The TechKobwa Project: Empowering Rwandan Women to Help Rwanda Realize Its Vision for Becoming the Information Technology Hub of Africa

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http://www.egr.msu.edu/techkobwa
http://rwandancampforgirlsinit.blogspot.com/
Outline

- Background
- Goals
- Overview of TechKobwa Camps
  - Day-to-day
  - Teacher training
  - Curriculum/activities
- Evaluation
- Going forward
Background

Rwanda

- 20 years post-genocide
  - Young population (median age 18.7 years)
- 80% agriculture economy
  - Subsistence farming
- Rwanda Vision 2020
  - Become the technology hub for Africa
- One of the lowest secondary-school enrollment rates in the world
Background

Why women?

- The prosperity of a nation follows the prosperity of its women
- Women’s leadership lends stability to a community
- Young women have little access to computers, lack confidence
Camp TechKobwa:
Young Rwandan women gain skills, confidence, inspiration, and a global perspective to become national leaders in ICT.
Goals

Training of teachers:

Equip teachers with materials and knowledge to keep teaching computational skills and start computing clubs after camp.
Key Camp Components

- Unhindered access to computers
- Fun “unplugged” computational exercises
- Beginning programming
- Basic electronics
- Week-long research project
- Strong role models and mentors
- Global experience/cultural exchange
- Career advice
A Day at Camp

- 5:30 a.m. Rise & shine, “shower,” and laundry
- 7:00 a.m. Breakfast: 1 piece of bread, tea, fruit?
- 8:00 – 1:00 p.m. Classes (w/ 30 min tea break)
- 1:00 p.m. Lunch: beans, rice/potatoes/noodles, 1 cube of meat, broth
- 2:00 – 5:30 p.m. Classes (w/ break)
- 5:30 – 7:00 p.m. Choose an activity
- 7:00 p.m. Dinner: Repeat of lunch
- 8:00 – 9:30 p.m. Recreational Activity
- 10:00 p.m. Lights out
Training the teachers

- Received 4 days of training
- Assisted in delivering camp lessons
- Increased technology knowledge and teaching skills
Classes: Computer Skills, Internet and Internet Safety
Classes: Algorithms, Logic, and Programming in Scratch
Classes: Electronics
Cultural Exchange

Skype with America

The Village Learning Place
educational programs, enrichment opportunities and informational resources for people in Baltimore City.

Teacher: Jill Muth (past PCV)
Career Panel

• Director, Business Strategy & Operations, CMU-Rwanda
• President of Girls in ICT & Business Leader VISA
• Founder of Fidalix Ltd. & Product Manager at Promelec
• Operations Manager & Membership Coordinator, PSF ICT Chamber
• Chief of Operations, Academic Bridge
• Miss Geek Rwanda 2015
Closing Ceremony

Visiting Dignitaries:
Sector Leader
Ministry of Youth and ICT
Peace Corps Country Leader
Headmaster of IPRC West
Team on the Ground

- 1 IBM distinguished engineer
- 1 MSU professor & 2 graduate students
- 5 Peace Corps Volunteers
- 6 Creation Hill Volunteers
- 5 KOICA volunteers
- 1 Kepler Institute volunteer
- 1 External evaluator (Peak Research)
- 10 teachers
Three Summers of TechKobwa

- **Campers**
  - >150 girls from all over Rwanda (~60 each year)
  - Secondary school students, ages 11 to 22
  - Typically, 6 girls from each of 10 participating schools
  - Majority with no internet experience
  - Organized in “families” identified by *ibitenge*

- **ICT teachers**
  - 30 teachers (10-12 each year)
  - Focus on schools in rural areas
  - Several with no computer lab or internet access
Evaluation:
Demonstrate impact of TechKobwa camps on transforming the Rwandan ecosystem through assessment of yearly outcomes and longitudinal studies.
Evaluation Planning

- Skyping with the Team
- Defining the Scope
- Understanding the Culture
- Planning for Low Tech
Evaluation Goals

- Young Women
  - Increase confidence
  - Increase computer literacy
  - Increase interest in ICT careers
  - Increase knowledge - Student Learning Outcomes (SLOs)
  - Develop research skills

- Schools & Teachers
  - Increase teacher ICT literacy
  - Improve ICT pedagogy
  - Bring ICT to all students, teachers & schools

- Rwanda
  - Capacity Building
  - Sustainability
TechKobwa Model

- 22 Facilitators
- 10 Teachers
- 60 Girls
Evaluation Challenges

Logistic:
- Power
- Internet Access
- 21 Surveys
- Time
Evaluation Challenges

Cultural

- Limited Experience with Surveys
- Anxiety Over Testing
- Shyness
- Tradition of Obedience
- Language
- Translations
Demographics: Girls

- Ages 12-20; Mean Age = 16
- Average Cell Phone Use = More than 1 time per week

Weekly Computer Use:
- None: 11%
- Less than 1 hour: 16%
- Between 1 & 2 hours: 23%
- Between 3 & 4 hours: 16%
- 5+ hours: 34%
ICT Attitudes: Girls

