

# PARTNERSHIP TO STRENGTHEN INNOVATION AND PRACTICE IN SECONDARY EDUCATION (SIPSE)

Report on regional and national policy forums: Kenya and Tanzania

May 2015

SIPSE is designed and implemented by  
Global e-Schools and Communities Initiative (GESCI)

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## 1. INTRODUCTION

The Strengthening Innovation and Practice in Secondary Education (SIPSE) Project has been running from July 2013 to May 2015 to pilot the innovative use of ICTs in the professional development of secondary school teachers. This has been done with the aim of improving their pedagogical skills and ability to integrate ICT into their teaching practice. This project was initiated with the goal of addressing the following challenges:

- The quality of teaching and learning in secondary schools in Science, Technology, English and Mathematics (STEM) subjects.
- The need to make education relevant to the needs of 21st century learners by preparing them for successful working lives.
- The in-service professional development of teachers in ICT Integration in STEM subjects.
- The face-to-face professional development model that takes a lot of staff time away from the classroom with the highest percentage of the professional development cost going to accommodation and participants' welfare rather than to the learning process.
- Offering the course in authentic teaching environments so as to unearth real challenges for evidence-based policy recommendations.

The teacher-training model employed a blended learning approach, which was targeted at addressing a key challenge of in-service teacher training: how to train teachers without removing them from the classroom. Participants were trained through 5 modules that provided a range of skills from use of ICT for didactic teaching to problem-based learning to project-based learning.

All of these activities as well as other related matters brought to the fore a range of lessons, challenges and opportunities that were later discussed in the Regional and National Policy Forums in May 2015.

### 1.1 Objectives of the national and regional policy forums

The objective of the regional and national policy forums was to develop policy recommendations on competencies and requirements for teachers. These would be included in national teacher training policies in Kenya and Tanzania to feed into ICT-based professional development courses for teachers in general.

In addition to the policy forums, a lot of lessons, challenges and opportunities for teaching and learning were drawn from the monitoring and evaluation research of the emerging models during the implementation of the SIPSE project.

### 1.2 Participants

The policy forums participants were drawn from participating schools (Heads of Schools, team leaders, teachers, and students), Regional Education Managers (DEOs, REOs, County Education Officers (TSC Directors), Universities offering pre-service training to the teachers, in-service teacher training institutions, and the Ministry of Education Headquarters. Education stakeholders from the curriculum development institutions and in-service teacher training organizations and departments were also invited.

### 1.3 The expected deliverables from this workshop included:

- Policy forum report
- Lessons learnt, challenges and opportunities
- Policy recommendations for ICT use in teacher professional development in Kenya and Tanzania
- Dissemination of outcomes from the forum through various channels of communication targeted at different audiences (partners, funders, ministries of education, schools, teachers, students)

See [appendix 1](#) for an overview of the policy forum programme and [appendix 2](#) for a listing of participants.

## 1.4 Policy forum facilitation, format and programme

The policy forums were facilitated at national level in Kenya and Tanzania by Esther Mwiyeria, Patti Swarts (GESCI Programmes Director), Mary Hooker (GESCI Senior Education Specialist) and Grace Omondi (GESCI Communications Specialist) with the assistance of Master Trainer teams. The facilitation format was to use a participatory consultative approach that integrated interactive sessions of presentations, panel discussions, group work simulations and plenary sessions.

Mr. Jerome Morrissey, the CEO GESCI jointly with the Ministry of Education representatives in Kenya (Mr. Stephen Mbogua) and Tanzania (Mr. Joseph Ngoseki) made the welcome remarks. The first session was facilitated by GESCI's Communications Specialist Grace Omondi who presented an overview of the SIPSE 2013-2015 project through a video presentation entitled "SIPSE Professional Development for the Integration of ICT in STEM Teaching and Learning – 2013 – 2015".

The second session focused on a presentation of the SIPSE 2013-2015 Monitoring, Evaluation and Learning (MEL) research that was summarized in the policy brief - presented by the GESCI MEL research team comprising of Mary Hooker and Esther Mwiyeria. The MEL research produced a number of key findings within the policy forum thematic areas of *Leadership and Planning for ICT Use in School Settings, ICT in the Curriculum, Teacher Professional Development for ICT and Infrastructure and Resources*.

One of the key findings identified in the research was the need for a triangular approach of leadership, teacher professional development and whole school development as key for effective ICT integration in secondary level schooling. The research presented several possible policy responses to support such a model.

See [appendix 6](#) for Policy Forum Brief document and presentation.

## 1.5 Group break-out sessions

The group break-out sessions and plenary sessions were facilitated by the GESCI facilitator team and Master Trainers. They provided the participants with opportunities to:

- examine the SIPSE MEL research results in each of the thematic areas,
- learn from each other's experiences at school, regional and national levels, and
- identify and consolidate possible policy responses, ideas and priorities.

These responses provided a good backdrop for the panel discussion session that followed the group break-outs.

At the same time, there were parallel sessions in which the evaluation of student webquest projects was taking place. The projects presented had been assessed and nominated by participants in the schools for overall best project awards at regional and national levels. The projects provided concrete examples and experiences of the project focus on higher order 21st Century skills, knowledge development and learning that is student directed, interactive, collaborative and that lies at the heart of the SIPSE focus on innovative practice.

The final session in all forums presented awards ceremonies for best performing schools and teachers in the SIPSE programme in the second year. The awards were donated and presented by GESCI and national partners affiliated to ICT in education and teacher development. Organizations that donated awards for this ceremony are: A to Z Technologies, Access Kenya, Cadbury, the Jomo Kenyatta Foundation, Microsoft, Orange Kenya, Platinum Associates, Roskar Travel and Sarova Hotels.

See [appendix 3](#) for an overview of the discussions, policy ideas and policy recommendations that came out of the break out group sessions.

## 2. OVERARCHING THEMES, DISCUSSIONS AND POLICY RECOMMENDATIONS

Over the course of the break-out sessions, key ideas and policy responses were discussed, prioritized and organized by participants under the headings of:

- Leadership and Vision
- Curriculum and Content
- Teacher Professional Development
- Infrastructure and Resources

There were a number of implementation recommendations that emerged for the strengthening and upscaling of the SIPSE model for teacher professional development as well as general policy recommendations for improving ICT use in teacher professional development and ICT integration in secondary schooling.

The following section presents the key takeaways that emerged from the break out group and plenary discussions of the regional and national workshops in Kenya and Tanzania.

### 2. 1 LEADERSHIP AND PLANNING

**In Kenya...**the discussions from three groups in the leadership and planning held at regional and national forums were centered on the following:

There is a need for specific budget allocation at ministry and school level of ICT development. There was a general feeling from the participants that there was no sufficient allocation of funds and commitment to the development of ICT at school level. When and where this was available, it was felt that the leadership always opted to use these funds whenever there was a shortfall in any other expenditure area. This led to one-off activities in the ICT development process, which was counterproductive in an area that is so dynamic. This was seen to be as a result of a lack of enough appreciation of the benefits that ICT can bring into the teaching and learning process in the core curriculum subjects. To this end the proposal was that the Leadership and Boards of Management (BOMs) in the schools should be sensitized and trained on the importance of ICT in administration, communication, and curriculum content delivery.

Further, the participants felt that ICT should not be a preserve for a few students who take computer studies but it should seamlessly be used to deliver curriculum content in all the subjects. This would require sufficient and effective ICT resources to increase access and reduce on time wasted in accessing online digital content and resources due to narrow bandwidth and outdated equipment without sufficient memory.

Participants suggested that leadership support for ICT use could be provided through championship by the school/county leadership. An increase in lesson time duration for specific ICT Integration periods, participation by school managers in monitoring and reflective sessions with teachers and a clear continuous follow-up on the implementation of the ICT vision for each school are other recommendations that were seen to be critical for successful ICT Integration.

Since ICT resources are expensive and the turnover of technology is high, it was suggested that a framework for partnerships between the school community, the private sector and the leadership should be developed so as to mobilize the much-needed resources.

**In Tanzania...**the teams that discussed the leadership and planning issues in Tanzania felt that ICT should be a core subject in the curriculum for all secondary school students like other subjects. For this to be implemented successfully, a roadmap for ICT Integration at all levels of education was needed. This roadmap should include

guidelines for accessing the ICT resources at school level and proper use of the internet for students and teachers. Parents, teaching and non-teaching staff, and the wider community, they felt, should be sensitized on the benefits and limitations for ICT use in teaching and learning. A conducive environment for ICT use should be created through the development of the ICT infrastructures, training of teachers, and leadership training on appropriate mechanism for monitoring and reporting integration of ICT in teaching and learning. To bring out the aspirations in the uptake of ICT as a core subject, one participant clarified by saying:

*“...Just like English is used for communication in all subjects while still being taught as a separate subject, ICT should also be integrated in all subjects and still be taught as a subject on its own...”*

## 2.2 TEACHER PROFESSIONAL DEVELOPMENT

Key policy themes and ideas emerging in the Teacher Professional Development policy domain break out group discussions in Kenya and Tanzania are presented in the table below. The policy ideas have been grouped around **seven main themes** related to:

1. pre and in-service ICT use in teacher education
2. teacher awareness, communities of practice, peer to peer & school learning networks
3. planning continuous professional development
4. teacher confidence & self-efficacy, blended learning, digital tools & e-content support
5. focus of teacher professional development
6. informal professional learning networks
7. accreditation, performance, recognition & remuneration, institutionalization & sustainability

Themes	Policy Ideas
1. Pre-service and in-service ICT use in Teacher Education	<ul style="list-style-type: none"> <li>• The government should set an adequate budget on ICT based training for both in-service and pre-service teachers</li> <li>• ICT training should be made compulsory at all levels of teacher training (diploma, bachelor)</li> <li>• There should be training (pre-service/in-service) of all teachers with ICT skills</li> </ul> <p>On pre-service:</p> <ul style="list-style-type: none"> <li>• ICT should be an integral part in all teacher training colleges</li> </ul> <p>On in-service:</p> <ul style="list-style-type: none"> <li>• After pre-service training teachers should be provided with continuous support and opportunities for knowledge deepening, workshops, refresher courses, short courses</li> <li>• Training in ICT should be compulsory from class 1</li> </ul>
2. Teacher awareness & participation, communities of practice, peer-to-peer & school learning networks	<p>Teacher awareness &amp; participation</p> <ul style="list-style-type: none"> <li>• Teachers need to be open-minded to use new technologies in integration of ICT T</li> <li>• There should be annual seminars for teachers on ICT integration in the teaching and learning process</li> </ul> <p>Communities of practice</p> <ul style="list-style-type: none"> <li>• The capacity of in-service teachers should be built, and they should be kept updated with emerging technologies</li> </ul> <p>Peer-to-peer &amp; school learning networks</p> <ul style="list-style-type: none"> <li>• There should be exchange programmes for teachers with partners who have fully implemented technology in their practices</li> <li>• Teachers should be encouraged to collaborate with each other</li> </ul>

Themes	Policy Ideas
3. Planning continuous professional development	<ul style="list-style-type: none"> <li>• ICT should be made a mandatory course for practising teachers.</li> <li>• Schools should be funded to involve teachers in use of ICT and undergo training on the use of ICT equipment.</li> <li>• Every teacher should continuously undertake a professional teacher development course in the use of ICT</li> <li>• Teachers should be given a phased in-service course in ICT integration</li> <li>• Teachers should be sensitised about the need to integrate ICT in the teaching and learning process</li> <li>• There should be higher frequency of in-service training - to build capacity of teachers and keep them updated with technology after every two year</li> </ul>
4. Teacher professional development focus	<ul style="list-style-type: none"> <li>• ICT training should be made compulsory and ICT integration a priority at all levels and subjects of education (administration, teachers, school managers)</li> </ul> <p>In pre-service</p> <ul style="list-style-type: none"> <li>• Teachers should only specialize in three subjects – and one of these should be ICT</li> </ul> <p>In in-service</p> <ul style="list-style-type: none"> <li>• Teachers should be well-trained in ICT integration so as to explore the challenges in ICT integration in classroom practices</li> <li>• A clear and practical approach on ICT integration during teacher training programmes should be incorporated</li> </ul>
5. Teacher confidence & self-efficacy, blended learning, digital tools & e-content support	<p>Teacher confidence &amp; self-efficacy</p> <ul style="list-style-type: none"> <li>• One of the requirements for teacher recruitment should be ICT compliance in order to enhance the teaching and learning process</li> <li>• Teachers should continuously take short courses to build ICT confidence</li> </ul> <p>Blended learning, digital tools &amp; e-content support</p> <ul style="list-style-type: none"> <li>• Online training should be encouraged</li> <li>• Each teacher should be equipped with a laptop</li> <li>• Teacher portals so that teachers can take advantage of digital content for teaching and learning</li> </ul>
6. Informal learning	<ul style="list-style-type: none"> <li>• Teachers should be encouraged to constantly seek more knowledge on use of ICT tools</li> <li>• Teachers should be encouraged to develop their materials and share them for peer review and improvement.</li> </ul>

Themes	Policy Ideas
7. Accreditation, performance, promotion, recognition & remuneration, institutionalization and sustainability	<p>On accreditation:</p> <ul style="list-style-type: none"> <li>• In Tanzania: Certificate level training for teachers is no longer done</li> <li>• In Kenya: The Teachers Service Commission (TSC) should recognise the SIPSE course as a teacher development course and award accordingly.</li> <li>• TPD should be followed by a thorough evaluation during training to ensure that teachers are well skilled</li> </ul> <p>On performance, recognition &amp; remuneration</p> <ul style="list-style-type: none"> <li>• A performance-based reward scheme should be considered for teachers successfully integrating ICT in their lessons</li> <li>• This could include promotion, commendations, recognition.</li> <li>• Teachers that are ICT compliant should have relatively better remuneration</li> </ul> <p>On institutionalization:</p> <ul style="list-style-type: none"> <li>• In Kenya: Each sub-county should establish an ICT centre for collaboration and sharing of ICT ideas and resources by teachers and students.</li> </ul> <p>On sustainability:</p> <ul style="list-style-type: none"> <li>• Will GESCI follow up the SIPSE course with knowledge creation certification level for this that are one certified?</li> <li>• What is the future of SIPSE alumni?</li> </ul>

## 2.3 CURRICULUM AND ASSESSMENT

Key policy themes and ideas emerging in the Curriculum and Assessment policy domain break out group discussions in Kenya and Tanzania are presented in the table below. The policy ideas have been grouped around **five main themes** related to:

1. digital content & access
2. digital content & student experience
3. digital content & teacher experience
4. planning ICT integration across the curriculum
5. digital content and ICT infrastructure

Themes	Policy Ideas
1. Digital content & access	<ul style="list-style-type: none"> <li>• ICT integration should be captured at all levels of education</li> <li>• Digital/e-content should be developed for all subjects</li> <li>• Content delivery should be accessed through ICT tools</li> <li>• Content should be posted and shared by teachers in online portal</li> </ul>
2. Digital content & student experience	<ul style="list-style-type: none"> <li>• Materials should be designed in a way that they can help the student interact with ICT</li> <li>• Computer studies should be made a core subject for students to enhance ICT integration</li> <li>• All students must be taught using ICT integration</li> <li>• All student exercises and presentations should involve ICT tools</li> </ul>



Themes	Policy Ideas
3. Digital content & teacher experience	<ul style="list-style-type: none"> <li>All teachers should be trained to be competent in the use of ICT resources and encouraged to use ICT in teaching and learning</li> <li>Student teachers in training colleges should be trained on the uses and application of ICT.</li> <li>Training in teacher colleges should include integration of ICT, and in-service teachers should get refresher courses on ICT skills</li> <li>Teachers should be engaged in content research using ICT in their subject areas</li> <li>Teachers should learn to evaluate content accessed through online channels</li> <li>Teachers should be involved in writing/developing the syllabus for all subjects.</li> </ul>
4. Planning for ICT integration across the curriculum	<ul style="list-style-type: none"> <li><i>In Tanzania:</i> ICT is already in the national curriculum at primary (TEHAMA) and secondary (ICS) levels</li> <li><i>In Kenya:</i> Is it the role of KICD to provide content for all schools? KICD to spearhead and take the lead and then other stakeholders should support the process</li> <li>ICT should be part of the curriculum of taught subjects and not a 'specialized course'</li> <li>The national curriculum designers should plan seminars about ICT integration</li> <li>The curriculum should be regularly revised to ensure that it is up-to-date and relevant</li> <li>The syllabus and curriculum should be reviewed to adequately accommodate ICT integration.</li> <li>The curriculum should be reviewed to reduce or merge subjects to create time for addressing 21st century skills development</li> <li>Review the syllabus to ensure that the learners are skilled to handle the challenges of the 21st century</li> <li>There should be workshops for teachers every 5 years to evaluate if the syllabus is still relevant, and if there are any areas to be updated.</li> <li>Teachers should be involved in developing the ICT integration curriculum</li> <li>Review and adjust timetabling to allow for integration of ICT in all subjects</li> <li>This takes longer than the currently allocated 40 minutes - lessons could be blocked so that lessons that require ICT integration get a double lesson.</li> <li>Extra time for more student activities out of the normal time-table should be created</li> </ul>
5. Digital content & ICT Infrastructure	<ul style="list-style-type: none"> <li>The ministry of education should support the implementation of ICT integration and enable teachers to acquire the necessary equipment</li> <li>There needs to be broader thinking to understand that ICT integration could very well be beyond just computers, to the use of other media like radio, TV, mobile phones</li> </ul>

## 2. 4 INFRASTRUCTURE AND RESOURCES

**In Kenya...** discussions around ICT infrastructure and resources pointed at the need to have ICT being made available for teachers and students through increased budgetary allocation at school level. To make this possible, cost sharing between the schools, the community, and private sector should be explored. ICT in school should not only be for the acquisition of ICT skills for students but also for seamless use in the delivery of content in all the other curriculum subjects. This would call for ICT equipment that is targeted at this function of ICT use in teaching and learning. ICT provision should go beyond the provision of desktops in a computer lab to laptops and tablets for teachers, internet connectivity and projectors. They further noted that standards for acquisition, distribution, modes of access and appropriate use of ICT in the schools should be developed.

**In Tanzania...**the participants felt that budgetary allocation for ICT and the acquisition of the resources was urgently required. In the absence of government support due to competing priorities, modalities for policies

on private-public partnership should be developed to guide schools on how to leverage support for affordable ICT infrastructure. Cost sharing measures with the school and parents' community should also be explored and supported by the government and as one teacher noted:

*"...in the same way the government supports the requirement for all parents to provide school uniform and books for students, it should also make it a compulsory requirement for all students to contribute towards the acquisition and maintenance of ICT infrastructure and resources at school level."*

The provision of ICT infrastructure, they added, should also be coupled with standards for ICT Integration in teaching and learning in schools, which should be developed and circulated by the ministry to all levels of education. This, they argued would provide clear lines of skills progression from one level of education to the next. For the efficient use of the ICT resources, maintenance and training should be regular and mainstreamed into the education budget.

## 2.5 STUDENT PERSPECTIVES ON ICT IN TEACHING AND LEARNING

The student representative group from Kenya and Tanzania voted for more and reliable internet connectivity in schools. Where this is available, they observed that it was not made accessible to the students. To deter students from accessing unsuitable sites, they proposed the use of firewalls and guidelines that are mainstreamed into the regular procedures and code of conduct for students. Free and easy access to the computer room could also make learning easier and fun. They advocated for access to digital books and evaluation through online mechanisms.

They noted that the infrastructure in the schools should also be improved in terms of quantity and quality. ICT skills should be offered to all the students in the school as a core subject and not just to the few who take computer studies according to the students. This should include frequent use of ICT in communication and presentation so that they can cultivate the skills necessary for the 21st Century.

A summary of their policy recommendations is presented below:

- The government should consider the use of ICTs in schools in order to improve ICT skills.
- There should be reliable internet connectivity in schools all the time.
- Resources such as laptops, computers, printers, ICT rooms should be made available and the quantity increased.
- All teachers and students should be educated on the use of computers in teaching and learning.
- There should be maintenance and updating of computer software and hardware for the smooth running of teaching and learning and for relevance.
- Resources (computers, projectors and access to internet) should be availed to the various learning institutions.
- E-learning should be incorporated into the system by setting online tests and assignments.
- Text books should be converted to electronic formats

## 2.6 POLICY RECOMMENDATIONS

The policy recommendations were collected, compiled and consolidated based on a synthesis of the policy forum ideas and recommendations emanating from the 5 policy forum events in Kenya and Tanzania. The recommendations are presented below organized under the four main themes of the policy forums, namely:

1. leadership and planning,
2. teacher professional development,
3. curriculum and content and
4. infrastructure and resources

The recommendations are organized in a matrix of the policy domains and specific recommendations pertaining to Tanzania and Kenya under each domain.

