

**INSPIRING SCIENCE EDUCATION FOR GIRLS USING ICT
HEADTEACHERS' SENSATIZATION WORKSHOP
HELD ON
3RD & 4TH SEPT 2007 AT MUKONO DFI MUKONO
REPORT**



Fig 1: Head teachers attending the Sensitization workshop at Mukono DFI.

Introduction:

As part of its continuous effort to enhance the teaching and learning of science using Information and Communication Technology (ICT) in secondary schools especially for girls, the Ministry of Education and Sports in partnership with Barclays Bank, SchoolNet Uganda and Digital Links (UK) initiated a project called *Inspiring Science Education For Girls Using Information Communication Technology (ICT)* in June 2006.

Four training workshops (one at Wanyange Girls School, one at Dabani Girls School, one at Gayaza High school and one at Mukono DFI) for teachers and one *Science with ICT* holiday camp for students have been conducted since the launch of project. The two day sensitization workshop aimed at bringing the Head teachers to speed with the project activities so that the headteachers, teachers students and project partners can move together. A few new schools were invited to the workshop so as to interest them in joining the project.

Workshop Objectives

The workshop had the following objectives.

- To provide the Head teachers an opportunity to share challenges faced by schools in managing the science teaching and learning process and to brainstorm strategies to address these challenges.
- To brief the Headteachers about the ***Inspiring Science Education for Girls Using ICT*** project (rationale, objectives, scope, partners, activities, successes & challenges).
- To update the school Head teachers on the current and planned strategies by the Ministry of Education and Sports to improve science teaching in schools.
- To sensitize the School Headteachers why and how Information Communication Technology (ICT) can be used to enhance the teaching and learning process.
- To equip the Headteachers with the Technical Need-to-Know information necessary to purchase, install and maintain ICT facilities in their schools.
- Study tour to Kyambogo College School ICT centre, one of the “Centres of Excellence” set up by the Ministry of Education and Sports.
- Get ideas and suggestions from the Headteachers on how best to implement the project in their schools.

Attendance:

Head teachers from the following schools attended the workshop: Dubani Girls School (Busia), Tororo Girls School (Tororo), Wanyange Girls School (Jinja), Nalinya Lwantale Girls School (Luweero), Bweranyangi Girls School (Bushenyi), Kyeizoba Girls School (Bushenyi), Ediofe Girls School (Arua), Muni Girls School (Arua), Agrey Memorial (Wakiso), Aiden College (Wakiso), Muntunyera High School, Bukooli College (Bugiri) and Bukomero SS (Kiboga).

Monday, 3rd Sept 2007 Activities.

DAY 1		
Time	Activity	By whom
8:30 -9:00 am	Registration and introductions	Participants
9:00-9:40 am	Brainstorming the challenges of managing science teaching and learning in schools and strategies to address the challenges.	- Facilitator - Participants
9:40 -10:40 am	- Brief about the <i>Inspiring Science Education for Girls Using ICT</i> project (rationale, objectives, scope, partners , activities, successes & challenges) - Questions & answers	- Kakinda Daniel (Project coordinator)
10:40 -11.00	HEALTH BREAK & BREAK TEA	

am		
11:00 -1:00 pm	Presentation: Current & future strategies to improve science teaching & learning by Ministry of Education and Sports. - Official opening - Questions & answers.	Mr. Nsumba_Lyazi (Ass. Commissioner Secondary (Comprehensive)
1:00 -2:00 pm	LUNCH	
2:00 -2:30 pm	Presentation: “ Role of computers in the Education System – Students’ perspective ”	Sheila Nakazibwe
2:30 – 3.00 pm	Presentation: Education for the Rural Schools using ICT	Ms. Aminah Namwabira
3:00 -4:30 pm	Presentation: Technical Need-To-Know for a school manager (ICT options and related costs – Purchase, Installation, maintenance	Allen Ssebandeke (SchoolNet Uganda Technical Director)
4:30 -5:00	HEALTH BREAK & END OF DAY 1	

Challenges of managing teaching and learning of science in Uganda schools.

As a background to the brain-storming session, the Head teachers were provided with the failure rate in sciences for the Uganda Certificate of Education (UCE) from 2000 -2006. (See Fig 2. for details)

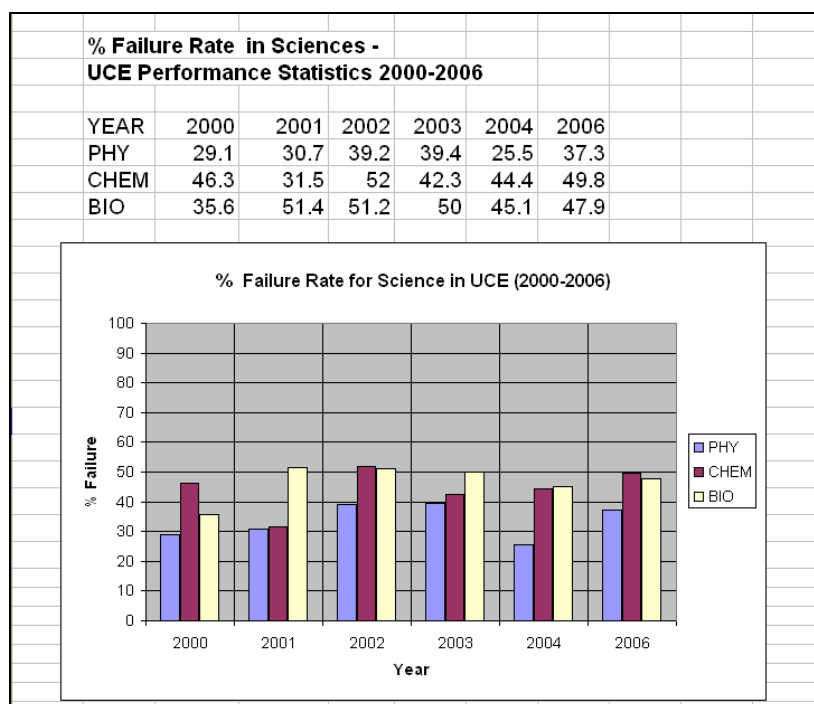


Fig 2: Failure rate in sciences at UCE (2000 -2006)

During the brainstorming session, the school Head teachers highlighted the following as some of the challenges of managing science teaching and learning in schools.

