

OLPC WORKSHOP FOR EDUCATION OFFICERS

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With Technical Assistance from ITU and SPC



WORKBOOK

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PURPOSE OF THIS WORKBOOK

The workbook provides reference notes for each session of a 2-day workshop designed to brief officers of Tuvalu Ministry of Education on the components of an OLPC Country Trial. Each session will include feedback activities designed to capture local interpretations and recommendations. These will then be included in a report that can be used by the Tuvalu OLPC Team as a core reference document.

A second version of the Workbook will be adapted for general guidance in OLPC programmes in the Pacific.

REFERENCES AND RESOURCES

ON THE CD AND SCHOOL SERVER

OLPC

- The XO In the Classroom, OLPC Peru
- The XO Comes to Class, OLPC Australia
- OLPC Teacher Guide, Jonathan Nalder, Education Queensland
- How to Make Activities Guide
- OLPC Nauru Mission Report (April 2009)
- Sugar not Necessarily Unhealthy, Master's Thesis, Bergmann, University of Bremen
- OLPC Training, Callan Services, Kiunga, PNG by DWU
- OLPC Australia Cost Structure
- Challenges and Impacts of OLPC, Leeming, Thomson, Forster, PRIDE Workshop, Sept 2008
- Parent's Agreement and Community Principles, OLPC Nauru
- Accessories guides sheets for solar power and charging (XOP racks)
- Various reflections on OLPC

- Other documents suggested by OLPC Oceania and SPC

ICT for Education

- Good Practice in ICT for Education, ADB
- Information Literacy Primer, UNESCO
- Guide to Measuring ICT in Education, UNESCO
- Child Online Protection Initiative, ITU
(1) children, (2) parents, educators, (3) industry, (4) policy makers
- Impacts of ICT in Education Study, UK
- OER Handbook (published from Wikieducator material)
- Statements of Learning for ICT and Pedagogy Strategy, Australia/NZ MCEETYA

ESTABLISHING A CLEAR VISION AND A POLICY FRAMEWORK

Reference:

This section refers extensively to the ADB publication “Good Practice in ICT for Education”

<http://www.adb.org/Documents/Guidelines/Good-Practice-in-ICT-for-Education/default.asp>

ISBN 978-971-561-823-6 (2009)

THE POLICY FRAMEWORKS

Many ICT initiatives fail because they have dependencies beyond the context in which they were deployed. This is true with ICT for Education. One of the most common reasons for failure is lack of a clear vision of how the ICT is intended to impact on the education system, and lack of a policy framework which ensures coordination between the educational ICT and other government ICT programmes and policies, and consistency with the wider environment, which one might call the “national ICT eco-system”.

The ADB advises that ICT initiatives at the school/institutional level will likely have a limited impact unless the ICT policies and strategies in the sector have been developed to support them. This is true also of OLPC projects, although these come with an associated set of principles and a whole-of-sector approach that addresses some (but not all) of the required linkages and coordination. Whilst pilots can be implemented to demonstrate and learn from OLPC, some careful thought must be given to accompanying policy development.

The ADB advises that there are three levels in the policy framework that are intertwined and inseparable. These are:

1. A National ICT Strategy
2. An Education Sector plan/policy for ICT
3. ICT policy for Educational Institutions (schools)

A National ICT Strategy is founded from a consensus amongst all the stakeholders including the government, civil society, private sector and citizens. It is based on a shared vision of how a country wishes ICT to work for them in the country’s development. From that vision, policies are formulated which create an “enabling environment” and ensure coordination between the different interest groups regarding their needs. For instance, a national ICT strategy might include provision for telecommunications regulations and taxation policy on ICT in order to stimulate growth of the sector, but also approaches for elevating the skills and capacities of individual citizens so that they are able to access and benefit from participation in today’s global knowledge economy and information society. It is not just about access and infrastructure but also about human development. The key indicator is “information literacy”; sometimes described as a “survival skill” in today’s age, where skills are needed not just to use ICT, but to be able to actively discriminate between different forms of ICT and select those that best meet one’s needs. Information literate societies are more likely to attract inward investment, as they will provide a capable work force. A national ICT strategy is also likely to improve affordability through fostering public-private partnerships and cost sharing opportunities.

Whilst Education Sector ICT Plans must be aligned with national education development objectives, they should not be disjointed or isolated from the national ICT policy. The sustainability of ICT for education initiatives are likely to be dependent in many ways on the whole country’s ICT eco-system. Examples include connectivity and provision of power, technical support and technology choices. In the development of sector plans, a clear understanding is needed of the potential of ICT and how it can be leveraged to achieve the impacts and transformations that are desired in respect to the country’s education development objectives. For instance, there is growing acceptance and evidence that ICT can impact at the level of education productivity and efficiency, professional development and pedagogical practice. All of these are high priorities for many ministries of education. ICT introduced at this level can affect widespread change. At one end of the spectrum, just putting computers in schools and hoping that they will improve things will lead to disappointment and will be a waste of resources; at the other end, a carefully thought-out deployment of appropriately chosen ICT

accompanied with associated training and technical support can be transformational. For instance, ICT can provide interactive learning experiences that encourage student-centred approaches to teaching, in parallel with teacher training and aligned with national education objectives. The ADB advise that ICT-enabled classrooms can promote active learning, whereby students actively construct knowledge. Furthermore, ICT can support further evolution towards team-centred pedagogy and to the use of collaborative technology. As we will see, the OLPC is specifically designed around such ideas, which if its promise is realised, it can take to the point where the potential impacts on the learning environment might be considered transformational. An education sector plan should be founded on the intension to achieve such potentials, and have a clear and realistic process with understanding of the “total cost of ownership”.

