Mars & Sandrine: Two Success Stories from Constructionist Learning in Rwanda

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Abstract

I am a member of the One Laptop per Child (OLPC) Learning Team located in Kigali, Rwanda, where there are currently 10,000 XO laptops deployed with another 100,000 en-route. I have a background working to empower young women in urban communities. While I was new to the ideas of constructionism and the benefits of laptop-use in education, I was most curious about the ways constructionist learning theory could affect the lives of young women in Rwanda. During my ten months thus far in the country, my curiosity has been rewarded manifold, particularly through the lives of two young women, Mars and Sandrine.

Mars, a formally shy, reserved student in 6th grade in the Rwandan capital of Kigali walked four hours each week to use her laptop. There, a colleague and I showed her and several other students not only how to use the laptop but allowed her time to think deeply and develop a concrete understanding of things she had been taught in school, but never fully grasped or felt confident in her understanding. After just a few short weeks, Mars morphed into an outspoken, confident, young women, who used her newfound prowess to eventually teach her class and show her family the importance of continuing her education.

Sandrine, also a 6th grade student, and friend to Mars, used her participation in a journalism camp at her school, with the laptops, to elevate herself as a leader in her classroom. She interviewed the Headmaster of her school and offered opinions and edits to her peers. But for Sandrine, her greatest achievement was sharing her finished newspaper with her parents; their delight for what their daughter created greatly inspired Sandrine and to this day, nine months after the conclusion of the camp, her newspaper is prominently displayed for all in her family to see.

Mars: the quiet girl turned teacher

Mars is a fifteen-year-old P6 (sixth grade) student from Kagugu Primary School, a co-ed school with 4000 students in Kigali. Mars' parents abandoned her and her older sister, Fiona (age 21 with a young daughter of her own), to live on their own with eight others in a small concrete house close to Kagugu. I met Mars through her outgoing friend who always came to talk with me when I visited Kagugu. Mars was quiet, reserved and did not appear to speak much English. In the beginning, I honestly did not notice her.

As a supplement to time in the classroom, a colleague and I asked a local newspaper to publish a weekly challenge based on various activities on the XO laptop called "XO Time." We also offered to any student who needed help solving the challenge, a meeting with members of our team each Saturday at a local café. We started this initiative with private school students in mind, assuming that parents could easily drop their children off at this popular café. On the first Saturday, much to our surprise, a small group of students from Kagugu, including Mars, dressed in their best clothing, arrived.

At Kagugu Primary school, the students are not allowed to take home their laptops nor have they been assigned ownership of any particular computer. The laptops are currently in storage in each classroom, until the teacher decides to use them. (It is OLPC philosophy that each child should have their own computer and should be allowed to take them home, but it takes some time for the schools and the teachers to become comfortable with this concept, especially in a school of 4000 students). The children from Kagugu who showed up to XO Time were eager to have more time to explore and use the laptops. Their excitement was palpable as soon as they saw the laptops on the table.

The first week's challenges were in Turtle Art, an activity based on Seymour Papert's computer language, Logo. We started by asking students to create simple shapes using Turtle Art's snap-together programming blocks. While the shapes were simple, the challenge was not. The participants did not know (or remember) which shape certain angles would create and, even after seeing one angle created, they could not replicate the same angle a second time (for example, when creating a square with multiple 90 degree angles). It was difficult for students to comprehend. This does not mean that Mars and others had not learned about angles and other geometric concepts in school. Quite the contrary, they had received adequate instruction, but they had trouble expressing and understanding this knowledge concretely.

As Seymour Papert discusses in *Mindstorms*, "the ability to articulate the processes of thinking enables us to improve them." (Papert, 1980) He goes on to elaborate on two of his major interests implicit in Piaget's work: "an interest in intellectual structures that could develop" in the child and "the design of learning environments that are resonant with them." (Papert, 1980) He further points to his belief that the "Turtle can be used to illustrate both of these interests: first the identification of a powerful set of mathematical ideas that we do not presume to be represented, at least not in a developed form, in children; second, the creation of a transitional object, the Turtle, that can exist in the child's environment and make contact with the ideas." (Papert, 1980). When my colleague and I saw that the students needed a more literal and concrete understanding of what they had been told in school we decided to proceed based on the Piaget theory that all learning is first physical. Papert and Cynthia Solomon exemplified this theory through their work on Logo, by having students "play Turtle" and we decided to do the same with these students. We used a traditional Rwandese spear to give the students a better grasp of "heading." The students held the spear as we called out different angles, which they had to replicate with their bodies.