- Lack/Shortage of science equipment, chemicals and fittings like running water.
- Shortage of science teachers resulting in science teachers teaching in a number of schools. This reduces their efficiency and cuts down on the contact time with the students. The Ministry of Education and Sports needs to do something about both the number and quality of the science teachers.
- There are some qualified but non-competent teachers. This raises questions about the capacity of the examining bodies for the teacher training institutions.
- Lack of women in science role models. The critical shortage of female science teachers in schools sends a wrong signal to the girls that sciences are not for them.
- Negative attitude of students towards science couple with discouraging remarks from male science teachers.
- A good number of teachers who have upgraded through distance education lack both the confidence and competence to teach A 'Level science classes.
- The big numbers of students in classes make it difficult to administer science practical.
- Some teachers lack interest in the teaching profession. They joined the profession as a last resort.
- Peer-influence and stereo-typing that sciences are difficult and are for boys.
- Lack of innovation on the part of the teachers.
- The syllabus is unfriendly and does not relate to the concepts and principles taught to the daily life of the students e.g. fermentation of cassava or distillation of local brew. Students don't see any connection between what they study in class and what they do at home.
- Poor methods of teaching dominated by mere dictation of text-book notes and little or no hands-on activity.
- Science textbooks are too expensive for schools to acquire enough copies or for students to acquire personal copies.
- A number of teachers who have benefited from in-service training workshops are not very willing to pass the information on to others. Some teachers don't value professional development workshops which are organized during the holidays because they don't see any immediate monetary gains.
- Lack of continuous assessment resulting into preparing for assessment at the end of the course. Non-candidate classes do not get opportunity to be exposed to proper examination techniques.
- Ministry selection criteria for schools to benefit from projects results into some schools receiving excess of equipment/chemicals and other schools receiving nothing.
- Failure of some Head teachers to properly supervise the implementation of the curriculum.

Presentation: *Inspiring Science Education for Girls Using ICT project* (rationale, objectives, scope, partners, activities, successes & challenges)
by Kakinda Daniel, Project Coordinator



Fig 2: Kakinda Daniel giving a project update to the Head teachers.

Mr. Kakinda Daniel, the *Inspiring Science Education For Girls with ICT* project coordinator briefed the Head teachers on the rationale, objectives, partners, activities, successes and challenges of the project.

Project Rationale:

As a way of supplementing the Ministry of Education and Sports efforts to improve science education in the country, Barclays Bank, Ministry of Education and Sports, SchoolNet Uganda and Digital Links (UK) came up with the *Inspiring Science Education For Girls with ICT* project.

Information Communication Technology (ICT) combined with Teacher Pedagogical Professional Development provides an opportunity for addressing through the following ways.

- Lack/inadequate instructional materials like books, equipment and chemicals through the use of electronic books, virtual science labs, simulations & video clips.
- Abstract science concepts can easily be visualized and explained through the use of animations and simulations.
- Using video clips, the external environment can be brought into the classroom helping to relate science to the daily life experiences of the learners.

- Young people love technology. Using ICT to deliver the science curriculum makes science learning interesting and motivating.
- Providing teachers with modern tools of teaching (computers, DVDs, LCD projectors) beyond the chalk-and-blackboard, makes teaching easier and motivating, helping teachers develop a positive attitude towards work.
- Online resources would supplement use of out-dated books.
- Internet collaborative tools would facilitate social networking

Project Objectives:

The project aims at addressing the Millennium Development Goal 3 (MDG 3): Eliminate Gender Disparity in Schools – Looking beyond mere enrollment numbers.

The project has two broad objectives:

- (i) Increasing the number of girls taking sciences
- (ii) Improving the performance of girls in the sciences.

Project Partners:

The project has no funders but Partners. A partnership is a strategic alliance or relationship between two or more organizations. Successful partnerships are often based on trust, equality, and mutual understanding and obligations. Partnerships can be formal, where each party's roles and obligations are spelled out in a written agreement, or informal, where the roles and obligations are assumed or agreed to verbally.

The *Inspiring Science Education For Girls with ICT* has the following informal partners:

- **Barclays Bank (CSR)** – Revolving fund (GB£5,000) to support importation of computers.
- **Ministry of Education and Sports** – Policy guidance, selection of project schools, building for computer refurbishment centre & project home, sponsoring training of teachers, monitoring & evaluation.
- **Digital Links (UK)** – Sourcing Refurbished computers, funding raising, training of local technicians, support for setting up a state-of-art computer refurbishment centre.
- **SchoolNet Uganda** –Revolving fund (GB £ 14,000) to support importation of computers, sell of computers, project implementation, monitoring & evaluation, sponsoring and conducting teacher & student training.
- **Project schools** – Purchase of computers, release of teachers for training, provide on-going school-based training for teachers & students.