Likewise, ICT for education at the institutional level (i.e. schools) need to be aligned with the strategies of the Ministry of education. An important point is that the needs at the institutional/school level should be considered in the development of the policy framework – right up to and including the national ICT strategy. The policy development process should be “bottom up” as well as “top down”, and ICT planning for schools must not be made in isolation of the national context.

Specific recommendations from the ADB guide (abbreviated here) include

- Regarding an ICT strategic plan for the education sector:
 1. Identify true cost components to support investment in, and operation of ICT for education;
 2. Consider public-private sector partnerships for covering and sharing costs; (other forms of cost sharing also are possible);
 3. ICT should be mainstreamed into the teacher education curriculum, and designed to improve productivity, preparing teaching materials and integrating ICT into teaching;
 4. ICT teacher training should be “hands on”;
 5. Professional development for school leaders should include technology leadership, pedagogical transformation with ICT, and “ICT culture” for their schools;
 6. A pro-equity approach should be employed in M&E concerning learning measures. M&E should be designed to measure students’ understanding of concepts and problem solving skills.
- Regarding ICT at institutional level:
 1. ICT “capability” encompassing both technology literacy and information literacy should be understood as a definition of ICT for education;
 2. Along with informatics (computer education), the curriculum should be assessed to identify ways in which ICT may enhance learning;
 3. Schools should encourage the use of “High technologies” or “interactive” and collaborative technologies in ways that enhance learning;
 4. Teachers must take on the role of facilitators to guide students in ICT-supported learning;
 5. School leaders must communicate a vision for ICT and foster an ICT culture in the school;
 6. M&E should measure the impact of ICT on the entire learning environment.

These recommendations can be reflected upon when considering each of the subsequent components of the OLPC country trial, addressed in this guide. In the next section, which deals with the background and principles of OLPC, we will see how those core principles resonate quite strongly with the recommendations made above.

THE VISION

Before engaging in an OLPC country trial, it is recommended that the Ministry clarifies its understanding of where the trial is intended to lead to, understanding of the total costs (and strategies of dealing with them) and a rationale for the investment.

Therefore, it is recommended that clear objectives and an M&E framework are developed at the outset of the trial, or otherwise it will be difficult to learn from it. The objectives framework should refer to the overarching

policies and national education objectives, as well as a clear understanding of the potential of ICT for education, and specifically, the principles and characteristics of OLPC. Monitoring and evaluation is a subject of a later section of this guide.

In order to justify the investment in the trials, and any further expanded deployment thereafter, a clear rationale is needed. The ADB best practice guide describes a set of rationales that are useful, although these should be localised and made relevant to the country context:

- Knowledge economy rationale. Education systems need to respond to the demands of the global economy, by raising ICT skill levels of all the citizens;
- Pedagogical rationale. The potentials of ICT to transform the learning environment (in ways aspired to in the national education objectives and reflecting trends in education development globally);
- Equitable access rationale. In the Pacific Islands context the disparity in the learning environment between urban and rural areas is evident. ICT has the potential to improve equity through improving access to resources, education services and the learning environment in general. This also applies to vulnerable and special needs education.

INTERNATIONAL POLICY FRAMEWORK

In the Pacific, OLPC is guided by several core policy touchstones:

1990 Convention on the Rights of the Child
2000 Education for All (UNESCO)
2000 Millennium Development Goals
MDG 1 – poverty and hunger
MDG 2 – universal primary education
MDG 3 – gender equality
MDG 8 – partnership for development
2005 Tunis Commitment to bridge the digital divide, WSIS

2005 Pacific Aid Effectiveness Principles
2005-14 UN Decade of Education for Sustainable Development
2005, 2007 Pacific Plan, Pacific Islands Forum
2007 Pacific Regional Digital Strategy
2007 PIF Leaders' Communiqué
2007 Cape Town Open Education Declaration

Further information on the regional programme, vision and context is available in the handout "One Laptop per Pacific Child: creating OLPC Oceania", by Michael Hutak, Regional Director, Oceania, One Laptop per Child



Activity 1

In groups, reflect on:

- What is the status of ICT for Education in Tuvalu at national and institutional level?
- What relevant national and sector policies are there in place or in development?
- What is your vision of what the OLPC trials should achieve?
- How do you justify the investment of time and resources?

Please provide feedback on how the OLPC trial can be aligned with national ICT and Education objectives and policies, and relevant International commitments.