Leadership & Planning	
<p><b>TANZANIA</b></p> <ul style="list-style-type: none"> <li>• The school leadership should create different projects and strategies to improve the use of ICTs</li> <li>• The school leadership should educate on the proper use of technology to avoid negative impact on the students</li> <li>• Schools should have an action plan to implement the use and application of ICT as a tool for teaching and learning</li> <li>• There should be a clear focus on building ICT competencies, which encourages the learners to be self-sufficient in life</li> <li>• Just like English is used in communication for all subjects while still being a separate subject, ICT should also be integrated in all subjects and can still be a subject on its own</li> </ul>	<p><b>KENYA</b></p> <ul style="list-style-type: none"> <li>• Clear objectives and an implementation plan (strategy that highlights these) of ICT integration in teaching and learning process with a clear plan for capacity-building for teachers and support staff on ICT use should be developed by the management</li> <li>• A roadmap for the provision of sufficient and efficient infrastructure for ICT integration</li> <li>• 20% of school tuition budget should go to ICT integration</li> <li>• Each department should come up with an ICT project-based task to be completed within a given period of time</li> <li>• There needs to be continuous and relevant training on ICT for all teachers and administrators</li> <li>• Head-teachers at county and national level should be sensitized on importance of ICT integration in teaching and learning.</li> <li>• Teacher training institutions should incorporate and review the ICT integration course in the curriculum for pre-service preparation of teachers</li> <li>• A plan should be developed for human resource training on emerging ICT trends jointly with Industry</li> <li>• An ICT integration plan should be incorporated in the school strategic plan but should be positioned in such a way that it can withstand competing priorities in the event of a shortfall of funds in other activities</li> <li>• Resources should be mobilized for ICT infrastructure.</li> </ul>
Teacher Professional Development	
<p><b>TPD – PRE-SERVICE &amp; INSERVICE</b></p> <ul style="list-style-type: none"> <li>• Pre-service: Student teachers should be trained on how to integrate ICT in teaching their subjects. This will develop their confidence</li> <li>• ICT integration should be seen as a priority subject in teacher pre-service training so that every graduate coming out of teacher training colleges is skilled. If ICT training is made a part of the pre-service training curriculum, there would be no need for 'extra' activities to skill teachers afresh, and instead the focus would be on refresher courses during in-service training.</li> <li>• In-service: To build teachers' capacity and keep them regularly updated with ICT.</li> </ul>	<p><b>ICT TEACHER COMPETENCIES FOR 21ST CENTURY</b></p> <ul style="list-style-type: none"> <li>• The terms of service for a 21st century teacher needs to be reviewed – what has changed for teaching profession in this century?</li> <li>• The 21st century teachers has increased demands and therefore the remuneration needs to match</li> <li>• Teachers need to be open-minded to use new technologies in integration of ICT.</li> <li>• There needs to be motivation for both training and implementation of ICT in education.</li> </ul> <p><b>PRE-SERVICE AND IN-SERVICE</b></p> <ul style="list-style-type: none"> <li>• Teacher professional development approaches should be sustained at all levels of education, and this should be integrated at in-service and pre-service levels.</li> <li>• There should be training (pre-service/in-service) of all teachers with ICT skills.</li> <li>• The training should be comprehensive training on ICT integration (why are teachers in training still using analogue lesson plans?)</li> </ul>

<p><b>INSTITUTIONALIZATION &amp; CERTIFICATION</b></p> <ul style="list-style-type: none"> <li>• Because in-service training will be ad-hoc dependent on school and ministry budget fluctuations, it needs to be regularized and institutionalized so that it is done at regular intervals.</li> </ul>	<p><b>INSTITUTIONALIZATION &amp; CERTIFICATION</b></p> <ul style="list-style-type: none"> <li>• The government should ensure that teacher professional development entails a blended approach to capacity building.</li> <li>• Each sub-county should establish an ICT centre for collaboration and sharing of ICT ideas and resources by teachers and students</li> <li>• Increase funding to ICT training at school level/in-service and personnel remuneration</li> <li>• Research, monitoring and evaluation of the skills and competencies attained is key to success of the programme.</li> </ul>
<p><b>Curriculum and Content</b></p>	
<p><b>DIGITAL CONTENT IN THE CURRICULUM</b></p> <ul style="list-style-type: none"> <li>• Materials and resources should be designed in the way that they can integrate ICT in all subjects.</li> <li>• Curriculum developers should redesign and insert into the syllabus ICTs into teaching and learning</li> <li>• There should be a comprehensive review of the existing ICT curriculum so that ICT is not viewed as a separate entity. This review of the curriculum should cater for ICT integration in all subjects, and have ICT be seen as a separate and integrated entity</li> </ul> <p><b>DIGITAL CONTENT IN CLASSROOM PRACTICE</b></p> <ul style="list-style-type: none"> <li>• The time for all lessons should be increased from 40 minutes to 60 minutes in order to encourage integration of ICT and project-based learning</li> <li>• It is the curriculum that dictates the timetable. If the timetable is to be changed, the curriculum must be reviewed so that ICT is not taken as an optional subject. If it is made compulsory it will also be examinable</li> </ul>	<p><b>DIGITAL CONTENT &amp; TEACHER EXPERIENCE</b></p> <ul style="list-style-type: none"> <li>• There should be a nationally acceptable secondary education curriculum for pre-service and in-service ICT integration training (ICT).</li> <li>• There should be continuous professional capacity building for all teachers.</li> <li>• There needs to be motivation for both training and implementation of ICT in education.</li> </ul> <p><b>DIGITAL CONTENT &amp; LEARNER EXPERIENCE</b></p> <ul style="list-style-type: none"> <li>• Strengthen implementation of ICT integration at all levels of learning.</li> <li>• Develop digital content in all levels of education (universal content across all levels – role of KICD; teacher designed digital materials role of teacher communities and networks)</li> </ul> <p><b>DIGITAL CONTENT &amp; THE CURRICULUM</b></p> <ul style="list-style-type: none"> <li>• The curriculum should be reviewed to make it relevant and to incorporate ICT integration - to reduce or merge subjects to create time for addressing 21st century skills development.</li> <li>• The content should be regularly reviewed to eliminate obsolete information/irrelevant content.</li> <li>• Review the syllabus to ensure that the learners are skilled to handle the challenges of the 21st century.</li> <li>• Computer studies should be made a core subject for students to enhance ICT integration</li> </ul> <p><b>DIGITAL CONTENT, CLASSROOM PRACTICE, MONITORING, EVALUATION, RESEARCH AND LEARNING</b></p> <ul style="list-style-type: none"> <li>• The timetable should be reviewed to allow ICT integration in terms of time allocation.</li> <li>• Monitoring and evaluation should be carried out in integration of ICT.</li> <li>• There should be research and a platform for sharing ideas</li> </ul>

## Infrastructure and Resources

- The government has to make sure that every school has electricity and internet connectivity.
- There should be an ICT resource center in each school.
- Every school should have a well-equipped ICT room
- Resources/funds for procurement of ICT equipment should be regular and mainstreamed into the budget of the ministry of education and vocational training
- Each Tanzanian school should have reliable electricity, complete with options to switch to alternative sources of power when there is a blackout.
- Each Teachers' College should be facilitated with basic ICT equipment in order to produce teachers who are equipped with 21st century basic skills
- ICT tools and resources should be provided to students, teachers, support staff at school level – and these should be in a common pool, e.g. in the staffroom, instead of the principal's office.
- There should be training of teachers, students and support staff on proper use of ICT resources.
- The directive on the use of mobile phones and ipads in schools should be reviewed; especially during exams periods for teachers
- Schools should invest in appropriate ICT equipment (that includes the government determining a ratio of ICT equipment/resources to students) e.g. solar powered bus with ICT computers that go from village school to village school.
- Strategies for pooling and sharing of ICT resources/ideas to boost connectivity should be developed. e.g. purchasing masts, programmes, software, etc.
- Students' contribution: Make internet connectivity resources available for every student
- Students' contribution: The administration should add more equipment for ICT learning.
- All stakeholders to provide funds for adequate and efficient ICT resources at all levels of education. There needs to be mobilization of resources.
- The government should avail electricity to all schools, and then the school management should ensure backups and power outlets in all teaching and learning rooms.
- School management should ensure internet connectivity to all departments and classrooms; and can bring on broad corporate well-wishers (eg. Safaricom) for support.
- Schools should prioritize the construction of ICT rooms

### 3. WRAP UP AND WAY FORWARD

#### 3.1 Participant Exit Evaluation

At the end of each workshop in the two countries, participant’s reaction to the content and facilitation processes was measured through a questionnaire. On being asked how the policy recommendations workshop was carried out, 93% of the participants felt that the approach was very thorough as shown in figure 1.

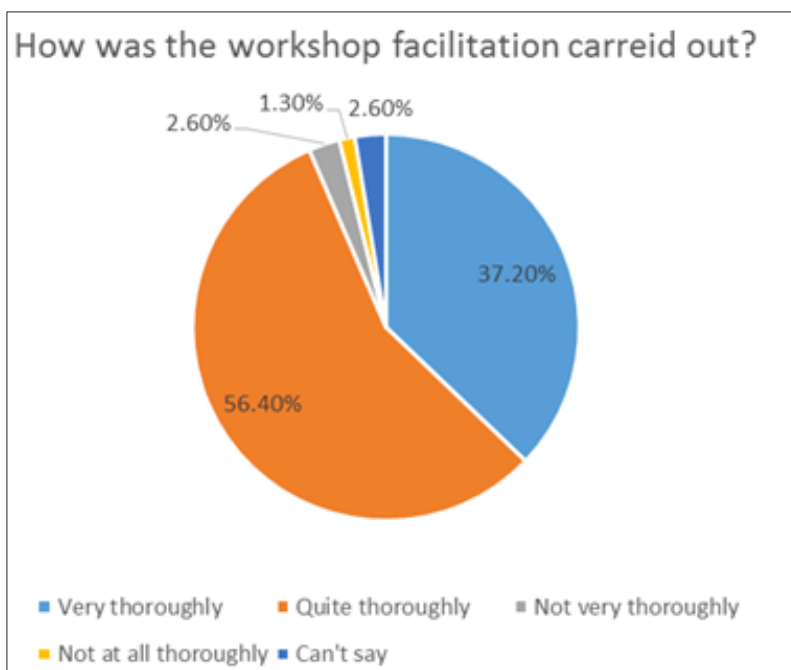


Figure 1: Quality of workshop facilitation process

On relevance of the policy ideas and recommendations to the schools represented, 85% of the participants indicated that they were very relevant as presented in Figure 2.

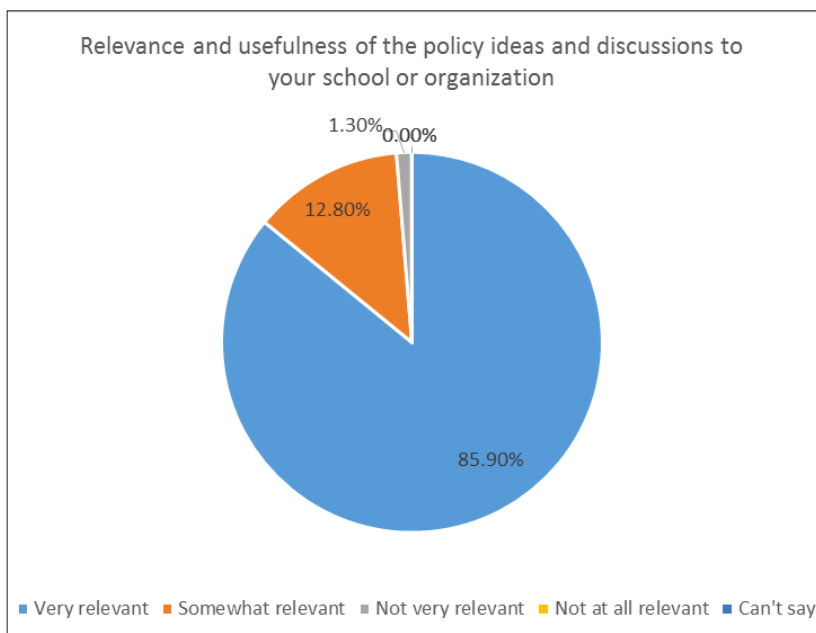


Figure 2: Relevance and usefulness of policy ideas and recommendations

The participants were also asked to make recommendations on measures that would ensure effective integration of ICT integration in Secondary schools as presented in Figure 3.

The participants felt that school-based professional development for ICT use, availability of internet access and budgetary allocation for ICT resources in the context of whole-school planning for ICT integration would contribute most to the success of any ICT integration measures at school level.

Recognition and motivation for both teachers and students was also seen as an important component to promote the seamless use of ICT in curriculum content delivery. Connecting schools was given the least priority most probably because they must have felt that “they should have put their house in order first before reaching out to others”.

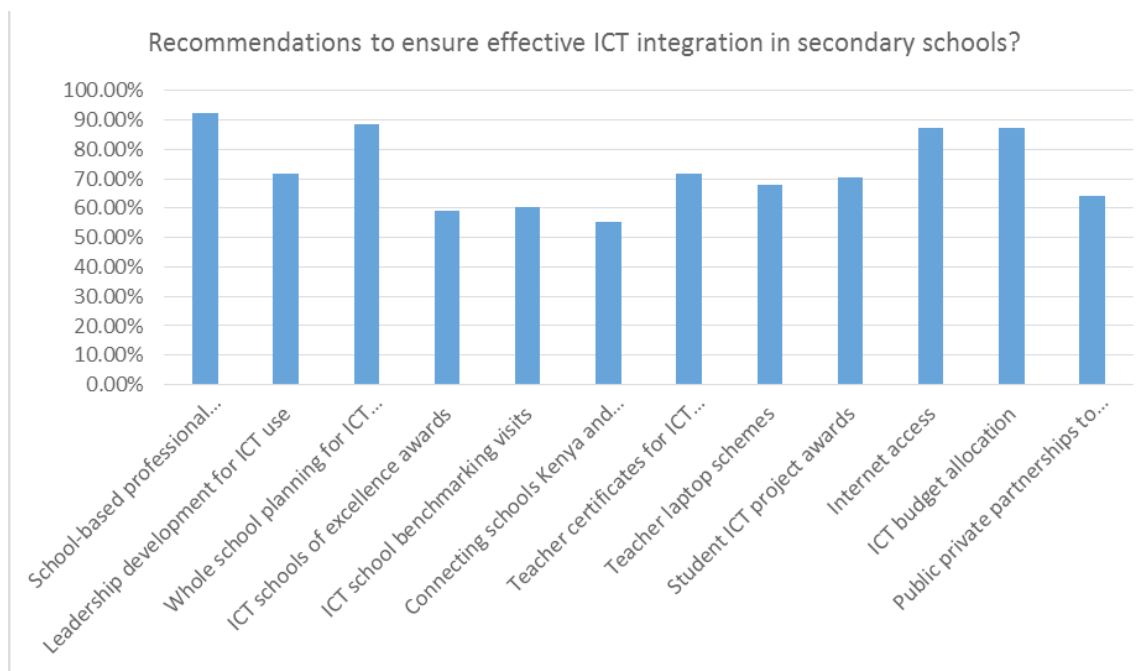


Figure 3: Recommendations for effective ICT use in Schools

See [appendix 4A](#) for a more detailed account of the exit survey summary.

## 4. PARTICIPANT IMPACT STORIES

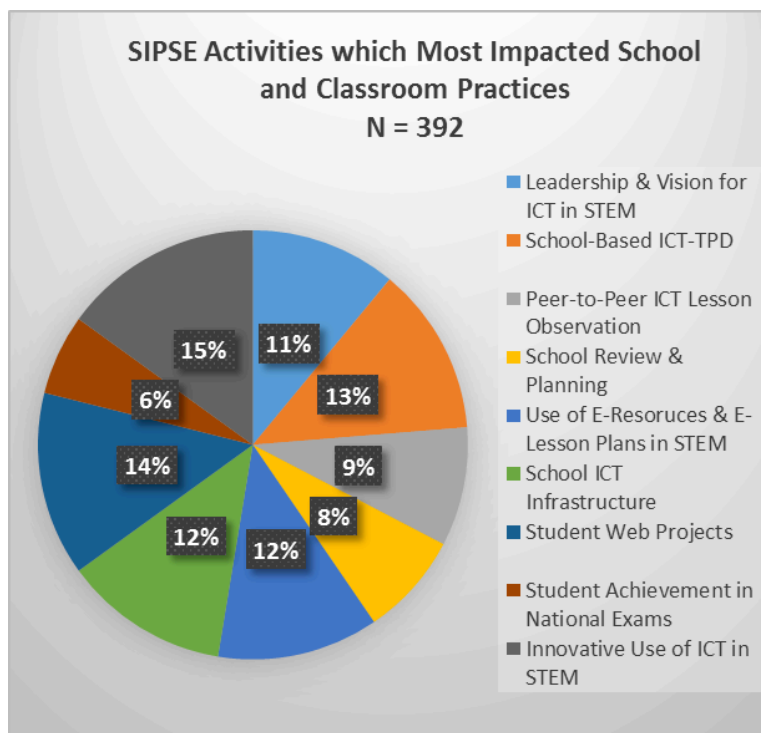


Figure 4: Most impactful SIPSE activities

An impact story survey was completed by participants during the policy forums in Kenya and Tanzania. The survey set out to assess the most significant impact that the SIPSE project contributed to in relation to ICT use by teachers and schools to support STEM teaching and learning. Participants provided impact stories in terms of 'what' was the most significant aspect of the project impact, 'who' was impacted and 'how' did SIPSE contribute to the impact.

On a question about what SIPSE activity areas had the most significant impact on ICT use in the schools and classroom practices, it was possible to identify 6 key areas from the % distribution pattern of the 392 participant responses, namely: *leadership & vision for ICT in STEM* (11%), *school ICT infrastructure* (12%), *e-resources and e-lesson plans in STEM* (12%), *school based ICT teacher professional development* (13%), *student webquest projects* (14%) and experimenting with *innovative use of ICT in STEM teaching and learning* (15%) (Figure 4).

The participant impact stories mirrored the patterns of their ratings of the SIPSE most significant activity areas that affected individual student, teacher and school practices - as per the examples below.

**A student impact story perspective:** "SIPSE has enabled me as a student to learn new different things which at first I was not aware of them, also helped to learn new skills of interaction between people whereby I have understood the importance of cooperation to me as a student."

**A teacher impact story perspective:** "It has revolutionized learning by captivating the learner's attention and participation; made teaching and learning friendly; helped us overcome the challenges of teaching abstract concepts."

**A head teacher impact story perspective:** "This was an eye-opener to the teaching profession.

...The teachers' ICT knowledge and skills were sharpened...

...Learner: Enthusiastic learning, also became experts in searching for information...

...Whole school: The entire school has positively taken in ICT; and attempted integrating it in teaching and learning..."



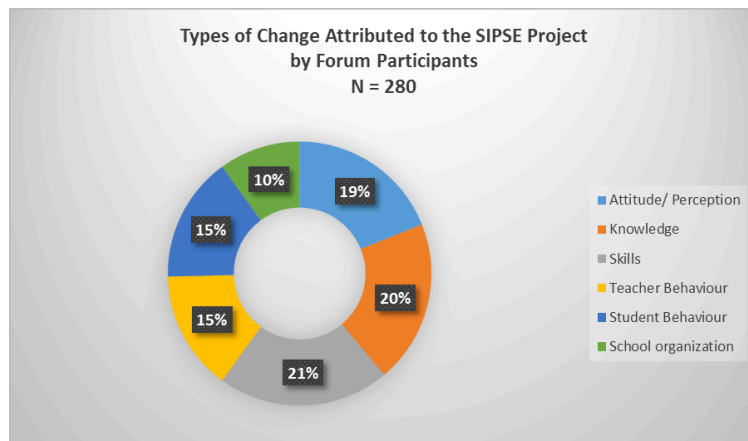


Figure 5: Types of significant change attributed to SIPSE

Participant response patterns attributed the most significant changes brought about by the SIPSE project as linked to the categories of *attitude* (19%), *knowledge* (20%) and *skills* (21%) – with changes in *teacher behavior* (15%) and *student behavior* (15%) coming in as slightly less significant and *school organization* (10%) as the least significant change domain (Figure 5).

