

# Partnership to Strengthen Innovation and Practice in Secondary Education (SISPE) in Kenya and Tanzania

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## African Digital Schools Initiative (ADSI)

**Authors:** GESCI Monitoring, Evaluation and Learning Research Team



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This publication was prepared by the GESCI team of Mary Hooker, GESCI Senior Education Specialist and Esther Mwyneria, GESCI Education Technologist and SIPSE project manager.

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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:

- <sup>35</sup><sub>17</sub> The UNESCO ICT competency framework for teachers (ICT-CFT) contextualized for teachers in Kenya and Tanzania and
- <sup>35</sup><sub>17</sub> 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

- <sup>35</sup><sub>17</sub> ICT use to support traditional didactic practices, to
- <sup>35</sup><sub>17</sub> 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

- <sup>35</sup><sub>17</sub> the course design integrating face to face workshops, to
- <sup>35</sup><sub>17</sub> online learning and school based communities of practice and reflection, to
- <sup>35</sup><sub>17</sub> the use of different platforms and tools for course delivery, to
- <sup>35</sup><sub>17</sub> 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.**

<sup>35</sup><sub>17</sub> 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>).

<sup>35</sup><sub>17</sub> 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 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.

<sup>35</sup><sub>17</sub> 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>.

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<sup>1</sup> <http://www.tanzania.go.tz/pdf/theTanzaniadevelopmentvision.pdf>

<sup>2</sup> [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)

<sup>3</sup> <http://www.education.go.ke/Documents.aspx?docID=1650;>

<sup>4</sup> <http://moe.go.tz/PDF/PEDP%20II%20Final%20Doc.pdf>

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

<sup>6</sup> [http://unesdoc.unesco.org/images/0021/002175/217509E.pdf,](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)

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

<sup>35</sup><sub>17</sub> 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 **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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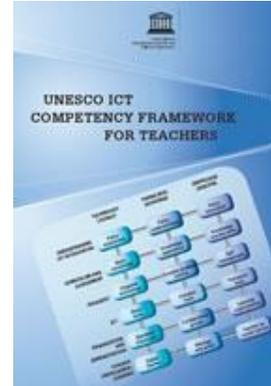
<sup>8</sup><http://planipolis.iiep.unesco.org/upload/Tanzania%20UR/Tanzania ICT Policy for BasicEducation 2007 .pdf>

### 3. The SIPSE Project Approach

#### *The SIPSE Model of ICT Teacher Professional Development - What, Why, How*

#### ICT Teacher Competencies

The SIPSE course develops teacher ICT competencies drawn from the UNESCO ICT Competency Framework for Teachers (ICT-CFT)<sup>9</sup> that have been contextualized for teachers in Kenya and Tanzania. The course materials are presented on a Chamilo platform.<sup>10</sup>

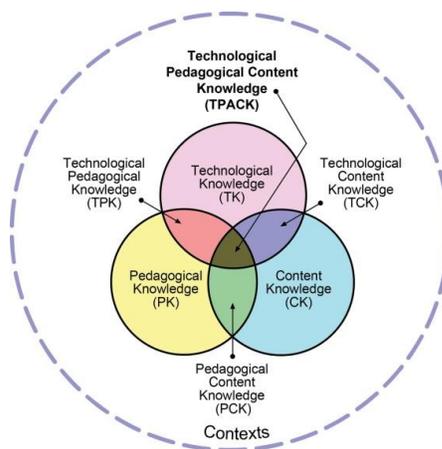


Teachers work through two levels of ICT competencies

<sup>35</sup><sub>17</sub> **technology literacy** for general *ICT application* in professional practice

<sup>35</sup><sub>17</sub> **knowledge deepening** for *ICT infusion* in STEM subject teaching and learning.

This course uses Open Education Resources (OERs) which are free to use for educational purposes – to develop course modules and teacher lesson plans.



