Camp TechKobwa
Evaluation Report

Summer 2016

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Executive Summary

- 80 people came together during Summer 2016 to train (9 teachers) and be trained (60 girls) at Camp TechKobwa in Rwanda
- 22 surveys were administered to evaluate changes in confidence, attitude, knowledge and understanding, and to identify changes to improve the Camp
- Teachers reported their teaching knowledge and skills improved in 24 of 24 subjects
- Teacher mastery was high in 46% of subjects after camp compared to 19% of subjects before camp
- 100% of teachers said that their learning of ICT was reinforced through teaching - and their ICT skills improved
- Student mastery was high in 59% of subjects after camp compared to 6% of subjects before camp
- Student mastery of lessons increased significantly ($p<.05$) in 28 of 34 subjects
- Student interest in ICT careers increased significantly
- Electronics lessons were rated "most helpful" and "favorite thing"
- More computer free time was the #1 recommendation for improvement
- 100% of participants rated Camp TechKobwa as "good" or "very good"

CAMP TECHKOBWA SUMMER 2016

Evaluation Report

Introduction

Camp TechKobwa was conducted over 2 weeks during Summer 2016, from July 26 through August 5. It was the 4th annual residential summer Information and Communication Technology (ICT) camp for girls in Rwanda hosted by the US Peace Corps in collaboration with Michigan State University, the Rwanda Ministry of Youth and ICT, and other partners since its start in 2013.

The camp's goals for young women included: providing a fun, innovative, ICT-rich environment to increase their knowledge, understanding, and experience with computing, engineering, and other STEM concepts, change their attitudes about ICT as a career, increase their confidence, and build community to develop teamwork skills, improve communication, and find mentors.

The camp's goals for teachers included: providing a "training of trainers" model to learn ICT skills, engineering concepts, and innovative methods and materials for teaching at camp, pilot the model, and then inspire them to take materials, methods, knowledges, skills, and abilities back to their home schools to disseminate for continued long-term impact.

Camp TechKobwa brought in experts in computing, ICT, and engineering, mentors, role models, volunteers, NGOs, and government partners to train teachers for 4 days, then help conduct the 5-day training camp for girls as a team. All participants, from organizers to volunteers, and from teachers to students, worked together, shared what they knew and what they had learned, and pledged to keep passing it on to increase ICT literacy, interest, and confidence in a way that might impact individuals as well as families, schools, districts, other students, other teachers, and the nation in its quest to achieve the technology goals of Vision 2020. Vision 2020 was launched in 2000 by Rwandan president, Paul Kagame, to transform the country into a knowledge-based hub, using technology to reduce poverty, increase health, and create new jobs.

Background

Ten teachers were recruited from 10 different schools throughout Rwanda to participate in Camp TechKobwa during the school break. Teachers arrived on Tuesday, July 26th and were trained for four days prior to the arrival of 6 girls from each of the teachers' schools on Sunday, July 31st. Unfortunately, one teacher was unable to attend or send a replacement. Schools selected the girls for participation. Travel expenses and all camp expenses, including room and board, were paid by TechKobwa.

A total of 60 girls and 9 teachers participated in the camp. Approximately 25 individuals helped with the camp, including two MSU undergraduate students, an MSU CS professor, 5 Peace Corps volunteers, the former Camp Director and co-founder, who was also a Peace Corps Volunteer prior to this years' camp, 5 students from the Akilah Institute for Women (https://www.akilahinstitute.org/), the IT Manager from Kepler (https://www.kepler.org), a nonprofit online university that confers American BA degrees in partnership with Southern New Hampshire University, an evaluator from Peak Research, and 1 volunteer from Creation Hill, a social enterprise that offers STEM camps throughout the country (http://www.creationhill.rw/about.html). In addition, other guests and host-country nationals participated on panels or provided other types of support.

The camp's goals were comprehensive and exceeded traditional professional development or STEM camp goals. Leadership, teamwork, life skills, community, networking, goal setting, and problem solving were also woven into the camp as training was provided in Information and Communication Technology (ICT) to both teachers and students.

Evening activities for students included a Movie Night, a Talent Show, Computer Free Time, and a Dance. Camp TechKobwa offered a mix between Summer Camp and college, with a rigorous schedule of lessons broken up by a Skype call with an American classroom, a Career Panel, digital photography, and a research and innovation team project and presentation. This research project, called Mission Innovation, combined lessons on using the Internet safely, coming up with a research topic for a local problem that needs to be addressed and solved, conducting internet research, writing up the problem, proposing solutions on a poster, and finally presenting the proposal as a team and fielding audience questions.

The days were long, starting with breakfast at 7 a.m. The typical camp day featured 6 to 8 hours of technology training, an hour of life skills training, 3.5 hours for 3 meals and a tea break, 1.5 to 3 hours of fun activities, and about 30 minutes for evaluation after both breakfast and dinner to collect knowledge pre-and post-test surveys. Lights Out was at 10 p.m.

For teachers, facilitators, and volunteers, a Staff Debrief was conducted around 9:30 p.m. each night. The teams worked approximately 15 hours per day with few breaks. All teachers, facilitators, and volunteers were assigned to "families" made up of girls with whom they stayed for nearly all camp activities. The requirements of preparing for teaching lessons and those of running the camp sometimes resulted in lessons being attended by a handful of teachers and volunteers, rather than all of them.

Girls were assigned to families which consisted of 6 girls, each from a different school to increase networking and the scope of community, plus two or more teachers and volunteers. Each family was assigned a beautiful piece of fabric (ibitenge) to wear each day as a family identifier. Families came up with their own names, created cheers to brand their families and increase bonding and unity, traveled to lessons together as a team, worked on research projects in family teams, and also ate all meals together in the dining hall.

Methods

Twenty-two surveys were developed prior to the Summer 2016 camp to assess student learning pre-post outcomes (10), student pre-post attitudes (2), teacher learning pre-post outcomes (8), teacher attitudes and experiences (1), and the camp overall (1).

These surveys were translated by Camp TechKobwa partners at Kepler and Flora Kalisa, a Rwandan now living in Belgium who had also hoped to work at the camp, but could not get a Visa in time. All student surveys were translated, with English language survey questions followed by Kinyarwanda translations. Teacher surveys were also available in both English and Kinyarwanda. This was a change from the 2015 camp, when most student surveys were translated, but teachers were expected to be able to understand English language surveys. English language skills were at a beginner level for a majority of girls and some teachers. It was hoped that putting both English and Kinyarwanda translations on the surveys would increase understanding and help individuals improve their skills.

All student assessments were administered with paper surveys because of technology concerns. It was known from the 2015 camp that power, WIFI, the number of functional computers, survey experience, English literacy, and even typing literacy would be challenges for participation in the evaluation. Every possible barrier to an effective evaluation was removed, making the evaluation very inefficient and labor intensive, but increasing the likelihood of participation without barriers. To conduct the evaluation by paper survey, SPSS databases were created, data were entered manually, and pre-post surveys were manually linked and then de-identified.

Some teacher surveys were administered by iPad to test the utility of that platform for future survey administration. Teachers were able to quickly master the touch screen interface and were also very comfortable with typing in answers. Because we only had 2 iPads, however, it was not possible to use iPads for all teachers. The use of iPads for surveys took about 3 times as long as paper surveys, making it inefficient for use with large numbers, like the students.

Another methodological consideration was administering surveys to the girls in the computer labs. This was not implemented or tested because of the limited experience of campers at using computers, no keyboarding experience, limited survey experience, and the fact that the camp did not have enough functional computers with Internet access for each girl to have her own system for the surveys. Pre-post knowledge tests required individual completion rather than group work.

In 2015, all pre-tests were administered to students on the first day of the camp, after registration, and post-tests were administered after dinner each day for the lessons of the day. It was very efficient to administer all pre-test surveys the first day, but we hoped to have a more positive, less grueling, and less intimidating introduction to the camp. After a long day of travel away from their own families and placement into family units without known friends, several hours of testing to establish what you don't know seemed harsh.

For 2016, 30 minutes was added to the daily schedules to allow pre-tests to be administered after breakfast each day. On the first day of camp, students were asked to complete Attitude Surveys and the first day pre-test only.

As students arrived, evaluation helpers assigned a unique ID number to each participant from the roster and asked them to place both their names and the numbers on each survey. As surveys were collected and pre-and post-tests were matched, names and numbers were confirmed and then names were deleted to increase privacy.

Data cleaning consisted of matching pre-and post-test surveys by number and name, randomly sampling 30% of surveys for data quality check, and recording unclear responses as missing. When both pre-and post-surveys were not available for a given student, for any learning outcomes, those surveys were eliminated from significance testing because comparison was not possible.

Camp TechKobwa suffered from some significant challenges, but still managed to achieve many of its goals. These challenges included personnel, technology, and facilities. The Peace Corps Volunteer who had been trained as Camp Director and completed most of the preparations for the camp was not able to attend at the last minute. The IBM scientist responsible for a lot of lessons and the Mission Innovation curriculum was not able to attend at the last minute. The Rwandan native, now living in Europe, who helped to translate the evaluation surveys and planned to help with the camp, was not able to get a Visa to attend at the last minute. One of the teachers was not able to attend at the last minute. Another teacher was hospitalized during the camp.

The second computer lab was never fully functioning, limiting computer time for individual use and practice. Internet access was intermittent, despite continuous effort from Kepler staff. Finally, the facilities were infested with bed bugs and had to be vacated and sprayed on 2 occasions because teachers and camp volunteers were being bitten throughout the night.

The IBM scientist who was unable to come to Camp TechKobwa for the Summer 2016 event contributed her curriculum, and the schedule was set, but there was little time for substitute teachers to learn it or study it before having to deliver it. When students failed to learn identified outcomes by the post-test, it may be that they were never trained on key learning outcomes.

Another possible reason for poor learning outcomes on individual items is poor test construction. Because of the tight timelines for developing curriculum, writing test items, and working with translators, some test items would have benefitted from revisions or development of better response options. Submission of final test items should be completed early for future camps to allow time for revision.

Several suggestions from the 2015 camp evaluation were implemented at the Summer 2016 camp. These included paying the teachers a small stipend for their time away from home and giving the teachers a day off in between their own training and the start of the camp for girls. This break allowed a large group of camp volunteers and teachers to share a field trip to Lake Kivu complete with boat ride and bat hike. Teacher boat fees were covered by Elisabeth Turner, which allowed everyone to participate. Several teachers expressed their gratitude. It was a fun day of bonding for all and also provided a mental break from the intensity of long days at camp. Teachers in 2016 did seem more enthusiastic about camp and participated more fully.

Teacher Results

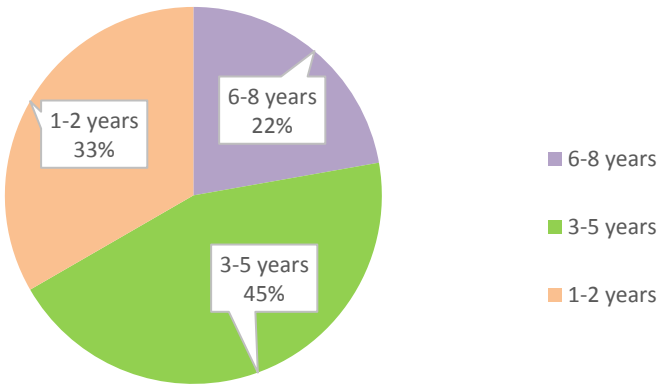
Nine teachers participated in Camp TechKobwa. Teachers completed a post-camp survey about their experiences, attitudes, and skills gains. They also completed daily pre-and post-lesson knowledge surveys about the subjects in which they had been engaged each day. This section is organized to share the learning outcomes and overall impact of Camp TechKobwa on teachers.