SPACE FOR YOUR NOTES

BRIEF SUMMARY OF OLPC PRINCIPLES AND APPROACH

Further information with the regional context is available in the handout "One Laptop per Pacific Child: creating OLPC Oceania", by Michael Hutak, Regional Director, Oceania, One Laptop per Child

The OLPC or One Laptop Per Child is a charitable project which aims to place sub \$100 laptops into the hands of third world children. It is designed with content and software designed for "collaborative, joyful, self-empowered learning". Its operating system, Sugar, is a user interface that is based on both cognitive and social constructivism where learners engage in "authentic exploration and collaboration". The software projects contributing to OLPC are based on constructivist understandings of learning. They emphasise the gains through collaborative learning. They use ICT as a medium for student created content and they use visual or "drag and drop" tools to enable young learners (and teachers) to create content.

The field of study dates back to the 1980's and the Logo programming language. Seymour Papert lead a team at MIT which developed Logo and the programmable turtle as a means to engage young learners in mathematics and logic. Papert coined the term constructionism, the (N word), which was built on constructivism, (the V word), and the works of Dewey and Piaget but added the idea that "the learner is consciously engaged in constructing a public entity, whether it's a sand castle on the beach or a theory of the universe", (Papert 1991).

The OLPC packages a specially designed low-cost, low-power and robust learning device (which is in no way an "office computer") with a set of core principles that are designed to maximise the impacts and scalability. The approach is very different from more "traditional" computers-in-schools projects that are based around training (mostly) older children to use ICT for office applications, with limited access for younger children. The OLPC program is centred around using the computer to learn, not learning to use the computer, which is why it provides a laptop to every child to use whenever they are learning (which is all the time). This is very different from a Computer Lab approach and offers a much more powerful model to fully explore the potential of ICTs in education. The OLPC is thus squarely targeted at young children, aimed at enhancing engagement and giving them the skills for a "life of learning".

In addition to the "XO" laptops, as they are named, OLPC has also developed specialised school server software, designated the "XS".

An OLPC program is not just about laptops. Because it is a coordinated development program, that involves the whole of a community, it brings with it not only improved basic education but bridges the digital divide. The OLPC programme will bring with it (by necessity) an integrated approach to power and communications infrastructure in the rural areas.

One might say that the OLPC is a form of "community media", because of the ownership principle, technology and community participation, especially with regard to content development. Thus, one technology that might "marry" very well with an OLPC deployment is community radio.

THE FIVE CORE PRINCIPLES OF OLPC

Child Ownership

OLPC has created the XO laptop to be low cost, robust and powerful, beautiful and friendly. It was designed for elementary school children, the first of its kind.

A laptop can be transformed into a mobile school: a portable learning and teaching environment. A connected laptop is more than a tool. It is a new human environment of a digital kind. An essential aspect of OLPC is the free use of the laptop at home, where the child and the family together can greatly increase the practice time normally available at a school lab or library.

The ownership of the XO is a basic right, coupled with new duties and responsibilities: including protecting, caring for, and sharing this creative environment. In Pacific communities, the concept of “ownership” may be interpreted differently but the result is that the child always has access to the laptop when he/she needs.

Low Ages

The XO is designed for the use of children ages 6 to 12 — covering the years of elementary school — but nothing precludes its use earlier or later in life. Children do not need to know how to write or read to enjoy and learn with an XO, in fact the laptops help them with basic literacy. Playing is the basis of human learning, and the digital activities on an XO help with acquisition of reading and writing.

Every year a new class of students will be incorporated into the program. The assessment of the OLPC program should be intrinsic to each class, and every student will have an individual portfolio or journal with the history of his or her learning paths in the many disciplines at school. Small children with learning, motor or sensory disabilities may use the computer as a prosthesis to read, write, calculate, and communicate.

The software is designed to help children in learning literacy, numeracy and in acquiring life-long learning skills such as collaborating with others, learning-by-doing, and in feeling that they are included and important (self esteem). These impacts will be greatest at an early age.

Saturation

OLPC is committed to elementary education in developing countries. To attain this objective we aim to reach “digital saturation” in a given population. The key point is to choose the best scale in each circumstance. It can be a country, a region, a municipality or a village, in which every child and teacher will own a connected laptop.

As with vaccinations, digital saturation implies a commitment to maintaining these tools as part of primary education over time. With it, the whole community becomes responsible for this focus on shared education, and the children receive support from the many institutions, individuals and groups around them. Universal connectivity helps these different communities grow together and expand in many directions, in both time and space. Over time, the education network becomes solid and robust, without a digital divide.

For a truly inclusive learning environment to be established in a school classroom, every child and the teacher must have a laptop. If only some have laptops, it creates a divide with negative impacts such as a demoralising effect on those children and teachers that do not have them, and hinders community-building.

Connection

The XO has been designed to provide an engaging wireless network. The laptops are connected to others nearby automatically. Children in the neighbourhood are permanently connected to chat, sharing information on the local network or web, making music together, editing texts, or using collaborative games.

The laptop can be charged by solar or mechanical power, or through special bulk-chargers at school. The unique XO display allows the use of the laptop under a bright sun. All of this makes it easy for children in a community to connect to one another almost anywhere.

This connectivity will be as ubiquitous as a formal or informal learning environment permits. We propose a new kind of school, an “expanded school” which grows beyond the walls of the classroom. Last but not least, this connectivity ensures a dialogue among generations, nations and cultures. The OLPC network will speak every language.

The laptops can also connect to a School Server and the global Internet, if available, to access educational resources and curriculum materials.

