Website: www.sayans.org
Email: info@sayans.org
P.O.Box 35194
Mpigi-Kampala, Uganda

Sayans
Inspire. Educate. Innovate

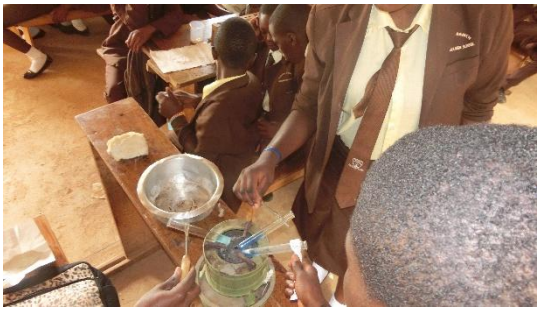
Technologies for STEM Education

Introduction

Schools in Uganda consistently perform poorly in science subjects and worse for the rural schools which lack resources and technologies for research and so students rely on notes given in class, often cramming to pass exams. Technology is the heart that pumps blood to the vital organs of science education. To acknowledge and appreciate the important role technology plays in promoting science education in Uganda and Africa at large, Sayans, is pleased to introduce the Sayans labs and resource facilities for rural schools. The labs contain computers and other educational technologies to foster interests and enhance students' performance. By engaging the teachers in the use of the technologies in their lessons, students are involved more through project based learning hence in-depth learning of taught content.

Project Description

The challenge



Sciences are often the worst performed subjects in Ugandan schools. In the recently released Uganda National Examinations, 40% of students failed sciences which were the worst performed, a trend consistent for the past many years. According to Womakuyu (2009), 50% of the students in urban schools passed sciences while 80% of their rural counterparts had low grades or failed altogether. This is attributed to rural schools having poorly equipped labs and lack access to technologies, making students focus on content given in class only. Teachers are also not creative in teaching and don't relate science to everyday life, thus making it detached and irrelevant hence students labeling them hard and boring. A bias that often stems right from primary school.
The national examinations board assumes an ideal situation and sets the same exams without regard for the local conditions of each school.

What we do

We set up Sayans labs, central resource and prototyping facilities containing computers, 3D printers, electronic components and other machinery. The computers are installed with educational software and resources (videos and reading material), and fun games aimed at nurturing interests in sciences and enhance idea generation. Students also use these computers to learn basic programming (using scratch and python programming languages) and other technologies to design and fabricate projects to enhance understanding of in class lessons. We grow a network of Sayans Educators who conduct transformational teaching by training science teachers on conducting experience/project based learning through which they incorporate the technologies into their lessons. Through an online discussion platform, the Sayans Educators provide each other peer support through sharing resources, lesson plans, and experiences, seeking and giving feedback. We also seek and provide both students and teachers sponsorship and other opportunities that are otherwise inaccessible to these communities through this platform which the teachers in turn share with their students.
Sayans will hold within school science fair competitions where students present their creations and the selected teams get intensive continued access to the Sayans Lab and experts in the selected area

to develop their ideas further. They then participate in the annual Sayans Camp, a platform where the chosen students from the countrywide competitions, projects with a potential for business win an incubation program for their projects at the Social Innovation Academy. During the incubation program, student innovators will gain more advanced and professional training on business start-up and development, exposure to experts in relevant fields and get linked to potential funding sources to seed their ideas into successful businesses. We believe this ultimately triggers students' creativity and inspires other students.

The schools will be required to pay a yearly subscription fee which is a contribution towards the maintenance of the Lab. The amount will be agreed upon with the school heads keeping in mind our learnings from the pilot phase and the conditions of the schools. The amount can be paid in installments throughout the year. We are working to get the Government to pay for the government aided schools in line with its policy of not charging these schools extra fees.

Why our Approach

According to Edgar Dale, students remember 50% of what they see and hear which percentage increases with increase in the use of active learning techniques. Access to computers and other tools provides students with opportunities to experience and get engaged in the learning which makes them remember more and consequently, cram less.

A centralized facility allows us to easily manage the usage of the technologies, assess their impact on the communities, and increase the sustainability of the technologies.

The teachers are directly in contact with the students and play a key role in influencing and molding the students. By growing a network of Sayans educators, we engage students more and have a wider reach.

