la umbo hili ni Sm^2 120, tafuta urefu wa CD



(A) Sm 14 (B) Sm 6

(C) Sm 10 (D) Sm 8 ☐

F. Tafuta eneo la umbo hili



(A) Sm^2 60 (B) Sm^2 25

(C) Sm^2 15 (D) Sm^2 72

G. Andika katika vipeo 256

1. 2^8 (B) 2^6

(C) 2^4 (D) 2^7

H. Eneo la mraba ni Sm^2 49, tafuta mzingo wake

1. Sm 28 (B) Sm 30

(C) Sm 60 (D) Sm 70

I. Bei ya ng'ombe w 3 ni shilingi 1800/=, tafuta bei ya ng'ombe wa 5;

(A) Sh 1500 (B) Sh 4500

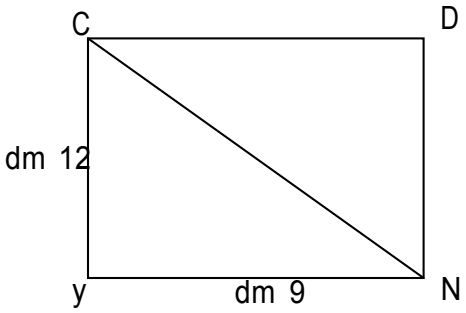
(C) Sh 6000 (D) Sh 3000

J. Kuku hutaga mayai 125 kwa siku, Je kwa wiki 3 atataga mayai mangapi?

1. Mayai 37 (B) Mayai 2000

(C) Mayai 112 (D) Mayai 2625.

K. Tafuta urefu wa CN



1. Sm 25 (B) Sm 20

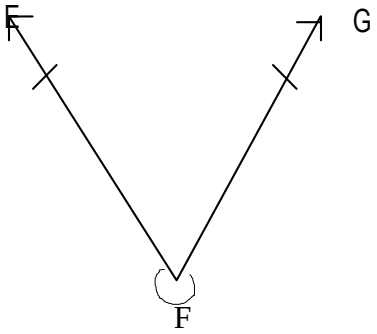
(C) Sm 9 (D) Sm 15

L. Rubani aliondoka Entebe saa 1645 kuelekea Nairobi, akafika baada ya dk 30. Andika muda aliofika kwa mpango wa saa ya kawaida

(A) 5:15 AM (B) 0500 PM

(C) 11:15 Jioni (D) 1715 ☐

M.



$\angle$ EFG ni aina gani ya pembe?