Project activities:

Kakinda informed the Head teachers that the current project activities included:

- **Computer Refurbishment** – Supply of affordable computers to schools and individual teachers.
- **Advocacy** – Aimed at getting more Govt support & eventual mainstreaming.
- **Sensitization** - Aimed at school Heads, teachers, students, PTA to demonstrate the project concept and buy-in.
- **Teacher training** - build teachers skills and competence for integrating ICT in the teaching of sciences.
- **Multimedia Digital Content Development** – build teachers and students' skills in developing interactive multimedia digital content relevant to the Uganda Science curriculum.
- **Uganda Digital Education Resource Bank** (www.uderb.org) : Online repository of resources identified or develop by teachers promoting sharing among an online “community of practice”
- **Science Fairs/ Exhibition** – Involving students actively in demonstrating the application of science
- **Students' Science with ICT Holiday Camps** – Develop students' life skills (self–esteem, collaboration, communication & presentation skills), ICT skills and competency to use ICT for learning science.
- Project promotion & soliciting for more project partners.

Achievements:

During its 1st year of operation, the project has made the following achievements

- 1200 PIII brand refurbished computers have been supplied to schools at an affordable price of 250,000/= @. Next consignment expected 1st week of Oct. 2007 with the majority of computers being PIV.
- 3 Teacher Training Workshop have been conducted (Wanyange Girls School (Sept 2006), Dabani Girls School (Jan 2007), Gayaza High School (April 2007) with a follow-up workshop at Mukono (June 2007). A total of 100 teachers have been trained on how to integrate ICT in the teaching of sciences in these workshops.
- 2 Science Fairs (Makerere College School & Dabani Girls School) have been supported with prizes of computers for the best A 'level & O'level girl exhibitor.
- Work on construction of Project home and Computer refurbishment centre is in progress.
- A 5-day student Science with ICT holiday camp was organized in May 2007 at Gayaza High School.
- Uganda Digital Education Resource Bank (<http://www.uderb.org>) is up and running.
- 1 Head teachers' sensitization Workshop was now going on.

Challenges:

- Intensifying the project activities at school level.
- Expanding the project to include more schools.

Presentation: Current & future strategies to improve science teaching & learning by Ministry of Education and Sports by Mr. Nsumba-Lyazi, Assistant Commissioner Secondary (Comprehensive).

Mr. Nsumba-Lyazi started by thanking the participants for having spared time to come to the workshop and SchoolNet Uganda for having willingly accepted to facilitate the workshop. He then gave the status of science at various level of education.



Fig 3: Mr. Nsumba-Lyazi addressing the Head teachers.

Status of science at various levels of Education (2005)

Level	Subject	Access (%) Enrollment	Quality (%) of performance in different grades			Remarks/Comments
			D1-C6	P7-P8	F	
P7 (2004)	Maths	100	41.3	36.7	21.9	UNEB statistics for the last 5 years indicates very poor results that over 50% fail Maths & over 40% fail Science every year.
	Science	100	56.5	21.5	22.0	
O'Level (2004)	Maths	100	25	35.9	39.0	UNEB statistics for 2004 indicate very poor results. This is likely not to be very different from other years. Therefore the situation is
	Biology	97	24.5	30.4	45.1	
	Physics	40	46.1	28.4	25.5	

						terrible. Maths and Science failure rate is almost 50%.
	Chem	40	25.5	30.1	44.4	
A'Level	Sciences	17	A-D	O	F	UNEB statistics for 2004 show that even the few students doing sciences at A'Level, the majority get poor results.
	Maths		48.1	26.3	25.6	
	Chem		32.2	44.5	23.3	
	Physics		48.6	36.8	14.6	
	Biology		39.1	36.5	24.4	
Univ/ Tertiary	Sciences	13				

Mr. Nsumba–Lyazi informed the school Head teachers that the Uganda government has put in place a policy on science in the education sector. The science policy is aimed at promoting ICT and Science in schools so that the school products – the students may use the ICT and science knowledge to modernize the country to prosperity in this 21st century of great use and application of science and technology.

In order to achieve the objectives of the science policy, the following challenges have to be addressed:

- Small numbers of students offering science at various levels.
- Poor performance of the science subject at various levels.
- Poor teaching methods with subjects taught theoretically with little or no attention to practical exposure.
- Lack of laboratories or poorly equipped laboratories.
- Negative attitude to science subjects by the stakeholders. There is need to change the attitudes of the teachers, Head teachers, parents and students so that they all become supportive. The talk that science is for the talented and gifted few must stop.

Mr. Nsumba-Lyazi also outlined some of the Ministry of Education and Sports interventions to strengthen the teaching of science and ICT in schools. These included:

- Making science subjects compulsory at O'Level.
- Construction and equipping of science laboratories in various schools.
- Science kits to various schools.
- In-service training for teachers of science subjects under the SESEMAT project with the sponsorship of JICA.
- Recruitment of more science teachers. This year 2007-2008, the Ministry of Education and Sports will recruit 2000 teachers, out of which 100 will be science teachers.
- Development of ICT policy in education and integration of ICT at all levels of the education system.
- Introducing computer education in schools and making it examinable at O'Level. It will soon be examinable at A'Level.

- Establishment of computer labs in schools and training teachers to acquire ICT skills. The Ministry of Education and Sports sent out a circular in 2004, requiring all school to have a budget line for ICT development in the school.
- This year, the Ministry of Education and Sports together with Uganda Communication Commission (UCC) are to put in place 100 school computer laboratories. Most of the schools to benefit from this project are rural schools.
- Using ICT in the teaching and learning process. Some of the ICT initiatives in school include SchoolNet Uganda, Nepad e-schools project and Cyber School Technology Solution Ltd.

Questions & Answers

The School Headteachers had the following questions/issues for the Ministry of Education and Sports.

- (i) Can the Ministry write a circular to the schools asking them to prioritize the establishment of computer labs as some Head teachers were finding it hard to convince their Board of Governors?