#### Technology Pedagogy and Content Knowledge (TPACK)

The SIPSE course modules introduce *TPACK* with its three forms of knowledge that a teacher needs to have to integrate technology into their teaching: **Technology Knowledge (TK)**, **Pedagogical Knowledge (PK)** and **Content Knowledge (CK)**.<sup>11</sup>

The SIPSE modules are organized into 4 units – where each unit has *TPACK* elements and activities – to assist teachers *try out* and *experiment* with TK and PK and CK combinations in their classroom practice – as follows:

<sup>35</sup><sub>17</sub> Unit 1: Presents exemplary ICT STEM Lessons (TCK)

<sup>35</sup><sub>17</sub> Unit 2: Presents chats & discussion forums on ICT use to support pedagogical strategies (TPK)

<sup>35</sup><sub>17</sub> Unit 3: Presents teacher computer practicals (TK)

<sup>35</sup><sub>17</sub> Unit 4: Presents guidelines and templates for teachers to apply technology, pedagogy and content knowledge in STEM lesson plans and classroom practice (TPACK)

<sup>9</sup> UNESCO ICT—CFT at: <http://unesdoc.unesco.org/images/0021/002134/213475E.pdf>

<sup>10</sup> STEM SIPSE Online at: [http://sipseonline.gesci.org/user\\_portal.php?nosession=true](http://sipseonline.gesci.org/user_portal.php?nosession=true)

<sup>11</sup>TPACK at: [http://en.wikipedia.org/wiki/Technological\\_Pedagogical\\_Content\\_Knowledge](http://en.wikipedia.org/wiki/Technological_Pedagogical_Content_Knowledge)

## ***The SIPSE Project Activities – What, Why, How***

The SIPSE project presents a **cascade model** of teacher development.

<sup>35</sup><sub>17</sub> 6 Master Trainers from each of the 2 countries were selected and trained in online facilitation and school based support competencies and skills

<sup>35</sup><sub>17</sub> In two years of project implementation, the Master trainers worked with the 120 STEM teachers in Kenya and Tanzania

- **Development of a professional development program.**

The SIPSE team worked with teacher educators and relevant Ministry of Education departments (such as curriculum department) to

<sup>35</sup><sub>17</sub> audit and evaluate the existing teacher education curriculum

<sup>35</sup><sub>17</sub> audit the capacity needs of teachers for ICT use

<sup>35</sup><sub>17</sub> identify how technology could enhance curriculum delivery, promote student-centered learning and acquisition of 21st century skills.

- **Delivery of the training program through a “blended” methodology**

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:

<sup>35</sup><sub>17</sub> Part 1: Classroom based training, 3 day orientation workshop session

<sup>35</sup><sub>17</sub> Part 2: On-line learning with Master Trainers

<sup>35</sup><sub>17</sub> 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

<sup>35</sup><sub>17</sub> a programme of meetings with the school directorates,

<sup>35</sup><sub>17</sub> classroom observations with teacher STEM teams ,

<sup>35</sup><sub>17</sub> review of & reflection on teacher lesson plans and classroom try outs

<sup>35</sup><sub>17</sub> 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

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

policies that would positively impact on teacher education in the two countries based on the experiences from the SIPSE project model.

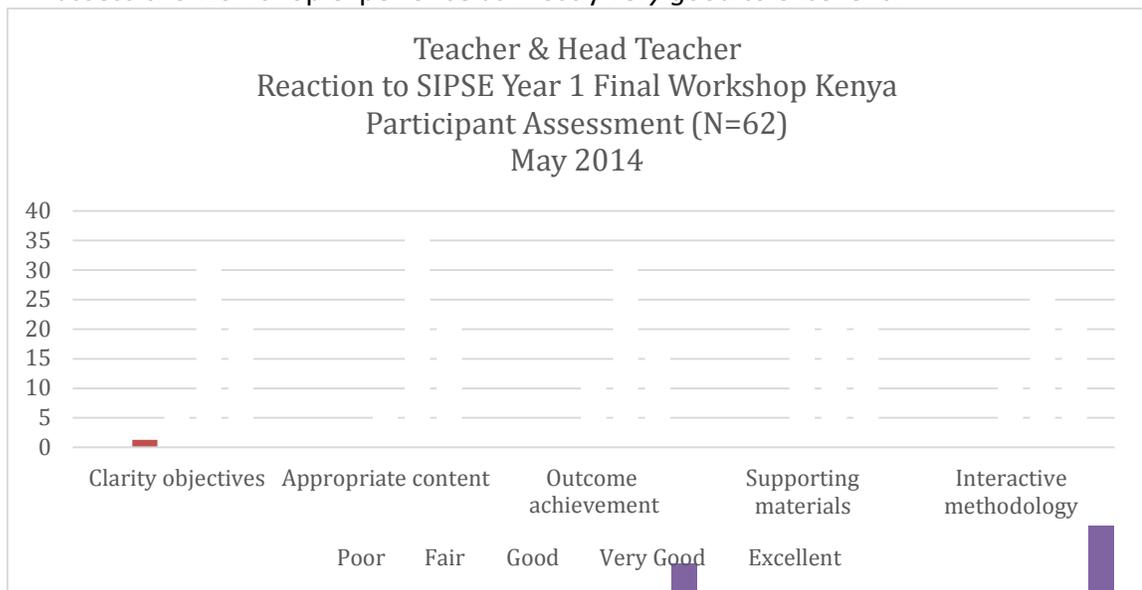
#### 4. Project Monitoring, Evaluation and Learning

