

Peer-to-peer Learning in West Papua A One Laptop per Child Experience

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Abstract

We describe the introduction of OLPC laptops to a school in West Papua. The challenge was how to introduce 14 laptops to a school of about 450 students and 20 teachers, most of who had never used a computer before. The only expert on the laptops was Ken Kahn who did not speak the local language and was only available for seven weeks.

The approach we undertook was based upon three different peer-to-peer teaching events: (1) among university student volunteers, (2) among teachers with support from the university volunteers, and (3) between cohorts of students.

Keywords OLPC, One laptop per child, peer-to-peer teaching, State University of Papua, Scratch, Turtle Art, Unipa

1. Introduction

Learning that he would be in West Papua for seven weeks, Ken Kahn applied to the OLPC Foundation for XO laptops. He was granted ten and another five beta laptops were donated by the London Knowledge Lab. In the summer of 2011 he arrived at the SD Negeri 02 Amban Primary School in Manokwari, West Papua with 14 working laptops (one broke in transit).

Two instructors and several students from the nearby State University of Papua volunteered to help. Each one volunteered to master one program. They then presented their program to the other students. After a week the volunteers presented their program again to the teachers. Each teacher then volunteered to become an expert on one program and to present it to the other teachers.

The following week the university volunteers presented programs to 16 students. After two weeks a new group of 16 students were introduced to the laptops by the first group of school students. This pattern of peer-to-peer teaching has continued for at least 18 months.

2. Peer-to-peer teaching among the university volunteers

The original plan was that Ken Kahn would introduce the OLPC [1] XO activities to the teachers and students and an instructor from the university (Julius Naibaho) would act as his interpreter.

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Fortunately, instead, eight university students (half majoring in computer engineering and half in English) and two instructors volunteered to help. The second instructor to volunteer, Yanty Rumengan, had the idea of encouraging the students to teach each other how to use the software on the laptops. The university students volunteered to present one or two applications to the rest of the group. This phase lasted a week with meetings of two hours each morning. Students did an impressive job of learning about and then presenting their chosen applications.

3. Peer-to-peer teaching among the teachers

The following week started with an impressive ceremony where we presented the school with the laptops. The regional minister of education, a university official, and the press were present. The ceremony made front page news.



Figure 1 - The presentation of the laptops to the school

Only one of the dozen teachers who participated had much computer experience. The school had no computers. Some of the teachers had never used a computer before and needed to be taught how to use a mouse. After presentations by the university students each teacher volunteered to master an application. Two hours a day for a week was devoted to peer-to-peer teaching among the teachers.

4. Peer-to-peer teaching among the students

During weeks three and four, 16 students (7 to 11 years old) learned to use the laptops. (An odd choice since there was only 14 laptops.) The head teacher reluctantly allowed the students to bring the laptops home the first week but then became nervous about lost or broken laptops and locked them up. Some of the teachers helped the students a little but most of the teaching was done by the university volunteers. Many of the school students worked together and frequently shared their discoveries informally with each other.



Figure 2 - A teacher presenting Scratch to other teachers



Figure 3 - A typical session with the students

After two weeks, a new group of 16 students was selected. The first group was given the task of teaching the new students. They paired up and they did very well. Only occasionally did they need help from a university volunteer (and some days there were none there).

5. Efforts to introduce computer programming

One of the authors (Ken Kahn) was particularly interested in introducing computer programming to the students. He gave demonstrations of Scratch both to the university volunteers and to the school students. Prior to presenting programming to the students he found that many students were using Scratch as a glorified paint program and had yet to explore scripts. This was also the case for the teacher that volunteered to present Scratch to the other teachers.



Figure 4 - A student teaching a student

After a short Scratch programming demonstration we asked the children to be creative and create a program that they would show to the class two days later. A prize of an ice cream went to the best program. Many of the presentations were variants of the first demo they saw.

Scratch was chosen over the other two programming environments available on the laptops, Turtle Art and eToys, because it was translated into Indonesian and had more functionality. Some students explored Turtle Art and eToys on their own. One girl made some impressive programs with Turtle Art. She showed her programs to other students who then also built some simple Turtle Art programs.

When the first group taught the second group more Scratch and Turtle Art programs were produced. There was lots of sharing of programs followed by creative modifications. Three or four simple scripts were typical of the Scratch programs.