Response: *The Ministry of Education and Sports sent out a circular to schools in 2004, requiring them to have a budget line for ICT and to report annual on the type of professional development the schools had given to the teachers. Schools had also been cleared to charge not more than 15,000/= a term towards ICT facilities. The schools should do all what is possible to provide students with ICT skills and knowledge so that they are not left out.*

- (ii) Transfer of teachers sometimes may result into taking away the only ICT teacher in the school. When the Ministry recruits new teachers, sometimes the Ministry posting standing teachers who had been recruited locally by the school to a totally different school.

Response: *The Ministry of Education will give priority to standing teachers for recruitment and will keep them at their current stations. The Ministry also made a deliberate recruitment of ICT teachers though very few teachers had ICT qualifications. The Ministry is currently transferring teachers on request. Massive transfers are only made when there is an indication of under performance as a result of overstaying.*

- (iii) Teachers are running to schools with PTA allowance and are reluctant to teach in the USE (Universal Secondary Education) schools with no PTA allowances.

Response: *This challenge is going to address the recruitment of more teachers, 1000 of them being science teachers.*

- (iv) Teacher Training Colleges should have a course unit on using computers for teaching.
- (v) Government should move away from urban schools and set up some of the *ICT Centres of Excellence* in rural schools.

Response: *This year, the Ministry of Education and Sports is working with the Ministry of ICT through the Uganda Communication Commission to set up 100 school computer labs with ten computers each. The beneficiary schools will be mainly rural schools and the computers will use solar energy as their source of power.*

- (vi) Will private schools benefit from the 100 computer labs which are being setup by the Ministry of Education and Sports since the private sector forms the bigger part of secondary education?

Response: *The Ministry of Education and Sports has worked with the private sector before. There are 350 Private schools under the USE program and the issue of teacher secondment to private schools is under debate. The private schools association should continue lobbying with the government.*

- (vii) Some government rural schools are in sorry state in terms of lack of infrastructure like labs and classrooms.

Response: *Ministry interventions like provision of science kits to ameliorate the situation. Also further identification of such schools for targeted assistance.*

- (viii) Ministry policy on reducing the number of subjects taken by students at O'Level viz compulsory sciences and Kiswahili.

Response: *Adoption of Swahili is a regional policy for East Africa Community. The Ministry is going to request for funds to recruit 1000 Swahili teachers.*

After the questions & answers session, the Guest of Honour, Mr. Nsumba-Lyazi declared the Head teachers' workshop officially opened.

Vote of Thanks

Ms. Margaret Ayiseni Tiyo, the Head teacher of Muni Girls School, passed a vote of thanks to the Ministry of Education and Sports on behalf of the Head teachers who participated in the workshop.

In their vote of thanks, the Head teachers thanked;

- The Ministry of Education and Sports, Digital Links (UK), Barclays Bank and SchoolNet Uganda for have initiated the *Inspiring science Education For Girls Using ICT* project and selecting their schools to participate in the project. The

project empowers the girl child with both science & ICT skills and knowledge. The Head teachers pledged their total support.

- The Guest of Honour for updating them on the current and future strategies by the Ministry of Education and Sports to improve science and ICT education in secondary schools and to allow them raise other issues which were not directly related to the workshop.

Presentation: **“Role of computers in the Education System – Students’ perspective”** by Sheila Nakazibwe (Student of 5 PCB/Agric, Makerere College School)

Sheila Nakazibwe is one of the girls who attended the 5 day *Science with ICT* student camp which was organized by the project and held at Gayaza High school in May 2007.

In her presentation to the Head teachers, Sheila covered the following areas:

- (i) Problems faced by students.
 - Difficult notes and concepts to visualise.
 - Wide syllabus that cannot be covered in time.
 - Lack of enough information from text books.
 - Expensive text books.
 - Teachers missing lessons.
 - Teachers encouraging cram work.
- (ii) Possible solutions.
 - Encouraging computer use as both a teaching and learning tool.
 - Encouraging team work in schools.
 - Using the little time available to the maximum to finish syllabus on time.
- (iii) Importance of computers in schools.
 - Acquire skills e.g. typing.
 - Benefit from both traditional & modern methods of teaching.
 - Provide more reading material.
 - Making learning more interesting and easier.
 - Promotes research, understanding what students read.
- (iv) Role of the Head teachers can play in solving the problems.
 - Provide funds for purchase of computers & the Internet.
 - Encourage staff to train in ICT through workshops in holidays.
 - Organize seminars & competitions that involve use of computers.
 - Encourage the use of computers and the Internet as a teaching tool.
 - Encourage course work that involves use of computers.

- Put in place computerized systems e.g. student records, school finances, examinations and report writing.
- Ensure that both boys and girls have the opportunity of using the computers.
- Involving parents & encouraging them to purchase computers at home.
- Revise the way computer studies is introduced to students so that students don't hate the subject.

Presentation: **“Education for the Rural Schools Using ICT”** by Aminah Namwabira (Student of 5 PCB/Agric, Wanyange Girls School).

Aminah Namwabira is one of the girls who attended the 5 day *Science with ICT* student camp which was organized by the project and held at Gayaza High school in May 2007.

Aminah shared with the Head teachers a project called *Education for the Rural schools* which was initiated after the camp and which she was coordinating.

The project has the following objectives:

- To bridge the gap between the academic gap between the rural and the urban schools through the use of ICT gadgets such as computers, cameras, radios, TV, video decks etc.
- To support the government's plans of sciences for all.
- To find a way of overcoming the problem of not finishing the syllabus. Failure to complete the syllabus is one of the causes of poor performance especially in sciences.
- To cover up the problem of inadequate teachers, laboratories and libraries in the rural schools through the use of simple ICTs such as audio and video tapes that at least every Ugandan student can afford.
- To use an integrated model teaching as a mitigation option to inadequate teachers, libraries and laboratories.
- To enhanced sharing of knowledge, experiences and scientific information between teachers and teachers, students and students and teachers and students so as to improve the relationship between students and teachers of various schools and advance the standard of communication between schools.