Teacher Experiences

Teachers shared computer and cell phone usage, teaching experience and ICT teaching experience, and rated perceptions of ICT experience pre-and-post TechKobwa using a method called Retrospective Pre-Post Test or RPT (Lamb, 2013).

Teachers reported 1 to 16 years of total experience teaching. The average time spent teaching in general was 6.44 years. Teachers reported 1 to 8 years ICT teaching experience, with an average of 3.67 years.

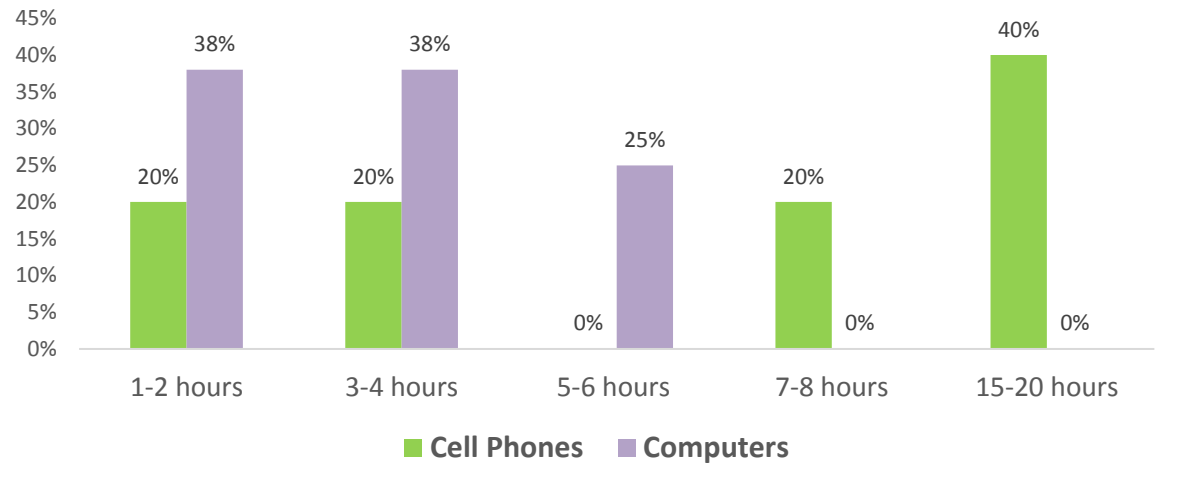
Chart 1. ICT Teaching Experience



Teachers were asked about the types of training, education, and experience they had in ICT. Responses were surprising, with only three teachers reporting any formal training (A0 in CS and Engineering, A0 in Information Technology, A2 in CS). High school lessons, self-study, and a module at university were also reported. TechKobwa training was the only source of ICT training reported by one teacher, underscoring the importance of the camp for teachers.

Although there are limits on the number of students that may be successfully accommodated by the camp, an alternative model might allow 2 or 3 times as many teachers, most without their own students, to provide support at the camp, learn the materials, and increase dissemination and reach throughout Rwanda. Most lessons would benefit from additional teacher support.

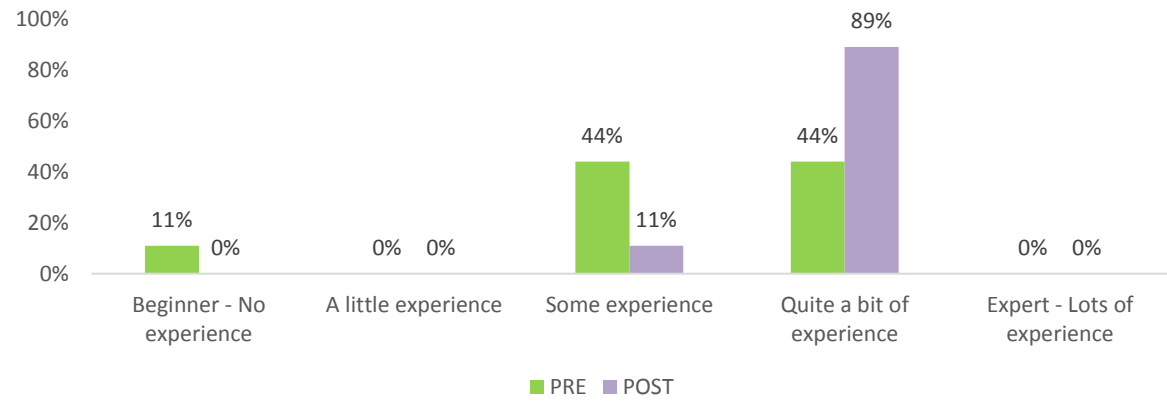
Chart 2. Daily Averages - Cell Phone & Computer Use by Teachers



When asked about computer use each day, teachers reported an average of 3 hours' computer use per day. Computer use ranged from 1 to 6 hours per day. Teachers were also asked about cell phone use each day. Hours ranged from 2 to 25 hours. When 24 and 25 hour responses were removed as outliers, the average cell phone use each day was 10 hours per day, which still seems high. If true, cell phones might be the most efficient way to bring ICT to Rwanda.

Teachers were asked to rate how experienced they were with ICT *before* Camp TechKobwa. Forty-four percent of teachers rated themselves as having "quite a bit of experience" and 44% of teachers said that they had "some experience." Eleven percent described themselves as "beginners." *After* camp, just 11% of teachers said that they had "some experience" while 89% said they had "quite a bit" of ICT experience.

Chart 3. Teacher Perceptions of ICT Experience – Before & After Camp



The mean level of experience before camp was 3.22 on a 5-point scale. After camp, average experience was 3.89 on a 5-point scale. This difference was not statistically significant. One of the benefits of the RPT method is the ability of raters to fully understand how much they know or do not know about the rating subject because they provide pre-and-post ratings

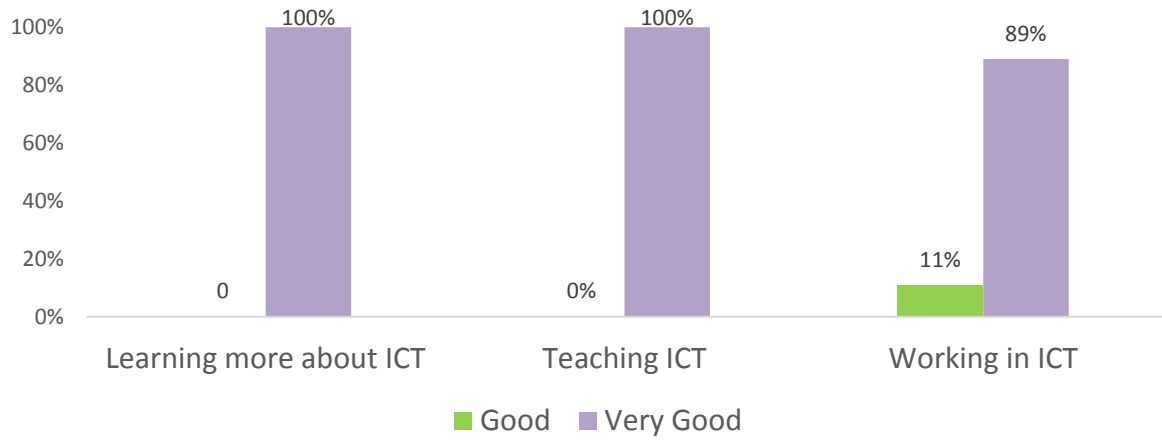
AFTER the training. Raters "know what they don't know" when this method is used. A weakness of true pre-post design is that beginner level participants tend to inflate their pre-training ratings because of limited experience. This, in turn, causes their post-training ratings to show less growth than occurred. The RPT method was effective in this context and teachers did not report any trouble understanding the rating concepts.

Teacher Attitudes About ICT

Teachers were asked how they felt about learning more about ICT to get a sense of their attitudes toward the camp. All teachers responded, "very good," the highest rating possible. Teachers were also asked how they felt about teaching ICT. Again, all teachers responded, "very good." Finally, teachers were asked how they felt about working in ICT. Eleven percent said, "good" while 89% said, "very good."

Respondents did not have any trouble with the bad to good rating continuum or other response options used at Camp TechKobwa. Overall, teachers were very positive about all aspects of ICT.

Chart 4. Feelings About ICT

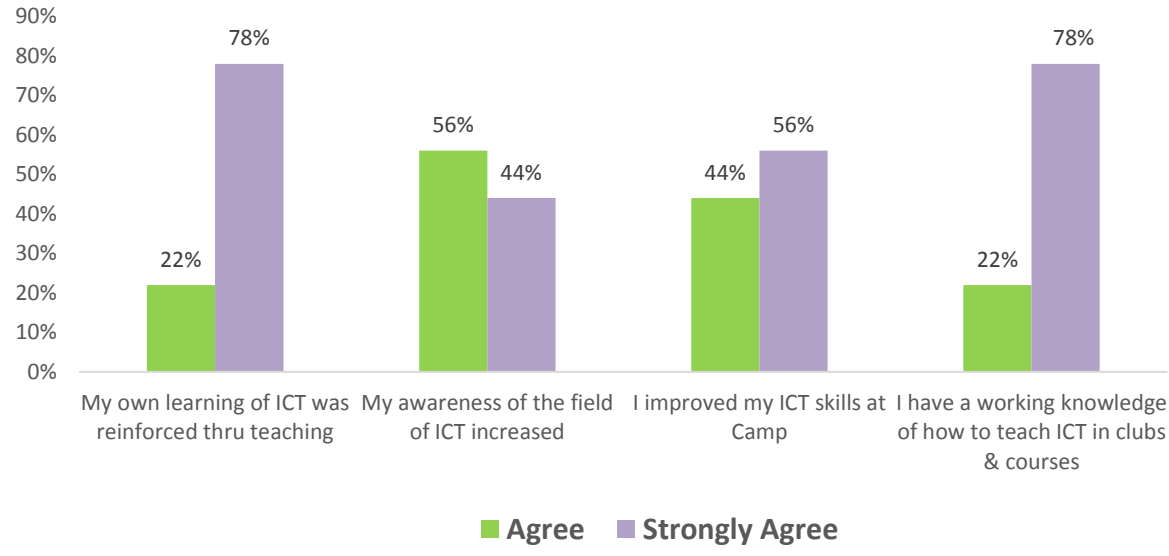


Mean ratings of these ICT attitudes show that teachers felt good about learning more about ICT (5/5 scale), teaching ICT (5.0), and working in ICT (4.89). These ratings confirm high levels of motivation for the camp and its goals.

Teacher Attitudes About Camp TechKobwa Goals

Teachers were asked to rate their level of agreement on 4 statements about achievement of goals fundamental to TechKobwa. Statements were rated on a 4-point scale from Strongly Disagree to Strongly Agree. All teachers provided mean ratings of agreement from 3.44 to 3.78 on these items. One hundred percent of teachers "agree" or "strongly agree" with all four statements below.

Chart 5. Teacher Attitudes About Camp Goals



Impact of TechKobwa on Teaching Knowledges & Skills

Teachers were asked if Camp TechKobwa has improved their teaching knowledge and skills in 24 specific areas. Ratings were provided on a 4-point scale from "Strongly Disagree" to "Strongly Agree." Mean ratings of agreement for 2015 and Summer 2016 camps are provided in Table 1 below.

In 2016, all subject areas received positive mean ratings ranging from a low of 3.25 for teaching ICT without a computer to a high of 3.89 for series and parallel and goal setting. There was limited rating dispersion. Teachers agreed that all TechKobwa lessons improved their teaching knowledge and skills. Several of the lowest rated lessons were in areas related to running a computer lab.