6. Results from a teacher and student survey

At the end of seven weeks we asked the teachers and students to fill in the following questionnaire (answers in parentheses):

1. How much did you know about computers beforehand? Had you used one?
Teachers (1 yes, 2 little, 2 never) Students (20 yes, 3 little, 1 never)
2. Did you find the computers easier or harder to use than you expected?
Teachers (5 easy) Students (17 easy, 4 difficult, 3 difficult at first then easy)
3. Do you think that knowing how to run apps on a phone helps in using computers?
Teachers (4 yes, 1 no) Students (14 yes, 10 no)
4. Which activities did you like the most and why?
Teachers (2 Speak/Chat, 1 Browse, 1 Calculator) Students (9 Scratch, 5 TamTam Mini, 2 Speak/Chat, 2 Record, 1 Maze, 1 Memorize, 1 Flipsticks, 1 Paint)
5. Which activities do you think are the most educational?

Teachers (3 Speak, 2 Browse) Students (12 Browse, 4 Scratch, 4 Memorize, 3 Write, 1 Physics)

6. Which activities were the most difficult?

Teachers (Browse, Scratch, TamTam Edit, Paint, All programs) Students (6 Turtle Art, 3 TamTam Synth Lab, 2 Help, 2 Distance, 2 Speak/Chat, 1 Paint, 1 Browse, 1 TamTam Edit, 1 TamTam Mini, 1 eToys, 1 None)

7. Which activities were the easiest?

Teachers (2 Record, 2 Browse, 1 Speak/Chat) Students (10 Speak/Chat, 7 Maze, 3 Scratch, 2 Paint, 2 TamTam Mini, 1 Physics, 1 Memorize, 1 Implode)

8. Did you feel you had enough time and help from others to learn how to use the laptops?

Teachers (4 not enough, 1 enough) Students (22 enough, 2 not enough)

9. Did you take the laptops home and use them? How much?

Teachers (2 one week, 2 one day, 1 no) Students (9 two weeks, 9 one week, 2 one or two days, 3 misunderstood question)

10. Do you have any suggestions for how to improve the training?

Teachers (5 need more time to practice) Students (5 more laptops, 2 more classroom sessions, 7 “yes”). Other suggestions: (1) we need to learn and asking people who know better, (2) the more teacher the better, (3) educational activities/programs should be more, (4) we should keep the laptop carefully, and (5) keep learning with diligence/dedication.

7. Discussion

The idea of peer-to-peer learning (and the related concepts of peer mentoring and cooperative learning) is an active area of research [2]. There can be significant learning, not only by the students receiving mentoring from a peer, but also by the student doing the tutoring. There have been several OLPC reports involving peer-to-peer learning and teaching of computing [3]. Case studies of peer-to-peer OLPC learning in Nicaragua and the United States [4] demonstrate not only the effectiveness but also the motivational benefits. The students were eager to share their knowledge.

7.1. Sustainable?

After seven weeks the school no longer had support from university volunteers. The school then hired part time one of the student volunteers (an English major) to take over the computer lessons. She continued the practice of a new group of students being taught by the previous group. When she left the school hired another student volunteer (a computer engineering student) to continue. 18 months after the start of this project it was still continuing. 12 laptops remained for the students (one broke and another was assigned to the teacher). After the first few sessions the school decided to give lessons only to 4th, 5th, and 6th graders. Over the 18 months the emphasis by the teacher on computer programming had declined in favour of programs such as Write and Paint.

7.2. Reproducible?

Without the support of the nearby university it is unclear if this project would have succeeded. The vice rector of the university was very supportive starting with help with the application to the OLPC foundation. He encouraged the lecturers and students to volunteer. Also the university policy is that students need to do some community service and helping with this project fulfilled that obligation.

Also because of the school's proximity to the university a good fraction of the students were children of academics and hence had some experience with computing. Other schools in the city would have been much more challenging.

On the other hand this project had no support from the World Wide Web. The school had no way to affordably provide Internet access. Perhaps with Internet access other forms of support might have substituted for the strong relationship with the university.

While the role of teachers was minimal in this project, we did depend upon university volunteers to start the process. There is some evidence, however, that children with no support can spontaneously learn and teach each other to use computational devices [5, 6].

7.3. Scalable?

Peer-to-peer teaching, by its nature, is scalable. The teachers were supportive but were not critical. The university volunteers were critical in bootstrapping the process but a single student was able to maintain it. It is likely that if there were enough laptops for each child and they were allowed to take them home that the peer-to-peer learning and teaching would have been even more effective.

7.4. Worthwhile?

One early concern was that no version of the XO laptop software has been localised for Indonesian. (Scratch is the only exception.) Instead the teachers considered the fact that the students were forced to use the English version of the software to be an extra bonus. They expected the students to learn some English in the process of using the laptops.

University volunteers and officials, teachers, parents, and members of the ministry of education considered the effort very worthwhile. There have been many discussions about trying to fund a much larger version of the project. The university is eager to train teachers to support learning about computers and computation.

References

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More details about this project can be found at the project blog: <http://west-papua-olpc.blogspot.com/>