##### **Project Monitoring ‘Quantitative’ Results – ‘What You Saw and Assessed’**

SIPSE monitored 5 levels of model implementation as below:

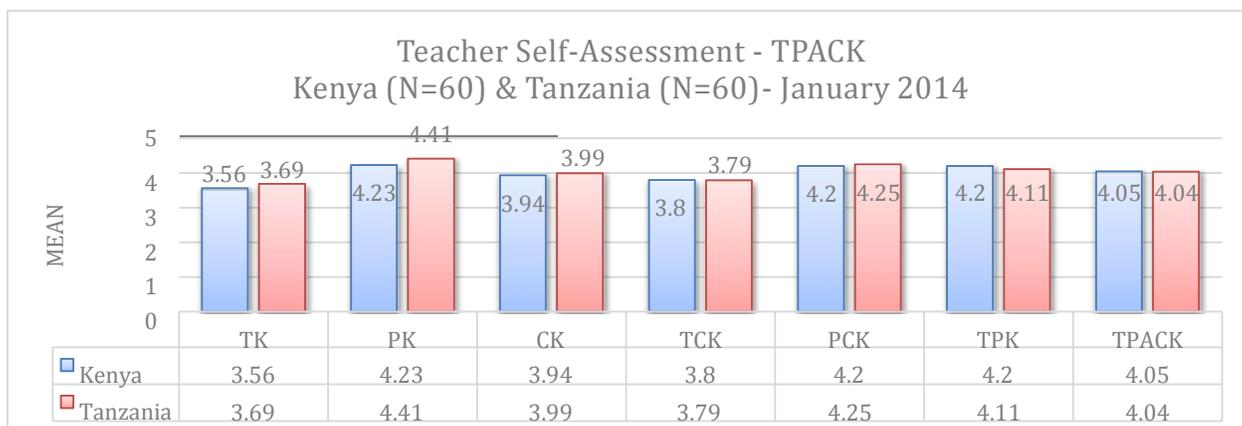
<sup>35</sup><sub>17</sub> **A level 1 reaction of teachers and head teachers** to training & sensitization workshops and online course.

<sup>35</sup><sub>17</sub> Below we see a typical workshop evaluation by participants in Kenya where they assess the workshop experience as mostly *very good to excellent*.



<sup>35</sup><sub>17</sub> **A level 2 teacher self-assessment** of their Technology, Pedagogy & Content Knowledge (TPACK) and how they see that they apply their knowledge in STEM teaching and learning.