Compared to 2015 teacher ratings, 2016 ratings were similar, though slightly higher for 11 lessons. Computer programming was rated nearly a full point higher in 2016.

Table 1. TechKobwa Lessons Improved Teaching Knowledge & Skills – Ratings of Agreement on a 4-point scale from Strongly Disagree (1) to Strongly Agree (4)

LESSONS	2015	2016
Teaching w/o a Computer	3.11	3.25
Computer Security	3.56	3.44
Managing Computer Labs	3.67	3.44
Conducting Team Research	3.56	3.44
Computer Lab Maintenance	-	3.44
Social Media/Networking	3.78	3.5
Basic Computer Skills	3.67	3.5
Mission Innovation	-	3.56

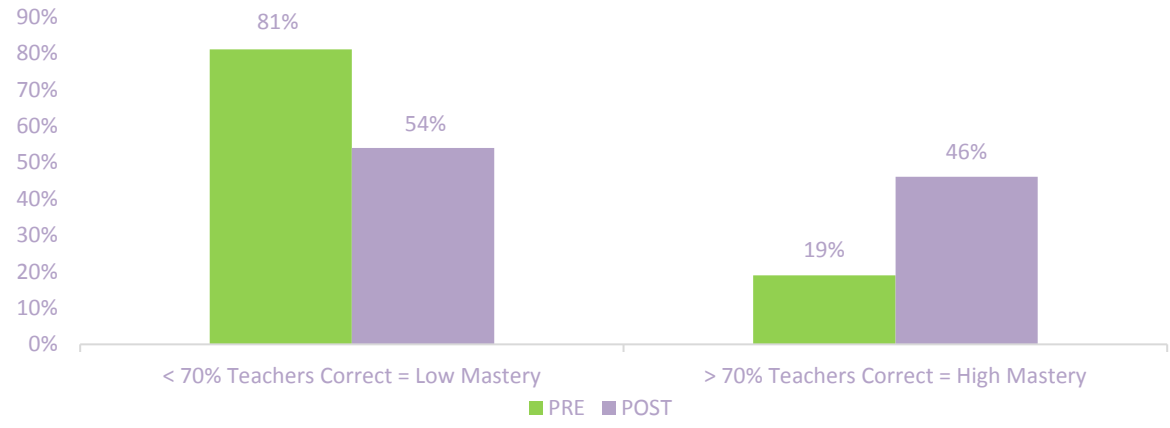
Facilitation Skills	3.56	3.56
Typing	3.5	3.56
Problem Solving	3.79	3.63
Computer Programming	2.78	3.67
Self Confidence	3.67	3.67
Public Speaking	3.33	3.67
Sound-Activated Switch & Sound Levels	3.89	3.67
Internet Research	3.56	3.75
Photography	3.56	3.78
Algorithms	3.67	3.78
Email	3.56	3.78
Written Communication	3.44	3.78
Binary	3.78	3.78
Circuits	3.56	3.78
Series & Parallel	3.89	3.89
Goal Setting	3.67	3.89

Camp TechKobwa provided a mix of technical, professional, and personal skills training, effectively demonstrating that there is a balance between these skillsets that may increase success. Teachers improved their technical skills, but also improved teaching knowledge and skills in problem solving, self-confidence, goal setting, facilitation, Internet research, writing, and public speaking.

Teacher Learning Outcomes

Teachers received training in more than a dozen subject areas. They completed pre-tests on 37 learning objectives to assess knowledge levels before the camp. Teachers also completed post-tests each day, after lessons, to determine whether they had mastered the material.

Chart 6. Teacher Learning Outcomes – Pre-Post Levels of Mastery



Teacher knowledge or mastery was defined as LOW if less than 70% of teachers answered the item correctly; HIGH if more than 70% of teachers answered correctly.

Teacher knowledge or mastery of learning outcomes was high before the camp on just 19% of the subjects taught. Teacher knowledge or mastery of learning outcomes was high after the camp on just 46% of subjects taught, which might suggest the need for more instruction time on certain subjects.

Teachers had low mastery of 81% of the learning objectives before the camp. After the camp, levels of low mastery dropped to about 54% or just over half of the teachers. This finding demonstrates that teachers came into TechKobwa with great need for the training provided. More training would have been even better. It would be interesting to see how teacher understanding of the learning objectives improved after they had taught the material, at the end of the week of camp for girls. Teachers participated in a train the trainer approach, learning the materials as students and then teaching the students. This model might also be explored for students, creating a true cascading mentoring model to increase interest and understanding of ICT at home schools beyond the camp.

Table 2. Teacher Learning Outcomes with Low Mastery Pre-and-Post Camp

	CORRECT PRE	CORRECT POST
Mentors	22%	67%
Social Media	67%	67%
Logic Concepts	22%	56%
Pixels	56%	67%
Relationship between current, voltage and resistance	22%	67%
Personal Information	33%	44%
Algorithms - Correct	11%	22%
Good Speeches	67%	67%
Algorithms - Call	0%	22%
Digital Footprints	0%	22%
Sharing Ideas	0%	22%
Run-length Encoding	33%	67%
Algorithms - Selection Sort	44%	56%
Scratch Scripts	0%	33%
Algorithms - Parallel vs. Sequential	11%	33%
Convert Decimals to Binary	22%	56%
Voltage	44%	67%
Convert Binary to Decimals	11%	56%

Teachers had low levels of mastery or understanding before Camp TechKobwa on 18 learning objectives (49%) that did not improve to high mastery after the camp (Table 2). These lessons show a high level of need for training and might benefit from additional time and better materials and/or methods. Algorithms, Scratch, and Binary were particularly challenging for teachers. It may also be that lessons developed by the IBM scientist who was unable to attend were not taught the same way that she would have taught them, with relevant stories and examples. Some of the test items in areas such as personal information, good reasons to share ideas, and how to give a good speech may not have been fair to ask if not taught.

Table 3. Teacher Learning Outcomes w/ Low Mastery Pre-Camp & High Mastery Post-Camp

	CORRECT PRE	CORRECT POST
Growth Mindset	56%	100%
Mission Innovation	44%	78%
Social Media	67%	78%
Currents & Diodes	56%	100%
Phishing	44%	78%
Internet Safety	67%	78%
Internet Searches	67%	89%
Parallel Connections	56%	78%
Integrated Circuits	22%	78%
OR Connections	56%	89%

Teachers had low levels of mastery before camp on 10 learning objectives (27%) that improved to high mastery after the camp (Table 3). These lessons were effective because they taught teachers content that was needed due to low levels of understanding before the camp and helped most of them achieve mastery of the lessons after training.

Table 4. Teacher Learning Outcomes with High Mastery Pre-Camp & Post-Camp

	CORRECT PRE	CORRECT POST
The 5 Ws of Good Writing	89%	89%
External Input Devices	89%	89%
Mentors	78%	78%

Teachers had high levels of mastery both before and after the camp on just 3 learning objectives (8%). Levels of mastery were high on all 3 of these learning objectives before the camp, but did not change or improve (Table 4). These lessons provide good examples of curriculum that was not a good use of time during the camp because understanding was already high.

Table 5. Teacher Learning Outcomes with Negative Gains Post-Camp

	CORRECT PRE	CORRECT POST
Computer Lab Rules	100%	89%
Speakers (convert electricity into sound)	89%	78%
Good Speeches	100%	89%
Helping Students w/ Presentations	33%	11%
"Five Levels of Why"	100%	89%
Objectives	33%	22%

Six learning outcomes showed negative improvement, meaning post-test responses did not improve over the pre-tests. Four of these items were developed by the TechKobwa scientist who was not able to attend the camp, so it is likely that the substitute teachers for her material did not have time, materials, or background knowledge to provide detailed coverage of the material. Many of these lessons showed high mastery both pre-and post-camp, suggesting low need for these lessons.

Another way to look at the teacher learning outcomes is to consider the gains achieved in teacher knowledge from pre-to post-test. Thirteen lessons achieved 30% or greater increases in teachers who achieved mastery from pre-to post-camp (Table 6).

Table 6. Teacher Learning Outcomes – Gains of 30% or More Correct from Pre-to Post-Camp

	% GAINS PRE-TO-POST CAMP
Mentors	45%
Growth Mindset	44%
Mission Innovation	34%
Relationship between current, voltage and resistance	45%
Currents & Diodes	44%
Phishing	34%
Scratch Scripts	33%
Logic Concepts – AND, NOR, NAND, OR	44%
Convert Decimals to Binary	34%
OR connections	33%
Convert Binary to Decimals	45%
Integrated Circuits	56%
Run-length Encoding	34%

The greatest increase in teachers achieving mastery pre-to-post camp was in Integrated Circuits (56%), but many very challenging lessons were mastered by teachers at camp. Significance testing was not conducted on most pre-post lessons due to the small size of the teacher population, so results of learning outcomes are compared pre-and post-camp in terms of the percentage of teachers who mastered subject areas.

Teacher Comments

Teachers were asked: What changes do you plan to make in your teaching as a result of Camp TechKobwa? This question was open-ended and was administered in the Teacher Attitudes and Experiences survey on the last night of the camp. Eight of nine teachers (89%) shared their plans for changing how they teach (Table 7).

Table 7. Teacher Plans to Change How They Teach Because of Camp TechKobwa

What do you plan to change?
Create materials to use
I will teach all answers through technology
Improve teaching methodology and help student become confident + ICT Club
Increase practice, enforce public speaking, create ICT Club
Teach ICT & use training
Use teaching aids
Use technology to find solutions to many problems
Use TechKobwa materials

Several teachers mentioned using teaching aids and materials or creating materials. Two teachers said they will create ICT Clubs. Changes to teaching methodology were also cited. Demonstrating the impact of the Mission Innovation experience, one teacher cited plans to use technology to find solutions to problems. Another plans to implement public speaking and practice, demonstrating the positive impact of the Mission Innovation projects.

Student Results

Students completed a total of 13 evaluation instruments at Camp TechKobwa. These included 10 pre-post assessments of student learning over 5 days as well as pre-post ICT attitude surveys and an overall camp survey.

There was a lot of discussion and planning before the camp to accommodate language challenges, address limited experience with surveys and survey response options, find ways to make the surveys culturally sensitive, and minimize the burden of being evaluated. To ensure that students understood the survey questions and to also help with English language skills, all survey questions were presented first in English, followed by Kinyarwanda translation whenever possible. Another concern was making sure that students did their own work. Teachers and Family Leaders helped supervise "Survey Time" and collect surveys.

Students were gracious about participating in the evaluation of Camp TechKobwa. They completed the student attitude pre-test on their first day at camp and then pre-tests after breakfast and post-tests after dinner each day on all student learning outcomes (SLOs). On the final full day of the camp, students completed the student attitude post-test and the camp survey.

