one laptop per child

OLPCorps Learning Guide

This learning guide was developed by the OLPC Learning Team. You can follow the Learning Team and progress of OLPC deployments at: www.learning.laptop.org/

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I. Why We Care about Learning

Education is a basic human right and the key for full human, social, economic and democratic development. As the pace of change in the world increases dramatically, the urgency to prepare all children to be full citizens of the emerging world also increases dramatically. Yet, educational systems remain rooted in the past. The gaps in equity in education and subsequent opportunity are increasing. Children do not lack capability, it is opportunity and resources. Simply doing more of the same is no longer enough, if it ever was. The best preparation for children is to develop a passion for education and learning and the ability to learn how to learn.

II. Why is the Laptop a Good Tool for Learning?

With 1:1 access to connected laptops, children actively engage in their own learning and are no longer passive recipients of information. The classroom is no longer limited to a pre-determined, one-size-fits-all approach. In this way, children can learn by teaching, actively assisting other learners and thereby liberating the teacher to focus their experience and expertise where most needed.

This is based on the theory pioneered by Seymour Papert called *constructionism.* In the book, *The Children's Machine,* Papert compares constructionism to the African proverb: If a man is hungry, give him a fish, but it is better to give him a line and teach him to catch fish himself. "Constructionism is built on the assumption that children will do best by finding ("fishing") for themselves the specific knowledge they need; organized or informal education can help most by making sure they are supported morally, psychologically, materially and intellectually in their efforts." (139)

A laptop is the most flexible learning tool. It allows children to be creative and productive and fit into today's digital world. Children can take ownership and express themselves by writing stories, taking pictures, making movies, exploring scientific phenomena, inventing learning games, or solving mathematical problems. They can access endless amounts of information, expertise and global collaboration to pursue learning in areas of personal interest.

III. What Makes the XO Laptop Different?

At first glance, it is easy to see that the XO laptop is different from other laptops. Its appearance may seem "toy-like" but its look was purposely designed. It is the "children's machine." It does not contain rote software that you and I might use for school and work, but rather an educational, intuitive, expressive platform designed specifically for children. Despite its look, the extreme durability of the XO laptop allows learning to take place beyond the classroom, but also at home, with family members, and in communal areas were meaningful learning experiences also take place.

OLPC has incorporated its five guiding principles into the XO laptop:

Child Ownership

The ownership of the XO is a basic right of the child and is coupled with new duties and responsibilities, such as protecting, caring for, and sharing this valuable equipment.

Low Ages
The XO is designed for the use of children of ages 6 to 12—covering the years of the elementary school—but nothing precludes its use earlier or later in life.

Saturation
Each child should own their own laptop. This could be a whole country, a region, a municipality or a village. As with vaccination a digital saturation implies the continuous intervention on the successive cohorts at the proper ages.

Connection
The XO has been designed to provide the most engaging wireless network available. The laptops are connected to each other, even when they are off. If one laptop is connected to the Internet, the others will follow to the web. The children in the neighborhood are thus permanently connected to chat, share information on the web, gather by videoconference, make music together, edit texts, read e-books and enjoy the use of collaborative games on line.

Free and Open Source
The child with an XO is not just a passive consumer of knowledge, but an active participant in a learning community. As the children grow and pursue new ideas, the software, content, resources, and tools should be able to grow with them. The very global nature of OLPC demands that growth be driven locally, in large part by the children themselves.

IV. Does the XO Laptop come with a Curriculum?
The XO laptop does not come with a ready-made curriculum. At OLPC, we are not defining what children should learn with the XO because we believe that those decisions need to be made at the local level. We offer support by providing tools (in the form of activities) as well as concrete ideas of how to become familiar with those tools and how to use them to facilitate a meaningful learning experience. The tools can be single purpose activities such as Record, Write, Chat, Calculate, Paint, etc.; games such as Maze, Memorize and Implode; content specific activities such as Moon and TamTam; or more sophisticated and open ended activities such as TurtleArt, Etoys, Scratch, and Pippy (find a full activity resource list in section VIII) that allows users to design and create projects about a variety of topics. We also make it easy to package digital libraries of reading materials or books in the form of "content collections." The best way to engage in these activities and content is through project-based learning.