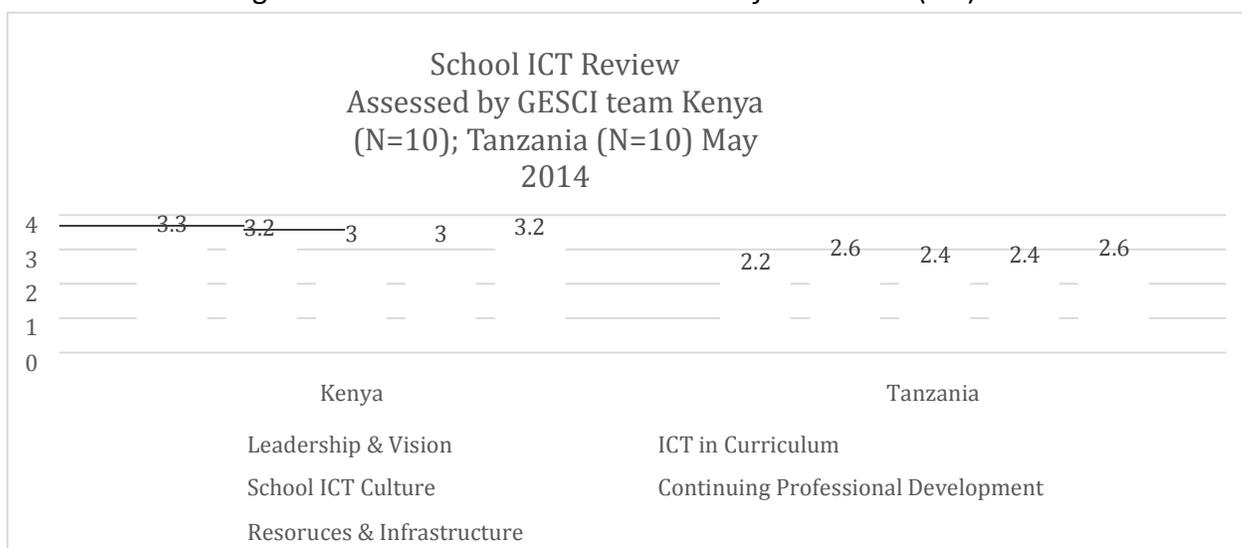
<sup>35</sup><sub>17</sub> Below we see the highest mean score ratings go to the Kenya and Tanzania teacher self-assessment of their *Pedagogy Knowledge (PK)* (4.23; 4.41) and the lowest to their self-assessment of their *Technology Knowledge (TK)* (3.56; 3.69)



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

<sup>35</sup><sub>17</sub> **A level 3 assessment of school support** for ICT integration in relation to *ICT leadership & vision, ICT across the curriculum, a school culture for ICT use, ICT professional development and infrastructure & resources.*

<sup>35</sup><sub>17</sub> Below we see in Kenya the highest mean score is *leadership and vision* (3.3) - in Tanzania the highest mean score is in *resources and infrastructure* (2.6)

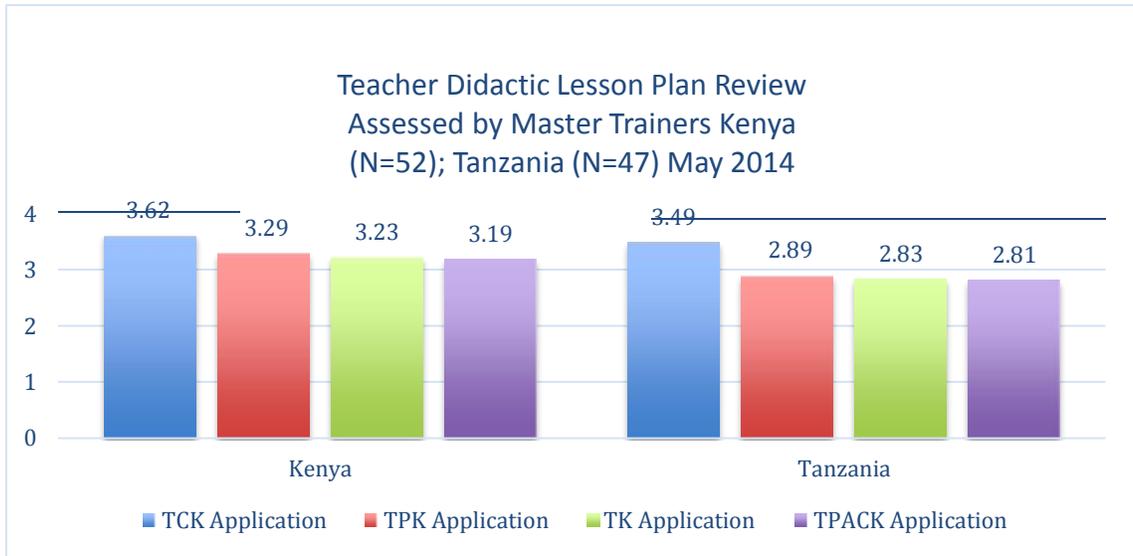


**Indicators:** Very Good = 4; Good = 3; Satisfactory = 2; Fair = 1

<sup>35</sup><sub>17</sub> **A level 4 teachers' application of TPACK competencies & skills** in lesson planning and in classroom practice.