Aminah added that some audio lessons, some conducted by teachers and others by students had already been recorded and video lessons will be recorded soon.

REACTIONS TO STUDENTS' PRESENTATIONS

- Participants concurred that hitherto Head teachers' involvement in ICT has been limited.

- There is no teacher guide for computer studies syllabus and no orientation training was done. As a result, some computer science teachers teach abstract ideas to beginners resulting into loss of interest.
- Commended the idea of student peer teaching and use of simple ICT media like audio cassettes which can be accessible to under-privileged schools.
- Agreed on the need for schools to involve parents in recognizing the necessity for ICT to enable students to access Internet for education resources.
- There is a need to guide the students in using ICT with assignments directed at addressing issues on the curriculum so that students don't get off track with ICT.

Presentation: **“Technical Need-To-Know for a School Manager”** by Mrs. Allen Nansubuga Ssebandeke, SchoolNet Uganda Technical Director.



Fig 4: Mrs. Allen Nansubuga Ssebandeke addressing Head teachers.

The Technical Need-To-Know basics for the School managers presentation was aimed at giving the Head teachers an update on the recommended available options for technologies in education in terms of infrastructure, hardware, software and to underline the need for technical capacity building for their teachers and students. Availability of technical capacity at school level will not only cut down the maintenance costs but will also reduce the computer downtime so that teachers and students can effectively use the computers to enhance the teaching and learning process.

Allen explained the options to consider when buying computers which includes; warranty, new or refurbished, RAM, Hard disk capacity, Processor speed,

Branded or no-name, processor type, laptop or desk-top, monitor screen size, power backup and safety.

She gave the average costs for new desktop computers both brand name like DELL, COMPAQ/HP, IBM and the no-name computers or clones. She also gave the current average costs for the refurbished computers.

“The technical specifications are constantly improving and the prices constantly coming down” Allen added.

When buying printers, the Head teachers need to consider the recurrent costs of toner or ink cartridges and the number of reams of paper printed per toner /ink cartridge in addition to the capital costs. Typically ink-jet printers are cheap but have a very high running cost.

The Head teachers need also to buy other computer peripherals like scanners, digital cameras, LCD projectors, CD/DVD writers and photocopiers. When buying LCD projectors, there is need to consider the lamp hours and the Lumens. The higher the lamp hours and the higher the lumens, the better.

Lastly, Allen gave the Head teachers an insight on Internet connectivity and computer networking as a way to maximize utilization of available resources including the Internet.

She concluded by reminding the Head teachers, that SchoolNet Uganda has a continuous supply of professionally branded refurbished computers.

The presentation can be downloaded from

<http://www.uderb.org/presentations/technical-need-to-know-basics-for-school-administrator.htm>

Reactions to the presentation:

It was agreed that SchoolNet Uganda should organize a 5-day Technical Training Workshop for the project schools in the coming Dec-Jan holidays.. Each school will send a teacher and a student. Interested Head teachers were also free to attend.

Tuesday, 4th Sept 2007 Activities.

DAY 1		
Time	Activity	By whom
8:30-10:40 am	- Presentation & demo: Using ICT to enhance the teaching and learning of sciences - Questions & answers	- Kakinda Daniel (Training Director, SchoolNet Uganda)
10:40 -11.00 am	HEALTH BREAK & BREAK TEA	
11:00 -11:30 am	Travel to Kyambogo College School ICT Centre.	Participants
11:30 -1:00	- Tour of the ICT facilities & brief on the centre activities and training programmes - Questions & Answers	- Kyambogo College school Head teacher & IT coordinator
1:00 -1:30	Tour of the Computer Refurbishment under construction at Kyambogo College school	Kakinda Daniel
1:30 -2.00 pm	Travel back to Workshop venue at Mukono DFI	Participants
2.00 -2.45 pm	LUNCH	
2:45 – 3.40 pm	-Reflection on the study tour and the workshop - Suggestions of the way forward	Participants
3:40 – 4:40	Closing remarks	
4:40 -5:00	TEA & END OF WORKSHOP	

Presentation: ***“Using Educational Technology to enhance the teaching and learning Process”*** by Kakinda Daniel, Training Director, SchoolNet Uganda.

This session started off with a reflection of the current situation in the Uganda schools and the strategies the schools are currently using to improve the academic performance of the students in the national examinations.

(i) Situation in Uganda schools.

Secondary schools in Uganda can be described using the following characteristics:

- The textbook remains the basic unit of instruction. Absorption of its contents tends to be a measure of educational success.
- Teachers use “talk & chalk” to convey information. Students are often recipients of instruction rather than active participants in the learning process.

- School teachers work largely in isolation from their peers in other schools & other countries. Schools tend to compete rather than work in collaboration.
- Very few teachers use ICT in their teaching.
- While some schools have computers, they are only used to teach about ICT (Computer studies). Use of computers to improve teaching & learning in other subjects is little unheard of.

(ii) Strategies schools are currently using to improve the students' academic performance in the National examinations.