Figure 1. Students play Turtle at a local café

Once the participants familiarized themselves with these physical actions, the challenges became easier for them; so we increased the level of difficulty. Mars, in particular, began to flourish. The changes in her demeanor were very apparent. I first noticed that as soon as the sheet with the challenge was passed out, the room fell silent; each child was completely focused on their task with no time for small talk. Even when I offered a hint (for which the students would beg), Mars and others would appear oblivious! Mars also began providing herself with additional challenges. When it was time for the students to draw their own names I thought that Mars would be happy knowing that her short name would be a fairly easy task, but instead she announced that she would draw her last name, UMUBYEYI. It took her the entire session and half of the next, but she was determined to draw her last name.
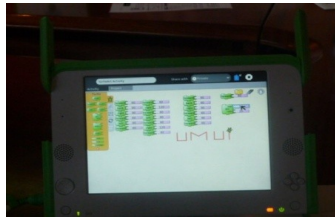

Figure 2. Mars uses Turtle Art to write her last name

In addition to her academic progress she had seemingly undergone a drastic personal transformation. The formerly "shy" girl who "didn't know English" began speaking more fluent English than her peers (the best we had encountered in all of Kagugu). She was eloquent, nice, thoughtful and very smart and she became aware of her progression as well. On one occasion, while working with another student, I complimented the student on doing good work and on being "smart." From across the room Mars overheard this and shouted "I am smart too!" It was surprising to imagine that this was the same Mars from just a few weeks earlier. Her growth continued. As new students arrived at the weekly sessions we needed more help. Some of the new students did not speak English (three of the newcomers were children of a taxi driver who saw the XO laptops and pleaded for his children to have the opportunity to work with us). Mars helped us to translate flawlessly. Additionally, since some of the new students were also new to Logo concepts we needed help getting them up to speed. Mars, again, rose to the occasion. I asked her if she would serve as the official teacher for new students. She shyly blushed and laughed at the idea of being a teacher, but she took charge, claiming a corner and an easel as her own. She used the same techniques we had used with her and taught her peers, confidently and correctly, something that just a few weeks ago eluded her.
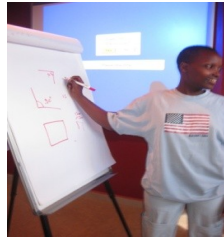
Figure 3. Mars teaches at XO Time

That was not the end of the surprises from Mars. A few weeks later at Kagugu, I met Mars and her friends in the school yard. Their teacher was absent and there was no substitute. Knowing how wonderfully Mars was teaching on Saturdays, I suggested, somewhat facetiously, that maybe she should teach the class. Much to my surprise and without hesitation, Mars said, "Okay, but first can you please make them all quiet?" I walked into the classroom, quieted the students and stood in the back of classroom and watched Mars conduct an entire class. Her peers were quiet and respectful as they grabbed laptops and followed along with her instructions. Two of her friends who attend the Saturday sessions walked around the classroom to help. One student even pulled out a folder with a copy of all the week's challenges! Mars explained angles, calling on volunteers in the class to physically create the shapes as she called out various degrees in the same manner in which she learned.

Figure 4. Mars teaches her class

Soon, from the back of the room, I saw that all laptops were reflecting squares, triangles and circles. Mars was now not only a "smart girl," but a teacher. At the end of the school year, Mars' sister, Fiona, stopped by our OLPC apartment. She talked about all of the great things she saw Mars create and about "how good she is on the computer." Fiona asked that I help her set up her own email address because now she also wanted to learn. Before leaving Fiona said "I may not have much opportunity for my life anymore, but Mars is very smart, and she is going to be something great, I will do whatever I can; so that she finishes school and succeeds."

Sandrine: the student journalist

Sandrine is a twelve-year-old student also from Kagugu Primary. She is a friend of Mars and others who attend XO Time, so she began to attend as well. It was here that I could first tell that she was very bright and a leader, much like Mars. That is why, when I held a journalism camp at Kagugu, I wanted to provide a space for Sandrine to recognize her potential and to develop these skills on her own.

I chose to work in journalism because through journalism, students would guide and manage their own work while developing creativity and skills in analytical and critical thinking. Students could also freely express themselves, while working cooperatively in groups. While all decisions

regarding the overall development of the newspaper as a whole would be a collective effort among the students, each individual student would be solely responsible for the content and development of their own articles. As journalists the children have the opportunity to be the voice of their communities and agents of change. Students and children are rarely called upon for suggestions as to what they would change or do to improve their community, neighbourhood or village. Now, by creating their own article topics, students can address issues and concerns important to them. This also provides the students with an opportunity to engage and learn more from their families, school, and community and through their writings to create change by focusing awareness on issues important to them. At the same time we wanted students to develop greater literacy and an appreciation for reading, writing and research. Students were divided into groups with Sandrine becoming the unmistakable leader of her group. Because the laptops were a transformative factor in her life, she lobbied her peers to focus their newspaper on technology in Rwanda. Her role as leader inspired the other groups toward more intimate collaboration. Group work is a very new idea to these students and some had trouble being inclusive and sharing ideas. Sandrine served as the ideal example of how this novel behavior could work beneficially. Soon the groups were reaching out to each other for ideas and editing help—creating very powerful learning moments.