<sup>35</sup><sub>17</sub> Here lessons plans and try-outs are assessed by master trainers.

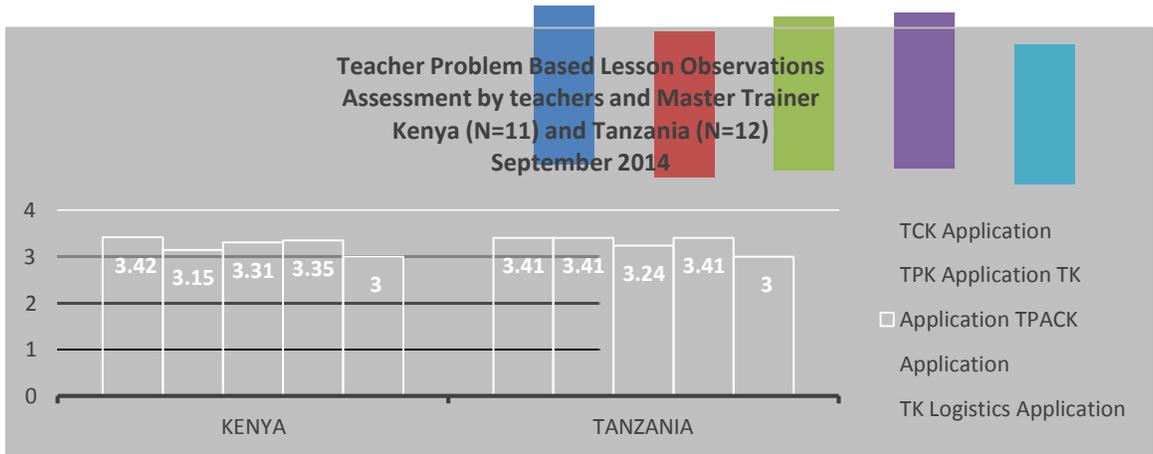
<sup>35</sup><sub>17</sub> Below we see that the MT highest mean scores go to teachers' *ICT use to support content* (3.62; 3.49) and lowest to teachers' *ICT use to support pedagogical strategies* (3.19; 2.81)



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

Below we see teachers and MTs assessment of teachers' application of ICT in problem-based learning lessons

Teachers have higher mean scores in their *ICT use to support content in PBL lessons* and lower mean scores in their *capacity to apply technology logistics during lessons* (coming out at an average score of 3 in both countries).

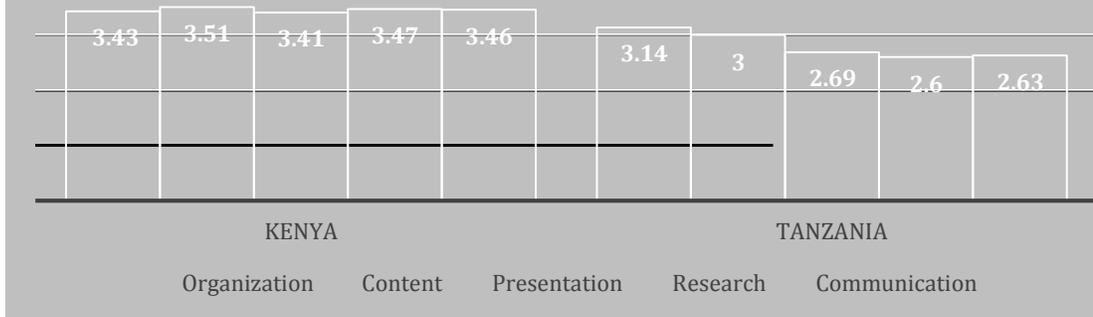


**Indicators:** Very Good = 4; Good = 3; Satisfactory = 2; Fair = 1

A level 5 SIPSE project impact measuring student knowledge and skills development with ICT use. Here student webquest projects were observed and assessed by SIPSE teacher and master trainers.