Free and Open Source

All children are learners and teachers, and this spirit of collaboration is amplified by free and open source tools.

A child with an XO is not a passive consumer of knowledge, but an active participant in a learning community. As children grow and pursue new ideas, their software, content, resources, and tools should be able to grow with them. The global nature of OLPC requires locally-driven growth, driven in part by the children themselves. Each child with an XO can leverage the learning of other children. They can teach each other, share ideas, and support each other's growth.

There is no inherent external dependency in being able to localize software into their language, fix the software to remove bugs, and repurpose the software to fit their needs. Nor is there any restriction in regard to redistribution; OLPC cannot know and should not control how the tools we create will be re-purposed in the future.

OLPC's goals require a world of great software and content, both open and proprietary. Children need the chance to choose from all of it. In the context of learning, knowledge should be free. Further, every child has something to contribute; we need a free and open framework that supports the human need to express and share.

The laptops have been developed in a truly open and collaborative environment based on the Open Source movement. It is therefore the case that children are able to go deeper into the laptops as they learn, and even change and improve them. The open approach also encourages the growth of local, regional and global communities that work to develop the laptops and support local languages and local content. The teachers, educationalists, people producing learning materials, and importantly the children themselves, are empowered to join in these communities and participate in these developments.

PACIFIC ISLANDS INTERPRETATIONS OF THE 5 CORE PRINCIPLES

The OLPC model, underpinned by its five core principles, needs to be adapted to take account of the Pacific context. For instance the core principle of 'child ownership' does not neatly dovetail with many traditional Pacific island communities, which favour village, group and collective ownership of resources. In these communities it makes much more sense to empower the child as the custodian of the device, it is theirs to use at school and at home, but it also their responsibility to share it with their families and communities, friends and family, and also to share the knowledge and skills they have acquired. Other core OLPC principles, such as the imperative to connect (where anything the child does on the XO can be done together with others, as a learning experience), or the commitment to "free and open source" (where students and educators can share learning materials in a spirit of free and open collaboration) -- are in complete harmony with the "Pacific Way".

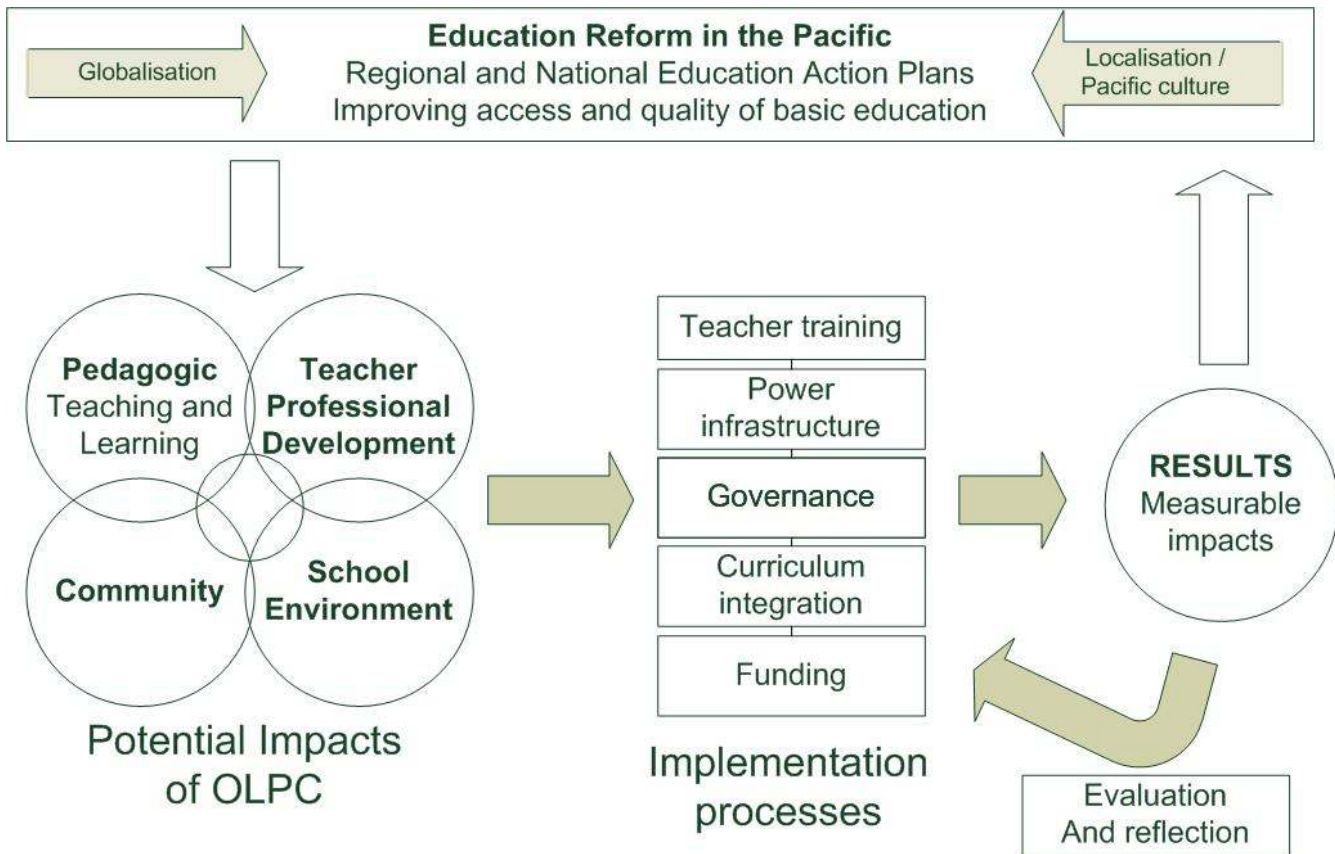


Activity 1

In groups, reflect on:

- Can you identify any local interpretations and issues around the OLPC approach?
- What do you think will be the main challenges for the OLPC programme in Tuvalu?

Please provide feedback on your reactions and recommendations regarding the OLPC principles and approaches.



Potential Impacts of an OLPC Programme
 (Ref: Challenges and Impacts of OLPC, Leeming, Thomson – PRIDE)

SPACE FOR NOTES

TRIALS DEPLOYMENT GUIDANCE (OVERVIEW)

INTRODUCTION

This document was prepared by SPC in March 2009 to help Ministries of Education plan for an OLPC Trial.

It is intended as a guide for Pacific countries to plan for a robust and well documented trail of the OLPC education improvement program and associated laptops. It assumes that the OLPC program, principles and laptops are known and the potential of the OLPC program as an “Agent of Change” in education is understood.

Lessons from the first 5 pilots are included in this template.

In summary, the regional priorities for education are embodied jointly in strategies such as the Forum Basic Education Plan, and nationally under the member states’ own reform programmes that are supported by various donors. One could say that some priorities are to improve and transform teacher education, curricula, and vocational education, with many voices (c.f. the PRIDE Project) calling for more Pacific cultural relevance and culturally appropriate pedagogy and content introduced into all of these areas, as well as a shift towards more progressive methods such as “active learning” and “learning by doing”. There are a lot of challenges with these areas.

As we see it, increasingly reflected in our ongoing trials, the OLPC is an “agent of change” for these desired reforms. However, it is more than that. Because it is not merely focused on academic education, but education in a much wider sense, with capability for bringing educational resources to the wider community in respect to technical and vocational education, distance learning and life skills. Because it brings in a coordinated intervention also comprising communications and electrification, it is also a community access project, bridging the digital divide and with potential economic development impacts across the sectors. Thus, one might best summarise the OLPC as a “human development” programme.

KEY ISSUES TO DETERMINE BEFORE COMMENCING A TRIAL

The following items are key to consider in the first planning session for an OLPC trial.

1) Setting firm Goals.

The principle aim of the trial is to establish if the OLPC program is appropriate for wider use in your country. It should be assessed against its ability to address your education strategy and improvement plans.

Although it is tempting to just try the laptops and see what happens, you may not get a good understanding of the program’s capability to help achieve your education goals.

Some issues we have seen that OLPC may be able to help with include

- Access to modern educational resources
- Developing new ICT and Information Literacy skills
- In service training of teachers (Distance learning)
- Assisting in developing child centric learning
- Engaging the community in the school

Going hand in hand with setting goals is a method to evaluate how successfully you achieved them. This is particularly critical for OLPC because the decision to scale up will be based on the evaluation.

We have established a partnership with the Australian Council of Educational Research (ACER) to help on the evaluation of the trials. They can provide advice and assistance on things like baseline studies, evaluation tools, training for evaluation and review of the data and final reports.

2) Deciding on a governance structure and partners for the trial

There are many issues to be considered for an OLPC trial and different areas of specialty need to be involved and we have found it very useful to set up a governance structure that allows all to be involved as early as possible.

Identifying stakeholders and convening an early meeting is also very useful. Stakeholders will include

- Political
- Finance
- Community
- Teachers and Principals
- Curriculum and educational resources
- Education policy and quality
- Government and non government schools
- NGO's
- IT specialists
- Internet providers

We have found that having a steering committee or task force with Core Teams works well. Perhaps there is already an ICT Task force set up by Government that could take oversight of the trial.

Remember if the decision is to scale up, all such players will have important roles to play and should be involved early in the decision making process.

3) Deciding on Numbers of laptops and locations of schools

An early first decision is the number of children and schools to be included in the trial. For example, we find much better results when every child and teacher in a school gets a laptop and we also see different benefits in urban schools and outer island schools and also in different language groups.

The number of laptops in the trial should not just be the number allocated by SPC. It should be the best number for you to decide to scale up deployment.

It is possible to get more laptops than those gifted to SPC. We can help in obtaining funding for additional laptops.

4) Determining the Budget

The budget will be determined by many of the above issues and can be complicated to work out.

From the equipment (laptops etc) side, a "rule of thumb" is that the laptop costs approximately US\$200 and an average total equipment cost is US\$250 per laptop. The additional equipment consists of servers, wifi network, memory sticks, power cables and plugs.

A template spread sheet has been provided to help calculate these costs

Other costs will include local teacher training costs, costs for volunteers that are used in the training, power and Internet costs for the school and any evaluation costs.