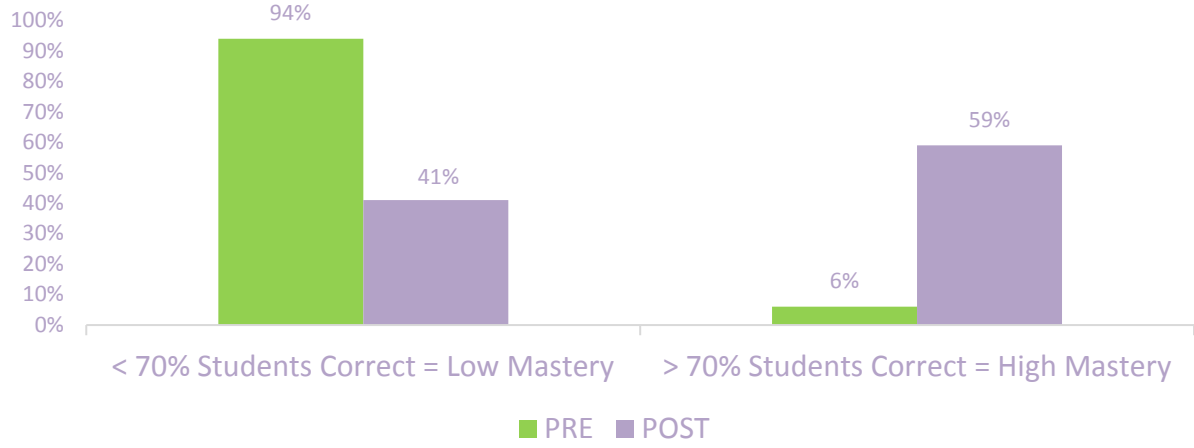
Student Learning Outcomes

Thirty-four quantitative student learning outcomes were measured in pre-and post-tests over 5 days. Student mastery of 28 out of 34 SLOs (82%) increased significantly ($p<.05$) over the course of one week of instruction at Camp TechKobwa. Student mastery was low on most subjects before camp and high on more than half of subjects after camp.

Student learning outcomes are presented in the following charts to show the percent of students who answered these questions correctly *before* the camp and the percent of students who answered correctly *after* relevant lessons. An asterisk (*) denotes significant change ($p<.05$) from pre-to-post camp.

Student knowledge or mastery was defined as LOW if less than 70% of students answered the item correctly; HIGH if more than 70% of students answered correctly. More than 70% of students achieved learning outcomes (high mastery) before the camp on just 6% of the subjects taught. Student knowledge or mastery of learning outcomes was high after the camp on 59% of subjects taught, suggesting additional instruction time or teachers may have benefited students.

Chart 7. Student Learning Outcomes – Levels of Mastery Achieved Pre-Post Camp 2016



Students had low mastery of 94% of the lessons before the camp. After the camp, levels of low mastery dropped to about 41% of lessons. This finding demonstrates that students came to TechKobwa with great need for the training provided.

This data visualization approach provides 3 important pieces of information: 1) Which areas of ICT, personal skills, and professional skills training students had mastered or been exposed to before the camp, which might be eliminated, shortened, or just reviewed in future camps; 2) Which lessons were effective at significantly increasing student knowledge from pre-to-post camp; and 3) Which lessons would benefit from having more time spent in class, the use of different methods, more teacher helpers, or better examples because few students had mastered the subjects before or after the camp.

Table 8. Student Learning Outcomes with Low Mastery Pre-and-Post Camp

	CORRECT PRE	CORRECT POST
*Algorithms - Call	27%	44%
*ICT Lab Rules	33%	64%
*Landscape Photography	22%	33%
*Algorithms - Selection Sort	5%	45%
*Algorithms – Parallel vs Sequential	27%	56%
*Sharing Ideas	52%	66%
Internet Searches	63%	69%
*Scratch Scripts	0%	44%
*Solving Problems	40%	69%
Mission Innovation	38%	44%

*Logic Concepts	12%	32%
Email	55%	68%
*Objectives	50%	68%

(Note: *p<.05)

Student mastery was low both before and after Camp TechKobwa on 13 of 34 (38%) learning objectives. These Student Learning Outcomes (Table 8) started with low average mastery, but also finished with low mastery, suggesting that there is room for improvement in teaching these lessons. Lessons were not mastered by 70% or more of students before or after camp. Students might have benefitted from additional instruction time, more teacher supports, or better methods. It is also possible that some of the lessons were not taught according to plan because of numerous camp challenges. Obviously, it's not fair to expect students to learn something they have not been taught.

Lessons on algorithms were challenging for students, with learning outcomes at the lowest levels before camp. Pre-test levels of knowledge on algorithms started low, ranging from 5% to 27% with correct responses before camp lessons. After camp, many of these learning outcomes were still low, but many reported substantial gains in percent correct. Executing another algorithm as a step started out with just 5% of students identifying the correct response. After camp, correct responses increased to 45% of students, a gain of 40 percentage points. After camp mastery was still low, but the gains achieved were substantial. More time, more support staff to help, etc. might increase positive outcomes even more in this area.

Eighteen Student Learning Outcomes in Table 9 below started with low average mastery before Camp TechKobwa but finished with high average mastery after camp (53%).

Table 9. Student Learning Outcomes w/ Low Mastery Pre-Camp & High Mastery Post-Camp

	CORRECT PRE	CORRECT POST
*Long-term Goals	43%	77%
*Relationship between current, voltage and resistance	25%	89%
*Currents & Diodes	33%	90%
* Algorithms - Selection Sort	23%	75%
*External Input Devices	37%	75%
*Taking portraits	45%	91%
*Voltage	40%	88%

*Convert decimals to binary	35%	91%
*Convert binary to decimals	33%	97%
*Parallel Connections	52%	80%
*The 5 Ws of good writing	60%	95%
*Pixels	30%	92%
*Skype	28%	74%
*Integrated Circuits (IC)	42%	83%
*OR Connections	53%	93%
*Run-length Encoding	0%	95%
*Presentations	62%	90%
Good speeches	63%	81%

(Note: *p<.05)

Electronics lessons were popular with teachers and students. Eight student learning objectives were covered in electronics lessons. Six of these learning outcomes were among the highest pre-to-post gains in student knowledge, with correct responses increasing from 41% to 64%.

Creating curriculum that has low levels of mastery before camp and high levels of mastery after camp is really the "sweet spot" for Camp TechKobwa. These learning objectives demonstrate low levels of understanding or exposure pre-camp and high levels of learning possible at camp.

Table 10. Student Learning Outcomes w/ High Mastery Both Pre & Post-Camp

	CORRECT PRE	CORRECT POST
Speakers	78%	97%
*The "Five Levels of Why"	73%	88%

Lessons with high mastery pre-and-post camp might be eliminated from future camps (Table 10). Most students already knew the material or had prior exposure. Time could be better spent on lessons that failed to achieve high levels of mastery by the end of camp. Just two Student Learning Outcomes started with high average mastery and either maintained that high level or increased even more. Another possible cause of high mastery levels before

camp is poor test item construction that leads respondents to choose the correct answer despite limited knowledge. These items and response options should be reviewed and improved if necessary.

Table 11. Student Learning Outcomes w/ Negative Gains in Mastery Pre-to-Post Camp

	CORRECT PRE	CORRECT POST
TVET Schools	62%	59%

Lessons with the greatest pre-test to post-test gains in student learning were the most effective for Camp TechKobwa. Lessons with the smallest gains either started and finished low or started and finished high. Either way, they were not effective because they provided information to students that was already known or that was taught in a way that did not increase understanding. Eighteen of 34 lessons (53%) achieved gains pre-to-post-camp of 30 percentage points or more (Table 12).

Table 12. Student Learning Outcomes – Gains of 30% or More Correct from Pre-to Post-Camp

	% GAINS PRE-TO-POST CAMP
Relationship between current, voltage and resistance	64%
Currents & Diodes	57%
Scratch Scripts	40%
Logic Concepts – AND, NOR, NAND, OR	33%
Convert Decimals to Binary	56%
Convert Binary to Decimals	64%
Run-length Encoding	95%
Algorithms - Selection Sort	52%
Integrated Circuits	41%
Pixels	62%
Algorithms - Call	40%
Five Ws of good writing	35%
Voltage	48%
Skype	46%
Taking Portraits	46%
External Input Devices	38%
Long Term Goals	34%
Computer Lab Rules	31%

How did teachers and students compare in terms of gains in mastery? Table 13 provides a sample of lessons for comparison. In most cases, student gains were greater. Student gains may have been greater because mastery was lower before lessons than for teachers. Teachers may have shown lower gains in mastery on some lessons because their mastery was high pre- and post-camp. These comparisons show that teachers and students come to TechKobwa with different needs.

Table 13. Sample Comparison of Teacher & Student Learning Gains from Pre-to Post-Camp

	TEACHER GAINS	STUDENT GAINS
Relationship between current, voltage and resistance	45%	64%
Currents & Diodes	44%	57%
Scratch Scripts	33%	40%
Logic Concepts – AND, NOR, NAND, OR	44%	33%
Convert Decimals to Binary	34%	56%
Convert Binary to Decimals	45%	64%
Run-length Encoding	34%	95%
OR Connections	33%	33%
Algorithms - Selection Sort	12%	52%
Integrated Circuits	56%	41%
Pixels	11%	62%

Student mastery was high before camp on just 6% of learning objectives in 2016, compared to 22% in 2015. After camp, mastery was high in 59% of lessons in 2016, compared to 83% of lessons in 2015. Students did not start at the same levels of knowledge in 2015 and 2016, nor did they finish at the same levels (Chart 8).

Chart 8. Student Learning Outcomes – Levels of Mastery Achieved Pre-Post Camp 2015

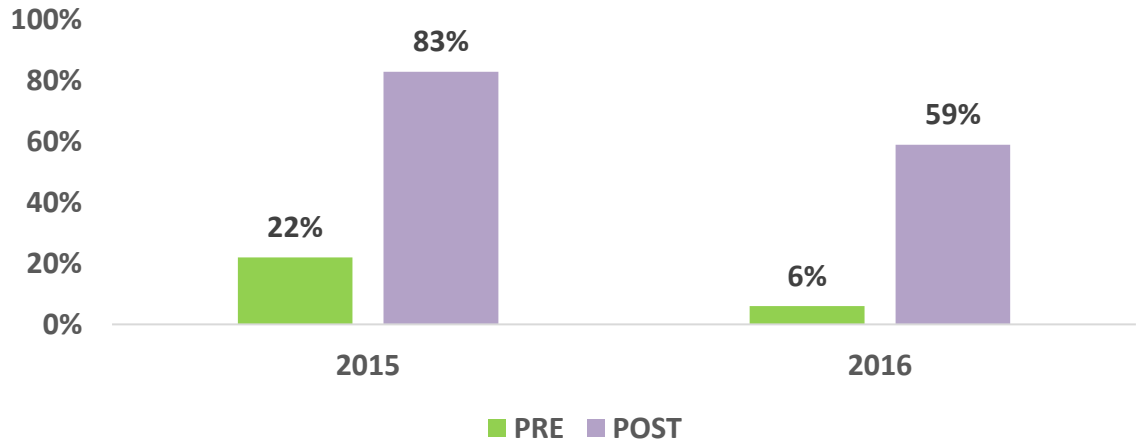
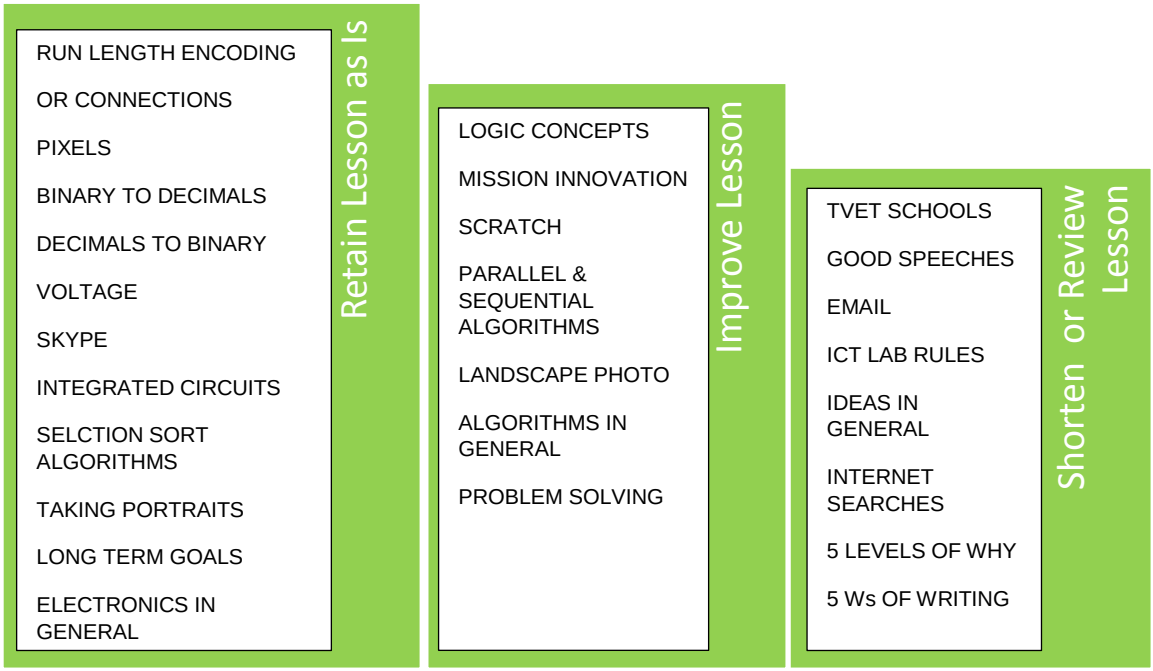


Chart 9 provides a visual of lessons that should be shortened or reviewed for clarity and relevance, improved with either more time, more support, or different methods, or retained "as is" because effective as delivered.