(A) Pembe butu (B) Pembe kuu

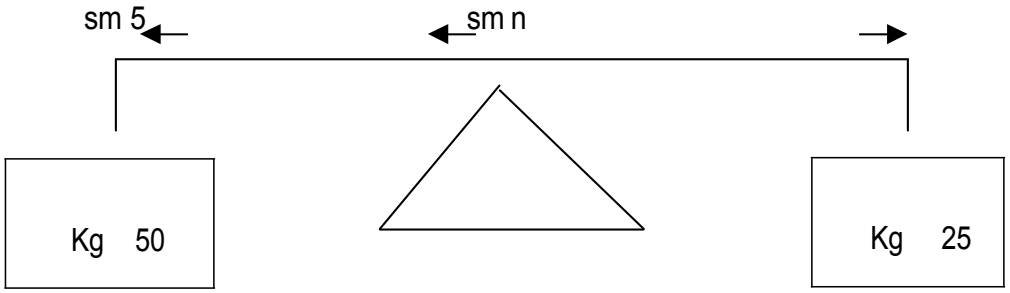
(C) Pembe kali (D) Pembe mraba ☐

SEHEMU C: SAYANSI: CHAGUA HERUFI ILIYO SAHIHI

• Kazi muhimu za damu kati ya hizi ni; • Kuyeyusha Kabondioxide • Kuyeyusha Oksijeni ☐ • Kusafirisha chakula na oksijeni katika sehemu zote za mwili • Kutupa joto	• Katika hali tatu za maada_____ina uwezo wa kubadilika katika hali zote. • Maada ya gesi • Maada ya yabisi ☐ 11 Maada ya vimiminiko 12 Majibu yote (A), (B) na (C) ni sawa
• Yafuatayo ni baadhi ya magonjwa ya kuambukiza yanayotibika; • Kisonono, Ukimwi na Malaria • Kisonono, Kaswende, Trikonomia ☐ • Kipindupindu, Taifodi, Kisukari • Athma , Ukimwi na Kisukari	• Mojawapo katika njia zifuatazo si ya kutoa uchafu mwilini:- (A) Kutema mate (B) Kukojoa ☐ (C) Kupumua (D) Kutoa jasho

• Si vizuri kuweka mimea inayokuwa chumbani wakati wa usiku kwa sababu (A) Harufu ya maua huleta maumivu ya tumbo (B) Hutoa unyevu (C) Oksijeni hutolewa (D) Kabomdioksaidi hutolewa ☐	• Ni udongo gani unaopitisgha maji kwa haraka zaidi? (A) Mfinyanzi (B) Tifutifu (C) Kichanga na Mfinyanzi (D) Mfinyanzi ☐

• Tafuta n.



(A) Sm 15 (B) Sm 10

(C) Sm 50 (D) Sm 25 ☐

• Mwanasayansi anapaswa kuwa na tabia gani ya (A) Kuongea sana (B) Uvivu (C) Udadisi (D) Uongo ☐	• Viini vya magonjwa huingia mwilini kupitia ; (A) Mdomoni tu (B) Kwenyengozi (C) Kwenye damu (D) Sehemu mbalimbali za mwili ☐
• Mama mjamzito anashauriwa; (A) Kuvaa nguo zisizobana ili aweze kupumua bila shida (B) Kula vyakula vyenye lishe (C) Kutofanya kazi ngumu (D) Majibu yote ni sahihi ☐	• Mwale unaoelekea katika uso wa kioo huitwa : (A) Mwale akisi (B) Mwale mtuo (C) Pembe akisi (D) Pembe mtuo ☐
• Ni nini kinachopambana na sumu zinazoingia mwilini; (A) Figo (B) Mapafu (C) Nyongo (D) ini ☐	• Kabonidayoksaidi na maji ni; (A) Gesi na kimiminika zinazotolewa moyoni (B) Taka zinazotolewa na mapafu (C) Taka mwili zinazotolewa na mwili (D) Taka mwili zinazotolewa na ngozi ☐
• Ugonjwa utokanao na mabadiliko yaliyo ya kawaida ya mawimbi ya umeme ya neva za ubongo ni; (A) Kifua kikuu (B) Kifafa (C) Kikohozi (D) Kisukari ☐	• Ni zao gani kati ya yafuatayo huifadhi rutuba; (A) Korosho (B) Minazi (C) Miembe (D) Mimea jamii ya kunde ☐

Annex 7: Key Informant Interview – Teachers

- Did you undergo Bridge IT training? In which year and for how long was the training? Who taught you Bridge IT methods? Did you like the training on Bridge IT? Why? What was it that you liked most about the Bridge IT training? (Teachers, handout, tools, classroom environment in which you trained, practicals, time table, Time) was there anything else apart from this that you liked most in your Bridge IT training? Of these what has been most helpful in making you a better science/math teacher / life skills.

- What were the challenges in Bridge IT training you received? In what way has Bridge IT training improved your level of interaction with the students? What would you want changed or improved in the Bridge IT? In what way are the methods that you learnt in Bridge IT training a challenge to teach to your students? In what way has it been easy to integrate Bridge IT methods in the science and math lessons for your class? What should be changed?

- Are you using the Bridge IT methods in the teaching of science/math/Life Skills in your class? In a week how many times do you teach science/math/Life skills to your students? Out of these times you teach science/math/Life skills how many times do you use Bridge IT methods?