Many participant final comments in the survey reflected the most significant change types attributed to SIPSE – see below.

*"...Demystifying the use of ICT materials in teaching and learning. Changing the perception by teachers on the use of ICT-integrated lesson plans"... "The use of ICT in the classroom was monumental since prior to this, the computer lab was thought to be for the ICT teachers and their students"... "Online training, chats and forums. Face-to-face workshops"... "It brings awareness and understanding to both teachers and students on the use of ICT equipment..."*

See [appendix 4B](#) for a more detailed account of the impact story survey

## 5. NEXT STEPS

This report will be disseminated to various audiences and stakeholder groups in different formats and through various channels of communication. All the SIPSE alumni teachers will receive a copy of the report through their email addresses. The ministry of education in Kenya and Tanzania will receive summaries of key recommendations in soft copies through a link but also in hard copies. The report will also be made available on the GESCI website with a brief write up with follow-up posts on social media. A brief of the recommendations coming from this project will also form part of the regular GESCI communications and publicity package for future events and projects. The recommendations will also be shared in any upcoming scaled-up phase of the project as a basis for implementation of future projects and course correction in the two countries.

## 6. POLICY FORUM DOCUMENTATION & MEDIA ARTEFACTS

See [appendix 5](#) for links to multi-media artefacts collected across regional and national policy forum – facebook/ twitter / photos etc.

The SIPSE project video is available at <https://www.youtube.com/watch?v=jfpfKqwwvzI&feature=youtu.be>

## APPENDIX 1: PROGRAMMES FOR THE REGIONAL AND NATIONAL FORUMS

### REGIONAL POLICY WORKSHOPS

28 April 2015 – BUTIMBA TEACHERS' COLEGE - MWANZA

7 May 2015 - TOP CLIFF LODGE - NAKURU

8 May 2015 – MUMBUNI BOYS HIGH SCHOOL

### INTRODUCTION

The Strengthening Innovation and Practice in Secondary Education (SIPSE) Project has been running from July 2013 to May 2015 to pilot the innovative use of ICTs in the training of secondary school teachers. This has been done with the aim of improving their pedagogical skills and ability to integrate ICT into their teaching practice. This project was initiated with the goal of addressing the following challenges:

- a) The quality of teaching and learning in secondary schools in Science, Technology, English and Mathematics (STEM) subjects
- b) The need to make education relevant to the needs of 21st century learners by preparing them for successful working lives
- c) The in-service training of teachers in ICT Integration in STEM subjects
- d) The face-to-face training model that takes a lot of staff time away from the classroom with the highest percentage of the training cost going to accommodation and participants' welfare rather than to the learning process
- e) Offering the course in authentic teaching environments so as to unearth real challenges for evidence-based policy recommendations

The teacher-training model employed a blended learning approach, which was targeted at addressing a key challenge of in-service teacher training: how to train teachers without removing them from the classroom. Participants were trained through 5 modules that provided a range of skills from use of ICT for didactic teaching to problem-based learning to project-based learning.

All of these activities as well as other related matters brought to the fore a range of lessons learned, challenges and opportunities to be discussed in National Policy Forum.

### Objectives of the Workshop

The objective of this workshop is to develop policy recommendations on competencies and requirements for teachers to be included in national teacher training policies in the project countries and to feed into ICT-based professional development courses for teachers in general.

These would be drawn from the evaluation of the emerging models, lessons learned, and challenges and opportunities for teaching and learning in the general and beacon schools.

### Participants

The workshops participants are drawn from participating schools (Heads of Schools, team leaders, teachers, and students), Regional Education Managers (DEOs, REOs, County Education Officers and County TSC Directors), Universities offering pre-services training to the teachers, in-service teacher training institutions, and the Ministry of Education headquarters. Education stakeholders from the curriculum development institutions and in-service organizations and departments are also invited.

### The expected deliverables from this project include:

- Workshop report with the following details:
  - o Lessons learnt, challenges and opportunities
  - o Policy recommendations for ICT use in teacher professional development in Kenya and Tanzania
- Dissemination of outcomes from the forum through various channels of communication and targeted at different audiences (partners, funders, ministries of education, schools, teachers, students)

Time	Session	Facilitators/ Guidelines
<b>SESSION 1: Objective: Provide a background of the project</b>		
8:00 am – 8:30 am	Registration	Master Trainers
8:30 am – 9:00 am	Introductions	SIPSE Master Trainer
9:00 am – 9:30 am	Welcome remarks	TSC County Directors/School Heads
9:30 am – 10:00 am	Project Overview <ul style="list-style-type: none"> <li>SIPSE corporate video</li> <li>SIPSE picture profile</li> </ul>	Grace Omondi, GESCI Communications Specialist
10:00 am – 10:30 am	TEA/COFFEE BREAK	
<b>SESSION 2: Objective: Gather contributions under the thematic areas outlined below to inform policy responses on ICT use in teacher development in Kenya and Tanzania</b>		
10:30 – 11:00am	Presentation on SIPSE Monitoring and Evaluation Research and findings: What have we have learnt under the different thematic areas?	Esther Mwiyeria, SIPSE Project Manager
<b>BREAKOUT SESSIONS:</b>		
<ul style="list-style-type: none"> <li>Groups/ 4 subgroups in each breakout room - homogeneous or heterogeneous</li> <li>Small breakout groups will discuss the learnings focused around SIPSE monitoring and evaluation research findings</li> <li>Template with M&amp;E research summary briefs and questions to guide: lessons learnt; challenges; opportunities; guidelines for discussion/ generating policy ideas/ recommendations</li> </ul>		
11:00am – 12:20pm <i>Discussion on ideas for policy support requirements and recommendations for school leadership, vision and planning for ICT use</i>	<b>Leadership and planning:</b> <ul style="list-style-type: none"> <li><i>Understanding the vision and planning for ICT use at secondary school level: What is the focus of ICT use at school level – setting up of equipment or planning for ICT integration across the curriculum - what are the monitoring and evaluation reports telling us?</i></li> <li><i>Exploring the options for ICT integration for knowledge deepening: How should school timetabling cater more/better for a shift from didactic to problem-based and project-based learning, and how could that be done? What are the implications for a school's vision and planning for ICT use across the curriculum?</i></li> </ul>	
<i>Discussion on ideas for policy support requirements and recommendations for school teacher professional development for ICT use</i>	<b>Teacher professional development:</b> <ul style="list-style-type: none"> <li><i>Understanding the landscape of blended professional learning that is school based: How can schools and national institutions support school-based professional development? What are the lessons we can learn from school based CPD through blended learning models?</i></li> <li><i>Discussion on teacher options for participation in ICT continuous professional development: Should teachers who participate in future project activities have more flexibility to engage in continuous professional development while teaching?</i></li> <li><i>Exploring the issues of course certification: How can SIPSE's competency-based teacher professional development be recommended for ICT in the secondary curriculum and the content integrated into national frameworks for teacher certification?</i></li> </ul>	
<i>Discussion on ideas for policy support requirements and recommendations for ICT in the secondary curriculum and content</i>	<b>Curriculum and content:</b> <ul style="list-style-type: none"> <li><i>Understanding the status of ICT integration in the curriculum in secondary schooling practice: What is the focus of ICT use in the secondary curriculum to support and improve teaching practice and student learning outcomes – what are the monitoring and evaluation reports telling us?</i></li> <li><i>Planning for ICT integration for student knowledge deepening and creation outcomes: Are there any assessment and curriculum changes required to facilitate shifts form didactic to problem- and project-based learning?</i></li> </ul>	

Discussion on ideas for policy support requirements and recommendations for ICT in the secondary curriculum and content	<b>Infrastructure and resources:</b> <ul style="list-style-type: none"> <li>• <i>Understanding the status of ICT infrastructure and resources in the secondary schools:</i> What is the focus of ICT procurement in secondary levels – a basic level of ICT purchasing ad hoc or an integrated approach that takes into account the full total cost of ownership (TCO) of ICT equipment and technical support – what are the monitoring and evaluation reports telling us?</li> <li>• <i>Enabling conditions:</i> What are the enabling conditions in terms of infrastructure and technical resources that need to be set up in schools in order to promote ICT integration across curriculum subjects?</li> </ul>	
12:20 pm – 1:00 pm	Group feedback and reporting (10 minutes per group) What were the 2-3 recommendations that came out of each thematic area? (5 minutes per group) <ul style="list-style-type: none"> <li>• Validation by a panel that contributes/ comments on the feedback provided</li> <li>• Validation in plenary by all</li> </ul>	Master Trainers/GESCI
1:00pm – 2:00pm	LUNCH	
2:00 pm – 3:30pm	Project-based learning presentations - Schools 1 to 5	<ul style="list-style-type: none"> <li>• SIPSE Master Trainer/s</li> <li>• Team Leaders</li> </ul> <i>NB: Participants will have an evaluation rubric for providing feedback</i>
3:30pm – 4:00 pm	TEA/COFFEE BREAK	
<b>SESSION 3: Objective: Recognition of the partnerships with all SIPSE implementation stakeholders</b>		
4:00 pm – 4:30pm	Presentations of awards	<ul style="list-style-type: none"> <li>• Partners/sponsors</li> <li>• Esther Mwiyeria, SIPSE Project Manager</li> </ul>
4:30 pm	DEPARTURE	

## NATIONAL POLICY WORKSHOPS

29 April 2015 – New Mwanza Hotel – MWANZA, TANZANIA

14 May 2015 – Kenya School of Government – NAIROBI, KENYA

## INTRODUCTION

The Strengthening Innovation and Practice in Secondary Education (SIPSE) Project has been running from July 2013 to May 2015 to pilot the innovative use of ICTs in the training of secondary school teachers. This has been done with the aim of improving their pedagogical skills and ability to integrate ICT into their teaching practice. This project was initiated with the goal of addressing the following challenges:

- a) The quality of teaching and learning in secondary schools in Science, Technology, English and Mathematics (STEM) subjects
- b) The need to make education relevant to the needs of 21st century learners by preparing them for successful working lives
- c) The in-service training of teachers in ICT Integration in STEM subjects
- d) The face-to-face training model that takes a lot of staff time away from the classroom with the highest percentage of the training cost going to accommodation and participants' welfare rather than to the learning process

- e) Offering the course in authentic teaching environments so as to unearth real challenges for evidence-based policy recommendations

The teacher-training model employed a blended learning approach, which was targeted at addressing a key challenge of in-service teacher training: how to train teachers without removing them from the classroom. Participants were trained through 5 modules that provided a range of skills from use of ICT for didactic teaching to problem-based learning to project-based learning.

All of these activities as well as other related matters brought to the fore a range of lessons learned, challenges and opportunities to be discussed in National Policy Forum.

### Objectives of the Workshop

The objective of this workshop is to develop policy recommendations on competencies and requirements for teachers to be included in national teacher training policies in the project countries and to feed into ICT- based professional development courses for teachers in general.

These would be drawn from the evaluation of the emerging models, lessons learned, and challenges and opportunities for teaching and learning in the general and beacon schools.

### Participants

The workshops participants are drawn from participating schools (Heads of Schools, team leaders, teachers, and students), Regional Education Managers (DEOs, REOs, County Education Officers and County TSC Directors), Universities offering pre-services training to the teachers, in-service teacher training institutions, and the Ministry of Education headquarters. Education stakeholders from the curriculum development institutions and in-service organizations and departments are also invited.

### The expected deliverables from this workshop include:

- Workshop report with the following details:
  - Lessons learnt, challenges and opportunities
  - Policy recommendations for ICT use in teacher professional development in Kenya and Tanzania
- Dissemination of outcomes from the forum through various channels of communication and targeted at different audiences (partners, funders, ministries of education, schools, teachers, students)

Time	Session	Facilitators/ Guidelines
<b>SESSION 1: Objective: Provide a background of the project</b>		
8:00 am – 8:30am	Registration	Master Trainers
8:30 am – 9:00am	Introductions	Esther Mwiyeria, SIPSE Project Manager
9:00 am – 9:30am	Welcome remarks from GESCI and the Ministry of Education, Science and Technology	<ul style="list-style-type: none"> <li>• Jerome Morrissey, GESCI CEO</li> <li>• Robert Masese, Director of Secondary Education</li> </ul>
9:30 am – 9:45am	Project Overview <ul style="list-style-type: none"> <li>• SIPSE project video</li> </ul>	Grace Omondi, GESCI Communications Specialist
9:45am – 10:30am	Project-based learning - Schools 1 to 4 <i>(10 minutes per group)</i>	<ul style="list-style-type: none"> <li>• Esther Mwiyeria, SIPSE Project Manager</li> <li>• SIPSE Master Trainers</li> <li>• Mary Hooker, GESCI Senior Education Specialist</li> </ul>
10:30am – 11:00 am	TEA/COFFEE BREAK	

**SESSION 2: Objective: Gather contributions under the thematic areas outlined below to inform policy responses on ICT use in teacher development in Kenya and Tanzania**

11:00 – 11: 30am	Presentation on SIPSE Monitoring and Evaluation Research and findings: What have we have learnt under the different thematic areas?	Mary Hooker, GESCI Senior Education Specialist
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**BREAKOUT SESSIONS:**

- Groups/ 4 subgroups in each breakout room - homogeneous or heterogeneous
- Small breakout groups will discuss the learnings focused around SIPSE monitoring and evaluation research findings
- Template with M&E research summary briefs and questions to guide: lessons learnt; challenges; opportunities; guidelines for discussion/ generating policy ideas/ recommendations

11:30am – 1:00pm  <i>Discussion on ideas for policy support requirements and recommendations for school leadership, vision and planning for ICT use</i>	<p><b>Leadership and planning:</b></p> <ul style="list-style-type: none"> <li>• <i>Understanding the vision and planning for ICT use at secondary school level:</i> What is the focus of ICT use at school level – setting up of equipment or planning for ICT integration across the curriculum - what are the monitoring and evaluation reports telling us?</li> <li>• <i>Exploring the options for ICT integration for knowledge deepening:</i> How should school timetabling cater more/better for a shift from didactic to problem-based and project-based learning, and how could that be done? What are the implications for a school’s vision and planning for ICT use across the curriculum?</li> </ul>
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<i>Discussion on ideas for policy support requirements and recommendations for school teacher professional development for ICT use</i>	<p><b>Teacher professional development:</b></p> <ul style="list-style-type: none"> <li>• <i>Understanding the landscape of blended professional learning that is school based:</i> How can schools and national institutions support school-based professional development? What are the lessons we can learn from school based CPD through blended learning models?</li> <li>• <i>Discussion on teacher options for participation in ICT continuous professional development:</i> Should teachers who participate in future project activities have more flexibility to engage in continuous professional development while teaching?</li> <li>• <i>Exploring the issues of course certification:</i> How can SIPSE’s competency-based teacher professional development be recommended for ICT in the secondary curriculum and the content integrated into national frameworks for teacher certification?</li> </ul>
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<i>Discussion on ideas for policy support requirements and recommendations for ICT in the secondary curriculum and content</i>	<p><b>Curriculum and content:</b></p> <ul style="list-style-type: none"> <li>• <i>Understanding the status of ICT integration in the curriculum in secondary schooling practice:</i> What is the focus of ICT use in the secondary curriculum to support and improve teaching practice and student learning outcomes – what are the monitoring and evaluation reports telling us?</li> <li>• <i>Planning for ICT integration for student knowledge deepening and creation outcomes:</i> Are there any assessment and curriculum changes required to facilitate shifts form didactic to problem- and project-based learning?</li> </ul>
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<i>Discussion on ideas for policy support requirements and recommendations for ICT in the secondary curriculum and content</i>	<p><b>Infrastructure and resources:</b></p> <ul style="list-style-type: none"> <li>• <i>Understanding the status of ICT infrastructure and resources in the secondary schools:</i> What is the focus of ICT procurement in secondary levels – a basic level of ICT purchasing ad hoc or an integrated approach that takes into account the full total cost of ownership (TCO) of ICT equipment and technical support – what are the monitoring and evaluation reports telling us?</li> <li>• <i>Enabling conditions:</i> What are the enabling conditions in terms of infrastructure and technical resources that need to be set up in schools in order to promote ICT integration across curriculum subjects?</li> </ul>
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1:00pm – 2:00pm	LUNCH	
2:00pm – 3:00pm	<p>Group feedback and reporting (10 minutes per group)</p> <p>What were the 2-3 recommendations that came out of each thematic area? (5 minutes per group)</p> <ul style="list-style-type: none"> <li>• Validation by a panel that contributes/ comments on the feedback provided</li> <li>• Validation in plenary by all</li> </ul>	Master Trainer/GESCI
<b>SESSION 3: Objective: Recognition of the partnerships with all SIPSE implementation stakeholders</b>		
3:00pm – 4:00pm	Presentation of awards	<ul style="list-style-type: none"> <li>• Partners/sponsors</li> <li>• Esther Mwiyeria, SIPSE Project Manager</li> </ul>
4:00pm	TEA / COFFEE / NETWORKING / DEPARTURE	

## APPENDIX 2: LIST OF PARTICIPANTS IN REGIONAL AND NATIONAL FORUMS

SIPSE REGIONAL POLICY WORKSHOP - 28 APRIL 2015, BUTIMBA TEACHERS' COLLEGE - MWANZA, TANZANIA			
Name	Institution	Email Address	Tel Number
GODFREY MICHAEL MUHANGWA	BUTIMBA TC	<a href="mailto:Godfreymuhangwa@Yahoo.Com">Godfreymuhangwa@Yahoo.Com</a>	0755-854001
DEVOTHA W.CHARLES	BUTIMBA TC	<a href="mailto:Deviewilly@Yahoo.Com">Deviewilly@Yahoo.Com</a>	0766-926909
SOPHIA J. NYAU	BUTIMBA TC	<a href="mailto:S.Nyau@Yahoo.Com">S.Nyau@Yahoo.Com</a>	0784-471666
DICKSON A. MPAMA	BUTIMBA TC	<a href="mailto:Mpamajr@Gmail.Com">Mpamajr@Gmail.Com</a>	0784-563045
WILLIAM L.THEONEST	BUTIMBA TC	<a href="mailto:Theonestwilliam@Gmail.Com">Theonestwilliam@Gmail.Com</a>	0756-775167
JOYCE JONJA	BWIRU GIRLS	<a href="mailto:Jonjajasmine@Yahoo.Com">Jonjajasmine@Yahoo.Com</a>	0767-179162
GOODLUCK MASHAURI	BWIRU GIRLS	<a href="mailto:Goodluckmashauri@Yahoo.Com">Goodluckmashauri@Yahoo.Com</a>	0765-705912
JICKSON MTAFYA	BWIRU GIRLS	<a href="mailto:Mtafyajickson@Yahoo.Com">Mtafyajickson@Yahoo.Com</a>	0766-540122
BARIVUNIAS CHARLES	BUSWELU SEC	<a href="mailto:Charles.Barivunias@Gmail.Com">Charles.Barivunias@Gmail.Com</a>	0769-361476
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## APPENDIX 3: OVERVIEW OF BREAK OUT GROUP DISCUSSION MAPPINGS – REGIONAL AND NATIONAL FORUMS

Four themes were discussed in the five workshops (regional and national) in Kenya and Tanzania. The themes, related to integration of ICT in secondary education are:

1. Leadership and planning
2. Teacher professional development
3. Curriculum and content
4. Infrastructure and resources

Five policy workshops were held in April and May in Tanzania and Kenya. The following are the highlights from breakout sessions and plenary discussions by the participants. This is followed by summaries of top policy recommendation ideas as selected by the participants.