Below we see that teachers and MTs assess student group projects with higher mean scores for *project content* (Kenya 3.51) and *project organization* (Tanzania, 3.14) and lower mean scores for *group presentation* (Kenya, 3.41) and *group research and communication* (Tanzania, 2.6, 2.63).

**Student Webquest Project Evaluations  
Assessed by teachers with Master Trainers  
Kenya (N=51); Tanzania (N=35)  
May 2015**



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

**Summary:** The monitoring quantitative results point to:

- <sup>35</sup>/<sub>17</sub> SIPSE teachers *who perceive*
  - their strengths to lie in their **pedagogical and content knowledge** and
  - their challenges to lie in their **technology competencies**.
- <sup>35</sup>/<sub>17</sub> School assessments reveal *mixed leadership priorities* –
  - in Kenya a greater focus on **vision and planning for ICT integration**
  - in Tanzania a bigger focus on **acquiring infrastructure resources**.
- <sup>35</sup>/<sub>17</sub> Teacher and master training observations of teacher planning and classroom practice *show teachers to be*
  - more effective in their **use of technology to teach STEM content**
  - less effective in **use of technology to support shift towards new pedagogical strategies** for cooperative, problem based and project based learning
- <sup>35</sup>/<sub>17</sub> Student project assessment that *reveal students to have*
  - stronger capacities in **organization and content** aspects of group work in project development
  - weaker capacities in **presentation, research and communication** aspects of group work in project development



- b) 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
- c) 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.



3. **Curriculum and content:** Addressing the needs of all learners

- a) The focus on sharing good practice and exemplary teacher resources by teachers
- b) Teachers are realizing the benefits of (open resources and software) can effectively support the teaching of **challenging** content



- c) Preparing lessons with **appropriate** approaches is challenging for teachers with an extensive syllabus and limited resources
- d) Finding **appropriate content** to match curriculum objectives and term level at students is challenging for teachers who are under pressure with heavy workloads and examinations

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 drill and practice) to create
  - c) Teachers require a lot of **technology** resources p

*updated but the problem is lack of enough facilities  
ilities such as laptops and projectors*

- d) The potential use of **mobile technology** for teacher professional learning, networking and student collaborative learning needs to be explored further.
- e) One of the issues is **communication with teachers in rural areas** with low connectivity.
- f) The other issue 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

### **Project External Evaluation Results**

The summative evaluation of the SIPSE was carried out by an external evaluator. The main findings on the project relevance, effectiveness and impact are presented below.

**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:

- <sup>35</sup><sub>17</sub> SIPSE used an enhanced instructional design strategy that extended beyond the more typical trainings in basic ICT skills.
- <sup>35</sup><sub>17</sub> SIPSE’s teacher training contained content for cultivation of students STEM and 21<sup>st</sup> 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.
- <sup>35</sup><sub>17</sub> 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.
- <sup>35</sup><sub>17</sub> 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:

- <sup>35</sup><sub>17</sub> 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.
- <sup>35</sup><sub>17</sub> 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.
- <sup>35</sup><sub>17</sub> 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:

- <sup>35</sup><sub>17</sub> Student behavior, knowledge and attitudes. Students in general have shown great interest, attentiveness and desire to participate during the ICT-based lessons.
- <sup>35</sup><sub>17</sub> 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).
- <sup>35</sup><sub>17</sub> Teachers’ use of ICT and ability to integrate ICTs effectively in teaching and learning.

See [appendix 3](#) for more information on the ‘SIPSE Model Now and in the Future’

## 5. 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 to local school levels – as in:

#### **Partnerships at National levels:**

- <sup>35</sup>/<sub>17</sub> Partnership with national teacher services institutions to recognize and certify continuous professional development
- <sup>35</sup>/<sub>17</sub> Partnership with ministries to recognize and support digital school development
- <sup>35</sup>/<sub>17</sub> Partnership with national teacher development institutions to integrate phased approach for ICT teacher competency development from pre-service to in-service
- <sup>35</sup>/<sub>17</sub> Partnership with national curriculum institutes for collaboration on content development
- <sup>35</sup>/<sub>17</sub> Partnership with corporates for internet and software deployment negotiations