5) Making the plan

The plan should cover the following activities

- a) At the school

- Consultation with the school and community
- Preparation and delivery of the laptops
- Design and installation of the server and network in the school
- Introduction of the laptops to the school, including
 - Teacher training
 - Parents training
 - Children training
- Reporting
- Follow up training

Generally, the introduction of the laptops into the school takes 2 weeks.

This is an intensive period and we like to use volunteers to help. We have many volunteers from Australia and New Zealand who are experts in networking and OLPC and are willing to volunteer their time to help start projects. They ask that their costs of transport, accommodation and meals be paid.

We will make sure they are well briefed and capable to conduct their tasks.

WE usually have 2 volunteers to help start a trial.

- b) In the Ministry of Education
- Training of staff
 - Training of trainers
 - Selection of content
 - Integration into curriculum
 - IT support
 - Converting the laptop to the local language



Activity 1

In groups, reflect on :

- What has Tuvalu done already
 - What are the main challenges
 - What are the next stapes?
- Recommendations for moving forward with the deployment

SPACE FOR NOTES

GOVERNANCE

(this section is rough draft only)

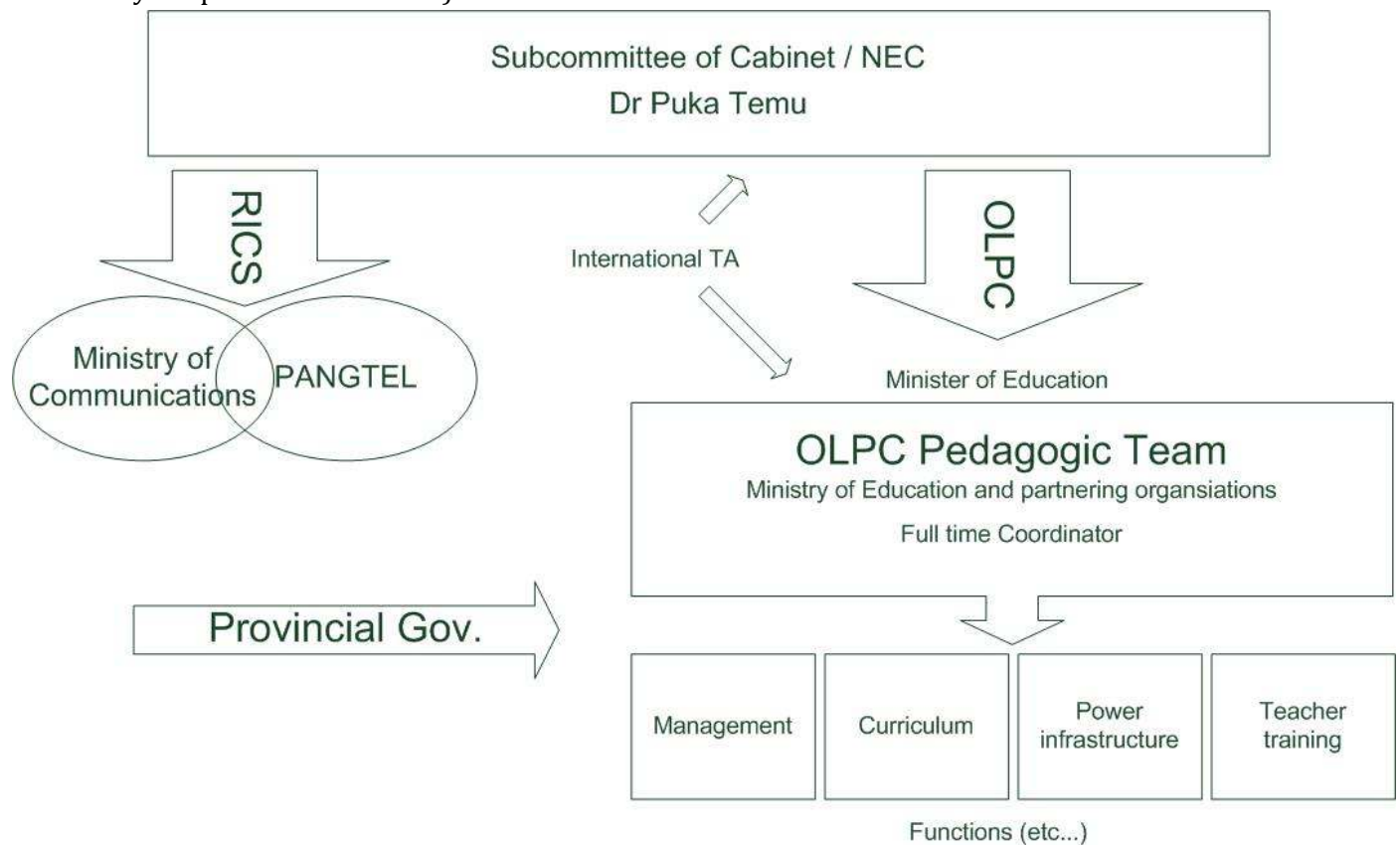
Governance of a country deployment may include some of the following (discuss)

- Core Team
- Steering Committee
- IT Task Force
- Coordination with other Departments and Partners
- Oversight of Trials
- Local Deployment Teams and Partners
- Implementation partners
- Private sector sponsorship