In general, electronics lessons were effective "as is," while most algorithms lessons were more challenging for students and should be enhanced in some way to increase knowledge and improvements in understanding.

Chart 9. Student Learning Outcomes – Retain, Improve or Change the Lessons



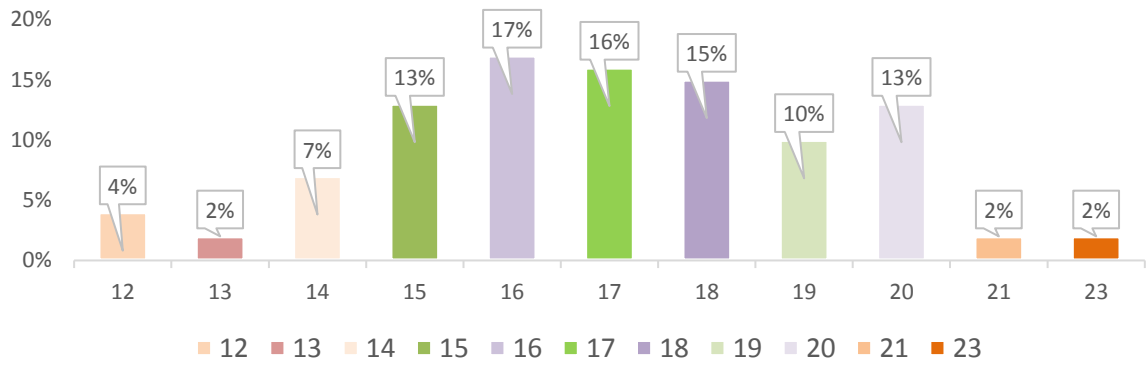
Student Attitudes

Students completed attitude and experience surveys before and after Camp TechKobwa. They were asked to share age, computer use, and cell phone use. They were also asked to rate their level of experience with ICT before and after camp.

In addition, students completed 14 questions about their feelings about ICT and six questions about their feelings about Camp TechKobwa. Many of these items were adapted from surveys developed and validated for computing camps at the Institute for Computing Education at Georgia Tech.

All Camp TechKobwa students were female. Sixty total girls participated in the camp. Ages ranged from 12 to 23 years (Chart 10). Mean age was 16.8 years in 2016, about the same as 2015 (17 years).

Chart 10. Student Age

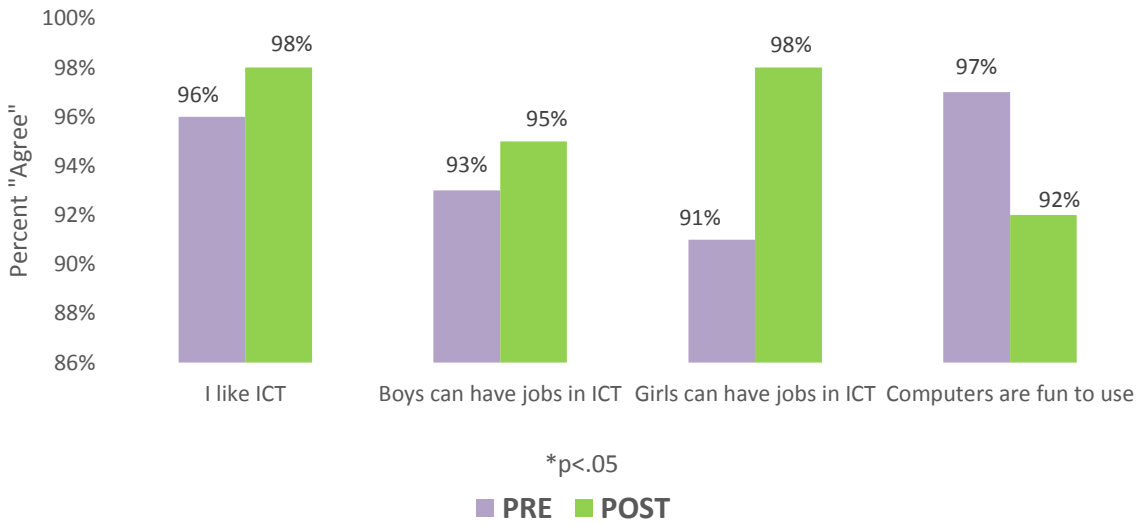


Students were asked about their computer use in an average week to get a sense of their experience, level of comfort, and access to ICT in daily life. Student use of computers ranged from "none" (13%) to "5 hours or more" (3%). Forty percent of girls left this item blank, which may be interpreted as zero computer use. With "missing" students coded as zero computer use, mean use of computers in an average week was .875 hours, compared to 1-2 hours in 2015. Students at Summer 2016 TechKobwa may have come to camp with significantly less computer experience than the 2015 cohort of students.

Cell phone use among students ranged from "zero" (8%) to "18 hours" per day. Twenty-seven percent of students reported cell phone use of less than 1 hour per day. Fourteen percent of students reported 10 or more hours of cell phone use each day. Average cell phone use was about 3.7 hours per day. Teacher use of cell phones was also high.

Students were asked, "How do you feel about Information and Communication Technology?" Fourteen items addressed constructs such as attitudes about computers and ICT, ICT as a male domain, motivation for ICT, confidence in ICT, and utility of ICT.

Chart 11. Student Attitudes – How do you feel about ICT?

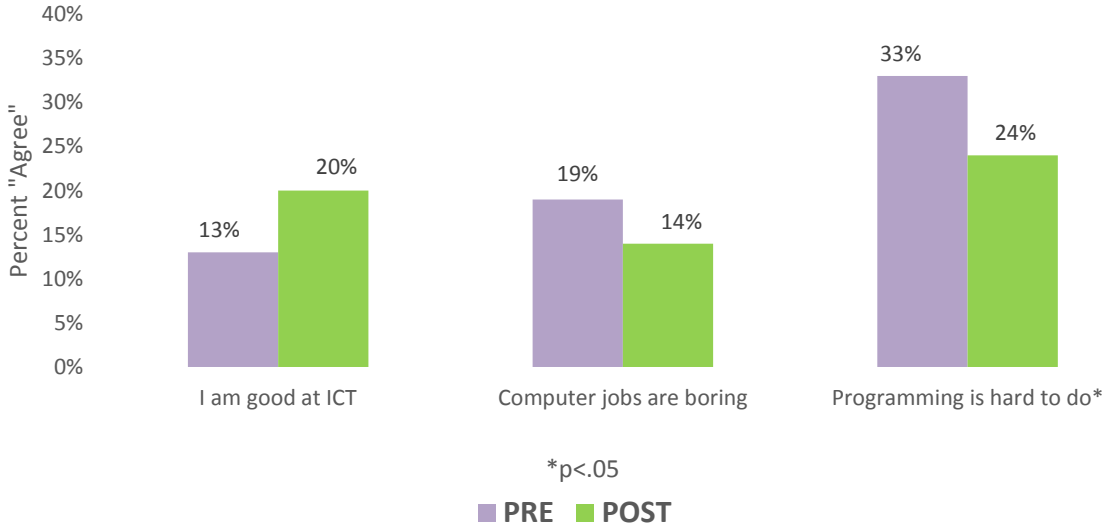


Students at the Summer 2016 camp liked ICT both before and after the camp (Table 11). Their attitudes about boys and girls working in ICT were positive before and after the camp, with girls starting lower but finishing even higher than boys. Computers seemed slightly less fun to use after camp, but overall ratings were high in agreement.

Perceptions of programming difficulty improved pre-to-post camp, with 33% of students agreeing that programming is hard to do before camp, compared to 24% after camp (Table 12). Ratings of this attitude changed significantly ($p<.05$).

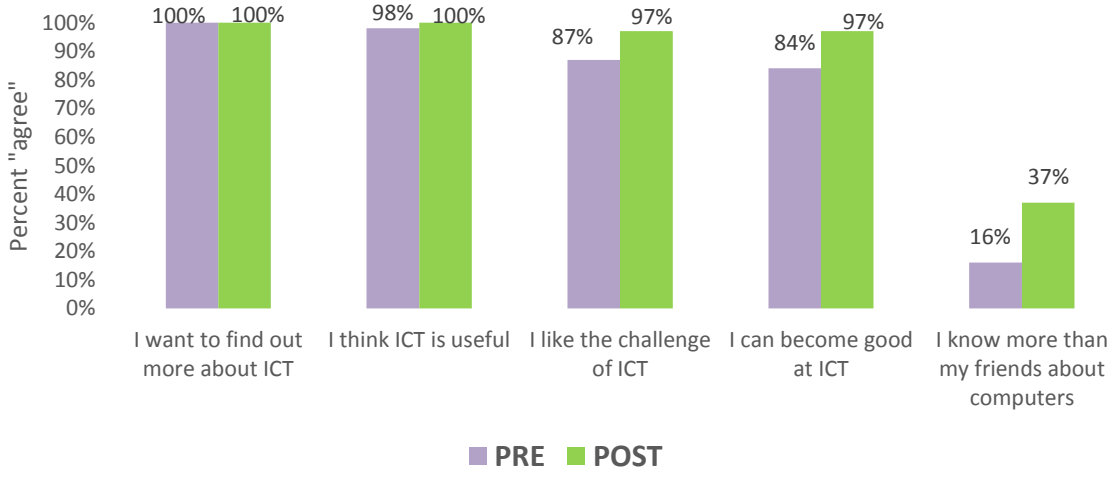
Computer jobs were perceived as boring by 19% of students before the camp, compared to 14% after the camp. Student ratings of confidence on the item, "I am good at ICT" were low both before (13%) and after (20%) the camp. Confidence was much higher in 2015, both before (30%) and after (59%) the camp.

Chart 12. Student Attitudes – How do you feel about ICT?



Students were also asked about their feelings about ICT in general (Table 13). Student interest in ICT was high both pre-and-post-camp. Students thought ICT was useful both before and after camp. Students who said that they liked the challenge of ICT increased from 87% before camp to 97% after camp. Students had limited confidence about knowing more about computers than their friends, both before and after camp, but this opinion improved 21 percentage points. The only substantial difference between the 2015 and 2016 cohorts on these items was on liking the challenge of ICT. Students in 2016 liked the challenge before (87%) and after (97%) camp, while 2015 students were less positive before (17%) and after (33%) the camp.