In this interactive session, the following were some of the strategies the Head teachers highlighted as currently used by the schools:

- Question packs/Uganda National Examination Board (UNEB) past papers.
- Remedial lessons after class/Saturdays.
- Three sets of exams: Beginning of Term, Mid-Term and End of Term exams.
- Educational tours/excursions.
- Stocking the school library with books.
- Discussions & seminars, Exhibitions.
- Testing, Testing, Testing.
- Involvement in national competitions (sports, essays, exhibitions, etc).
- Extra practicals during evenings & Saturdays.
- Early syllabus coverage through additional lessons.
- External/Internal career guidance talks.
- Use of role models.
- Doing exams up to the last day of the term & marking during the holidays
- Use of Resource persons to cover some of the topics.
- Professional Development workshops for teachers.
- Encourage teachers to train as examiner.
- Students' discussions facilitated by former students.

Kakinda emphasized that schools need to think about how Information Communication Technology (ICT) can be used to improve the effectiveness of the current field-tested strategies in a cost-effective manner.

Kakinda also reminded the participants that students learn differently because they have different styles of learning. Some students are predominantly visual, others auditory and others kinaesthetic.

- A visual student comprehends information better through diagrams, pictures/photographs and watching video.
- An auditory student does best by listening to orally presented information.
- The Kinesthetic student learns best through Hands-on activity - touching, creating or doing.

“As teachers, we often forget to cater for the different student learning styles. Ultimately, we are only understood by those students who learning styles match our own.” Kakinda added.

Using one example from Physics (S1- States of matter) and another example from biology (S6 – Mechanism of Photosynthesis), Kakinda demonstrated by ICT can help the teacher take care of the students' different learning styles in the classroom.

(iii) Types of Educational Technology

Educational technology is technology which supports teaching. Educational technology may include photographs, video clips, animations, simulations, Virtual Reality (VR) models etc.

Using demonstrations, Kakinda explained the difference between an instructional video and an educational video. He also illustrated what an animation, a simulation and a Virtual Reality (VR) model is.

- A computer animation shows step-wise sequences of diagrams or images to illustrate complicated concepts. This break down facilitates learning. e.g. Biology: Human fertilization, Agriculture: Petrol & Diesel engines.
- A computer simulation is an imitation of the real system. The user alters certain parameters, and the computer reveals the changes. e.g. Physics: Determination of spring constant by method of oscillation
- A Virtual Reality Model is a 3 Dimension, real-time interactive Computer simulation. A VR model may combine text, graphics, sound and video.

“The best way would be to use real system when teaching. Educational technologies offer students alternative ways to learn when real systems are not available or impossible to set up.” Kakinda cautioned.

(iv) Examples of using Educational Technology to enhance the teaching & learning process.

Kakinda Daniel demonstrated how Educational Technology can be used to enhance the teaching and learning process using examples from different subjects based on the Uganda secondary curriculum.

Examples included:

- Virtual Reality Models in Computer studies (S1 : Parts of a computer)
- Photography in Geography.
- Email and Internet in Economics (S5: Price fluctuations of agricultural products).
- Simulations in Physics (S5: determination of focal length of a converging lens).
- Databases in Biology (A' Level: Evolution – Comparative Taxonomy).
- Educational Video in History (S4: African History – Shaka Zulu).
- Instructional video in Mathematics (S5: Integration).
- Virtual labs in Chemistry (S5: Acid-base titrations).
- Use of Internet to supplement the book library.

In his concluding remarks, Kakinda Daniel informed the Head teachers that for Educational Technology to be an asset to the schools and impact positively on the teaching and learning process in the school;

- (i) There are three primary components; Infrastructure, Capacity Building & Relevant Educational Content. More often, schools concentrate on the infrastructure and forget the other two critical components with the end results of no positive impact on the student performance.
- (ii) When planning for use of Educational Technology in schools, the school must consider the Total Cost of Ownership rather than just the initial capital costs. Schools need to include the following cost categories in Educational Technology budget line:
 - Housing Costs: Secure building with burglar proofing, adequate electricity power outlets, suitable furniture.
 - Equipment costs: Hardware/software and their installation, LAN installation
 - Running Costs: Paper, Printer ink/toner, electricity, security, insurance, maintenance, Internet connectivity and teacher motivation.
 - External Support : Technical & Pedagogical
 - Training of Teachers: Technical and Pedagogical. No real value can be obtained from the ICT investment without proper teacher training.

Study tour of Kyambogo College School ICT Centre.

Kyambogo College ICT centre is one of the ICT centres which have been set up by the Ministry of Education and Sports as a “Centre of Excellence”. A “Centre of Excellence” is supposed to serve as a model where other schools can go to learn and copy.

At Kyambogo College school, the Head teachers were received by Mr. Charles Yakani (Mobile: 0772751678, email: yakani@btinternet.com), the ICT Coordinator of the centre. The school was conducting 2-week training for its teachers on how to integrate ICT in their teaching.

Mr. Charles Yakani briefed the Head teachers briefed on:

- The ICT infrastructure at the school.
- Lab organization management and educational resources available to both teachers and students.
- Procedures and rules for using the Lab. He shared a soft copy of the computer lab rules with the Head teachers.
- The booking system for conducting lessons in the computer lab.
- Programmes by the ICT centres for staff development in using ICT. He shared a copy of the two-week training programme.
- Assistance the ICT centre gives to staff members who would like to conduct ICT enhanced lessons.
- Other services like training, Internet access given to the community at a fee as part of the centre sustainability strategy.

- The definition of an e-school as one that:
 - Has appropriate ICT equipment and Infrastructure.
 - Is connected to the Internet.
 - Has trained teachers to impart ICT skills to the students according to agreed curriculum and content.
 - Has teachers trained to use ICT for teaching and learning.
 - Has access and contributes to teaching and learning materials.
 - Has ICTs as tools to enhance the administration and management of the school.



Fig. 5: Head teachers asking questions after briefing by Charles Yakani.