Approaches in Other Countries with key partners

- Solomon Islands
- Nauru
 - USP
- PNG
 - DWU
 - Don Bosco Technical Institute
 - Church Networks
 - PNGSDP – Private sector sponsorship
- Australia
 - 1-to-1 Network
 - State Education Authorities
 - Universities
 - Private sector sponsorship

This is an early vision of a possible governance system for OLPC in PNG (given as an illustration; PNG has not necessarily adopted such a scheme):



Activity 1

In groups, reflect on:

- Governance for the Tuvalu Trials
 - Core team
 - Steering committee
 - Island-based teams
 - Implementation partners
 - Sponsorship opportunities

SPACE FOR NOTES

TEACHER TRAINING

Teacher training is the most significant input required in an OLPC trial and subsequent Country Programme, coordinated with the student training and (uniquely) parent training, which are also essential for a successful OLPC programme.

SCHEDULE

Note that the training schedule is discussed in the [section on Deployment](#).

TRAINING SYLLABI AND RESOURCE MATERIALS FOR TRAINERS

The following are amongst the resources available for trainers. It should be noted that these may be designed for specific curricula.

- OLPC Oceania teacher training guides from the Wikieducator. These were developed in 2008 and do not cover curriculum integration in details, but are useful for the initial training stages (Level 1 and 2). A copy of is available on the resource CD (as a Wikieducator Collection, downloaded as PDF)
- OLPC Australia. The XO Comes to Class book contains valuable, detailed and up to date (Dec 2009) reference material. Specific training guides for their phased approach may be available on request.
- OLPC Peru. The XO in the Classroom book is also useful as a training reference.
- Teacher Guide, Jonathon Nalder, Education Queensland
- The Help Activity (with a question mark as icon) on the XO itself is a guide to the laptop.
- Peru and Uruguay are the largest country roll-outs but their material is not available in English.
- Information Literacy Primer, UNESCO publication (download can be located using Google)

APPROACHES TO TRAINING

Teacher Training is needed at the beginning of a deployment, after a few months of using and adopting them, and with periodic inputs linked to existing professional development. OLPC training should be integrated into both PD and institutional teacher education.

Since the first trials in 2008, approaches to teacher training have developed and converged with the following general consensus:

1. Initial training introducing teachers to the principles and basic operation of the laptops. This usually takes a minimum of 3 days but preferably one week.
2. Second level training: Introduction to the Activities on the laptop, networking and collaboration. This also takes 5 days minimum. This includes:
 - Basic core activity set
 - Introductory thinking about lesson planning with the Activities
 - Sharing and Inviting
 - The Journal
 - Connecting to the School Server
 - Using resources on the School Server, and sharing with students
 - A look at some more advanced Activities (see section on Activities)
 - Basic hardware training (including updating, re-flashing, using flash drives, etc)
3. Advanced training, lasting one week minimum:
 - Curriculum Integration. See the section on Curriculum Integration
 - Advanced lesson planning, trial lessons
 - Using Moodle on the SchoolServer
 - Online resources, including how to download new activities and joining supporting online forums (all teachers should be signed up to Gmail accounts)
 - Classroom Management including practical work

- Developing resources for lessons and saving them on the server

ADDITIONAL RECOMMENDED TRAINING

Additional ICT training for teachers is recommended in the following areas:

1. Collaborative content development using wikis; the Wikieducator
2. Social/professional online networking using email groups and forums; the Ning
3. Information Literacy. This covers not only the ability to search and locate resources, but “ICT Capability” that empowers teachers to discriminate between different types of ICT and to select those that best meet their needs. The UNESCO publication “Information Literacy Primer” is a key publication for all education professionals considering ICT for Education strategy. A copy is available on the resource CD.

LEARNER SUPPORT MECHANISMS FOR TRAINEES

In addition to the training, on-going learning support should be provided. The following are some techniques employed in other countries:

1. Training of resource persons, especially any particular teachers who are enthusiastic and have above average technical skills. Quite often there is an “ICT Teacher” and also a core group of leading teachers who can be called “Champion Teachers”. If possible, counterparts from the community too (who could be organised into community OLPC clubs)
2. Looking back at the discussion on Policy, we should note that it is important for the school management – the Principal and Deputy – to be fully “on board” to promote an ICT culture and the OLPC principles within the school and community as a partners.
3. Teacher self-help groups. Teachers should meet regularly (weekly) and compare and evaluate ideas, lesson plans and help each other.
4. Community OLPC clubs can be instrumental in developing teaching ideas and even to create new resources and Activities. They can also provide on-going training for teachers and students on an ad-hoc basis.
5. Online support. Not all teachers will be able to access the Internet, but a core group could be formed who do. A Google Group email forum and a social network site (a Ning is recommended – www.ning.com) which can be used for sharing multimedia, documents and blogs, etc. Volunteers, external experts and government officials could also be subscribed and use the forum to provide backstopping, for monitoring and mentoring.
6. Introduction of OLPC training into the local teacher training framework, for instance teacher training institutions, the Ministry’s teacher professional development curriculum.
7. Sugar on a Stick (SOAS). The Sugar operating environment and the OLPC laptop Activities are now available in a form that can be installed on a flash drive that will boot up the computer when it is turned on. In this way, teachers and others can experience OLPC without having access to an XO laptop. This is a great way for planners and partners of an OLPC programme to become familiar with the technology.