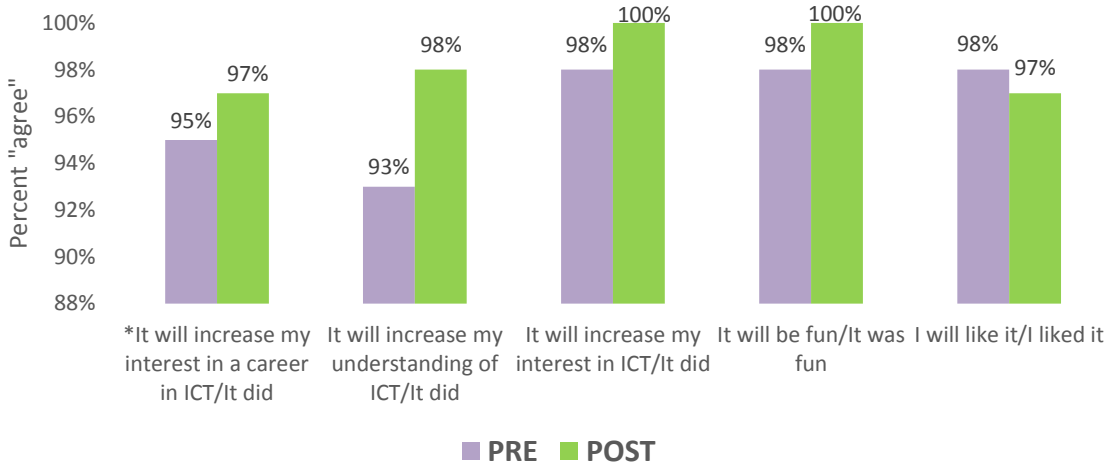
Chart 13. Student Attitudes Pre/Post – How do you feel about ICT?



These attitude ratings show that there was limited significant change after camp, but students had very positive overall opinions about ICT. Importantly, students acknowledged that ICT is not easy and that they like the challenge. Future camps might address confidence building.

To assess student motivation and interest in the camp, students were asked, "How do you feel about attending Camp TechKobwa?" Five items addressed their agreement with statements about camp, pre-and post-camp (Chart 14).

Chart 14. Student Attitudes Pre/Post - How do you feel about Camp TechKobwa?



Students were very enthusiastic about participation in Camp TechKobwa both before and after the camp. They thought it would be fun, expected to like it, and agreed that it would increase their interest in ICT in general, as well as interest in a career in ICT. In addition, students thought the camp would increase their understanding of ICT. Ratings of agreement on these statements were high both before and after the camp. Only the item about increased career interest increased significantly from pre-to-post-camp ($p<.05$).

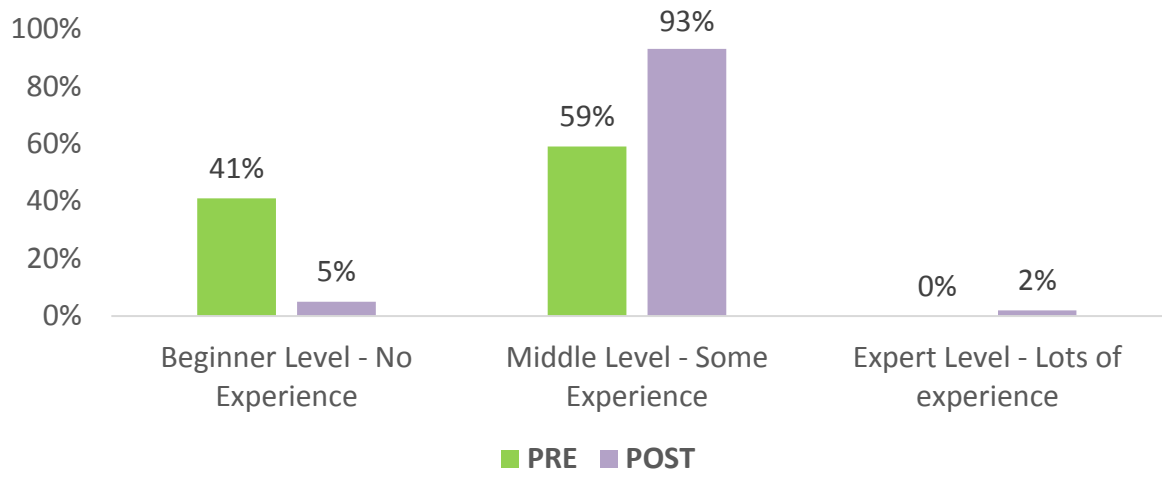
There were no substantial differences between the 2015 and Summer 2016 cohorts of students. All ratings about the camp were high before and after the camp. Camp TechKobwa may have status associated with attendance as only 6 girls were selected from each school. It may also be that the camp has a positive reputation as an intense, fun experience.

Finally, students were asked how experienced they believed themselves to be with Information and Communication Technology before the camp and after the camp.

Forty-one percent rated themselves as "beginners" before Camp TechKobwa. After the camp, just 5% of students still felt like beginners. Ninety-three percent of students rated themselves as "middle level" with regard to ICT experience after the camp, compared to 59% before camp.

Students in the 2015 cohort were more likely to think of themselves as having "expert level" experience (5%) before and after (11%) camp than girls in 2016. Fewer students in 2015 felt that they were starting the camp as beginners (34%) compared to 2016 (41%). These differences might explain some of the differences in confidence seen between the two cohorts.

Chart 15. Student Attitudes Pre/Post - Rate Your Level of Experience



Camp TechKobwa Survey

All Camp TechKobwa participants, facilitators, organizers, and volunteers were invited to complete a Camp Survey on the last day of the camp. Eighty individuals completed Camp Surveys. Although no names were requested, some individuals wrote their names on the surveys. Identifying information was removed from all surveys during data entry.

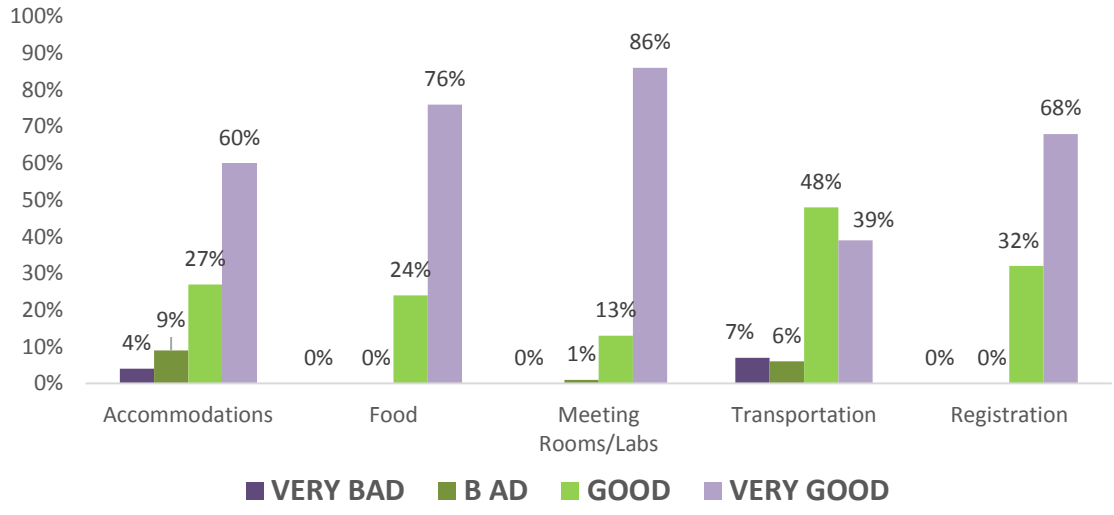
Participants described their roles as Students (76%), Peace Corps or MSU staff (9%), Teachers (13%), and Other (3%).

Respondents were asked to use a "very bad" to "very good" rating scale to share feelings about the accommodations, food, and meeting rooms/labs of Camp TechKobwa.

Meeting rooms/labs at IPRC West received the most "very good" ratings at 86%, compared to 77% during TechKobwa 2015. Meeting rooms/labs also garnered the highest mean ratings at 3.85 on a 4-point scale, compared to 3.76 for food and 3.44 for accommodations. Transportation (3.20) and camp registration (3.68) were also rated in 2016. Food was rated even higher in 2016 than 2015, when 71% of camp participants said that it was "very good." Ninety-three percent of students rated food "very good" compared to 33% of teachers and 33% of PCV/MSU volunteers.

Ratings for IPRC West were high across categories, with the exception of accommodations, which received just 60% of ratings in the "very good" category. The challenge of bed bugs in the support staff (teachers, volunteers, camp coordinators) dorms may have been the cause. Twenty-five percent of teachers and 33% of PCVs/MSU volunteers rated accommodations as "bad" or "very bad." This will be explored later in open-ended questions.

Chart 16. Feelings about Camp Features (n=80)

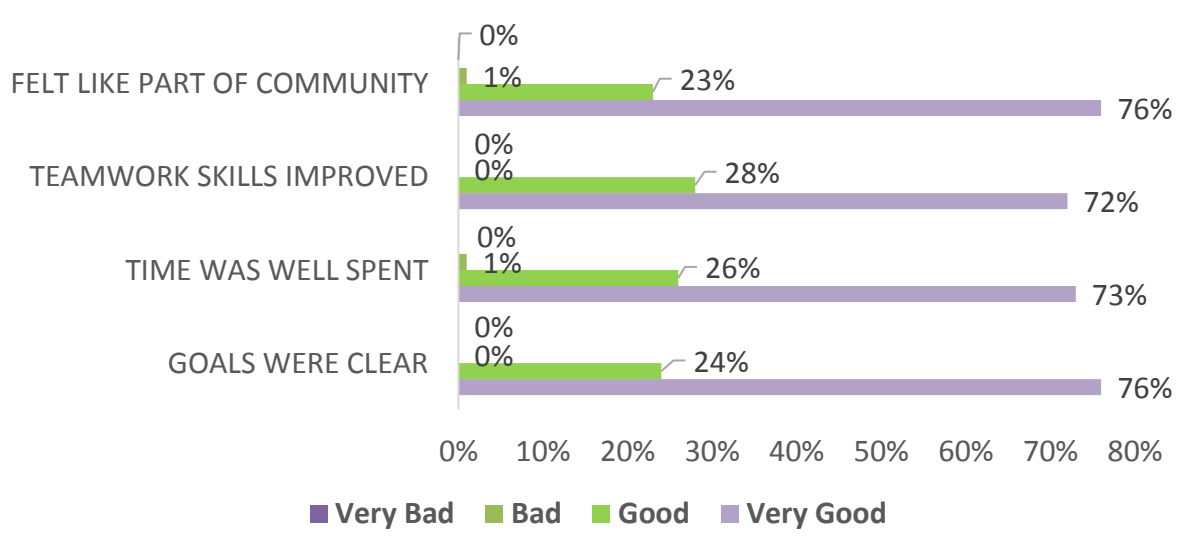


Transportation was the lowest rated element of running the camp with just 39% "very good" ratings. Eight percent of students rated transportation as "bad" or "very bad." Holding the camp in a more centralized location, like Kigali, might reduce the travel time and potential for delays for individuals. Another challenge to travel for the students in 2016 was the national day of service falling on the same weekend that camp started for the girls.