V. Project Ideas
The "project" is the pillar of constructionism. Through project-based learning, the student becomes more than just the student learning math or science, but the mathematician or scientist conducting research. It is difficult for most to imagine computers offering little more than browsing capacity, but the XO's activities were developed to lend themselves to project-based work. A project, in the OLPC context, is a research topic, theme, question, or challenge that allows children to think critically, collaborate with their peers, teachers and community to express themselves and form opinions. In the attached project examples, you will find that a simple general topic such as "trees" can easily develop into months of advanced environmental research and a simple rearrangement of class furniture can lead to complex geometry concepts.

Here are some tips when developing your own project ideas:

Allow peer collaboration
This will give children the opportunity to both teach and learn from their peers.

Involve local community
Be sure to particularly engage those students who did not receive an XO. Think about ways they can become directly involved in projects. Could they be mentors? Help collect data? Help fix technical problems, etc?

Projects are also a great way for children to get more involved and learn more about their own communities. Maybe they can interview community or family members. Maybe they can research their family and community history. Learning can flourish far beyond the classroom's walls.

Reach out to local experts
Is there a local university that can help you conduct a project? Will they share their knowledge and materials? Children could even assess the business plan, for example, of the local village fruit stand, and propose their own business models.

Depth
Ask yourself, if your project idea lends itself to deep critical thinking. Is this a project that could have been done just as easily without a laptop? Remember that the XO's software was developed to serve as more than a simple browsing tool. Additionally, is this project something with the potential to grow into more long-term research, as the case in the attached project examples?

In the appendix, you will find a compilation of projects. These projects can be duplicated, but instead, challenge yourself to use them as a jumping board to create your own projects based on the specifics of your deployment's community and the tips above.

Project Rug (See Appendix I)
Project Tree (See Appendix II)
Vision 2020 (See Appendix III)
Projects from Claudia Urrea's PhD Thesis *"One to One Connections: Building a Community Learning Culture"* (Appendix IV)

VI.   *Assessment*
If you have worked in education or with children before, I am sure you have noticed significant positive shifts in the children that you knew would never be fully measured by a test or numerical data. Fortunately, we have come to understand that standardized testing is not the only dimension to measure the impact that 1 to 1 computing has on children and the communities where they live. Other factors such as the ability to problem solve, think critically, use multiple sources of information, be reflective, and communicate with multiple media, work individually and in a team, be a self learner, and bring significant changes their communities are new dimensions to measure impact. We are working together with a community of people worldwide to define this new framework of dimensions and indicators to be able to measure their success.

One thing we need to remember, every OLPC experience is different and should be measured according to its specific goals. We fully understand assessment is a need to monitor the growth of students. This growth will not be accurately measured through typical standardized testing and should take into account the individuality and personal growth of each child and the classroom as a learning environment

A great way to assess the status of your work is through "learning stories." These are situations where a student or teacher makes a breakthrough, there is an epiphany, a student completes an amazing work that was not possible before the XO laptop, etc.

Below are some examples of learning stories from Uruguay, Peru & Mongolia:

A New Confidence Gained (Uruguay)
The following story was posted to: http://olpc-ceibal.blogspot.com/ by teacher Rosamel Ramírez and translated by Gabriel Eirea

In my 6th grade class I had a 14-year-old student that didn't know how to read. He was very anxious to receive his laptop. He had serious behavior and social problems that he was controlling inside the classroom. When the computers arrived we distributed them and I proposed to write a text in Write. He had liked very much a play at the school. He had been moved by and identified with Nacho, one of the characters.

Then he told me:
- Teacher, I want to write about Nacho... but I don't know.

- Come and tell me what you want to write.

He told me orally. He brought his laptop, entered to Write and wrote everything he proposed himself.

- What a beautiful work you did! Now you have to read it to your classmates.

- But I don't know how to read?

- Ah, it doesn't matter, you will know because you did it - I said in a low voice with complicity and a wink.

He read it many times in silence, he passed it to his notebook, he stood in the front and with tears in his eyes, and he read the text to the class.

- I know how to read, I know how to read! - He would shout, excited and smiling

For him it was an unforgettable day, he wrote and the read aloud... then he read simple texts written in his classmate's XOs... this is how he started his literacy

The XO Becomes a Family Learning Tool (Uruguay)
Néstor [a primary school student in a Uruguay] told me [his teacher] that his father, who is a constructor, would search for house models and make plans in TurtleArt to build them later.

Besides that, with the calculator the entire family would use the XO to make the budget for the materials, among other things. They would also write their lists in Write.