LEADERSHIP AND PLANNING		
Forum	Policy ideas	Policy recommendtaions
Regional forum - Mwanza, Tanzania 28 April	<ul style="list-style-type: none"> <li>✓ ICT should be encouraged in all secondary schools like other subjects There should be a road map for the access of ICT in schools, and ICT integration at all levels</li> <li>✓ Each school should create an ICT school award system and roadmap for both teachers and students</li> <li>✓ Develop a school infrastructure that will ensure learning through ICT</li> <li>✓ School management should give counselling to parents who believe that ICT has a negative impact on their children. The leadership should teach students the proper use of using new technologies</li> <li>✓ The leadership should focus on creating departments which will provide education to people who are not aware of ICT</li> <li>✓ Leaders hold come up with a project that will improve the ICT skills of students, eg. ICT subjects ion school curriculum</li> <li>✓ The school leadership should enhance various strategies to implement the use of ICTs in schools to expand the knowledge of students</li> <li>✓ School leaders should be competent in ICT to encourage larger school cooperation</li> <li>✓ The leadership should move beyond their school to networks and share their ICT policies and good practice with the local community and other schools</li> <li>✓ The school board should be informed and engaged in ICT development and implementation</li> </ul>	<ol style="list-style-type: none"> <li>1. The school leadership should create different projects and strategies to improve the use of ICTs.</li> <li>2. The school leadership should educate on the proper use of technology to avoid negative impact on the students</li> </ol>
National forum - Mwanza, Tanzania 29 April	<ul style="list-style-type: none"> <li>✓ The ministry of education should encourage more use of ICTs in schools.</li> <li>✓ The ministry of education and vocational training should promote teachers' professional development to enhance the implementation of curriculum objectives by increasing teachers' allowances, and provide training and learning environments that supports technology.</li> <li>✓ The government should put more emphasis on developing ICT infrastructure as it has done on laboratories and science books.</li> </ul>	<ol style="list-style-type: none"> <li>1. Schools should have an action plan to implement the use and application of ICT as a tool for teaching and learning.</li> <li>2. There should be a clear focus on building ICT competencies, which encourages the learners to be self-sufficient in life.</li> <li>3. Just like English is used in communication for all subjects while still being a separate subject, ICT should also be integrated in all subjects and can still be a subject on its own.</li> </ol>

Emerging points during plenary discussion:

- ✓ The school leadership should make deliberate follow-up and put in place monitoring mechanisms on ICT integration in the curriculum in their schools.
- ✓ The school leadership should create an environment that is conducive for ICT integration. This would serve as motivation for teachers to promote ICT integration in their classes.

<p><b>Regional forum - Nakuru, Kenya</b> 7 May</p>	<ul style="list-style-type: none"> <li>✓ There should be support from the school administration through making ICT tools directly accessible to teachers and students as well as encouraging cooperation from all departments in the school in ICT matters.</li> <li>✓ Schools should have clear achievable objectives of ICT use.</li> <li>✓ ICT should be a component of the school strategic plan.</li> <li>✓ ICT should be given a larger vote head in the ministry of education and in schools</li> <li>✓ Computer studies should be mandatory in all secondary schools.</li> <li>✓ ICT integration in teaching should be a compulsory unit during teacher training.</li> <li>✓ All teachers should have regularly in-service training.</li> <li>✓ Heads of institutions and managers should undergo mandatory ICT training so that they can help establish ICT infrastructure.</li> </ul>	<p>The school management should have:</p> <ol style="list-style-type: none"> <li>1. Clear objectives and an implementation plan (strategy that highlights these) of ICT integration in teaching and learning process</li> <li>2. Capacity-building for teachers and support staff on ICT use</li> <li>3. Provision of sufficient and efficient infrastructure for ICT integration</li> </ol>
<p><b>Regional forum - Machakos, Kenya</b> 8 May</p>	<ul style="list-style-type: none"> <li>✓ 20% of school tuition budget should go to ICT integration for the next 5 years.</li> <li>✓ Each department should come up with an ICT project-based task to be completed within a given period of time.</li> <li>✓ There needs to be continuous and relevant training on ICT for all teachers and administrators.</li> </ul>	<ol style="list-style-type: none"> <li>1. 20% of school tuition budget should go to ICT integration for the next 5 years.</li> <li>2. Each department should come up with an ICT project-based task to be completed within a given period of time.</li> <li>3. There needs to be continuous and relevant training on ICT for all teachers and administrators.</li> </ol>
<p><b>National forum – Nairobi Kenya</b> 14 May</p>	<ul style="list-style-type: none"> <li>✓ The ministry should ensure that all headteachers are trained on the importance of ICT and then equipped with the necessary ICT skills and knowledge.</li> <li>✓ The leadership should plan, budget and allocate funds for ICT projects to ensure adequate resources for ICT infrastructure.</li> <li>✓ School leadership should support teacher professional development and in-service training in ICT.</li> <li>✓ The leadership should emphasize on the integration of ICT in teaching and learning.</li> <li>✓ There needs to be supervision on how ICT integration is being carried out.</li> <li>✓ Schools should have a vision and a strategic plan for ICT integration.</li> <li>✓ The leadership should increase lesson duration to allow teachers more time to impart skills to the learners</li> </ul>	<p>Main policy ideas as discussed and voted in plenary (in descending order – highest voted first):</p> <ol style="list-style-type: none"> <li>1. Headteachers at county and national level should be sensitized on importance of ICT integration in teaching and learning.</li> <li>2. Teacher training institutions should incorporate and review the ICT integration course in the curriculum.</li> <li>3. A plan should be developed for human resource training on emerging ICT trends.</li> <li>4. An ICT integration plan should be incorporated in the school strategic plan.</li> <li>5. Resources should be mobilized for ICT infrastructure.</li> </ol>

	<ul style="list-style-type: none"> <li>✓ The school leadership should participate in ICT integration.</li> <li>✓ The leader (school heads) and board of management should organize and coordinate integration of ICT and then ensure that what is agreed upon is implemented.</li> </ul>	
<p><i>Emerging points during the discussion:</i></p> <ul style="list-style-type: none"> <li>✓ <i>There are ICT vote heads in the current fee structure. The government should review the current fee structure and work with the schools.</i></li> <li>✓ <i>Merging ICT policies into the school ICT plans is not a good idea, as it is likely to become a casualty of resources when there are other bigger priorities. There is need for a stand-alone ICT strategy until one is established by the government.</i></li> <li>✓ <i>Partnerships with private sector should be explored</i></li> </ul>		



## TEACHER PROFESSIONAL DEVELOPMENT

Forum	Policy ideas	Policy recommendations
Regional forum - Mwanza, Tanzania 28 April	<ul style="list-style-type: none"> <li>✓ Teachers should be trained frequently (in-service) and take short courses to build confidence.</li> <li>✓ To build capacity of teachers and keep them updated with technology after every two years</li> <li>✓ Teachers should be well-trained in ICT integration</li> <li>✓ There should be annual seminars for teachers on ICT integration in the teaching and learning process.</li> <li>✓ There should be higher frequency of in-service training so as to explore the challenges in ICT integration</li> <li>✓ Teachers in colleges and universities should be trained on how to use ICT in teaching and learning</li> <li>✓ Teachers should be encouraged to constantly seek more knowledge on use of ICT tools</li> </ul>	<ol style="list-style-type: none"> <li>1. To build capacity to teachers and keep them regularly updated with ICT.</li> <li>2. Student teachers should be trained on how to integrate ICT in teaching their subjects. This will develop their confidence.</li> </ol>
National forum - Mwanza, Tanzania 29 April	<ul style="list-style-type: none"> <li>✓ ICT training should be made compulsory at all levels of teacher training (diploma, bachelor)</li> <li>✓ The capacity of in-service teachers should be built, and they should be kept updated with emerging technologies</li> <li>✓ The government should set an adequate budget on ICT based training for both in-service and pre-service teachers</li> </ul>	<p>Main policy ideas:</p> <ol style="list-style-type: none"> <li>1. Because in-service training will be ad-hoc dependent on school and ministry budget fluctuations, it needs to be regularized and institutionalized so that it is done at regular intervals.</li> <li>2. ICT integration should be seen as a priority subject in teacher pre-service training so that every graduate coming out of teacher training colleges is skilled. If ICT training is made a part of the pre-service training curriculum, there would be no need for 'extra' activities to skill teachers afresh, and instead the focus would be on refresher courses during in-service training.</li> </ol>
<p><i>Emerging points during plenary discussion:</i></p> <ul style="list-style-type: none"> <li>✓ Certificate level training for teachers is no longer done in Tanzania.</li> <li>✓ ICT training should be made compulsory and ICT integration a priority at all levels and subjects of education (administration, teachers, school managers)</li> </ul>		
Regional forum - Nakuru, Kenya 7 May	<ul style="list-style-type: none"> <li>✓ ICT should be an integral part in all teacher training colleges. A clear and practical approach on ICT integration during teacher training programmes should be incorporated. This should be followed by a thorough evaluation during training to ensure that teachers are well skilled. During the training teachers should be encouraged to develop their materials and share them for peer review and improvement.</li> <li>✓ One of the requirements for teacher recruitment should be ICT compliance in order to enhance the teaching and learning process. Those that are ICT compliant should have relatively better remuneration.</li> <li>✓ Teachers should be given a phased in-service course in ICT integration. ICT should be made a mandatory course for practising teachers.</li> <li>✓ Teachers should be sensitised about the need to integrate ICT in the teaching and learning process.</li> </ul>	<p>Main policy ideas as discussed in plenary:</p> <ol style="list-style-type: none"> <li>1. The terms of service for a 21st century teacher needs to be reviewed – what has changed for teaching profession in this century? The 21st century teachers has increased demands and therefore the remuneration needs to match</li> <li>2. Pre-service and in-service teachers be given comprehensive training on ICT integration (why are teachers in training still using analogue lesson plans?)</li> <li>3. Increase funding to ICT training at school level/in-service and personnel remuneration</li> </ol>

	<ul style="list-style-type: none"> <li>✓ Schools should be funded to involve teachers in use of ICT and undergo training on the use of ICT equipment.</li> <li>✓ There should be exchange programmes for teachers with partners who have fully implemented ICT.</li> <li>✓ Every teacher should continuously undertake a professional teacher development course in the use of ICT.</li> <li>✓ The Teachers Service Commission (TSC) should recognise the SIPSE course as a teacher development course and award accordingly.</li> </ul>	
<b>Regional forum - Machakos, Kenya</b> 8 May	<ul style="list-style-type: none"> <li>✓ There should be training (pre-service/in-service) of all teachers with ICT skills.</li> <li>✓ Teachers need to be open-minded to use new technologies in integration of ICT.</li> <li>✓ Each sub-county should establish an ICT centre for collaboration and sharing of ICT ideas and resources by teachers and students.</li> </ul>	<ol style="list-style-type: none"> <li>1. There should be training (pre-service/in-service) of all teachers with ICT skills.</li> <li>2. Teachers need to be open-minded to use new technologies in integration of ICT.</li> <li>3. Each sub-county should establish an ICT centre for collaboration and sharing of ICT ideas and resources by teachers and students</li> </ol>
<b>National forum – Nairobi Kenya</b> 14 May	<ul style="list-style-type: none"> <li>✓ After training, teachers should be provided with continuous support and opportunities for knowledge deepening, workshops, refresher courses, short courses.</li> <li>✓ Will GESCI follow up the SIPSE course with knowledge deepening for this that are one certified? What is the future of SIPSE alumni?</li> <li>✓ Each teacher should be equipped with a laptop.</li> <li>✓ Training in ICT should be compulsory from class 1.</li> <li>✓ Online training should be encouraged so that teachers can take advantage of digital content for teaching and learning.</li> <li>✓ A performance-based reward scheme should be considered for teachers successfully integrating ICT in their lessons. This could include promotion, commendations, recognition.</li> <li>✓ Teachers should only specialize in three subjects – and one of these should be ICT</li> <li>✓ Teachers should be encouraged to collaborate with each other.</li> </ul>	<p>Main policy ideas as discussed and voted in plenary (in descending order – highest voted first):</p> <ol style="list-style-type: none"> <li>1. Teacher professional development approaches should be sustained at all levels of education, and this should be integrated at in-service and pre-service levels.</li> <li>2. Research, monitoring and evaluation of the skills and competencies attained is key to success of the programme.</li> <li>3. The government should ensure that teacher professional development entails a blended approach to capacity building.</li> <li>4. There needs to be motivation for both training and implementation of ICT in education.</li> </ol>

**CURRICULUM AND CONTENT**

Forum	Policy ideas	Policy recommendations
Regional forum - Mwanza, Tanzania 28 April	<ul style="list-style-type: none"> <li>✓ Materials should be designed in a way that they can help the student interact with ICT</li> <li>✓ All students must be taught using ICT integration.</li> <li>✓ All student exercises and presentations should involve ICT tools.</li> <li>✓ The curriculum designer should make the plan on seminar about ICT integration.</li> <li>✓ All teachers should be trained to be competent in the use of ICT resources and encouraged to use ICT in teaching and learning.</li> </ul>	<p>Main policy ideas:</p> <ol style="list-style-type: none"> <li>1. Materials and resources should be designed in the way that they can integrate ICT in all subjects.</li> <li>2. Curriculum developers should redesign and insert into the syllabus ICTs into teaching and learning</li> <li>3. The time for all lessons should be increased from 40 minutes to 60 minutes in order to encourage integration of ICT and project-based learning.</li> </ol>
National forum - Mwanza, Tanzania 29 April	<ul style="list-style-type: none"> <li>✓ Review and adjust timetabling to allow for integration of ICT in all subjects. This takes longer than the currently allocated 40 minutes - lessons could be blocked so that lessons that require ICT integration get a double lesson.</li> <li>✓ ICT should be part of the curriculum of taught subjects and not a 'specialized course'.</li> <li>✓ Student teachers in training colleges should be trained on the uses and application of ICT.</li> </ul>	<ol style="list-style-type: none"> <li>1. There should be a comprehensive review of the existing ICT curriculum so that ICT is not viewed as a separate entity. This review of the curriculum should cater for ICT integration in all subjects, and have ICT be seen as a separate entity</li> <li>2. It is the curriculum that dictates the timetable. If the timetable is to be changed, the curriculum must be reviewed so that ICT is not taken as an optional subject. If it is made compulsory it will also be examinable.</li> </ol>
	<p>Emerging points during plenary discussion:</p> <ul style="list-style-type: none"> <li>✓ ICT is already in the national curriculum at primary (TEHAMA) and secondary (ICS) levels.</li> <li>✓ There needs to be broader thinking to understand that ICT integration could very well be beyond just computers, to the use of other media like radio, TV, mobile phones.</li> </ul>	
Regional forum - Nakuru, Kenya 7 May	<ul style="list-style-type: none"> <li>✓ Teachers should be involved in writing/developing the syllabus for all subjects.</li> <li>✓ The curriculum should be the same for the same level of training.</li> <li>✓ Teachers should be involved in developing the ICT integration curriculum.</li> <li>✓ Extra time for more student activities out of the normal time-table should be created.</li> <li>✓ There should be workshops for teachers every 5 years to evaluate if the syllabus is still relevant, and if there are any areas to be updated.</li> </ul>	<p>Main policy ideas as discussed in plenary:</p> <ol style="list-style-type: none"> <li>1. There should be a nationally acceptable secondary education curriculum for pre-service and in-service ICT integration training (ICT).</li> <li>2. The timetable should be reviewed to allow ICT integration in terms of time allocation.</li> <li>3. The content should be regularly reviewed to eliminate obsolete information/irrelevant content.</li> </ol>
Regional forum - Machakos, Kenya 8 May	<ul style="list-style-type: none"> <li>✓ The curriculum should be reviewed to reduce or merge subjects to create time for addressing 21st century skills development.</li> <li>✓ Review the syllabus to ensure that the learners are skilled to handle the challenges of the 21st century.</li> <li>✓ Computer studies should be made a core subject for students to enhance ICT integration.</li> </ul>	<ol style="list-style-type: none"> <li>1. The curriculum should be reviewed to reduce or merge subjects to create time for addressing 21st century skills development.</li> <li>2. Review the syllabus to ensure that the learners are skilled to handle the challenges of the 21st century.</li> <li>3. Computer studies should be made a core subject for students to enhance ICT integration.</li> </ol>

<p><b>National forum – Nairobi Kenya</b> 14 May</p>	<ul style="list-style-type: none"> <li>✓ The curriculum should be regularly revised to ensure that it is up-to-date and relevant. There should be a revision of the already prepared curriculum material.</li> <li>✓ The syllabus and curriculum should be reviewed to adequately accommodate ICT integration.</li> <li>✓ Digital/e-content should be developed for all subjects.</li> <li>✓ Content learnt through online channels should be evaluated.</li> <li>✓ Content delivery should be through ICT tools and this content posted online.</li> <li>✓ ICT integration should be captured at all levels of education.</li> <li>✓ Training in teacher colleges should include integration of ICT, and in-service teachers should get refresher courses on ICT skills.</li> <li>✓ Teachers should be engaged in content research using ICT in their subject areas.</li> <li>✓ The ministry of education should support the implementation of ICT integration and enable teachers to acquire the necessary equipment.</li> </ul>	<p>Main policy ideas as discussed and voted in plenary (in descending order – highest voted first):</p> <ol style="list-style-type: none"> <li>1. Strengthen implementation of ICT integration at all levels of learning.</li> <li>2. The curriculum should be reviewed to make it relevant and to incorporate ICT integration.</li> <li>3. There should be continuous professional capacity building for all teachers.</li> <li>4. There need to be motivation for both training and implementation of ICT in education.</li> <li>5. Develop digital content in all levels of education (universal content across all levels – role of KICD).</li> <li>6. There should be research and a platform for sharing ideas.</li> <li>7. Monitoring and evaluation should be carried out in integration of ICT.</li> </ol>
	<ul style="list-style-type: none"> <li>✓ Emerging point during discussions: Is it the role of KICD to provide content for all schools? KICD to spearhead and take the lead and then other stakeholders should support the process</li> </ul>	

CURRICULUM AND CONTENT

Forum	Policy ideas	Policy recommendations
Regional forum - Mwanza, Tanzania 28 April	<ul style="list-style-type: none"> <li>✓ Every school should have an ICT room like the way of introducing the construction of laboratories to all schools in the country</li> <li>✓ All classroom content should be found in soft copy (CDs and DVDs) instead of books.</li> <li>✓ Every school should have enough teaching materials such as projectors, laptops, flip charts, etc</li> <li>✓ The government has to make sure that every school has electricity and internet connectivity.</li> <li>✓ Every classroom should have a computer and internet access.</li> <li>✓ ICT infrastructure should be easily available for better learning and teaching process in schools.</li> </ul>	<p>Main policy ideas:</p> <ol style="list-style-type: none"> <li>1. The government has to make sure that every school has electricity and internet connectivity.</li> <li>2. There should be an ICT resource centre in each school.</li> <li>3. Every school should have a well equipped ICT room.</li> </ol>
National forum - Mwanza, Tanzania 29 April	<ul style="list-style-type: none"> <li>✓ Every teachers' training college should have a dedicated ICT room with complete ICT infrastructure. The school and community around should be sensitized on the need to contribute towards ICT infrastructure.</li> <li>✓ Partnerships should be initiated with developed countries and NGOs who can provide grants and loans to promote the availability of this infrastructure and related resources.</li> <li>✓ All teachers and tutors should be facilitated with an environment to enable them conduct research to develop innovative pedagogical approaches and methodologies in ICT-based teaching and learning methods.</li> </ul>	<p>Main policy ideas:</p> <ol style="list-style-type: none"> <li>1. Resources/funds for procurement of ICT equipment should be regular and mainstreamed into the budget of the ministry of education and vocational training</li> <li>2. Each Tanzania school should have reliable electricity, complete with options to switch to alternative sources of power when there is a blackout.</li> <li>3. Each teachers training college and schools should be facilitated with basic ICT equipment in order to produce teachers who are equipped with 21st century basic skills.</li> </ol>
	<ul style="list-style-type: none"> <li>✓ The government should assist schools to build ICT infrastructure and provide enough computers according to the number of the students in each school.</li> <li>✓ All classrooms should be modernized and fitted with electricity.</li> <li>✓ The government should create citizen awareness on the importance of ICT infrastructure by facilitating small scale industries to adopt better technology.</li> <li>✓ There is need for training to enable teachers and students to know the use of ICT infrastructure and related resources.</li> <li>✓ All schools should have wireless and wired network for students and teachers to access online learning materials.</li> </ul>	
	<p>Emerging points during plenary discussion:</p> <ul style="list-style-type: none"> <li>✓ The basic requirement for all teachers' colleges at inception and launch should be that they must have basic ICT infrastructure and equipment. However, this 'basic' ICT equipment needs to be defined – what does 'basic' mean? Two laptops? Three projectors?</li> </ul>	