Mr. Joseph Ganatusanga, the Head teacher of Aggrey Memorial passed a vote of thanks to the school on behalf the participants.

“As Head teachers, we have found this interaction very useful and very enriching. There is a lot we have learned and we will try to implement some of them when we return to our schools” Mr. Ganatusanga concluded.

Tour of the Computer Refurbishment Centre

The Head teachers were lead to the Computer Refurbishment centre which is still under construction by Kakinda Daniel.



Fig. 6 Head teachers touring the computer refurbishment centre under construction.

Kakinda Daniel informed the Head teachers that the ground floor is to be used for the computer refurbishment and technical training for students and teachers. The first floor will host a 50 computer training centre and a digital education resource centre.

The Head teachers were very grateful to the Ministry of Education and Sports for having allocated money to setup the computer refurbishment centre.

Reflections on the study trip to Kyambogo College School ICT centre.

The Head teachers were asked to reflect on their study trip to the Kyambogo College School ICT Centre.

They were given three probing questions:

- (i) What are the things that impressed you or you liked most during the trip?
- (ii) What is your opinion on the idea of having curriculum-technology Professional development courses for teachers?
- (iii) What did you learn from the study tour?
- (iv) What recommendations do you have for the *Inspiring Science For Girls Using ICT* project

Things which impressed Head teachers and things they liked most during the study trip included:

- The range of ICT equipment; the VSAT connection for Internet, the DSTV for educational videos, the very many computers connected to the server

through the Local Area Network, the KCD projector and the SMART board. All the technologies were very impressive.

- The level of collaboration that the teachers at the school showed as they conducted the in-service training for other teachers of the same school.
- The high level of attendance of the training workshop by the teachers depicted that the teachers are well motivated maybe in terms of payment. "I am worried that some poor schools may not afford to have such a well attended in-service training in their schools" expressed one Head teacher.
- The fact that the resource persons were teachers from the very school was an excellent idea which as Head teachers need to emulate, it is not only outside people who can facilitate well.
- The training was full of hands on and the participants had a lot of things to do. This ensured that skills were being learnt.
- The computer lab design, setup and management was very impressive and worth emulating.

Head teachers' opinion on having ICT Professional Development Courses for teachers at their schools

- The idea is very good but it needs money.
- The idea is OK but it seems for less developed schools this might be a bit challenging.
- The idea is superb and Head teachers need to be innovative and take advantage of such training.

What the Head teachers learnt from the study tour.

- Success of ICT must have the support of the Head teacher.
- Geographical location and environment of Kyambogo College School could be a motivating factor for adopting ICT since teachers/students are aware of opportunities of embracing ICT.
- ICT goes hand-in-hand with selecting the educational content that meets the needs of the users.
- Having many female science teachers could be a factor in motivating embracing ICT.
- Making the lab accessible all the time is an idea to take up.
- Community use at a cost is a way of promoting sustainability.
- It is important for all Head teachers to be ICT literate because an ICT illiterate teacher can find it very challenging when transferred to an ICT rich school.

Recommendations to the *Inspiring Science Education For Girls Using ICT Project.*

- (i) The idea of sensitization workshop for Head teachers was a very good. Many such trainings should be done in addition to the teachers'

- trainings. A 5-day ICT training workshop should be organized for the project Head teachers in the coming Dec-Jan holiday.
- (ii) The involvement students in presenting their experiences at the Student camp and the projects the students initiated after the camp is wonderful idea. Another Science with ICT camp should be organized for those project schools which did not participate in the May 2007 camp.
 - (iii) The Technical Need-To- Know presentation was made to the Head teachers was great eye opener.
 - (iv) Can the Ministry of Education and Sports include some of the 15 project schools among the 100 schools to receive computers from UCC? Can the project schools be assisted by the Ministry of Education and sports with LCD projectors and SMART boards?

Closing Remarks

The closing remarks were made by Mrs. Tarinyeba K. IDA, the Head teacher of Tororo Girls School and the Treasurer of NASU (National Association for Secondary School Head teachers of Uganda) on behalf of the Ministry of Education and Sports.



Fig. 7: Mrs. Tarinyeba addressing the Head teachers at the closing ceremony.

- Thanked the Head teachers for turning up for the workshop which is a good sign of their commitment to the project.

- Thanked SchoolNet Uganda for the work it has been doing since it started in 1997 and for facilitating this workshop.
- Urged the Head teachers to consult SchoolNet Uganda regarding the purchase of computers and setting up the ICT centres at their schools.
- Requested the Head teachers to share what they had learned with Head teachers of the neighbouring schools.
During the staff meeting at the beginning of the term, they should talk to the teachers about what they had learned at the workshop.
- .Reminded the Head teachers to incorporate a reasonably amount of money in their school budget for ICT development.

She concluded by thanking the project partners; Barclays Bank, Digital Links (UK), SchoolNet Uganda and Ministry of Education and Sports for all the support they have given to the project.

“Educate a woman and you have educated a nation” she added.

The workshop ended with the award of certificates to the participants



Way Forward

It was agreed that three training workshops will be organized next Dec-Jan holiday: A 5 –day training for Head teachers, A 5 –day Technical Training Workshop and a 5 –day student camp.