- Using the Bridge IT methods what changes have occurred in the way you interact with the students and in the way students interact with you in the learning process? What advantages are there in using Bridge IT methods compared to the traditional way of teaching science/math/Life skills? What difficulties do you meet in using Bridge IT methods? Was the method understood by the student? Is it the boys or the girls who find the Bridge IT methods interesting compare to the traditional methods? How have the methods enabled the students to put into practice the lessons they learnt in science/math/Life skills?

- Between boys and girls who has benefited more from the teaching of science/math/Life skills in your class? In what way have boys benefited and what way girls benefited? Give examples.

Annex 8. Interview Guide for District Level Officers

UTANGULIZI

Kama ujuavyo, program ya Bridgeit ilitekelezwa kartika shule 150, mikoa 7 na wilaya 17 Tanzania kutoka mwaka 2008 hadi 2012, Bridge It Ni Program ya International Youth Foundation na Ilikuwa Inatekelezwa Kwa Ushirikianao kati ya Wizara ya Elimu na Mafunzo ya UfundI (MoEVT) pamoja na washirika wengine.

Lengo la program hii ilikuwa kuongeza ubora na mafanikio ya elimu kwa wanafunzi katika shule za msingi katika masomo ya Hisabati,Sayansi na Stadi za Maisha,kwa kutumia teknolojia ya simu ya mkononi.Program hii hasa ililenga kuongeza ufanisi kwa walimu kutumia teknolojia kuwapa wanafunzi maarifa na ujuzi.

Lengo kubwa la ufuatiliaji huu ni kupima mafanikio kwa walimu na wanafunzi katika masomo tajwa hapo juu na kupima namna ambavyo njia hii inaweza kutumika na katika kuboresha ufundishaji na kujifunzapamoja na kueneza program hii katika wilaya nyingine Tanzania baada ya kuona matokeo chanya na yaliyo wazi.

Tunapenda kukuhoji ili kupata uzoefu wako kuhusu Bridge it na ufundishaji wa masomo ya ya hisabati, sayansi na stadi za maisha katika shule za majaribio (Pilot Schools).tunatarajia kupata ukweli kuhusu program hii na namna ilivyotekelezwa katika shule zako.

Ushiriki wa ufuatiliaji huu ni wa kujitolea tu unaweza kujibu au kuacha swali ambalo huko tayari kulijibu au kusimamisha mahojiano wakati wowote

Iwapo utaamua kutoshiriki katika mahojiano ya leo hakutakuwa na adhabu yoyote.Majibu ya hojaji hizi yatakuwa ni siri,jina na utambulisho wako havitakuwa sehemu ya ripoti itakapoandikwa. Napenda kujua iwapo una swali lolote kabla ya kuanza mahojiano

MWONGOZO WA MAHOJIANO KATI YA WATENDAJI WA WIZARA, MKOA NA WILAYA.

In General, how can you explain about BrightIt Technology? The main objective of this program was to increase quality of education and good performance for standard five and six students by using Bridge It. How was the situation?

- Before the program
- During the program,
- The current situation after lapse of the program

Changes in Bridge IT

Which is an important thing we can learn from the implementation of this program and whole system of that program? Is that program corresponding with the ministry curriculum which is applicable to teaching? How the implementations of this program have brought efficiency in teaching relevant subjects for teachers?

How this program has helped or has brought positive changes in learning for;

- Girls
- Boys

What are good things was revealed in teaching by using this technology. Give examples of a school and good thing which was revealed. This program was costing. If it expands to all primary schools in your District or Municipal; will your district or municipal be able to incur costs for running this program? Or what are items can the district or municipal incur or contribute, and what are items it cannot?

How will the situation be if other subjects (eg Geography) be included in the Bridge IT?
In your view, Bridge IT should start from which class? And what subjects are relevant to be offered? Who will be the main stakeholders and who will do what to ensure this program is implemented? In implementing this program, what were the challenges? Which good thing you learnt and what should be continued in this program?