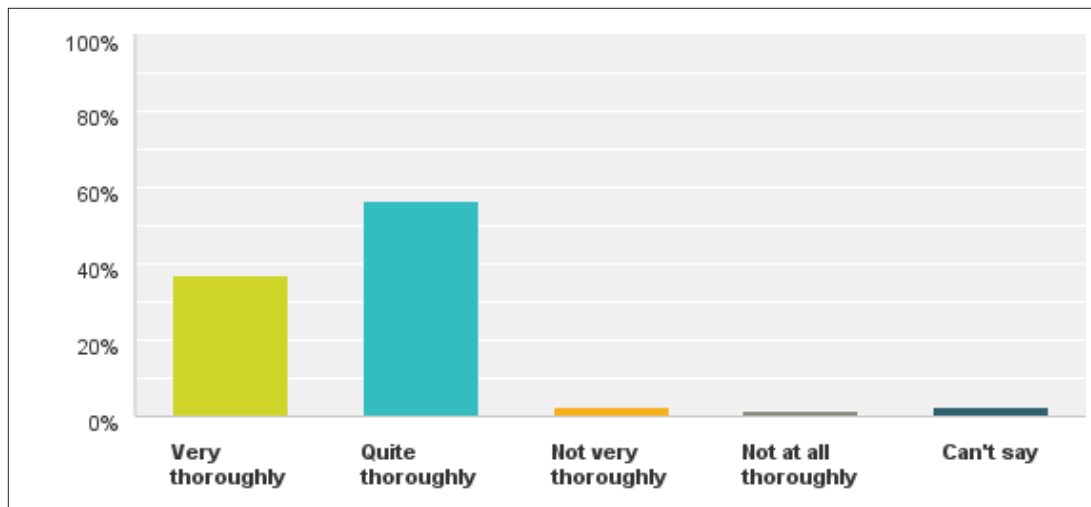
<p><b>Regional forum - Nakuru, Kenya</b> 7 May</p>	<ul style="list-style-type: none"> <li>✓ The government should ensure that all teachers are equipped with laptops/tablets.</li> <li>✓ The ICT infrastructure in schools should be improved or be provided.</li> <li>✓ There is need for more funding from the government to purchase ICT materials in schools</li> <li>✓ Parents and the board of management of schools should be involved in the ICT infrastructure development of their schools.</li> <li>✓ School should ensure that ICT infrastructure and resources are insured.</li> <li>✓ Students' contribution: Make internet connectivity resources available for every student</li> <li>✓ Students' contribution: The administration should add more equipment for ICT learning.</li> </ul>	<p>Main policy ideas as discussed in plenary:</p> <ol style="list-style-type: none"> <li>1. ICT tools and resources should be provided to students, teachers, support staff at school level – and these should be in a common pool, e.g. in the staffroom, instead of the principal's office.</li> <li>2. There should be training of teachers, students and support staff on proper use of ICT resources.</li> <li>3. The directive on the use of mobile phones and ipads in schools should be reviewed; especially during exams periods for teachers</li> </ol>
<p><b>Regional forum - Machakos, Kenya</b> 8 May</p>	<ul style="list-style-type: none"> <li>✓ Schools should invest in appropriate ICT equipment (that includes the government determining a ratio of ICT equipment/resources to students) e.g. solar powered bus with ICT computers that go from village school to village school.</li> <li>✓ Strategies for pooling and sharing of ICT resources/ ideas to boost connectivity should be developed. e.g. purchasing masts, programmes, software, etc.</li> </ul>	<ol style="list-style-type: none"> <li>1. Schools should invest in appropriate ICT equipment (that includes the government determining a ratio of ICT equipment/resources to students) e.g. solar powered bus with ICT computers that go from village school to village school.</li> <li>2. Strategies for pooling and sharing of ICT resources/ideas to boost connectivity should be developed. e.g. purchasing masts, programmes, software, etc.</li> <li>3. Students' contribution: Make internet connectivity resources available for every student</li> <li>4. Students' contribution: The administration should add more equipment for ICT learning.</li> </ol>
<p><b>National forum – Nairobi Kenya</b> 14 May</p>	<ul style="list-style-type: none"> <li>✓ There should be electricity and sockets in classrooms at all levels of education – kindergarten to university.</li> <li>✓ Teachers should be trained on integration of ICT.</li> <li>✓ There should be reliable internet connectivity in all schools.</li> <li>✓ The ICT infrastructure needs to be available to be used by students.</li> <li>✓ The school administration should provide ICT equipment to all classrooms – including projectors.</li> <li>✓ All secondary school teachers and students should have laptops.</li> <li>✓ A portion of the school budget should be allocated to ICT infrastructure.</li> <li>✓ Digital content should be available to all teachers and students.</li> <li>✓ The government should allocate more funds for the procurement of ICT equipment</li> </ul>	<p>Main policy ideas as discussed and voted in plenary (in descending order – highest voted first):</p> <ol style="list-style-type: none"> <li>1. All stakeholders to provide funds for adequate and efficient ICT resources at all levels of education. There needs to be mobilization of resources.</li> <li>2. The government should avail electricity to all schools, and then the school management should ensure backups and power outlets in all teaching and learning rooms.</li> <li>3. School management should ensure internet connectivity to all departments and classrooms; and can bring on broad corporate well-wishers (eg. Safaricom) for support.</li> <li>4. Schools should prioritize the construction of ICT rooms.</li> </ol>

<p><b>Student Group 1</b></p>	<ul style="list-style-type: none"> <li>✓ There should be more and reliable internet connectivity in schools</li> <li>✓ We need more ICT teachers to ensure that all subjects are be taught using computers.</li> <li>✓ There should be access to computer rooms, laptops, and projectors for easier learning.</li> <li>✓ Students should be trained in computer use.</li> </ul>	<p>Main policy ideas as discussed and voted in plenary (in descending order – highest voted first):</p> <ol style="list-style-type: none"> <li>1. The government should consider the use of laptops in schools in order to improve ICT skills.</li> <li>2. There should be reliable internet connectivity in schools throughout.</li> <li>3. Resources such as laptops, computers, printers, ICT rooms should be made available and the quantity increased.</li> </ol>
<p><b>Student Group 2</b></p>	<ul style="list-style-type: none"> <li>✓ Text books should be converted to electronic format</li> <li>✓ Assignments and tests should be posted online</li> <li>✓ Facilities in computer laboratories should be improved. This includes increasing access to computers for students and increasing the number of ICT equipment.</li> <li>✓ Internet should be made available to students.</li> <li>✓ All students should be taught computer lessons. Computer studies should be introduced to schools that do not currently offer it.</li> <li>✓ Teachers should be trained on use on computers in teaching.</li> <li>✓ Students should be taught ICT and allowed to present their ideas using computers.</li> </ul>	<p>Main policy ideas as discussed and voted in plenary (in descending order – highest voted first):</p> <ol style="list-style-type: none"> <li>1. All teachers and students should be educated on the use of computers in teaching and learning.</li> <li>2. There should be maintenance and updating of computer software and hardware for the smooth running of teaching and learning.</li> <li>3. Resources (computers, projectors and access to internet) should be availed to the various learning institutions.</li> <li>4. E-learning should be incorporated into the system by setting online tests and assignments.</li> <li>5. Text books should be converted to electronic formats.</li> </ol>
<p>Emerging points during the discussion:</p> <ul style="list-style-type: none"> <li>✓ How will students be protected when they go online? This could be done using firewalls, electronic tracking and through guidance by the teachers.</li> <li>✓ How about social sites? These can be blocked from the server.</li> <li>✓ How about in rural settings where schools have no internet connectivity? They can access content through phones or at cyber cafes. There are affordable phone handsets that can be used to access the internet.</li> <li>✓ The laptop project beginning from class 1 is important because ‘the foundation is better than the rooftop’. Even the young ones need it as early identification of their potential.</li> </ul>		

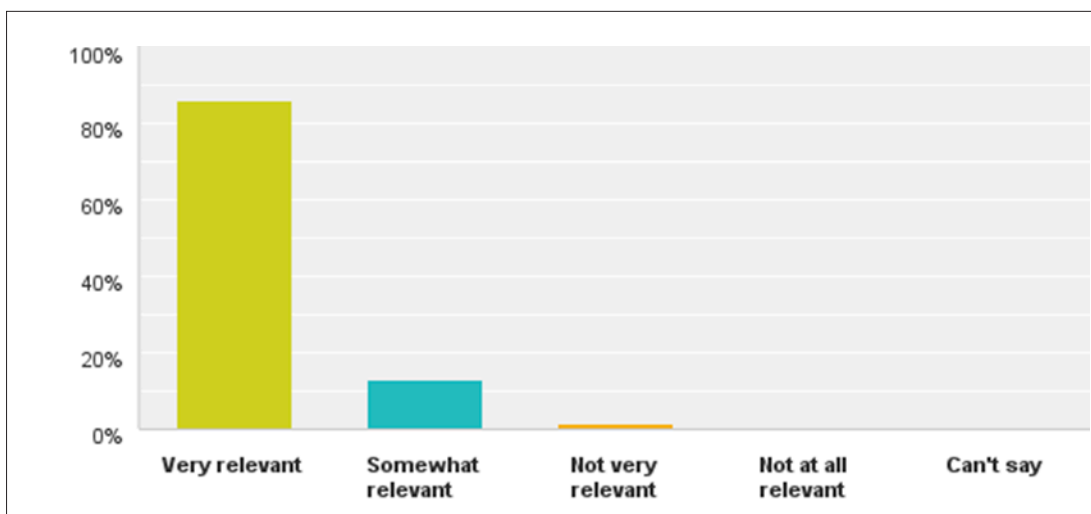
## APPENDIX 4: SURVEYS

### A. EXIT SURVEY

1. How thoroughly did the forum cover the key policy issues of ICT use in teacher education and in secondary schools?

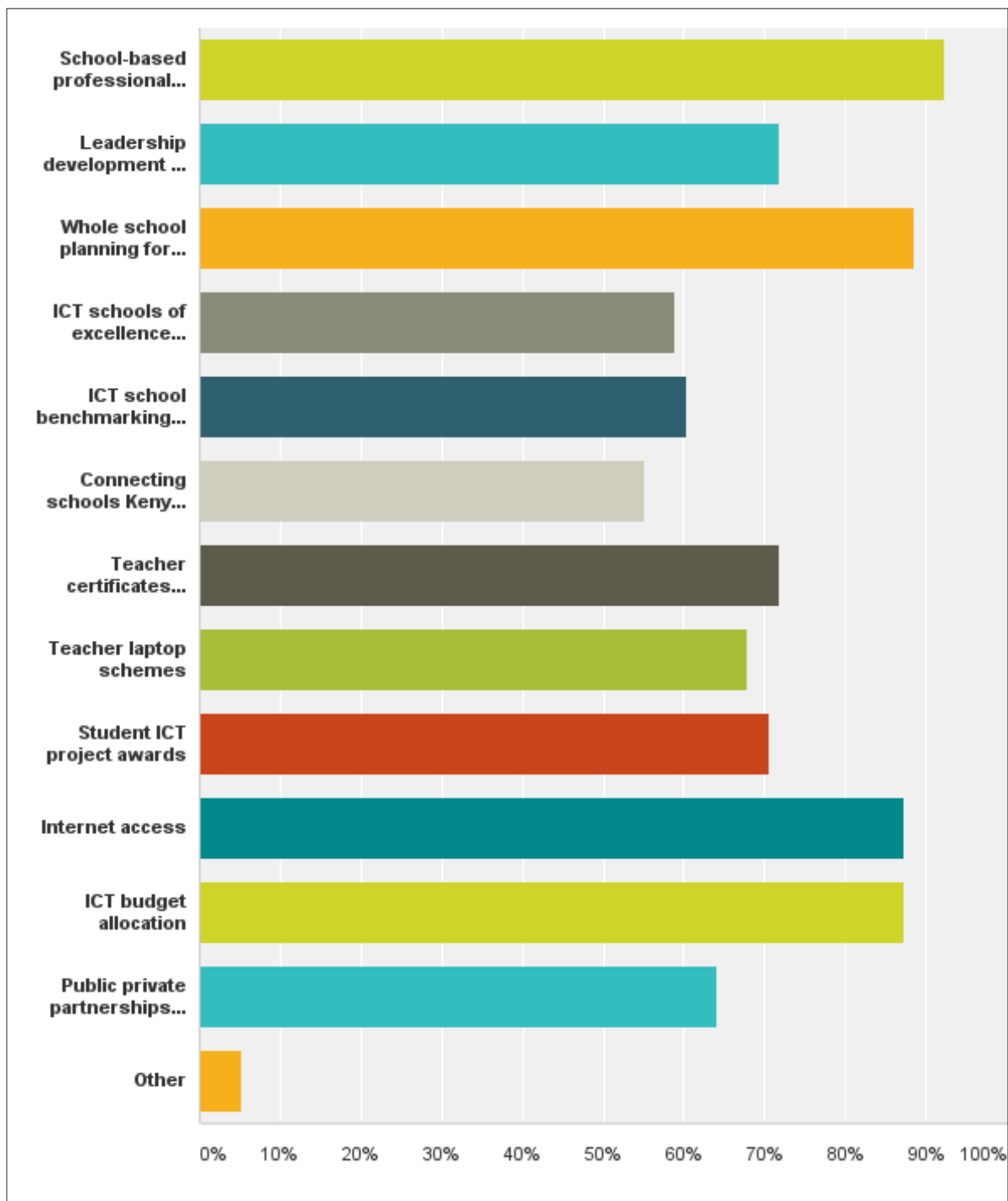


2. How would you rate the forum in terms of usefulness of the policy ideas and discussions to your school or organization?





3. What do you think would be the most important ways to ensure effective ICT integration in secondary schools?  
Chose as many options as you wish...



What do you think would be the most important ways to ensure effective ICT integration in secondary schools?  
Chose as many options as you wish...

Answer Choices	Responses	
School-based professional development for ICT use	92.31%	72
Leadership development for ICT use	71.79%	56
Whole school planning for ICT integration	88.46%	69
ICT schools of excellence awards	58.97%	46
ICT school benchmarking visits	60.26%	47
Connecting schools Kenya and Tanzania	55.13%	43
Teacher certificates for ICT professional development	71.79%	56
Teacher laptop schemes	67.95%	53
Student ICT project awards	70.51%	55
Internet access	87.18%	68
ICT budget allocation	87.18%	68
Public private partnerships to support ICT	64.10%	50
Other	5.13%	4
<b>Total Respondents: 78</b>		

4. Please share any other feedback on the forum, or your ideas of future ICT use in your school, and opportunities to collaboratively solve the ICT integration needs

- More computers and laptops are needed so as to ensure ICT Integration to all students. More integration to all teachers so as they can be able to teach the whole subjects by using projectors.
- The government should involve all government stakeholders on how to integrate ICT with education
- There must be a lot of seminars and workshops so as to build confidence on the teachers who are using an ICT
- To advice the ministry of education and vocational training to buy more computers, projectors and other ICT materials for teaching and learning in schools.
- The programme should be continued to the whole country as well
- These programmes should be extended as both of the schools in Kenya and Tanzania should be inacted
- These programmes should be continuous and extended to all schools in Tanzania and Africa.
- If infrastructure/resources are available, then ICT integration will be useful.
- On curriculum content the developers should re-design insert into the syllabus ICT and teaching process.
- To improve infrastructure and to organize the school leadership to integrate with ICT
- Schools should ask for NGO's to sponsor the schools on provisions of ICT equipment's like laptops, projectors and modems
- The school headmaster should look for sponsor for the equipment of ICT
- To introduce ICT integration on education curriculum to ensure that ICT subject will be taught like other subjects because ICT helps to expand and to improve students to work in groups/team.

- More ICT teachers in my school
- Some challenges such as internet failures are beyond technology. Ways to deal with this challenge should be thought about.
- Using ICT IN TEACHING AND SHOULD BE WITHIN THE EDUCATION CURRICULUM
- ICT should be a subject so as to be taught in all school in Tanzania as a compulsory subject.
- The STEM teacher to impart ICT skills to other teachers who did not get the project opportunity to join the program.
- Find more partners to support the development of infrastructure in school which will support ICT integration in teaching and learning activities.
- Find more partners to support the development of infrastructure in school which will support ICT integration in teaching and learning activities.
- 1. The forums should be repeated for second time 2. Government should collaborate with schools on ICT Integration
- 1. Form one's and two's should have ICT as core subject 2. In-service training for teachers to be consistently done
- There is need to ensure that the training is not done during school term. It turned out to be extra-strenuous though not complaining.
- Need to roll the same to all teachers in the school.
- Embrace it in every subject motivation and awareness for its usefulness. Government and county governments to provide free Wifi to access Internet in learning activities.
- The BOMs as well as the Principals should realize the momentous positive ICT can bring to school in terms of learning and support it fully.
- Building a resource platform online for teachers
- Establish more centres with more ICT (laptops) for time saving forums and more participation by teachers and learners
- Improve infrastructure for ICT
- Train more teachers on Basic ICT skills Equip the school with appropriate resources for ICT Integration
- More teachers to be integrated into the programe
- ICT is the way to go.
- Infrastructure development
- Equip ICT lab computer studies in form 1 classes
- More sponsors
- More laptops and connectivity in schools.
- ICT Integration should be part of all the training in all the levels of education. Stakeholders to recognize the significance of ICT for future development. the world is a global village.
- Classrooms should be ICT designed for all learners
- In order for the SIPSE programme to continue being useful. it should be disseminated to other teachers, there should be a follow-up programme that is well - coordinated and sustainable.
- Programme can do very well done during the holidays - school based.
- yes and should be conducted in other schools
- more workshops needed
- A one time face to face in the programme is necessary for exchange of ideas
- School managements should endeavor to improve ICT integration facilities and support professional teacher development
- The school should provide more funds for ICT

## B. IMPACT STORY SURVEY

1. Most Significant Impact Story of SIPSE: Can you tell us about WHAT the impact was, WHO was impacted and HOW SIPSE CONTRIBUTED to it

WHAT?	WHO?	HOW DID SIPSE CONTRIBUTE?
Learning to use the internet	Students	Researching for content from internet
Learning became learner-centred rather than teacher-centred - the teacher became a facilitator	The learners were impacted greatly because they could research and come up with solutions to problems	SIPSE contributed greatly by the integration of ICT in teaching and learning
I was able to acquire ICT skills which I have applied in classroom teaching	The students benefitted more because the abstract ideas were made more concrete	SIPSE contributed by offering in-service training. From the training I was able to acquire ICT skills from the trainers and colleague teachers
It has eased in learning sections making them interesting	Mostly the students	It has taught teachers how to improve their teaching in ICT and organizing SIPSE projects for students
By the time when I started the project of SIPSE, to integrate teaching and learning with ICT	SIPSE are the ones who provide a project	SIPSE have contributed the good knowledge of ICT together with the equipment like laptop and projector to school
Before this programme I was not able to use ICT in the teaching process but after the introduction of the programme now I have gained alot that makes me to be able to be more compliant in technology	myself I have impacted inscludind my students at large	SIPSE have contributed by giving me a lot of new knowledge that I did not have, and through the provision of laptops, modem and projector, and chats and discussion forums including the workshop
SIPSE CHAT: To a certain extent the chat was imbalanced due to connectivity problem. Something that caused me and my fellow teachers to be disappointed. But through keeping trying we were able to get gift as second winners	Myself and my school	SIPSE has brought big changes at my school, we have laptops. I have ICT knowledge. I can use ICT to teach my subjects
The teachers and students now integrate ICT knowledge in teaching and learning activities	Teachers and students	Provide the knowledge on ICT to them
Problem-based learning	Teachers and students	They tried to give more information about the PBL
Use of ICT in teaching and learning	Teachers and students	By giving a chance for our school to participate in project work 2015
Peer group observations	Students and teachers	SIPSE has insisted more on collaborative teaching and learning
Awareness of ICT integration in education	SIPSE teachers in Tanzania together with e-learning administrator	By providing training, conducting seminars and research for ICT integration in education
TPACK	Esther	Teaching using ICT, searching for materials from the internet
Enabling to use ICT in teaching and learning	Teachers and students in Tanzanian schools	Providing skills and knowledge on how to use ICT equipment in teaching and learning activities
Internet access and leader vision	School community	Improving of internet resources