Appendix 1: List of Workshop Participants and Contact Information

F= Facilitator, P =Participant

	Names	School/ Organization	Phone No.	Email	
1.	Kakinda Daniel	SchoolNet	0772-820167	dkakinda@yahoo.com	F
2.	Allen Nansubuga	SchoolNet	0772-362373	alnansubuga@yahoo.com	F
3.	Ssenkunja John	3R's SS	0752-631130	senkunja@gmail.com	F
4.	Ssenkubuge Lawrence	St. Henry's College Kitovu	0772-401275	lssenk@yahoo.com	F
5.	Sempala Kigozi Emmanuel	Aidan College	0752-647746	aidan_college@yahoo.com	P
6.	Ngirabakunzi John	Bukomero SS	0772-494855 0752-941412	aidan_college@yahoo.com	P
7.	Twirire Bigairwe Yosiya	Muntuyera High School	0772-674573	muntuyerahighschool @yahoo.com	P
8.	Kintu Aggrey	Bukooli College Bugiri	0772-420436	Aggrey_kintu@yahoo.co.uk	P
9.	Adong Semmy	Wanyange Girls School	0772-398030	adongsemmy@yahoo.co.uk	P
10	SR. Susan Clare Ndeezo	St. Mary's Ediofe Girls SS	0772-519828	ndeezosusan@yahoo.com	P
11	Kisame Micheal	Bweranyangi Girls School	0772-609882	mikekisaame@yahoo.com	P
12	Tumushabe Jolly (Mrs)	Kyeizooba Girls SS	0772-487162	jollytumushabe@yahoo.com	P
13	Serumaga Jane (Mrs)	Nalinya Lwantale Girls SS	0772-663957	janeserumaga@yahoo.com	P
14	Ndikwani Juliet	Dabani Girls SS	0782-361241	ndikwani@yahoo.com	P
15	Tarinyeba K. IDA (Mrs)	Tororo Girls School	0772-440717 0752-440717	itarinyeba@yahoo.co.uk	P
16	Ayiseni Tiyo Margaret	Muni Girls School	0772-514945	margaret.ayiseni @aruaeducation.com	P
17	J W Ganatusanga	Aggrey Memorial Sc.	0772-428074	jwgana@yahoo.com	P
18	Matovu Richard	SchoolNet	0712-183677	rkmatrix@yahoo.com	F
19	Namwabira Aminah (student)	Wanyange Girls School		aminahsitenda@yahoo.com	F
20	Nakazibwe Sheila (student)	Makerere College School		snakazibwe@yahoo.com	F
21	Nsumba-Lyazi Robinson	Ministry of Education & Sports	0772-440890	Nsumba_lyazi@yahoo.com	F

Appendix 2:

**DEPARTMENT OF COMPUTER STUDIES AND ICT
KYAMBOGO COLLEGE SCHOOL**

TEACHERS' TRAINING PROGRAM

**MONDAY, 3rd SEPT 2007 TO FRIDAY 14TH SEPTEMBER 2007
COURSE OUTLINE AND TEAMS RESPONSIBLE:**

UNIT	CONTENT	DAYS	TEAM LEADER	TEAM MEMBERS
1	MS WORD: <ul style="list-style-type: none"> • Creating files and folders • Saving work in folders and removable storage devices • Creating tables • Inserting pictures into word documents • Application of MS Word in lesson planning 	MONDAY 3rd AND TUESDAY 4TH SEPTEMBER 2007	Paul Lwere	Gita Mustafa Alice Alwenyi Isaac Mawiwi Kiwanuka Donnie
2	MS POWER POINT <ul style="list-style-type: none"> • Basic skills in creating slides • Adding content into the slides • Background colours to slides • Adding animations to slides • Generating slide shows from your slides 	Wednesday 5th September to Thursday 6th September 2007	CHARLES YAKANI	Gita Mustafa Kimbugwe Anthony Faustine Abiriga

	<ul style="list-style-type: none"> • Hyper linking slides to documents, sounds, pictures and web links • Using Power Point as a teaching tool 			
3	MS EXCEL <ul style="list-style-type: none"> • Basic skills of creating an Excel work sheet • Using Excel to plot graphs • Using Excel to calculate averages medians ,modes (useful for generating mark sheets) • Excel for statistical graphs (geography) 	Friday 7th September and Monday 10th September 2007	Kimbugwe Anthony	Ronald Omara Gita Mustafa Faustine Abiriga
4	THE INTERNET and COMMUNICATION <ul style="list-style-type: none"> • Basics of the internet • Searching for information from the internet and use of different search engines relevant to your subject • Downloading documents from the internet • Copying downloaded documents from the internet into document editing software 	Tuesday 11th September and Wednesday 12th September 2007	CHARLES YAKANI	Agnes Nandujja Isaac Mawiwi Gita Mustafa

	<ul style="list-style-type: none"> • E-mail communication • Global networking through Messenger services such as MSN, yahoo, Moodle etc. • Use of internet resources and other networked resources for teaching (<i>learnthings, global classroom</i>) 			
5	<p>TV AND ITS USE IN TEACHING</p> <ul style="list-style-type: none"> • Recording programmes for use at a later time • Teaching using a recorded lesson from a VCR or DVD ROM • Challenges of TV teaching and solutions • Training on use of the interactive Smart board and its advantages as a teaching tool 	<p>Thursday 13th September and Friday 14th September 2007</p>	<p>Isaac Mawiwi</p>	<p>Paul Lwere</p> <p>Ronald Omara</p> <p>Alice Alwenyi</p> <p>Anthony Kimbugwe</p> <p>Charles Yakani (for Smart board)</p>
6	<p>CLOSING CEREMONY AND CERTIFICATE GIVING</p>	<p>4:00 PM 14th September 2007</p>	<p>MR. R. NSUMBA LYAZI</p>	<p>HEAD TEACHER YAKANI C</p>

NOTE:

1. **Team leaders need to meet with their team members to plan their training strategy**

2. **Plenty of activity sessions need to be incorporated into the training sessions.**
3. **Members of other teams should feel free to offer advice to other teams as part of team work.**

THANK YOU FOR YOUR COOPERATION.

**CHARLES YAKANI
ICT COORDINATOR**