With above questions, program coordinator at the district level should be asked in addition with the following questions;

i. How many schools involved with Bridge IT Program?

ii. Amongst those schools, which schools have shown high efficiency in using that technology?

iii. Which schools have shown low efficiency in implementing this program?

iv. Teachers underwent this program, are they still working to those schools or do they still continue applying those methods? Have they managed to train other teachers?

v. Teachers need empowerment so that they continue with this Project;

vi. What are important things or which methods should be applied to implement this program?

Annex 9: Bridge IT Environment in pictures

The study covered 18 Bridge IT schools and 11 control schools in 9 districts and six regions

A total of 2687 pupils in completed an Attitude Questionnaire and Test in Mathematics and Science

The study was undertaken one and a half years after financial and technical support for the Bridge IT Project had stopped and the project was running on its own initiative.

More than 80% of all Bridge IT teachers show positive communication skills with pupils in the classroom in each of the classroom observation in 18 Bridge IT schools

Improvement for girls has been much more significant and their interest in learning Mathematics and Science has improved a lot

Teachers were trained to encourage the mixing of both boys and girls and to ask questions equally to both sexes.

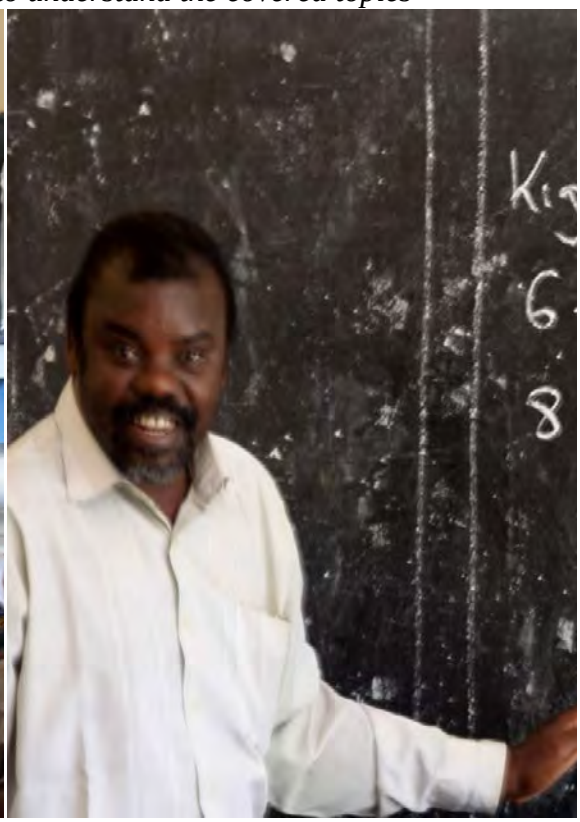
In Temeke district, out of 1063 pupils who sat for primary leaving examinations 504 were girls and 559 were boys they all passed well and went to secondary schools. Among these, 409 pupils excelled in Mathematics and science subject's girls were 220 and boys were 189 respectively. Teachers in all Bridge IT schools attributed the better performance to high regular attendance of students, reduction of absenteeism and improved interests of students in the subjects delivered with Bridge IT methodology

In some schools teachers have adopted innovative approaches to meet equipment failure and lack of central repair mechanisms. In three schools where the network cable got spoilt or stolen the alternative was to use CDs in a DVD before obtaining a replacement.

In Bridge IT implementing classrooms pupils' confidence has increased.

Pupils see the reality of things, remain attentive while teaching is ongoing, understand the subject much faster, easily and clearly, conclude earlier and keep memory of what they see. This has in turn made the subjects taught more enjoyable and boosted their performance.

videos prove sufficient in enabling pupils to understand the covered topics



Bridge IT methodology reduces the burden to the teacher because the videos prove sufficient in enabling pupils to understand the covered topics.

DVD, CD or flash players which are more easily available should be used rather than phones and if possible introduce projectors other than TV sets.

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