WHAT?	WHO?	HOW DID SIPSE CONTRIBUTE?
Since using ICT with SIPSE was that most learners were motivated to join science subjects as they use ICT sources	The students and teachers	By making some schools to have projectors, laptops and this has made the Head of School even to buy
ICT - students were able to use computer in searching materials	Esther Mwiyeria	To provide knowledge on how to use ICT media to teaching and learning in schools
Integration of ICT in my teaching subject	Teachers and learners	To bring awareness to teachers on the use of ICT in teaching and learning
Enabled me to find so many materials concerning what I am studying	Myself	By searching materials through the internet; chatting with other students through emails
project-based learning	Teachers and students	Provision of ICT skills to teachers and student-centred learning
Presentations from student groups	Students and teachers	For preferable and attractive webquest
Improvement of teaching and learning process through integration of ICT	Madam Esther has made this possible	
Students' interest on checking the projected videos	Students	No one missed the class and all were attentive; they were so happy to see projectors and videos during the class
On the curriculum content and ICT integration	Teachers, students	Tends to make us cooperative on the ICT integration and also to make good relationship between teachers and students
It's about how ICT was innovated and integrated in my school	It's me with my students as we have moved a step ahead	It brought me from the preliminary way of non-ICT competence to where now I'm well equipped with this
The way that the programme was done	Project manager and their team	The project manager and their team contributed much to apply ICT integration

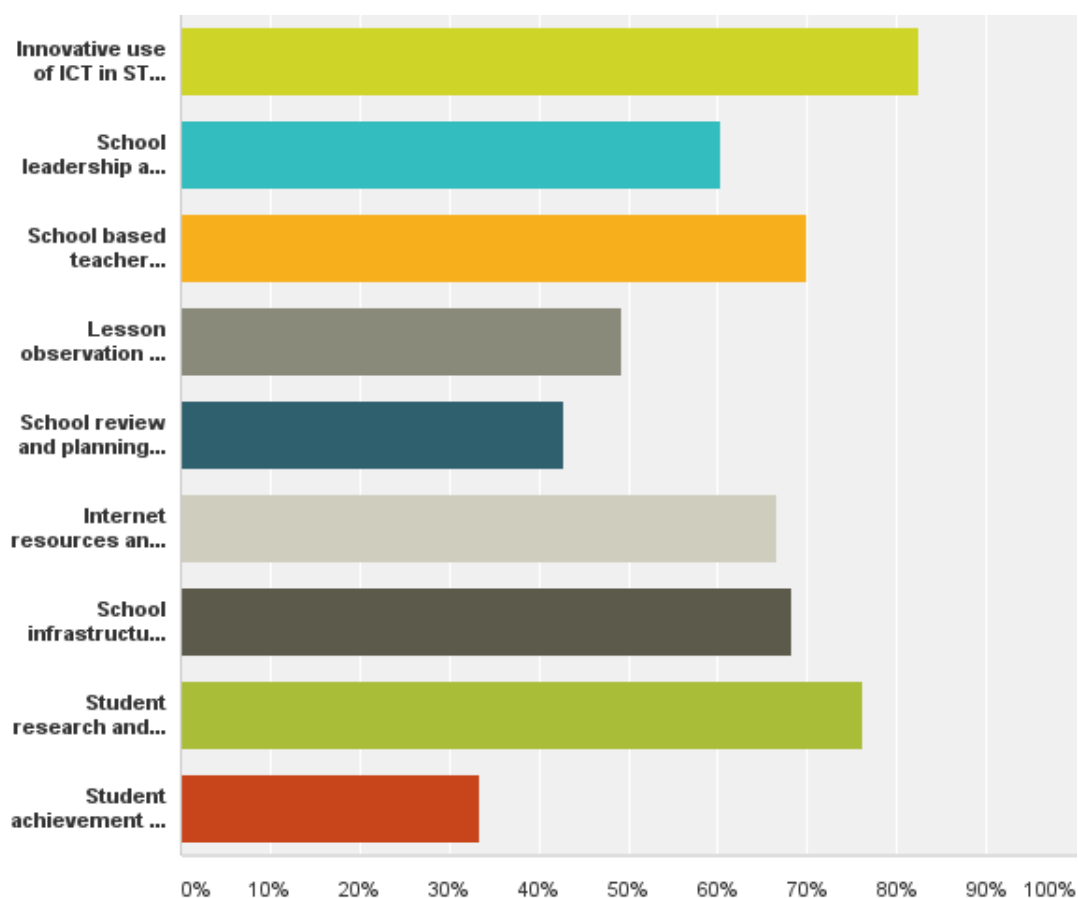
WHAT?	WHO?	HOW DID SIPSE CONTRIBUTE?
Innovative use of ICT in teaching and learning; lesson observation of teachers' TPACK; students searches and presentation of projects; school infrastructure and support	SIPSE teachers and non-SIPSE teachers, students and school community as well	By provision of laptops, projectors and skills and knowledge on computer usage
Chat session	Teachers	By conducting the chat session. Encouraging learners to participate
The day I joined SIPSE programme and started learning on ICT and how I can integrate it with students in my teaching and learning. Also the day we won the prize as a beacon school and being provided awards and certificate on how to use ICT in teaching and learning	SIPSE was one of the programmes that imparted a lot of ICT knowledge to our school with the cooperation of teachers from Butimba Teachers College	SIPSE contributed a lot in training us and providing ICT resources to our school. They have changed our attitude to teaching and learning using ICT equipment
The use of computer more frequently; meeting with different people from different places e.g. chats and discussion forum	The SIPSE organizers was more the help to me during chats, discussions and meetings	It contributed a lot because I'm familiar with using computer and overhead projectors
Increase the knowledge and skills also ways to remember	Students, teachers	Being able to come together and done a project; helping on implementing it; make people to study different projects and studies
Use of ICT in schools, and devices like laptops	Students, teachers and other education facilitators	SIPSE has contributed much by giving out the benefits of using ICT in the education sector and how to implement
Use of ICT equipment as teaching and learning materials	Students	By giving general overview on how ICT use can lead to proper flow of academic materials
The content prepared by SIPSE was good to model the skills of ICT and develop the knowledge about ICT in the classroom	Master Trainers, presentations during the workshops, online chats and discussion forums	By enabling connectivity; providing the equipment like laptops, modems, projectors, etc. that were useful to ICT; posting on the interesting topics
The content prepared was good since it impact a lot of knowledge on ICT use	Trainers	By providing equipment
the impact of SIPSE in my teaching helped me to get more information about my content to teach before I get into class. Also my students was much developed with skills in ICT technology	Students and teacher (I)	We both benefitted with SIPSE through expanding our knowledge about using ICT in our studies
Development of teaching and learning activities by integrating with ICT	Students, teachers and communities as well	SIPSE contributed by providing seminar/ training to the teachers who in turn provided education (quality education) to the students by integrating ICT teaching and learning activities
SIPSE has enabled me as a student to learn new different things which at first I was not aware of them, also helped to learn new skills of interaction between people whereby I have understood the importance of cooperation to me as a student	Students	SIPSE has enabled and contributed so many things to as I have been given so many chance to discuss and present our views
A lot of things such as to chat in through internet because to share ideas and to improve how to use ICT tools; also to post questions in the discussion forum	With Madam Esther and Kennedy Yegon (teachers)	To develop teaching and learning simply and performance

WHAT?	WHO?	HOW DID SIPSE CONTRIBUTE?
Through the SIPSE online, the following knowledge was acquired: 1. Being able to log-in to the Chamilo platform, using advanced features in Word and Excel 2. Evaluating learning materials from the net and adapting them to the needs of the learners 3. Computer literacy skills for some teachers	All the teachers in the STEM subjects; other members of the teaching staff; students	It has been an eye-opener into new ways of generating information to use for the teaching and learning process; I have become more confident in the use of ICT - both software and hardware; gave the literacy skills necessary
1. Teaching and learning were transformed through the use of ICT 2. Learning became learner-centred and learners could search for information online 3. Abstract concepts were made clearer to the learners	Teacher: This was an eye-opener to the teaching profession. The teachers' ICT knowledge and skills were sharpened Learner: Enthusiastic learning, also became experts in searching for information Whole school: The entire school has positively taken in ICT; and attempted integrating it in teaching and learning	1. Teacher development 2. Transformation of teaching and learning 3. SIPSE shed light in the use of ICT tools in teaching and learning 4. It interests learning
Teaching of Biology and Chemistry and Maths - alot of innovation has been done to make the subjects more interesting; the whole school, teachers, students, non-teaching staff are very positive about the working of computers; it is now easier to teach bigger classes; leadership	Mr. Macharia (Biology) learnt to use a computer and became very innovative; Mr. Wanjau (English) is always using his tablet in class and elsewhere; teachers very committed in lesson preparation and presentation - spending extra time in school to prepare; teachers learnt how to use PowerPoint; Madam Kauna very passionate. Other non-SIPSE teachers joined in and they learnt with us	1. Change of attitude on use of computers in class to the teachers and students 2. Having a laptop and projector is great 3. Exposing our teachers, empowering them and even financing to a 5-star hotel cannot be taken for granted 4. ICT-SIPSE has helped us to be ICT compliant 5. Changing leadership thinking (digital) 6. SIPSE has made learning easy and interesting
Content delivery with appreciation of ICT integration in teaching and learning	Learners, teachers and the school community	Provided an interactive platform where teachers could learn from each other, hence learning how to source materials suitable for teaching and learning. SIPSE provided adequate time and was patient with the teachers in learning hence reducing technophobia; SIPSE provided ICT materials for a start and that was beautiful!
It showed us how to apply ICT in our modern life today	Learners	Organizing the workshop
Students' ability to research information from the internet and make notes from the same	Students	Taught us how to use links to access information
It has helped us gather more information and has made learning more efficient	It has impacted us as the students and also to our teachers	SIPSE has encouraged us learners to continue using the website as a source of educative information
The linkage/hyperlinking of the videos in teaching as a learning resources and the use of ICT tools	The Master Trainers and my fellow colleagues	Provision of workshops and its input especially to the school administration to purchase the ICT tools
Spiced teaching and learning using ICT	Teacher and student	Through innovative use of ICT in teaching and learning; paradigm shift in learning

WHAT?	WHO?	HOW DID SIPSE CONTRIBUTE?
Concerned teachers, SIPSE trainers having/getting to use ICT tools in teaching and learning more than before and students as well	Teachers and students	By starting off the ICT plan - ie. making use of ICT a reality that was never before in the school
The concerned teachers and other colleagues bought laptops and phones that could enable them to integrate ICT in their lessons; students' morale was boosted and got more interest in computer studies	Teachers, students, administration, accounts and secretary	By training the teachers on how to integrate ICT; in school administration, learning and teaching activities
Using ICT in classroom teaching changed the attitude and perception	The students and teachers	Opening the innovative use of ICT in the classroom for student-based learning and how to integrate it in the learning and teaching process
It has revolutionized learning by captivating the learners attention and participation; made teaching and learning friendly; helped us overcome the challenges of teaching abstract concepts	Students, teachers, non-teaching staff	Before SIPSE, we had no laptops, no internet connection and an ICT integrated lesson was all but a dream. Thanks to SIPSE
Project-based learning	students	Students were able to gather, synthesize and analyze information
Understanding of subjects was made easier; lessons become more interesting	Students and teachers	Offered training services to our teachers; handed laptops and projectors to schools
ICT integration simplified hard/difficult concepts using simulations, videos, photographs. It gives access to the most current information and helps us to collaborate with others most	Teachers, learners, nation/society	Training; equipping teachers and schools (laptops, modems, projectors, cameras); bringing teachers together to share in workshops and chats
The enthusiasm towards exploring new ways of doing things in a learning environment as well as how to make learning more interactive and enjoyable	Students and teachers	Before this programme began, much of the school population thought that a computer is only good for computer studies
I was able to understand clearly how blood circulates in the body	Teachers and students	From the internet I was able to download a video on blood circulation and show it to the students
Revolutionized teaching and learning process and made teaching fun and real for learners	Teachers, learners, school community	Training of teachers, offering support throughout the project, supply of computers and projectors to the school
Teaching and learning using videos	Learners and teachers	Teachers were able to deliver the content well
Concept mapping	Students and teachers	Taught students and teachers easier ways of summarizing a topic
Use of ICT tools in classroom presentation and content delivery to learners	Students, teachers and the school as a whole	Provision of first projector and laptop to the school, training the teachers and school visits
Change of attitude towards the science (Biology) among students and appreciation of the use of ICT	Students, teachers	The knowledge as a teacher that I gained from SIPSE has helped me to change the former boring lesson to a lesson to look forward to, thanks to ICT integration introduced by SIPSE
Changing learning from teacher-centred to learner-centred	Teachers and learners	SIPSE made teachers develop and be in a position to use ICT tools in teaching and learning



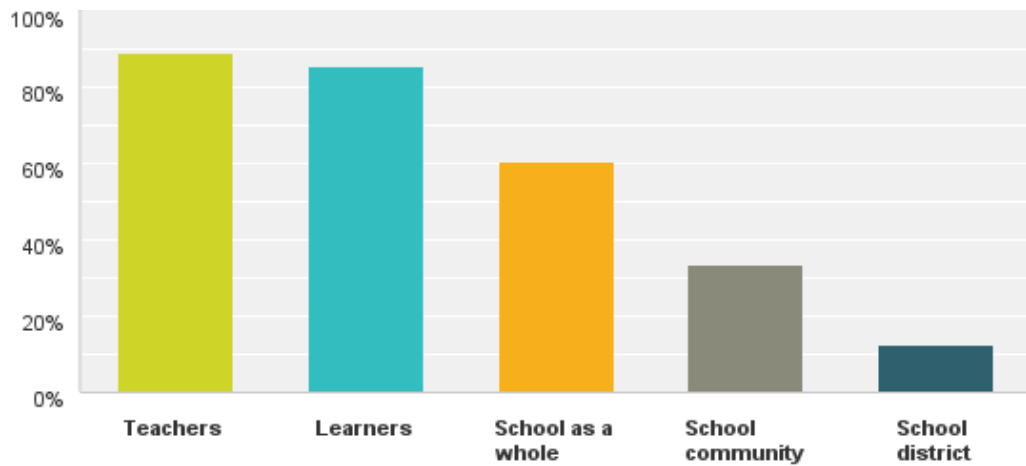
2. Which of the following areas were most affected by the impact you noticed? (Mark all that apply with an x to the left of the relevant description)



Which of the following areas were most affected by the impact you noticed? (Mark all that apply with an x to the left of the relevant description)

Answer Choices	Responses
Innovative use of ICT in STEM teaching and learning	<b>82.54%</b> 52
School leadership and vision for ICT integration in STEM teaching and learning	<b>60.32%</b> 38
School based teacher professional development for ICT use in STEM	<b>69.84%</b> 44
Lesson observation of teacher's TPACK	<b>49.21%</b> 31
School review and planning for ICT prioritization across the curriculum	<b>42.86%</b> 27
Internet resources and ICT teacher lesson plans for STEM subjects	<b>66.67%</b> 42
School infrastructure to support ICT use in the computer lab and classroom	<b>68.25%</b> 43
Student research and presentation of projects	<b>76.19%</b> 48
Student achievement in school and national examination	<b>33.33%</b> 21
<b>Total Respondents: 63</b>	

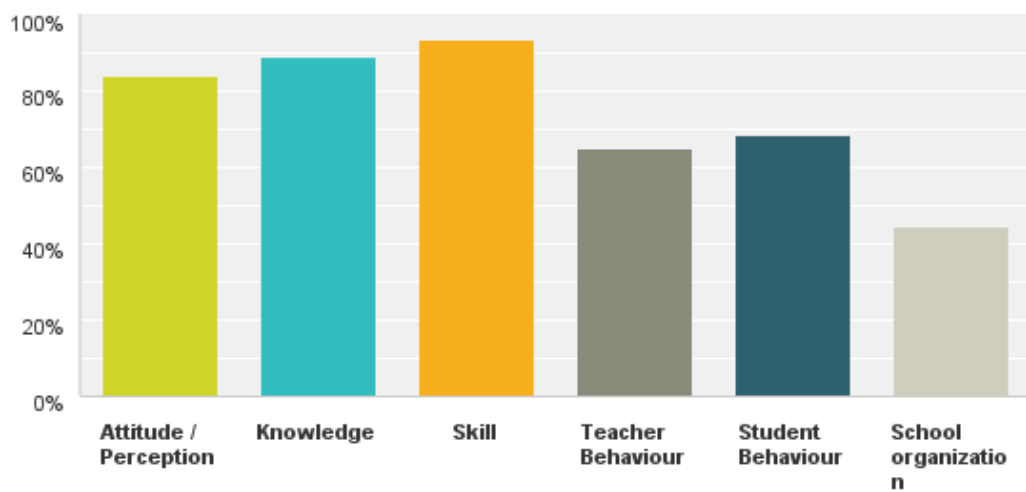
3. Who was impacted (you may cross (X) more than once)?



Who was impacted (you may cross (X) more than once)?

Answer Choices	Responses	Count
Teachers	88.89%	56
Learners	85.71%	54
School as a whole	60.32%	38
School community	33.33%	21
School district	12.70%	8
<b>Total Respondents: 63</b>		

4. What kind of change occurred (you may cross (X) more than one)?



Answer Choices	Responses	
Attitude / Perception	84.13%	53
Knowledge	88.89%	56
Skill	93.65%	59
Teacher Behaviour	65.08%	41
Student Behaviour	68.25%	43
School organization	44.44%	28
<b>Total Respondents: 63</b>		

5. What specific activity / aspect of the SIPSE project do you think contributed to the impact?

Specific SIPSE Activities that contributed to the project impact
1. Project-based learning
2. Use of ICT tools in the classroom
3. Creation of projects
4. Webquest
5. Good seminars and materials as a whole
6. The lack of many face-to-face sessions
7. Through programmes that were distributed to teachers
8. Integration of ICT in teaching and learning
9. Training on how to integrate ICT in education and close supervision of the project
10. Organization of the materials using ICT, and teaching and learning subject contents using ICT programmes
11. Awakening the government to play part on including ICT in the national curriculum and providing ICT equipment in schools
12. The student-centred learning and internet access improving
13. ICT use
14. Provision of knowledge and provision of media-like laptop and projectors
15. Project-based learning
16. Knowledge given by SIPSE Master Trainers
17. Teaching and learning using ICT
18. Learner-centred activities
19. On curriculum content, discussion forum and chatting session
20. It was that of the forum chatting as when I logged in, I found challenges and different ideas of my fellow colleagues
21. By introducing the SIPSE project it attract to deal with the subject by ICT
22. Use of ICT tools in presentation
23. Follow-up made by the SIPSE team asking the members to join the chat session
24. Training and provision of ICT knowledge and equipment
25. By engaged in talking with students and working together to make the project done
26. Increase the contribution and knowledge of ICT in schools and around Tanzania and Kenya

Specific SIPSE Activities that contributed to the project impact
27. It brings awareness and understanding to both teachers and students on the use of ICT equipment
28. Online training, chats and forums. Face-to-face workshops
29. Chats and discussion forums
30. Problem-based learning
31. Training on integrating ICT into teaching and learning
32. Problem-based learning
33. To use the ICT tools in order to improve teaching and learning process
34. How to integrate ICT with learning process in the STEM subjects. It never seemed a reality before then.
35. The innovative use of ICT tools and materials from the net to suit learner needs
36. Taking the computer to class and a projector
37. Demystifying the use of ICT materials in teaching and learning. Changing the perception by teachers on the use of ICT-integrated lesson plans
38. Making the policies
39. Content deepening
40. By giving more details in the research to the project
41. The project-based learning made the learning to be more student-centred
42. ICT integration in teaching and learning
43. Laptops, projectors provided at the beginning to the school and continued school visits for monitoring
44. The provision of laptop and projector to the school; training of the teachers
45. Project-based learning where the students search for the information themselves

Specific SIPSE Activities that contributed to the project impact
46. The online training of teachers provision of infrastructure - laptops and projectors
47. Learner-centredness
48. Teacher training services and internet access
49. Project-based learning
50. The use of ICT in the classroom was monumental since prior to this, the computer lab was thought to be for the ICT teachers and their students
51. Downloading videos from the net and connecting the laptop to the projector for the students to see
52. The continuous online and offline support and training though it was hectic. Maybe it could be made school-based?
53. The e-learning platform
54. Involving the learners
55. Training the teachers and provision of the projector and laptop
56. In-service training of teachers of STEM subjects and helping them appreciate and use ICT in teaching the subjects
57. Lesson plan preparation

## APPENDIX 5: FACEBOOK AND TWITTER POSTS

### FACEBOOK POSTS:

15 May 2015

From 20 February to 27 March 2015, students in the SIPSE project carried out competitive educational projects in Biology, Math, English, Chemistry, Physics and ICT with the support of their teachers building up to the awards ceremonies.