Ignacio Comes Back to School (Peru)
This story is from Carla Gomez-Monroy

I heard different stories of why Ignacio stopped coming to school. A certain fact, however, was that he had been reported as a dropout from sixth grade, after two months of not coming to school. Even the Thursday we handed out the laptops, he didn't come.

The Monday after, he came to school with his father. The father explained that he has to leave home really early to go to their chacra, their farm, to work and that there was nobody to wake Ignacio up so he could go to school, but that he was going to talk to his neighbor, so she could wake Ignacio up in time for him to come to school. That day, Ignacio got his laptop, and he was fast getting used to it, faster even than some of his classmates who had it since the previous Thursday. The school authorities and the Ministry of Education staff decided that Ignacio could not take his laptop home because they were afraid he would not come back to school again. Therefore, the teacher who did the cleaning of the school and boarding house took Ignacio's laptop every afternoon up town for Ignacio to be able to use it while she was cleaning the boarding house. Then he had to give it back to her. He spent a week like that, during which he was also very involved with his classes. His motivation to be at school could be felt.

One Monday, a week after he got his laptop, he came by and asked me to please give back his laptop to the principal's assistant. I pretended not to know the arrangements that they had made for him and asked him why. He sat next to me in the schoolyard where I was running some connectivity tests with the technical team and he shyly explained to me that he was not allowed to take it home. I asked him what his feelings were about being back at school. He said he was happy. I asked him if he felt he was capable of taking his XO home and keep on coming to school. He said yes. I asked him where he lived. He said really up town (no Internet connection gets there). I told him he could take his laptop home but that the Internet connectivity was not set up to reach his house, and that he had to come to classes to send me emails once I was gone, and also to share all his findings with his classmates. He smiled but didn't leave. I assured him that I was going to speak with the school authorities for them to know that Ignacio would be taking his laptop back and forth with him. He left happily, and kept on coming to school.

The Smoking Project (Mongolia)
This story is from Elana Langer

In summer of 2008, at school 93 in Mongolia, the students were working with Scratch to do generative theme projects. One student was investigating health and decided to do a project on smoking. She did research at school and asked her teacher for information. Her teacher told her that it was important to "have at least a two hour break between cigarettes", and health will not be adversely affected. The student was not satisfied with the answer and started to investigate further. She brought her XO laptop home and did

some research along with her parents (both smokers). Together, they found pictures of damaged lungs and teeth of smokers; they also found detailed information of the health risks of smoking. After discovering this, the student's parents promised to both try to stop smoking! The student was also able to share this information with her teacher and class.

VII. Suggested Reading

- *Designing Multimedia Environments for Children* by Allison Druin & Cynthia Solomon
- *Computer Environments for Children: A Reflection on Theories of Learning and Education* by Cynthia Solomon
- *Mindstorms* by Seymour Papert
- *The Connected Family* by Seymour Papert
- *The Children's Machine* by Seymour Papert
- *TurtleArt* by Artemis Papert & Brian Silverman
- *One to One Connections: Building a Community Learning Culture* by Claudia Urrea (see Appendix IV)
- Future of Learning Group at MIT Media Lab: http://learning.media.mit.edu/

VIII. Full List of Activities & Resources:

SCRATCH
Scratch is an easy-to-learn multimedia programming language. It is great for storytelling.

http://scratch.mit.edu/ - The Scratch community website has over 400,000 Scratch projects to view and remix
http://info.scratch.mit.edu/Support/Videos - Introductory videos covering the Scratch basics
http://info.scratch.mit.edu/@api/deki/files/568/=ScratchReferencev13.pdf - Scratch reference guide PDF
http://info.scratch.mit.edu/Support/Scratch_Cards - Scratch cards, 12 PDFs of simple things to try in Scratch
http://www.picocricket.com/picoboard.html - The Picoboard, a device that connects Scratch to some interesting sensors

ETOYS
EToys is a media-rich authoring system aimed at helping children learn by doing. They can explore their ideas by creating models, simulations, and games complete with text, graphics, sound, and video.

http://www.squeakland.org/about/
http://www.squeakland.org/about/intro/ - An introduction to the benefits of and ideas behind Etoys
http://www.squeakland.org/tutorials/ - Etoys tutorials: screencasts and quick guides
http://wiki.laptop.org/go/Etoys - lots of Etoys links and projects
http://wiki.laptop.org/images/2/28/OLPCEtoys.pdf - PDF about Etoys on the OLPC XO, includes a bunch of great project ideas