The following week, after receiving her completed newspaper, I asked Sandrine what her dad thought about her newspaper. She smiled more broadly than I ever saw anyone smile before and said, "My parents love it! They say my newspaper is beautiful!"

After hearing Sandrine's declaration and seeing her pure delight in her parents' admiration, it became clear to me that a shift was occurring far beyond the walls of her school. As a student I remember school projects, as far back as first grade, as being thoroughly enjoyable. They were important to me because I could tailor them to my own interests and passions, but more importantly (which I only realize now), projects provided me with an opportunity to bring my work home and involve my family. I was able to share ideas with my parents and show them my progress in a way that was not possible through solitary study and contemplation. I believe my family also shared a reciprocal joy and gratitude for our productive and engaging time together. Of course, the best part was bringing home the fruits of my labor (diorama, poster board, etc.), with a good grade and having it displayed in our home. This was the first time something like this had ever happened for Sandrine. All she had to share with her parents prior to this was her report card with a grade based primarily on a year-end exam. Now she has a newspaper that to this day (9 months ago) she keeps preserved at home for all to see.

Here is the article that Sandrine wrote:

UBUMENYI IKORANA BUHANGA MU ITERA MBERE
Photo by Uwase Sandrine
IKIGO CY,AMASHURI ABANZA CYA KAGUGU

kiboneka mu karere ka GASABO. Mu mugi wa KIGALI Kikaba cyarabonetswe ho ubushakashasti Abana bakaba batagikenera amakayi. Kuko ibintu byose Bakaba babyigira kuri LAPTOP Abana bakaba bashimira abayobozi. Bazibage jejeho. Ikinyamakuru J,S,CandM tukaba twaregereye. Umuyobozi w,ikigo cyamashuri Abanza cya KAGUGU tumubaza ngo kuba abana. Basigaye b,igira kuri laptop. Babyakiriye bate yadusubije agira. Ati:<<Abana babyakiriye neza usibyeko bitari biboroheye kuko bwari ubwambere>>: None abana bakaba bazitahana. Kugira ngo bakore Imikoro. Tukaba twarabajije umwana. Ururimi bigamo aradusubiza ati biga m,ururimi rw,icyongereza. Ubwo namwe murumvako bageze. Ku Iteranmbere Iyo mbonye Iterambere risigaye Riba I KAGUGU binyereka aho U RWANDA rugeze

Figure 5. Sandrine's newspaper article

Sandrine's article translated:

Science and technology in development

Kagugu Primary School is located in Gasabo, District, Kigali City.

At this school it has been found that kids do not need to carry so many books, the number of books have been reduced by the use of laptops in studying science and technology. All students from this school thank the authorities for these laptops. In an interview, the Magazine J,S,C and M had with the Headmaster of Kagugu Primary School about how they receive the fact that students are using laptops in learning (classroom), he said: << Students have been excited and very happy, but it has not been easy for them because this was their first time to see laptops>>

Now, during the camp, kids take laptops home to use them for their homework.

We asked one student about which language they use in studying, and he said: we study all courses in English. I hope you understand how the development is advancing to this school, and the situation at Kagugu shows how Rwanda is developing.

Figure 6. Translation of Sandrine's Article

So, for me, while I have witnessed and learned much during my first year of field work in Rwanda, nothing exemplifies the importance of laptops in education and constructionist learning like the stories of Mars and Sandrine. Mars, once very shy and reserved, is now teaching her class and commanding the attention and respect of her peers. Children, who had never touched a laptop, walk 4 hours to work on a weekly newspaper challenge. Sandrine now has her very own "beautiful" newspaper hanging on her wall at home for all her family to see. As with most young women, Mars and Sandrine needed an opportunity and catalyst for them and their families to appreciate their intelligence and true potential. The laptops, the work they did and the goals they achieved empowered the children and elevated them both into leadership roles. They will now carry this knowledge and confidence with them the rest of their lives. I am happy to report that while advancing to secondary school was originally, not the course foreseen for them, both Mars and Sandrine have indeed continued on to secondary school. In the past few months I have received calls from both girls saying that "school is too easy for them now!" It is these moments that define the beginning of learning projects and these moments will continue and grow as the program scales and progresses. I look forward to meeting many more Mars and Sandrines.

References

Papert, S. (1980) *Mindstorms: Children, Computers and Powerful Ideas*. Harvester Press. Brighton.

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