Nakuru Girls High School with a project on e-waste (ICT) emerged the best overall from Nakuru County (793 points). Mumbuni Boys High School with a project on building construction (Physics) was the best from Machakos County (758 points).

Congratulations to the teachers and students! Read more at <http://gesci.org/kenyan-students-awarded-in-project-based-l...>



86 people reached

Boost Post

6 May 2015



**Gesci**

Posted by Grace Omondi [?] · May 6 at 3:58pm ·

Leadership and Planning, Teacher Professional Development, Curriculum and Content and Infrastructure and Resources are four thematic areas that will be discussed at the SIPSE regional and national policy workshops in Nakuru, Machakos and Nairobi on 7th, 8th and 14th May, respectively.

76 people reached

Boost Post

11 May 2015

How can students contribute to national policy recommendations on integration of ICT in STEM subjects? They are important stakeholders that are often forgotten in the debate.

Please share with us your ideas.



125 people reached

Boost Post

5 May 2015



**Gesci**

Posted by Grace Omondi [?] · May 5 at 12:05pm ·

SIPSE is indeed a piece of action research about how teachers can use technology to improve their teaching and at the same time encourage students to use richer resources from the internet.



64 people reached

Boost Post



**GESCI**

Posted by Grace Omondi [?] · May 5 at 10:45am · Edited ·

SIPSE workshops on 28 and 29 April 2015 were aimed at developing policy recommendations on issues around integration of ICT in secondary education in Tanzania, based on lessons from the implementation of the SIPSE project. Read more at: <http://gesci.org/sipse-policy-workshops-in-tanzania.html>



### | GESCI | ICT in Education

What have we done? What impact have we made? What have we learned? How will we use what we have learned to inform future interactions? These questions were posed by Patti Swarts, GESCI's Director of Programmes during the...

GESCI.ORG

94 people reached

Boost Post

24 April



**GESCI**

Posted by Grace Omondi [?] · April 24 at 3:46pm ·

Getting ready for the SIPSE policy workshops in Tanzania on 28 and 29 April. Looking forward to policy recommendations for ICT use in teacher professional development for Kenya and Tanzania.



81 people reached

Boost Post

21 April



**GESCI**

Posted by Grace Omondi [?] · April 21 ·

GESCI and Access Kenya partner to improve STEM teaching and learning. <http://www.itnewsafrika.com/.../accesskenya-extends-support.../>



### AccessKenya extends support for teaching and education | IT News Africa- Africa's Technology...

Kris Senanu Deputy Chief Executive AccessKenya Group and Dr. Tom Musili, Executive Director...

ITNEWSAFRICA.COM

55 people reached

Boost Post

15 April



**GESCI**

Posted by Grace Omondi [?] · April 15 ·

The Jomo Kenyatta Foundation CSR committee members, L-R Evelyne Kiswii, Janet Nzuki and Samuel Ndiki donating secondary books towards Strengthening Innovation and Practice in Secondary Education (SIPSE), a GESCI project. Receiving the donation is Esther Mwiyeria (R), SIPSE project manager.

Thank you Jomo Kenyatta Foundation for these book donations!



186 people reached

Boost Post

9 April



You added 2 new photos.

Posted by Grace Omondi · April 9 ·

12 and 13 March 2015: SIPSE taking stock of project-based learning in Nakuru and Machakos

The last round of tracking the Partnership to Strengthen Innovation and Practice in Secondary Education (SIPSE) project is in progress. In line with this, a team of two officials from the ICT4E unit in Kenya's Ministry of Education, Science and Technology (MoEST) and GESCI staff visited secondary schools in Nakuru and Machakos counties on 12th and 13th March 2015 to assess teachers' prog... [See More](#)



152 people reached

Boost Post

#### SIPSE TWITTER POSTS:

Well done Nakuru Girls High & Mumbuni Boys High for best projects in [#STEMsubjects](#)  
<https://twitter.com/GESCI/status/600231631279038464>

Mumbuni Boys High project on construction is best overall, Machakos County in [#SIPSE](#) project on [#projectbasedlearning](#)  
<https://twitter.com/GESCI/status/599135946521579520>

Nakuru Girls High project on e-waste is best overall from Nakuru County in [#SIPSE](#) project on [#projectbasedlearning](#)  
<https://twitter.com/GESCI/status/599135665545224192>

[#TSC](#), [#KICD](#), [#MinistryofEducationKenya](#) at policy forum on [#ICTintegration](#) in [#STEM](#) subjects at secondary school level  
<https://twitter.com/GESCI/status/598778041679147009>

[#SIPSE](#) project-based presentations by [#MwalaSecondary](#) on drug abuse and [#NakuruGirls](#) on e-waste  
<https://twitter.com/GESCI/status/598777077987414016>

Getting views from all stakeholders (teachers, students, ministry officials, SIPSE master trainers) on the issue of [#ICTintegration](#)  
<https://twitter.com/GESCI/status/598776865332035584>

[#SIPSE](#) national policy forum on [#ICTintegration](#) in [#STEM](#) subjects underway at the Kenya School of Government, Nairobi

<https://twitter.com/GESCI/status/598776592396091392>

How can students contribute to policies on [#integrationofICT](#) in [#STEM](#) subjects? [@dmwinzi](#) [@KICDKenya](#) [@ICTinED\\_Africa](#)

<https://twitter.com/GESCI/status/597711085391769600>

SIPSE policy forums in Kenya from 7 May, on Leadership & Planning, [#TeacherProfessionalDevelopment](#), Curriculum & Content and Infrastructure

<https://twitter.com/GESCI/status/595936973442920448>

SIPSE is [#actionresearch](#) on how teachers can use technology to improve [#teachingandlearning](#) in [#STEM](#) subjects

<https://twitter.com/GESCI/status/595513383279034369>

Ready for [#SIPSE](#) workshops - TZ, 28, 29 Apr. Looking forward to discussions on [#ICTintegration](#) in teaching & learning

<https://twitter.com/GESCI/status/591586202958049281>

[@AccessKenya](#) & [@GESCI](#) partner to improve [#STEM](#) teaching in [#Kenyan](#) schools: <http://intel.ly/1Qe3XLE> via [@itnewsafrika](#)

<https://twitter.com/IntelEastAfrica/status/590499226901213185>



## APPENDIX 6: POLICY FORUM BRIEF

### SIPSE POLICY BRIEF

#### PARTNERSHIP TO STRENGTHEN INNOVATION AND PRACTICE IN SECONDARY EDUCATION (SISPE) IN KENYA AND TANZANIA

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##### Executive Summary

This policy brief highlights the key insights learned from the *Strengthening Innovative Practice in Secondary School (SIPSE)* project pilot that was launched and implemented among some 120 Science, Technology, English and Mathematics teachers in 20 schools in Kenya and Tanzania from 2013 to 2015.

The SIPSE pilot innovation used a blended learning design to build teacher competencies in a phased approach for ICT integration – drawing on two frameworks:

- The UNESCO ICT competency framework for teachers (ICT-CFT) contextualized for teachers in Kenya and Tanzania and
- the Technology, Pedagogy and Content Knowledge (TPACK) framework

The SIPSE approach focus was to support teachers to explore the pedagogical integration of ICT to support classroom practice in STEM teaching and learning - from

- ICT use to support traditional didactic practices, to
- ICT use to support new interactive, problem and project based approaches.

The monitoring and evaluation of the SIPSE model research brings out an emerging model that combines an innovation package of elements – from

- the course design integrating face to face workshops, to
- online learning and school based communities of practice and reflection, to
- the use of different platforms and tools for course delivery, to
- the use of open education resources and software to fast track ICT integration in teacher education and school education curricula.

It highlights the need for a triangular approach of **leadership, teacher and whole school development** as key for effective ICT integration in secondary level schooling. It also suggests several possible policy responses to support such a model.

### 1. INTRODUCTION: ICT in education and teacher development in Kenya & Tanzania

Secondary education has become a **priority in the post-2015 education and development agenda** globally and in Sub-Saharan Africa (SSA). There is a new focus on

- competencies in Science, Technology, English and Mathematics (STEM) subjects
- acquisition of skills for higher order thinking, analysis and synthesis & team work
- as pivotal to the future development of the African continent

The challenges and opportunities for education and development are reflected in the **Kenya and Tanzania national development policy visions**.

- In Tanzania the National Vision 2025 envisages development towards a society of high quality livelihoods and a strong and competitive economy – where education is considered as ‘a strategic agent for mind-set transformation and for the creation of a well-educated nation’ (URT, 2002, p4<sup>1</sup>).
- Kenya is working towards becoming a **knowledge-based economy and society** by implementing its Vision 2030 for social, cultural, political and economic development (GoK, MSP, 2008<sup>2</sup>).

In both countries **remarkable progress has been made in education provision and outreach** as key to enabling

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1 <http://www.tzonline.org/pdf/theTanzaniadevelopmentvision.pdf>

2 [http://www.healthresearchweb.org/files/A%20globally%20competitive%20and%20prosperous%20Kenya%20\(2008-2012\).pdf](http://www.healthresearchweb.org/files/A%20globally%20competitive%20and%20prosperous%20Kenya%20(2008-2012).pdf)

national vision and socio economic development. The countries' education sector support programmes and free primary and secondary education have resulted in expanding education access and equity at primary and secondary levels (GoK, 2008;<sup>3</sup> URT, 2006, 2010<sup>4</sup>).

Rapid expansion has brought **concerns about the quality of education**. Teachers of Mathematics, Science and Language (especially English) at secondary level are in short supply. Many schools have no teachers for some science subjects, and failure rates for these subjects are high especially in rural areas and among girl students (World Bank, 2007<sup>5</sup>; UNESCO, 2012, 2013/2014<sup>6</sup>).

The Governments of Kenya and Tanzania recognize the **potential for the use of ICT** to address challenges of quality, equity and access in education.

- In Kenya the National ICT Strategy for Education and Training focuses on use of ICT to assist 'to transform education and address significant challenges of access, quality, relevance and equity faced by the education system'(GoK, 2006, p9)<sup>7</sup>.
- In Tanzania the *ICT Policy for Basic Education* describes the role ICT as one that can 'enhance education, including curriculum development, teaching methodologies, simulation laboratories, life-long learning and distance education and for teaching of not only ICT, but of all subjects and specializations' (URT, MoEVT, 2007, p8)<sup>8</sup>.

The Kenyan and Tanzanian governments have carried out significant numbers of ICT deployments and initiatives over the past decade. What is needed is

- a holistic framework to align national vision and planning with local initiatives and implementation
- a coherent approach for integrating ICT across the school curriculum and administration and in teacher professional development initial and continuous.

The SIPSE ICT integration approach in STEM teaching and learning in secondary schools in Kenya and Tanzania can provide an **important model and lessons learned from monitoring and evaluation research** to contribute to national and local policy frameworks – as presented in the following sections.

## 2. SIPSE PROJECT CONTEXT

The SIPSE project was conceptualized from the need to address the shortfalls in the teaching and uptake of science subjects at secondary education level. The SIPSE model was guided by the following objectives and goals:

1. To **leverage ICTs for the provision of professional development** to existing teachers on new pedagogical approaches - to promote a learner centered, participative and ICT- based approach to curriculum delivery.
2. To **encourage, support and facilitate teachers with methodologies** that would enable learners to develop information literacy skills, team work, project work and higher order skills that society, the world of work and knowledge economy demand.
3. To **design and operate a school based support programme** - with a focus in showcasing good practice of technology integration facilitated by the use and integration of digital learning resources.
4. Drawing on the evaluation of the emerging models for ICT in teaching and learning in the schools, **to develop policy recommendations** on competencies and requirements for teachers to be included in national teacher training policies in the project countries and to feed into ICT-based professional development courses for teachers in general.

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3 [http://archive.lib.msu.edu/DMC/African\\_Journals/pdfs/Utafiti/vol1no1NS/aejpNS001001004.pdf](http://archive.lib.msu.edu/DMC/African_Journals/pdfs/Utafiti/vol1no1NS/aejpNS001001004.pdf)

4 [http://ec.europa.eu/europeaid/documents/case-studies/tanzania\\_pedp\\_en.pdf](http://ec.europa.eu/europeaid/documents/case-studies/tanzania_pedp_en.pdf)

5 <http://siteresources.worldbank.org/INTAFRREGTOPSEIA/Resources/No.7SMICT.pdf>

6 <http://unesdoc.unesco.org/images/0021/002175/217509E.pdf>, [http://unesco.nl/sites/default/files/dossier/gmr\\_2013-4.pdf?download=1](http://unesco.nl/sites/default/files/dossier/gmr_2013-4.pdf?download=1)

7 <http://www.nepadkenya.org/documents/MOE-ICT%20in%20Education.pdf>

8 [http://planipolis.iiep.unesco.org/upload/Tanzania%20UR/Tanzania\\_ICT\\_Policy\\_for\\_BasicEducation\\_2007.pdf](http://planipolis.iiep.unesco.org/upload/Tanzania%20UR/Tanzania_ICT_Policy_for_BasicEducation_2007.pdf)



The SIPSE approach used traditional “face-to-face” methods of training through workshops and “eLearning” using a combination of online/ web-based, mobile phone and offline electronic delivery mechanisms - following the below methodology for 2 cycles of professional development at ‘technology literacy’ and ‘knowledge deepening’ levels:

- Part 1: Classroom based training, 3 day orientation workshop session
  - Part 2: On-line learning with Master Trainers
  - Part 3: Classroom based training, 3 day concluding workshop session
- *Showcase good practice in teaching which motivated learner participation.*

All schools received school-based visits programme by the Master trainers. The school visits encompassed

- a programme of meetings with the school directorates,
- classroom observations with teacher STEM teams ,
- review of & reflection on teacher lesson plans and classroom try outs
- demonstration of ICT teaching & learning strategies by master trainers & teachers

Lesson plans and resources produced by teachers were put on the teachers’ online portal with a focus on knowledge sharing of emerging good practice for ICT integration.<sup>12</sup>

- *Identification, development and dissemination of policy recommendations for developing 21st century skills and scaling up the project*

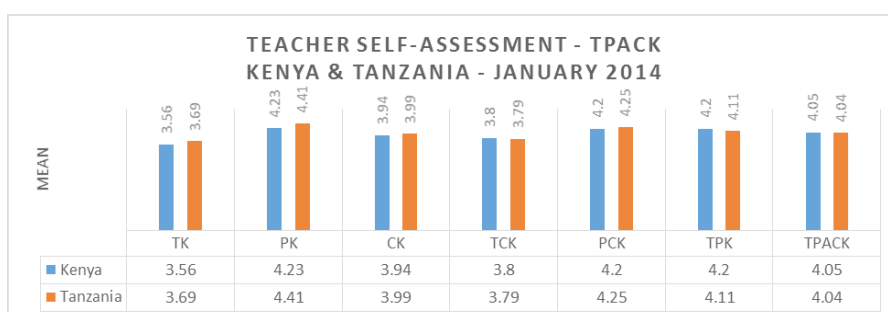
The SIPSE approach holds policy forums for the identification and recommendation of policies that would positively impact on teacher education in the two countries based on the experiences from the SIPSE project model.

#### 4. PROJECT MONITORING, EVALUATION AND LEARNING

##### Project Monitoring

SIPSE monitored 5 levels of model implementation as below:

- A level 1 reaction of teachers and head teachers to training & sensitization workshops and online course modules for applying and infusing ICT use in STEM
- A level 2 teacher skills and knowledge self-assessment of their Technology, Pedagogy & Content Knowledge (TPACK) and how they see that they apply their knowledge in STEM teaching and learning
- Below we see teachers in Kenya and Tanzania respectively showing Pedagogy Knowledge (PK) as their highest average score (4.23; 4.41) and *Technology Knowledge (TK)* as their lowest average score (3.56; 3.69)

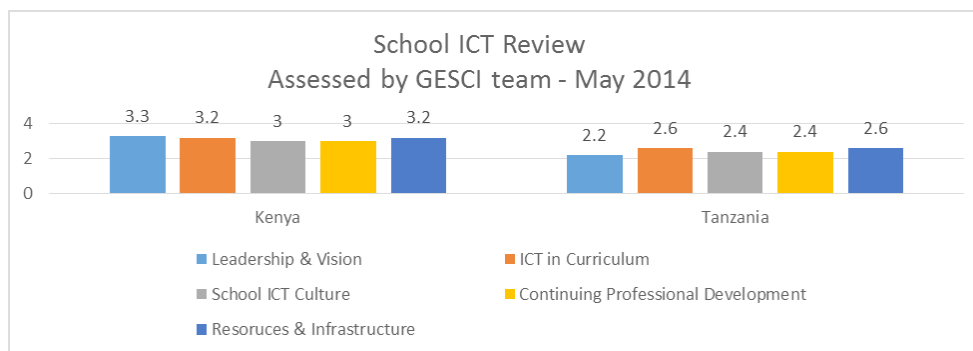


Indicators: Strongly agree=5; Agree=4; Neither agree nor disagree=3; Disagree=2; Strongly disagree=1

- A level 3 assessment of school support for SIPSE project related to promoting *ICT leadership & vision, ICT across the curriculum, a school culture for ICT use, ICT professional development and infrastructure & resources.*

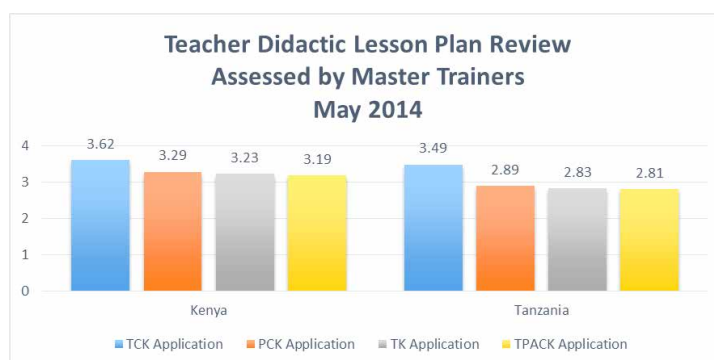
12 SIPSE Teachers’ Portal at: <http://sipseportal.gesci.org/>

- Below we see in Kenya the highest average score is *leadership and vision* (3.3) - in Tanzania the highest average score is in *resources and infrastructure* (2.6)



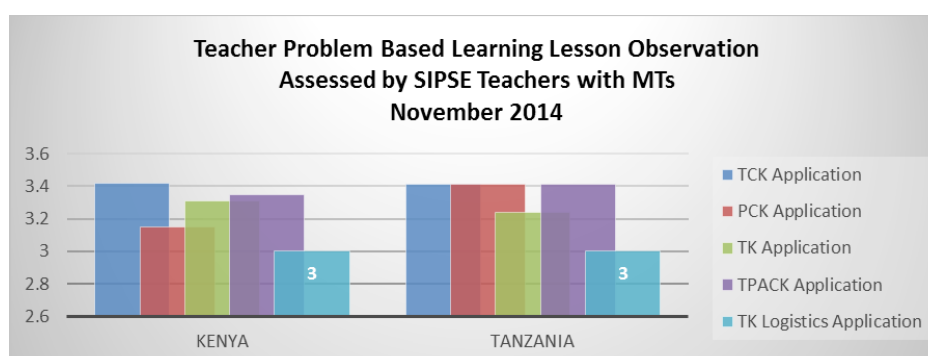
Indicators: Very Good = 4; Good = 3; Satisfactory = 2; Fair = 1

- A level 4 teachers' application of TPACK competencies & skills in lesson planning and trying out of ICT to support STEM teaching and learning in the classroom. Here lessons plans and try-outs are assessed by master trainers.
- Below we see that teachers show *highest average scores in their ICT use to support content* (3.62; 3.49) and *lower average scores in their ICT use to support pedagogical strategies* (3.19; 2.81)



Indicators: Very Good = 4; Good = 3; Satisfactory = 2; Fair = 1

- A level 5 SIPSE project impact measuring teachers' application of TPACK and student problem based and project based learning in STEM subjects - here lessons and student projects are observed and assessed by SIPSE teacher peer-to-peer and master trainer observation groups.
- Below we see that *teachers have higher average scores in their ICT use to support content but lower average scores in their capacity to apply technology logistics during lessons (coming out at an average score of 3 in both countries).*



Indicators: Very Good = 4; Good = 3; Satisfactory = 2; Fair = 1

## Project Evaluation

The summative evaluation of the SIPSE was carried out at the end of the project to gauge relevance and effectiveness in achieving objectives and impact

**Relevance** measured the extent to which the SIPSE project and outcomes have remained consistent with the vision, mission and needs of the project stakeholders. Relevance in the project was achieved through the following:

- SIPSE used an enhanced instructional design strategy that extended beyond the more typical trainings in basic ICT skills.
- SIPSE's teacher training contained content for cultivation of students STEM and 21st Century skills, as well as media, technology and information literacy skills. These are skills that youth need to more fully participate in the expansion of knowledge-based societies in East Africa.
- SIPSE addressed the problem of scarcity of teaching and learning materials (TLMs) in schools by building the capacity of teachers to search and select appropriate open educational resources (OERs) and integrate in their STEM lessons.
- SIPSE addressed the need for ICT equipment in schools by providing 16 project schools with one laptop and one projector and four "beacon" demonstration schools with six laptops and four projectors for use in curriculum subject teaching.