WRITE

Write is a basic text editing application featuring. It provides an easy way for children to write a story, craft a poem, or complete an essay, as well as more advanced features like image insertion, table creation, and layout operations.

http://en.flossmanuals.net/write_activity - Write activity manual

RECORD
The Record activity provides a simple way for children to take pictures, view slideshows, and record video and audio.

http://en.flossmanuals.net/record - Record activity manual

CHAT
The Chat activity provides a simple environment for discussion, whether it's between two individuals or an entire classroom.

http://en.flossmanuals.net/chat - Chat activity manual

TURTLEART
Turtle Art lets children program a Logo "turtle" to draw colorful and complex artwork.

http://en.flossmanuals.net/turtleart - TurtleArt activity manual
http://wiki.laptop.org/go/Turtle_Art
http://wiki.laptop.org/go/Turtle_Art_with_Sensors - using sensors with TurtleArt
http://wiki.laptop.org/go/Turtle_Art_student_guide
http://www.ceibal.edu.uy/portal/recursos/educativos/tortugarte.htm - Spanish TurtleArt guide from Plan Ceibal

BROWSE
Browse is a simple Web application that allows children to access the Internet and share links among their friends.
http://en.flossmanuals.net/browse - Browse activity manual

MOON
Moon provides a neat graphical interface illustrating the current phase of the moon, with a variety of display options.

http://wiki.laptop.org/go/Moon

MEASURE
Measure allows children to measure, log data and create graphs of sounds, electrical current and other signals.

http://wiki.laptop.org/go/Measure

TamTamJAM, TamTam MINI, TamTam EDIT, SYNTHLAB

All TamTam activities provide a fun, powerful way to collaborate musically.

http://wiki.laptop.org/go/TamTamJam

PIPPY
Pippy is a simple and fun introduction to programming in Python, the dynamic programming language underlying much of the software on the laptop.

http://wiki.laptop.org/go/Pippy

IMPLODE
Implode is a colorful game of logic.

http://wiki.laptop.org/go/Implode

TERMINAL
Terminal offers a graphical wrapper for the common command-line interface familiar in Unix, allowing kids to dig deeper into their systems, issue commands, and make modifications to their laptops.

http://wiki.laptop.org/go/Terminal_Activity
http://en.flossmanuals.net/terminal - Terminal activity manual

ANALYZE
The Analyze activity provides detailed diagnostic information for more experienced users and developers.

http://wiki.laptop.org/go/Analyze

LOG
The Log activity is a tool mostly for developers, which exposes the logs kept by Sugar and activities in a simple UI.

http://wiki.laptop.org/go/Special:Browse/Log

SPEAK
Speak offers a fun and goofy face which will speak any text you type.

http://wiki.laptop.org/go/Speak

MAZE
The Maze activity presents children with an increasingly more difficult series of mazes to navigate via the keyboard, competing for best times with their friends.

http://wiki.laptop.org/go/Maze

DISTANCE
Distance is a two-laptop collaborative activity that can be used to measure the distance between them.

http://wiki.laptop.org/go/Distance

MEMORIZE
Memorize is the classic matching-pairs memory game with a twist: each card can consist of any multimedia object, such as images, sounds and text.

http://wiki.laptop.org/go/Memorize

PAINT
The Paint activity provides a canvas for a child's creative expression. Children can draw free-form images with a paintbrush and pencil, and use the dedicated toolbar to play and experiment with shapes. Text support, image import functionality, and an interactive placement system give children limitless ways to explore their creativity.

http://wiki.laptop.org/go/Paint_%28Oficina%29

READ
Read is a basic PDF or document viewer. Providing basic controls for page navigation and a variety of zoom tools, it makes it easy to read a book in either laptop or handheld modes.

http://wiki.laptop.org/go/Read

WIKIBROWSE
WikiBrowse is an offline wikipedia snapshot containing hundreds of useful articles and images for reference, even without access to the internet
http://wiki.laptop.org/go/WikiBrowse_English

CALCULATE
Calculate provides a generic calculator with a simple, straightforward interface. Designed to be intuitive for even the youngest children, it also supports advanced mathematics and boolean logic

http://wiki.laptop.org/go/Calculate