Ratings of Agreement

<table>
<thead>
<tr>
<th>Statement</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>I know more about computers than my friends</td>
<td>11%</td>
<td>11%</td>
</tr>
<tr>
<td>I like the challenge of ICT</td>
<td>33%</td>
<td>17%</td>
</tr>
<tr>
<td>I am good at ICT</td>
<td>59%</td>
<td>30%</td>
</tr>
<tr>
<td>Programming is hard to do</td>
<td>34%</td>
<td>35%</td>
</tr>
</tbody>
</table>

(Note: items adapted from Penn*Compact Survey, 2012)
**Student Learning Outcomes**

**Correct Response**

- **Converting Electricity Into Sound**
  - Pre: 3%
  - Post: 73%

- **Integrated Circuits**
  - Pre: 22%
  - Post: 38%

- **Parallel Algorithms**
  - Pre: 2%
  - Post: 52%

- **Components of Algorithms**
  - Pre: 2%
  - Post: 47%

- **Ohm's Law**
  - Pre: 9%
  - Post: 37%

- **Components of Circuits**
  - Pre: 9%
  - Post: 76%

- **Self Confidence**
  - Pre: 9%
  - Post: 77%

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CELEBRATION OF WOMEN IN COMPUTING

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th>Post</th>
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</thead>
<tbody>
<tr>
<td>2015</td>
<td></td>
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Association for Computing Machinery
Student Learning Outcomes

Correct Responses

<table>
<thead>
<tr>
<th>Topic</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Phishing</td>
<td>21%</td>
<td>75%</td>
</tr>
<tr>
<td>*Protecting Personal Information</td>
<td>47%</td>
<td>64%</td>
</tr>
<tr>
<td>*Voltage</td>
<td>69%</td>
<td>93%</td>
</tr>
<tr>
<td>*Parallel Currents</td>
<td>0%</td>
<td>82%</td>
</tr>
<tr>
<td>*Binary to Decimal</td>
<td>34%</td>
<td>85%</td>
</tr>
<tr>
<td>*Decimal to Binary</td>
<td>17%</td>
<td>85%</td>
</tr>
<tr>
<td>*ASCII</td>
<td>60%</td>
<td>91%</td>
</tr>
</tbody>
</table>

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2015

Association for Computing Machinery
Draw a Scientist Test
(Chambers, 1983)

Pre Test
42% Male
39% Female
19% Unclear

Post Test
30% Male
50% Female
20% Unclear
Teachers

- ICT Experience = 0-5 years; avg. 1-2 years
- Computer Use Each Week = 0-5+ hours
- Cell Phone Use Each Day = 0-5+ hours; avg. 1-2 hours
- Feelings About ICT
- Camp Goals
- Improvement in Knowledges/Skills in 23 Subject Areas
Teachers

Perceptions of ICT Experience Before & After Camp TechKobwa

- No experience: 0% (PRE), 0% (POST)
- A little experience: 20% (PRE), 11% (POST)
- Some experience: 10% (PRE), 44% (POST)
- Quite a bit of experience: 60% (PRE), 33% (POST)
- Lots of experience: 10% (PRE), 33% (POST)

Legend: \( \text{PRE} \) - Pink, \( \text{POST} \) - Green
Teacher Goals

- I Know How to Teach ICT in Clubs & Courses: 80% Strongly Agree, 10% Agree, 10% Disagree
- My ICT Skills Improved: 67% Agree, 33% Disagree
- My Knowledge of ICT Increased: 80% Strongly Agree, 20% Agree
- Prior Knowledge of ICT Strengthened thru Teaching: 60% Agree, 40% Disagree

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CELEBRATION OF WOMEN IN COMPUTING | 2015 | ANITA BORG INSTITUTE
ASSOCIATION FOR COMPUTING MACHINERY
Teacher Attitudes

How do you feel about

- **ICT in general**: 60% Very Good, 40% Good
- **Learning more about ICT**: 100% Very Good, 0% Good
- **Teaching ICT**: 80% Very Good, 20% Good
- **Working in ICT**: 89% Very Good, 11% Good

Very Good | Good
Camp Evaluation

Feelings About Camp
n=84

- My teamwork skills improved
  - STRONGLY DISAGREE: 0%
  - DISAGREE: 1%
  - AGREE: 18%
  - STRONGLY AGREE: 81%

- I felt like part of a community
  - STRONGLY DISAGREE: 0%
  - DISAGREE: 8%
  - AGREE: 31%
  - STRONGLY AGREE: 60%

- The goals were clear
  - STRONGLY DISAGREE: 0%
  - DISAGREE: 0%
  - AGREE: 33%
  - STRONGLY AGREE: 68%

The goals were clear
I felt like part of a community
My teamwork skills improved
What’s next

- Campers and teachers
  - Implementing their plans
  - Starting technology clubs
  - Creating a social community

- Core TechKobwa Team
  - Improving curricular and evaluation infrastructure
  - Planning camp for 2016
  - Starting a non-profit to assist with funding
  - Seeking foundation support for 5-year project with assessment as key component
More Information

- http://www.egr.msu.edu/techkobowa
- http://rwandancampforgirlsinit.blogspot.com/
Murakoze Cyane!

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