**Effectiveness** relates to what extent the project implementation made progress in relation to achieving the four project objectives. Effectiveness in the project was seen in the following areas:

- The SIPSE model of introducing key concepts during workshops, addressing them in-depth during online training, and supporting the application and practice through master trainer visits in the classrooms increased the effectiveness of the project at the classroom practice level.
- The SIPSE project has been effective helping most teachers to prepare and present digital resources that are appropriate to lesson topics, elucidate concepts in ways that are compelling and easy to understand.
- SIPSE showed at the classroom practice level to be effective in providing opportunities for students to practice higher order skills.

**Impact** relates to the quality and extent of project results. The evaluation examined impact in the areas of (1) teacher training/capacity building and (2) student behavior, knowledge and attitudes. The findings revealed positive impacts of SIPSE as evidenced by:

- Student behavior, knowledge and attitudes. Students in general have shown great interest, attentiveness and desire to participate during the ICT-based lessons.
- Comprehension levels of the participating students appear to have generally shown improvement across all STEM subjects over the last year (finding is based only on teacher ongoing informal assessments).
- Teachers' use of ICT and ability to integrate ICTs effectively in teaching and learning.

## Qualitative Monitoring Results – 'What You Said'

1. **Leadership and planning:** a key to ICT integration that moves beyond a focus on equipment and basic skills
  - a) SIPSE heads and teachers see that school planning for ICT should reflect the **vision of the school core values for technology integration** and be linked to national educational goals and school principles of excellence and quality
  - b) A key leadership strategy that school leaders and teachers appreciated in SIPSE is to develop a **school ICT action plan** through school review and consensus building – about where the school is now and where it wants to be
  - c) SIPSE heads and teachers see the school plan as a **roadmap tool for ICT integration** for mapping different stages and targets for ICT use over time from building awareness to promoting a culture of ICT use across all school activities from administration to the curriculum

*School ICT planning is quite useful in ensuring progressive ICT development in a school. This ensures that ICT application in the school is carefully and effectively developed over a specified time limit.*

Participant, SIPSE National Workshop, May

- d) An important leadership approach that needs to be cultivated is the idea of **systems leadership** – the school leaders ability to move beyond their own school to **network and share** their ICT policies and good practices with other schools

## 2. Teacher professional development: school based and practice focused

- a) **Teacher perception, confidence, attitude, fears, and time availability to prepare** for ICT integration are critical factors in determining how and if they use ICT in the classroom
- b) Teachers perceive professional development for ICT use as a **professional learning journey that needs to be sustained** – to take teachers through stages of ICT use from supporting their current practice focused more on transfer of knowledge to students - to improving their future practice focused more on students' collaborative & interactive knowledge deepening, building and sharing
- c) Professional learning needs to be frequent, school-classroom based, practice focused and timely so that teachers have the opportunities to **experiment with and discover** the full potential of technology in their classroom practice
- d) Teachers appreciate the SIPSE focus on **teacher communities of practice as essential** for enabling a culture of innovative practice with ICT in schools - while **teacher peer-to-peer classroom observation and reflection** on what works and doesn't work is challenging. Many teachers resist or are not comfortable with collaborative professional learning.

*The mixture of technology and skills (in this module) has been quite interesting. Also the websites given are useful and the sharing makes us bench mark and learn so many things e.g. in chats and discussion.*

SIPSE Teacher, SIPSE Online Evaluation – 'Module 2 – ICT in the STEM Curriculum'

- e) Teacher **innovative practice** with ICT is enabled by their ICT skills capability, access to computer and internet resources and a **safe space to practice** their acquired skills and knowledge in lesson planning and classroom practice
- f) There is evidence of **emerging teacher innovative practice** focused on collaborative and meaningful learning that is problem based using mixed resources (ICT and non-ICT) and pedagogical strategies (didactic, problem & project based) to achieve lesson objectives in STEM teaching and learning

## 3. Curriculum and content: Access & tools

- a) The focus on sharing good ideas, digital content from STEM OER websites and exemplary teacher resources in a **central teachers resource database** was highly appreciated by teachers
- b) Teachers are realizing the potential of how the combined applications of new **pedagogical strategies** (higher order discussions & questions, group work, problems based and project based learning), and **technology** (open resources and software) can effectively support the teaching of **challenging concepts in STEM**.

*The teacher appreciates the use of technology which is shown in use of power-point for content, procedures used in calculation and assignments. He also uses good questioning techniques and practice and drill that enables the students to understand what is being taught.*

SIPSE Master Trainer, Classroom Observation Report

- c) Preparing lessons with **new learner centred problems based and project based approaches** is challenging for teachers with heavy workloads, crowded classes, an extensive syllabus and limited timetable lesson slots of 40 mins on average
- d) Teacher applications of project and problem based learning demand a **flipped classroom** approach – where students investigate outside the classroom and present and share knowledge in class time
- e) Finding **appropriate content** to match curriculum objectives and form level of students is challenging for teachers who are under pressure with heavy workloads and examinations
- f) Good e-content does not make for a good lesson – it is a **teacher’s cumulative good practice** in integrating technology in every lesson from the ‘hook’ to the teacher and student activities to the evaluation that results in good learning.
- g) The **incompetent use of ICT content resources** by teachers can create more harm than good – as in it can be harmful to progress in student learning and distract from traditional practices such as student note-taking critical for reinforcement of concepts to assist student in exam preparation

#### 4. Infrastructure & Resources: From basic purchasing to whole school deployment

- a) SIPSE has assisted schools in creating enabling conditions for technology use – but laptop and projector and computer **facilities are limited** in schools
- b) Teachers have explored opportunities for **experimenting with a range of e-resources** (presentation, video, audio, photos, graphics, animations, simulations, drill and practice) to create interactive and simulating learning experiences
- c) Teachers require a lot of **support and practice in trialing and developing technology** resources prior to using it in classroom practice

*SIPSE has helped me to be updated but the problem is lack of enough facilities – e.g. to provide among facilities such as laptops and projectors.*

Teacher comment, workshop evaluation January 2014

- d) The potential use of **mobile technology** for teacher professional learning, networking and student collaborative learning needs to be explored further. One of the issues is communication with teachers in rural areas with low connectivity. The other issues is limited devices for students to access and engage with technology as a learning tool.

#### 5. Sustainability: Whole school development for ICT use – key to sustainability

- a) The school vision for ICT use needs to move beyond a focus on ICT basic facilities and skills. The school review in SIPSE demonstrated a vision not only for ICT but with innovative and creative ideas for implementing **whole school digitalization** covering every facet of administration, teaching and learning



- b) The culture of ICT use needs to penetrate from national policy through to classroom practice – and this will only be achieved through **whole school consultation, and an e-learning vision** shared by all stakeholders of staff, students and parents and is supported by national vision, policy and strategy for ICT integration

*At the beginning when I saw and read the web quest I was not so sure of how will I work with my students. But we managed to sit as a team with my colleagues (STEM teachers) as a leader and discuss it and we came with one understanding, then we started the work with our students. My students now are eager to learn any topic using web quest method because they were very interested in it, though it cost a lot of time to accomplish it. Thanks once again for your advice.*

Teacher comment in email to Master Trainer, after trying out 'webquest' project based learning approach

## CONCLUSIONS – SIPSE MODEL NOW AND IN THE FUTURE

The findings from the SIPSE Monitoring and Evaluation tell us that there are:

### *Existing Initiatives and Needs*

- 1) In Kenya and Tanzania there have been **very successful strategic planning and expansion of school systems at secondary level** – a critical level for the development of higher order skills and knowledge to prepare youth for employment in traditional and new digital knowledge based industries
- 2) However expansion has brought out **issues of quality and teacher supply in general and specifically in STEM subjects** where failure rates are high, particularly in Science and mathematics subjects and in rural areas
- 3) Kenyan and Tanzanian governments are **committed to ICT deployments and initiatives** to address issues of access, equity & quality of provision and outcomes
- 4) However a **holistic approach** may be needed to ensure the flow of national policy and strategy into school and classroom practice

### *Innovation in the GESCI-SIPSE Project*

- 5) The SIPSE project presents an **innovative blended learning model** to build teacher ‘technology literacy’ and ‘knowledge deepening’ competencies for technology use in STEM teaching and learning.
- 6) The model presents a **phased approach for teacher ICT development** that has been trialed and validated in the project pilot of 20 secondary schools in Tanzania and Kenya during 2013 – 2015
- 7) The pilot has demonstrated evidence of **emerging good practice and exemplary materials of teacher use of ICT** to support didactic, interactive, problem-based and project based teaching and learning of STEM subject content and concepts
- 8) The project introduced **school review and action plans** to encompass a **whole school approach for ICT integration** based on ‘SIPSE schools of excellence’ criteria;
- 9) The project has trialed a **toolkit of ICT teacher development** that can be adapted and adopted for teacher development, leadership development and whole school development for ICT integration – inclusive of
  - a. contextualized ICT teacher competencies for teachers in Kenya and Tanzania,
  - b. modules that have been developed based on prioritized competencies and that can be accessed on m-learning, e-learning platforms and CDs offline
  - c. action plan roadmaps for building different levels of school ICT integration
- 10) The project introduced the use of **Open Education Resources (OERs)** to fast track development of course materials. Other resources included
  - a. the development of a teachers’ portal of exemplary STEM lesson plans and e-resources, and
  - b. a teacher TPACK toolkit of self-assessment, lesson review, classroom observations and reflection tools on how teachers are applying their technology, pedagogy and content knowledge sets in practice

### *Future Visions, Challenges and Opportunities*

- 11) The next phase of SIPSE will seek to **inform teacher ICT professional development** in Kenya and Tanzania – by deepening and consolidating the innovation, impact, access and collaboration domains of the SIPSE model.
- 12) **Innovation:** The next phase of the SIPSE model expansion will seek to consolidate its innovative **phased approach to ICT integration** (with contextualized UNESCO ICT-CFT and TPACK frameworks for gradually building ICT capabilities and innovative use in STEM teaching and learning) to inform national ICT policy and strategy in education and professional development;
- 13) **Access:** The next phase will seek to **extend the model access** to more secondary schools in Kenya and Tanzania
- 14) **Impact:** The focus in the next phase will be to deepen the model impact to encompass a whole school approach for ICT integration based on ‘*schools of distinction*’ criteria encompassing leadership

and vision, ICT in the curriculum, ICT school culture, teacher ICT professional development and ICT infrastructure and resources;

- 15) **Multi-partner collaboration:** In the next phase the SIPSE initiative will seek the collaboration and involvement of multiple actors at all education levels – from the curriculum expert and teacher development providers to county and district education directorates and boards to school based leaders, teacher leads and STEM specialists.

## POSSIBLE POLICY RESPONSES

The following policy responses can address some of the key findings of the SIPSE pilot and Monitoring and Evaluation.

### *ICT in Teacher Education – Policy Response:*

1. Developing the SIPSE project as a model of emerging good practice and case studies for scaling up the **use of ICT to promote innovative practice in secondary schooling in Kenya and Tanzania**
2. Showcase the **project tools, frameworks, models and emerging good practice** at national, regional and international forums and conferences
3. Develop **partnership for ICT integration** from national policy levels to regional/ county to school practitioner levels – as in:
  - **Partnerships at National levels:**
    - Partnership with national teacher services institutions to recognize and certify continuous professional development
    - Partnership with ministries to recognize and support digital school development
    - Partnership with national teacher development institutions to integrate phased approach for ICT teacher competency development from pre-service to in-service
    - Partnership with national curriculum institutes for collaboration on content development
    - Partnership with corporates for internet and software deployment negotiations
  - **School and Practitioner levels:**
    - School-based professional development, leadership development and whole school development;
    - ICT schools of excellence awards,
    - ICT school benchmarking visits;
    - Connecting schools Kenya and Tanzania

### *Pedagogical / Educational Responses:*

4. Focus on **innovative practice outcomes** in STEM teaching and learning that includes cognitive, technical and soft skills development (team work, communications, critical thinking, creativity and innovation), not only educational knowledge outcomes.
5. Focus on **teacher education models that integrate technology** not as a technical skills subject on the side, but as a tool to support pedagogical and content.
6. In teacher development: focus on **learning pathways of ICT use in teacher professional education** that will bring teachers through different levels of capability – from ICT use to support didactic teaching to ICT use for knowledge deepening problem and project based learning practices.
7. In curriculum and content, **review and map secondary and teacher education curricula to provide a picture** of what needs to be considered when using ICTs for teacher professional development or integrating ICT in STEM subject teaching and learning
8. In content development, **set up national multi-partner multi-disciplinary team** (experts from national institutions for curriculum development, teacher development and outstanding STEM teacher practitioners) to expand on the SIPSE ICT-STEM modules for secondary teachers to cover teacher prioritized competencies across current and new domains of the ICT-CFT and TPACK frameworks.
9. Use **open education resources to fast track** module development and to create a data base of e-content for teachers
10. In school development: **create a schools of excellence award system and roadmap** to build schools through different levels of ICT integration and capability - from initial stages of ICT use to support professional and administrative needs to ICT enabling, ICT confident and ICT transformative stages of technology use to shift schools into the realm of 'ICT schools of excellence schools'.
11. Work with the SIPSE project schools to **trial and test materials** with teachers and create laboratories on what works, doesn't work and what can be up-scaled across secondary schooling in Tanzania and Kenya

## POLICY BRIEF

### 1: WHAT IS POLICY? How do I contribute to a policy forum?

#### *What is policy?*

The term 'policy' can be used to describe any course of action which intends to change a certain situation.<sup>13</sup> Government ministries (such as education), agencies (like the national institutes for curriculum development), councils (such as the county or district education directorates) and institutions (such as schools) all make policies that affect our daily lives and professional practices.

The Ministry of Education makes policy plans of action to set out clear rules and expectations for the delivery of programmes and services to the public.<sup>14</sup>

The Ministry can make policies that can change

- what curriculum you will teach
- how students will be assessed
- what length of teacher education will be required
- how teachers will register for service
- what health and safety standards should be applied in teaching and learning environments etc..

The term 'policy making' is about the process of changing an idea into an action. These 'ideas' can come from many different places, for example:

- government
- ministers
- politicians
- councillors
- civil servants
- society
- community groups
- trade unions
- public opinion
- professionals, such as heads, teachers and academics
- people like you

#### *How to contribute to the policy forum*

One of the best ways to have your ideas heard is by participating in a policy consultation meeting – such as this 'policy forum'. Consultation is a great way for everyone to contribute with their ideas to a policy discussion and policy making process.

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13 <http://www.nidirect.gov.uk/what-is-government-policy>

14 <http://www2.gov.bc.ca/gov/topic.page?id=CA395D52F68844529BAFB97CFDEECA51>

## 2: SIPSE policy responses micro, meso and macro levels

Linking SIPSE to different levels of education for informing policy at each level

	<b>Micro-level: School Learners Teachers Leaders</b>	<b>Meso-level: Teacher Professional Development Institutions</b>	<b>Macro-level: Policy Implications Ministries of Education/ TED/ Curriculum</b>
<b>Leadership and planning</b>	Developing ICT integration roadmaps towards digital schools	ICT leadership modules for in-service and short courses – linked to digital schools leadership	Certified Digital Schools Awards; support policy and strategy
<b>Professional Development</b>	School based and online opportunities for ICT professional development pathways linked to competency frameworks	Pre-service, in-service and short course linked to contextualized ICT competency frameworks	Contextualized ICT Competency Frameworks for Teachers – Certified pre and in-service awards
<b>ICT Curriculum and content</b>	Teachers' portal of exemplary lesson plans and resources	Use of open education resources in module development and e-content	Mapping of ICT in secondary and teacher development curricula
<b>Infrastructure &amp; resources</b>	Integrated approach for ICT infrastructure and resources procurement that takes into account ICT budgets	Technical training for ICT support	Policy and strategy for ICT deployment and budget support in secondary schooling
<b>Sustainability</b>	Whole school development for ICT integration; network with other schools;	Support teacher development for ICT integration through different formats, online face to face, school outreach	Support sustainability of ICT integration in secondary schooling through policy measures
<b>= Success Innovative Practice</b>	Quality teaching & meaningful learning; improved student outcomes in STEM subjects	New and more flexible models for teacher professional development	Student graduates with STEM skills; contributing to new industries and social development in knowledge age

### 3: SIPSE Now and in the Future

#### Conclusions: What does the M&E tell us about SIPSE NOW and in the FUTURE?

The findings from the SIPSE Monitoring and Evaluation tell us that there are:

##### Existing Initiatives and Needs

- 1) In Kenya and Tanzania there have been **very successful strategic planning and expansion of school systems at secondary level** – a critical level for the development of higher order skills and knowledge to prepare youth for employment in traditional and new digital knowledge based industries
- 2) However expansion has brought out **issues of quality and teacher supply in general and specifically in STEM subjects** where failure rates are high, particularly in Science and mathematics subjects and in rural areas
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- 4) However a **holistic approach** may be needed to ensure the flow of national policy and strategy into school and classroom practice

##### Innovation in the GESCI-SIPSE Project

- 5) The SIPSE project presents an **innovative blended learning model** to build teacher ‘technology literacy’ and ‘knowledge deepening’ competencies for technology use in STEM teaching and learning.
- 6) The model presents a **phased approach for teacher ICT development** that has been trialed and validated in the project pilot of 20 secondary schools in Tanzania and Kenya during 2013 – 2015
- 7) The pilot has demonstrated evidence of **emerging good practice and exemplary materials of teacher use of ICT** to support didactic, interactive, problem-based and project based teaching and learning of STEM subject content and concepts
- 8) The project introduced **school review and action plans** to encompass a **whole school approach for ICT integration** based on ‘SIPSE schools of excellence’ criteria;
- 9) The project has trialed a **toolkit of ICT teacher development** that can be adapted and adopted for teacher development, leadership development and whole school development for ICT integration – inclusive of
  - a. contextualized ICT teacher competencies for teachers in Kenya and Tanzania,
  - b. modules that have been developed based on prioritized competencies and that can be accessed on m-learning, e-learning platforms and CDs offline
- 10) The project introduced the use of **Open Education Resources (OERs)** a teachers’ portal of lesson plans and e-resources, and a TPACK toolkit of self-assessment, lesson review, classroom observations and reflection tools on how teachers are applying their technology, pedagogy and content knowledge sets in practice

##### Future Visions, Challenges and Opportunities

- 11) The next phase of SIPSE will seek to **inform teacher ICT professional development** in Kenya and Tanzania – by deepening and consolidating the innovation, impact, access and collaboration domains of the SIPSE model.
- 12) **Innovation:** The next phase of the SIPSE model expansion will seek to consolidate its innovative **phased approach to ICT integration** (with contextualized UNESCO ICT-CFT and TPACK frameworks for gradually building ICT capabilities and innovative use in STEM teaching and learning) to inform national ICT policy and strategy in education and professional development;
- 13) **Access:** The next phase will seek to **extend the model access** to more secondary schools in Kenya and Tanzania
- 14) **Impact:** The focus in the next phase will be to deepen the model impact to encompass a **whole school approach for ICT integration** based on ‘*schools of distinction*’ criteria encompassing leadership and vision, ICT in the curriculum, ICT school culture, teacher ICT professional development and ICT infrastructure and resources;

15) **Multi-partner collaboration:** In the next phase the SIPSE initiative will seek the *collaboration and involvement of multiple actors* at all education levels – from the curriculum expert and teacher development providers to county and district education directorates and boards to school based leaders, teacher leads and STEM specialists.