Respondents were also asked to share their feelings from "very bad" to "very good" for 4 camp goals (Chart 17). They were asked if their teamwork skills improved, if they felt like part of a community, if camp goals were clear, and if their time was well spent.

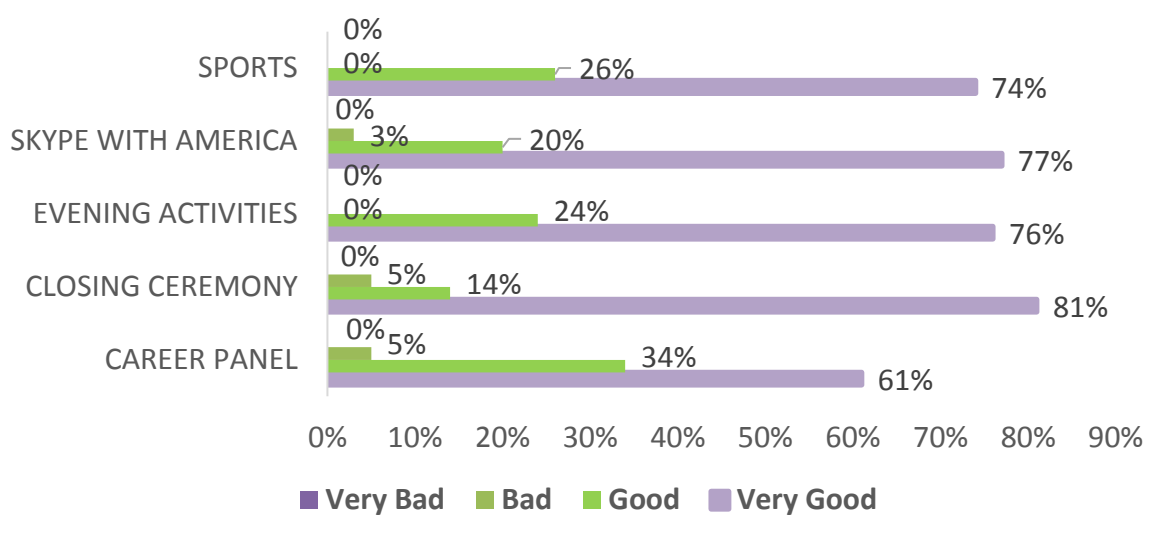
Ratings were "good" or "very good" across categories. There was some disagreement on feelings of community in 2015, with 9% reporting that they did not feel like part of a community, but the 2016 camp was very unified.

Chart 17. Feelings about Camp Goals



Camp participants were also asked to rate their feelings about 5 different TechKobwa activities and 6 different TechKobwa lessons (Chart 18). The ratings were made on the same 4-point scale from "very bad" to "very good." Respondents were also provided with a "Did Not Participate" option.

Chart 18. TechKobwa Activities Ratings



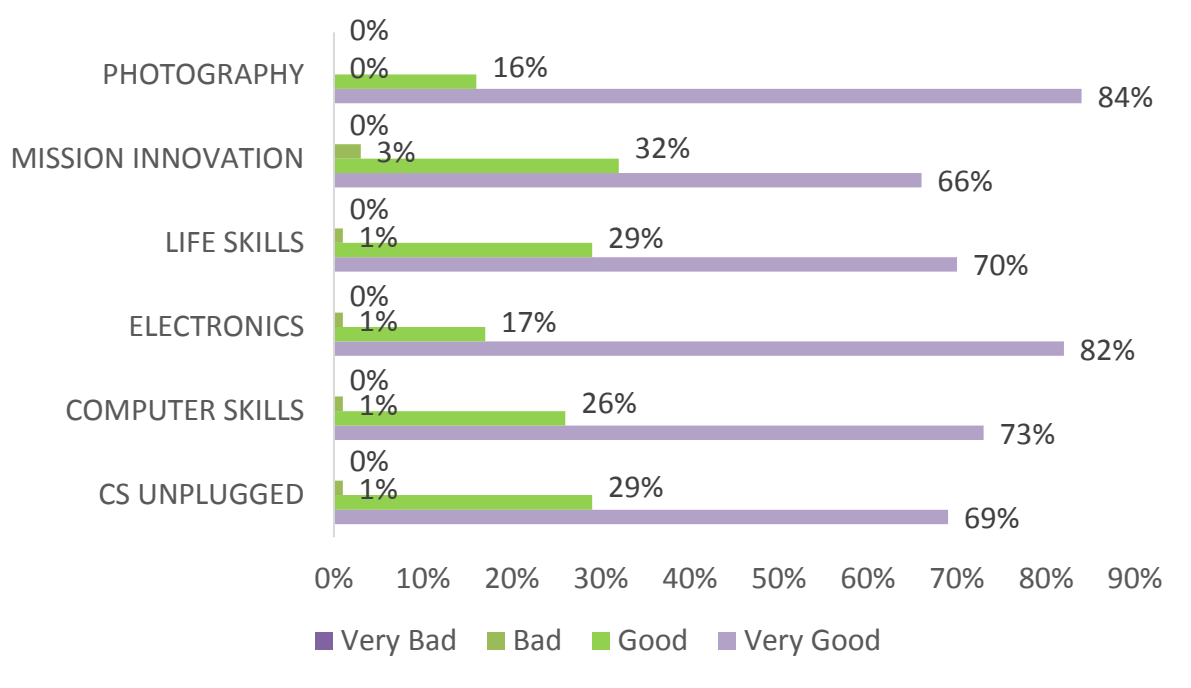
All activities received high mean ratings of satisfaction, ranging from 3.57 on a 4-point scale for the Career Panel to 3.76 for Evening Activities and the Closing Ceremony. Skype with America (3.75) and Sports (3.74) were also highly rated. The Closing Ceremony had the highest ratings (81%) of "very good" feelings, while the Career Panel had the lowest (61%).

When asked to rate camp lessons (Chart 19), participants provided high mean ratings on a 4-point scale from 3.63 for Mission Innovation projects to 3.84 for Photography. Photography and Electronics lessons had the highest percentages of "very good" ratings.

Mission Innovation ratings of "very good" were low among PCV/MSU volunteers (33%) compared to students (69%) and teachers (78%). Photography and Electronics ratings were high across categories of participants. Computer Skills had low ratings of "very good" among PCV/MSU volunteers (17%) compared to students (79%) and teachers (78%). Life Skills ratings of "very good" were moderate across categories of participants with PCV/MSU volunteers the lowest at 60%, followed by 67% of teachers and 74% of students. CS Unplugged was extremely popular with teachers (100% "very good"), but less popular with PCV/MSU volunteers (25%). Students also liked these lessons, with 69% rating it "very good."

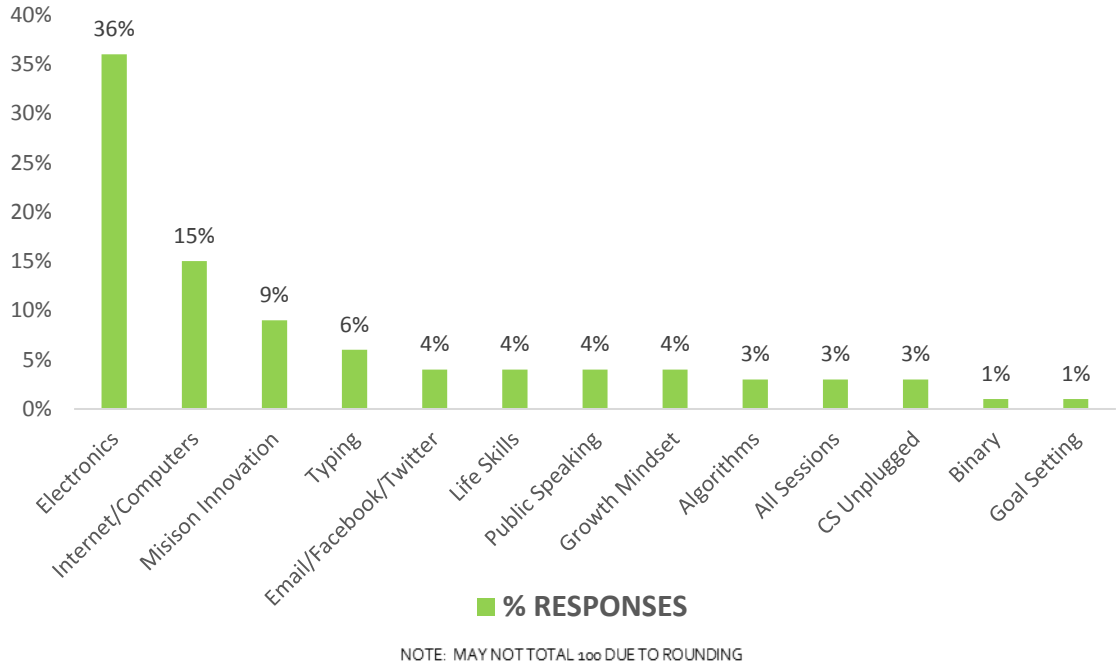
Overall, Camp TechKobwa was rated "good" (23%) or "very good" (75%) by all camp participants. The average rating of camp overall was 3.74 on a 4-point scale. Compared to the 2015 camp, overall ratings were slightly lower in 2016. Teachers and PCV/MSU volunteers provided fewer "very good" ratings in 2016. Student ratings of camp overall were high across camps.

Chart 19. TechKobwa Lesson Ratings



Ratings are explored in more detail below with participant responses to questions about the most helpful lesson, how they will use what they learned, one change to make camp better, and favorite experiences from Camp TechKobwa Summer 2016.

Chart 20. Which lesson was most helpful to you?