#### **School and Practitioner levels:**

- <sup>35</sup>/<sub>17</sub> School-based professional development, leadership development and whole school planning;
- <sup>35</sup>/<sub>17</sub> ICT schools of excellence awards,
- <sup>35</sup>/<sub>17</sub> ICT school benchmarking visits;
- <sup>35</sup>/<sub>17</sub> Connecting schools Kenya and Tanzania

### ***Pedagogical / Educational Policy Responses:***

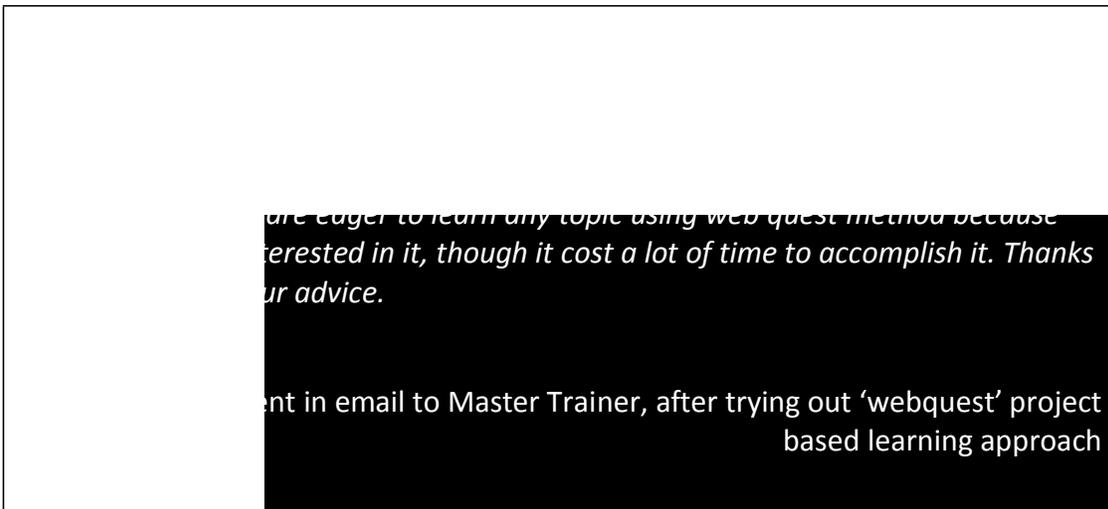
4. Focus on **innovative practice outcomes** in STEM teaching and learning that includes cognitive, technical and soft skills development (team work, communications, critical thinking, creativity and innovation), not only educational knowledge outcomes.
5. Focus on **teacher education models that integrate 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

See [appendix 1](#) for more information on what we mean by 'policy' and contributing to policy

See [appendix 2](#) for more information about policy responses for different stakeholders at every education level (micro-meso-macro).



## APPENDIX 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

- <sup>35</sup>/<sub>17</sub> what curriculum you will teach
- <sup>35</sup>/<sub>17</sub> how students will be assessed
- <sup>35</sup>/<sub>17</sub> what length of teacher education will be required
- <sup>35</sup>/<sub>17</sub> how teachers will register for service
- <sup>35</sup>/<sub>17</sub> 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:

- <sup>35</sup>/<sub>17</sub> government
- <sup>35</sup>/<sub>17</sub> ministers
- <sup>35</sup>/<sub>17</sub> politicians
- <sup>35</sup>/<sub>17</sub> councillors
- <sup>35</sup>/<sub>17</sub> civil servants
- <sup>35</sup>/<sub>17</sub> society
- <sup>35</sup>/<sub>17</sub> community groups
- <sup>35</sup>/<sub>17</sub> trade unions
- <sup>35</sup>/<sub>17</sub> public opinion
- <sup>35</sup>/<sub>17</sub> professionals, such as heads, teachers and academics
- <sup>35</sup>/<sub>17</sub> **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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<sup>13</sup> <http://www.nidirect.gov.uk/what-is-government-policy>

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

## APPENDIX 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:</b> <i>School Learners Teachers Leaders</i>	<b>Meso-level:</b> <i>Teacher Professional Development Institutions</i>	<b>Macro-level:</b> <i>Policy Implications Ministries of Education/ TED/ Curriculum</i>
<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

## Appendix 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
- 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
- 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.

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