Impacts & Outcomes:

Matrix	Impact	Indicator
Creativity and innovation	Students will attain a mindset of being creative and innovative in scientific concepts and will get problem solving skills that will enable them generate unique ideas.	Students' projects developed in the lab and presented in Sayans fairs.
Teacher development	Teachers will develop creative skills to enhance teaching and will conduct lessons that are student centered.	Student based lessons conducted, lesson plans and termly plans.
Students excellence, teamwork and Sponsorship	The rate of excellence in the science subjects will be improved and better understanding of the taught concepts.	Students termly and yearly performance in science subjects
	Students and teachers will have access to and attain sponsorship opportunities and/or grants.	Number of students and teachers that get these opportunities
IT development	Students and teachers will know how to use the computers and other technologies while being able to contribute to the open source community	Number of students and teachers who know how to use the technologies
Creation of employment opportunities	Students will generate project ideas that will create their own employment opportunities	Students projects that grow into actual businesses

Project Team

Sayans currently has two teams; Sayans (Ug) and Sayans (US). The Uganda team has extensive

Website: www.sayans.org
Email: info@sayans.org
P.O.Box 35194
Mpigi-Kampala, Uganda

Sayans
Inspire. Educate. Innovate

experience in working with active based learning and education, understand the local education system and the culture while the US team wide experiences and exposure to technologies in use. Close communication with the US team allows proper development of computers and other technologies dissemination for use in the Sayans labs. Sayans also has mentors and consultants from SINA who provide probono services to Sayans.

Traction

Since inception in March 2016, Sayans has been piloting with 5 primary and 5 secondary schools. The pilot started with training teachers on project based learning where 25 science teachers trained. Subsequent follow up trainings were conducted to embed a culture of active teaching in the teachers and to date, each teacher is impacting over 500 students daily with renewed teaching. The teachers were also supported to start Sayans clubs and now each school has an active science club with each having between 30-60 students. Two of the schools (1 primary and 1 secondary) have conducted their first science fair competitions.

We have set up our first mini Sayans Lab which has 5 Raspberry Pi computers and one ordinary laptop containing educational resources which we have tested and found compatible to the school's curriculum. The lab also contains 2 DC power supplies, two drills (one handheld and one press drill), some electronics components and soldering guns. There are usually 5 to 15 students per day that use the lab during week days and up to 30 students during the weekends.

Budget

		Operating Cost Estimate for 2017								
Cost per Training			**Qtr I**		**Qtr II**		**Qtr III**		**Qtr IV**	
Rental space	100		Qty	Cost	Qty	Cost	Qty	Cost	Qty	Cost
Markers	20	Trainings	1	140	1	140	1	140	1	140
Training materials	20	Computer Maintenance	1	20	4	80	6	120	8	160
	140	Sayans Fair	0	0	0	0	0	0	1	200
Computer maintenance per quarter		Supporting Schools	10	200	10	200	10	200	10	200
		Office	3	480	3	480	3	480	3	480
Estimated at 20USD/quarter	**20**	Salaries	2	900	3	1350	3	1350	3	1350
Cost per Sayans Fair		**Total**		**1740**		**2250**		**2290**		**2530**
Venue	100	**Capital Cost Estimate for 2017**								
Materials	50	**Item**		Cost	Qty	Total				
Transportation	50	**Computer systems**					**Grand Total 20240**			
	200	Computer units		180	20	3600				
Support and M&E Costs per school per quarter		Shipping		20	20	400				
		Taxes		20	20	400				
Transportation	10	Mini projector		50	10	500				
Materials	10	**One Sayans Lab**								
	20	Woodworking equipment		1000	1	1000				

Website: www.sayans.org
Email: info@sayans.org
P.O.Box 35194
Mpigi-Kampala, Uganda

Sayans
Inspire. Educate. Innovate

Office Costs per month		Electronic equipment	1000	1	1000	
Office Space	100	Computers	1000	1	1000	
Electricity	10	3D printer	1000	1	1000	
Internet	50	Tabletop CNC	500	1	500	
	160	Safety equipment	1000	1	1000	
Salaries per month		Shipping	100	1	100	
Teacher Trainers	150	**Trainings**				
IT Trainer	150	Projector	100	2	200	
Lab Trainer and attendant	150	White Board	30	1	30	
	450	Printer	200	1	200	
		Miscellaneous	500	1	500	
		Total:			**11430**	
Grand Total					**20240**	

The estimated budget is for setting up and running one Sayans Lab for a period of one year.

Contact Info.:

Omoding Geoffrey
Email: Omoding@sayans.org
Tel: +256 754 573733