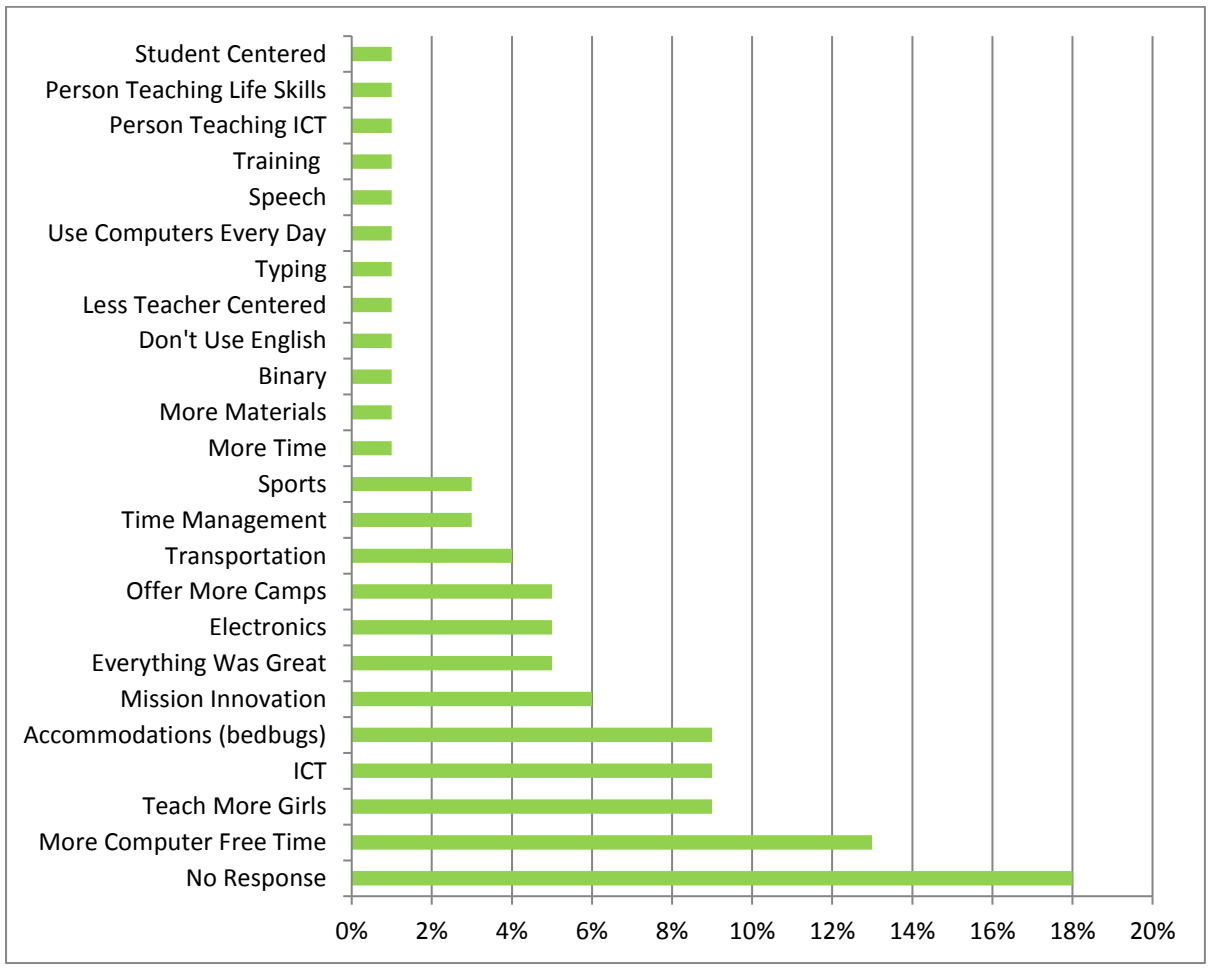
NOTE: MAY NOT TOTAL 100 DUE TO ROUNDING

In 2015, the camp evaluation survey asked respondents to rate each of 18 lessons on whether they were personally useful. In the interest of reducing the burden of the survey, the question was changed to "which lesson/class was most helpful to you." Respondents were also asked to share how they would use what they learned. Only one of 80 respondents answered the second part of the question. It should be dropped for 2017 camps.

Electronics lessons were chosen as "most helpful" by 36% of camp participants (Chart 20). Internet research/computers/computer knowledge/ICT was chosen by 15%. Mission Innovation was the most helpful lesson according to 9%, followed by Typing (6%). All 9 remaining responses accounted for 1%-4% of the "most helpful" list.

While Mission Innovation was challenging to orchestrate, it seems to have been effective at connecting the lessons of Camp TechKobwa so that students could finish the camp with applied solutions.

Chart 21. What ONE thing should be changed to make the Camp even better?



In 2015, participants were asked to name 3 things they would change to improve Camp TechKobwa. To increase the response rate, this item was changed to "What one thing should be changed to make the Camp even better?"

Eighteen percent of participants did not respond to this item. Those who did had a lot of ideas for improvement. Responses were diverse with 23 separate categories of change; 12 categories had just one respondent each. The #1 change recommendation was to offer more computer free time (13%). The #2 change was tied at 9% each for offering the camp to more girls, addressing problems with accommodations (bedbugs), and ICT. Respondents did not elaborate on why they recommended changing ICT, but based on other survey responses, the ICT may need to be improved (access, speed, or working stations), or may be improved so that each participant has a working computer. Mission Innovation was recommended for change by 6%. Comments suggest more time is needed. See all change requests in Chart 21.

In 2015, most popular requests for change included more time, more girls, and more camps. The request for more camps and therefore more girls being trained was honored with a second camp offered in December 2016. In 2015, teachers requested pay for their service as well as a break between their own training week and that of the students for whom they were responsible for teaching and shepherding as family members. Both of these requests were accommodated in 2016.

Finally, participants were asked to share their ONE favorite part of the whole Camp TechKobwa experience. Twenty-one percent of respondents left this item blank, but there were more than 30 different responses to the question, many with just one respondent. This shows that Camp TechKobwa Summer 2016 was special in different ways to different people. See Table 14 for all responses.

Table 14. ONE Favorite Thing About Camp TechKobwa

ONE FAVORITE THING	% RESPONDENTS
Team Work	6%
Electronics	5%
The Lab Room	5%
Technology Lessons	4%
Skype with America	4%
Talent Show	4%
Typing	4%
Mission Innovation	3%
PCVs	3%
Teachers	3%
The Girls	3%
Dance	3%
Managing Your Time	3%
Families	1%
Affirmations	1%
Computer Free Time	1%
CS Unplugged	1%
Photos	1%
Email	1%
Fun	1%
Scratch	1%
ICT	1%

Public Speaking	1%
Survey Time	1%
Internet	1%
Services	1%
Watching the girls have their moments	1%
The way you improved my skills and knowledge	1%
Technology	1%
How happy everyone was	1%
Skills	1%
The arrangements	1%
Organization of the camp	1%
Location	1%
Different thoughts	1%
Entertainment	1%
Friends	1%
Everything	1%

(NOTE: May not total 100 due to rounding)

The top response was Team Work (6%), followed by Electronics (5%), the Lab Room (5%), and Technology Lessons (4%), Skype with America (4%), the Talent Show (4%), Typing (4%), and Mission Innovation (3%). PCVs, teachers, and the girls also received more than one response as "favorite."

Discussion

Camp TechKobwa Summer 2016 was a challenging camp because of personnel, technology, and facilities issues, but still managed to achieve many of its goals. It successfully demonstrated the power of esprit de corps as volunteers, teachers, and students worked together to create a learning experience that may change the lives of participants as well as those of their fellow students and teachers at their home schools.

The camp was short-staffed due to last minute cancellations, and some lessons had to be delivered without training or any prior experience. Bedbugs in the volunteer dorms also made the camp more challenging than average. ICT challenges were not unexpected, but additional working CPUs would have greatly improved student experiences and computer time.

Some of the changes that were implemented because of the 2015 evaluation proved to be beneficial. These included paying the teachers a small stipend for their time and providing a small break between the teacher and student instructional weeks.

Teachers came into Camp TechKobwa with mastery of just 19% of the subjects covered. They left with mastery in nearly half of subjects (46%). Their interest in ICT, teaching ICT, and working in ICT was high, but average ratings of ICT experience before camp were 3.22 on a 5-point scale ("some experience"). After teacher training, ratings of ICT experience increased to 3.89 ("quite a bit of experience").

Teachers had a wide range of ICT experiences prior to Camp TechKobwa, but the camp helped all of them achieve key goals: learning of ICT reinforced through teaching, increased

awareness of the field of ICT, improved ICT skills, and working knowledge of how to teach ICT in clubs and courses.

Teachers agreed that their teaching knowledge and skills had improved in 24 of 24 lessons rated. Substantial gains of 30% or more correct from pre-to-post camp lessons were achieved for Mission Innovation projects, Electronics, Scratch, Binary to Decimals, Decimals to Binary, Logic Concepts, Run-length Encoding, and Growth Mindset.

Students came into Camp TechKobwa with great enthusiasm about ICT and average access to computers of less than 1 hour per week. Student mastery of subjects covered in the camp was low (6%) before the camp, but much better (59%) after the camp. Student learning improved significantly in 28 of 34 (82%) subject areas, but students needed more time and/or improved instruction to achieve mastery of all subjects. Confidence also increased as a result of Camp TechKobwa in one area. Student ratings of the statement, "Programming is hard to do" decreased significantly ($p<.05$) from pre-to post-camp, showing that the TechKobwa ICT experience made girls realize that technology was not beyond their grasp. Student interest in ICT careers also increased significantly from pre-to post-camp.

Camp TechKobwa was highly rated overall by all camp participants, teachers, students, volunteers, and others. The lowest rated elements of the camp included transportation (according to students) and accommodations (according to volunteers and teachers). These camp programs/features should be reviewed and addressed before the next camp.

The Career Panel was the lowest rated activity, while the Closing Ceremony was the highest. All camp lessons were highly rated in the "good" to "very good" range, but there were differences in ratings depending on role at the camp. Mission Innovation and Computer Skills lessons, for example, were not as highly rated by PCV and MSU volunteers as they were by students and teachers. CS Uplugged was also highly rated by teachers and students, but less popular with volunteers.

Electronics lessons were loved by all. The Snap Circuit kits provided a hands-on way to easily learn and apply concepts to increase understanding of electronics principles. This kind of simple, pre-packaged curriculum might hold the key to TechKobwa sustainability. Letting the teachers take kits back to their home schools increases the likelihood of cascading mentoring and wide spread dissemination.

Electronics lessons were perceived as most helpful, followed by Internet/computers, Mission Innovation, and Typing. The number ONE thing that should be changed was providing more computer free time, followed by offer the camp to more girls. ICT and accommodations were also high on the list of requested changes, though there were numerous requests made by just one individual, such as making the lessons less teacher centered, using computers every day, and allowing more time for lessons.

Teachers should be interviewed or surveyed within 6 months of TechKobwa to assess the mid-term impact of camp on them, their schools, and their students. They should also be tracked long-term and encouraged to stay connected to the camp and the community that was created. Now that all participants of the camp have email accounts and knowledge of Facebook, a large community of TechKobwa graduates could stay connected and also provide support and mentoring to each other.

Future camps might assess teacher learning outcomes after teachers have completed the cascading mentoring model and used their knowledge to train students. It is likely that mastery of subjects increased even more as the teachers taught what they had just learned.

The 2016 Summer camp assumed limited English language fluency and provided translations on all evaluation surveys as well as translators for many classes. Although one of the recommendations for improving the camp was to stop teaching in English, improvement of English language fluency (speaking, writing, and listening) should be added as a goal for the camp as this outcome is probably measurable and significant.

As Camp TechKobwa transitions to become supported completely in-country and offered more than once per year, growing pains are inevitable. Peace Corps Volunteers will rotate in, bringing enthusiasm and new ideas, and out, taking corporate wisdom. It's important that curriculum be standardized and lessons become replicable, but what is probably most important is the continuity of the spirit of the camp which inspires confidence, learning, and community.

References

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APPENDIX

Camp TechKobwa Evaluation Plan

Camp TechKobwa Evaluation Plan

Evaluation Tasks	***Outcomes***	***Data Gathered by Survey/Instrument***
Evaluate Impact of Camp TechKobwa Experience on Student Participants	• *Change in Attitudes about ICT* • *Increased Confidence in ICT* • *Increased Knowledge of ICT* • *Increased Perception of Expertise in ICT* • *Increased Interest in ICT* • *Increased Interest in ICT Careers*	*Student Pre-Post Attitude Survey*
Evaluate Impact of Camp TechKobwa Experience on Teachers	• *Improved Leadership/Teamwork Skills* • *Impact of Teaching on Learning* • *Impact of Teaching on Intent to Disseminate ICT* • *Increased Confidence*	*Teacher PostCamp Survey*
Evaluate Camp TechKobwa Lessons	• *Improved Content* • *Increased Learning of Identified Objectives* • *Formative assessment*	*Daily Lesson Evaluations Of Student and Teacher Learning Outcomes*
Evaluate Overall Camp TechKobwa Experience for All Participants	• *Achievement of Camp Goals* • *Creation of ICT Community* • *Improved Teamwork Skills* • *Utility of Lessons* • *Impact of Lessons on Knowledge & Skills* • *Satisfaction* • *Formative program feedback*	*Post-Camp Survey for Students, Teachers & Staff*
Process Evaluation	• *Improved functionality and utility of materials and methods* • *Improved communication and collaboration of team* • *Integrate results of each Camp element/activity/group evaluation into recommendations*	*Observation Notes*