TRAINING APPROACHES IN DIFFERENT REGIONAL COUNTRIES

OLPC Pacific Islands – early country trials

The early trials in Oceania developed the first approaches to three stages of training as described above, but mainly in the basic and intermediate stages. The advanced training including curriculum development and server training was not developed in depth, although the concepts were increasingly understood.

In PNG the first attempts were made to link teacher training and curriculum integration with official professional development. Divine Word University is playing a leading role in two series of trials, including an official government programme started through the regional SPC programme in 2008, and a privately funded

1000-laptop deployment initiated by PNG Sustainable Development. DWU has incorporated OLPC training into their teacher education curriculum based at St. Andrew's Campus, Wewak. They are also involved in formulating teacher training for deployments and development of teaching ideas, and have an OLPC technical team based in Madang that is directly assisting with deployment. One promising idea is to establish an SMS (mobile phone-based texting) helpdesk, for which they aim to seek sponsorship from the mobile companies.

OLPC Australia

OLPC Australia has been successful in obtaining private sector sponsorship and have established an NGO with six full time staff members. They have been working throughout 2009 building partnerships with the government and links to universities and state education authorities. This has included alignment with Australia's Digital Education Revolution initiative.

OLPC Australia's teacher training programme includes the following:

Level 1

- Understanding the laptop
- Understanding the Sugar Operating Environment
- Understanding the XO Activities and tips for the classroom
- "Sugar on a Stick" for all participants
- Training a technical resource person identified by the school and/or community

Level 2

- Aligning the XO Activities to Curriculum Frameworks
- Sharing XO Activities to illustrate the benefits of collaborative learning

Follow up workshops

- Periodic
- To coincide with existing professional development

In parallel, they have been:

- Developing the Sugar Activity and curricular integration with Universities, and deployers work with University Education Lecturers and staff to align the Sugar Activities to curriculum frameworks.

Kiribati's OLPC Country Plan

Kiribati's OLPC programme has not yet started, but they have formulated a plan. In their training requirements they look to regional partners to provide training to in-country trainers who will be selected from the following sections of the Ministry of Education and organization; Education Statistics, Kiribati Teachers College, Basic Education, and Telecommunication Authority of Kiribati (TAK).. The in-country trainers will provide training to teachers of selected schools where the OLPC is to be implemented, on how to use XO laptops and the application of its essential features/programmes. The in-country trainers, in collaboration with the teachers of the selected schools should ensure that the use of XO laptops fits in within the school (class) lesson plans.

They have also made a linkage to a teacher's education institution. The computer lecturer of the Kiribati Teachers College (KTC) will be the local IT deployment specialist. He should also be responsible for the on-going repairs and upgrade of XO laptop programmes when needed.

Nauru's OLPC Country Programme

In Nauru's second OLPC training workshop of April 2009, the following concepts and approaches were pioneered:

- Development of a "Toolkit" to assist with curriculum integration (see the Curriculum Integration section)

- Teacher self-help groups with regular reflection on class management techniques and experiences with using the XOP in lessons.
- An online “community of practice” for teachers
- Linkage to Wikieducator for collaborative content development and building up server resources;
- Lesson planning training, whereby teacher trainees design trial lesson plans and then directly test them in class, monitored by other teachers. The teachers were asked to consider the following:
 - To identify the attribute(s) of the ICT that will be leveraged;
 - To identify the desired teaching methods that the XO activities enable;
 - Classroom management methods for the laptop activities;
 - To identify the added value that the XO provides;
 - To do a risk assessment and identify the risks, including the added burden on the teacher’s workload, and how they can be managed.

Education Queensland

Education Officers and Teachers from Education Queensland have produced a teacher guide following a small trial deployment at Caboolture, near Brisbane. This is interesting in that it has been done from an insider’s viewpoint within the existing Australian ICT in Education frameworks. The training/rollout strategy includes some similarities with the approaches above.

1. Pre-rollout training
 - Learn about the principles and develop a pre-rollout “learning vision”
2. Peer trainers (training of trainers) and general laptop literacy
 - Use of “mini lessons” prepared and printed in advance, to develop laptop literacy
 - Trial lessons using the mini-lesson plans
 - Discussions of cyber behaviour
3. Informal learning
 - Teachers give informal training and learn along with students. Play and exploration time.
4. Formal / planned learning – the class begins to use the XIO in normal class work
 - Develop lesson ideas based on two categories:
 - i. Doing “old things in new ways” using the XOs
 - ii. Conceiving ideas of “new things in new ways” which the technology brings to the table
 - Sample lesson plans are given
 - A framework for “personalised challenge-based learning” with lessons learned from monitoring

The guide is made available as a handout and on the resource CD.

LEARNING WITH THE STUDENTS

Teacher Training should be integrated with Student training with the facilitation of technical trainers provided by the OLPC partners (initially) working with the in-country training team. The Student training then becomes part of the teacher’s learning experience. Students will learn quickly and will eventually be able to train teachers! This characteristic of ICT in which students can learn from instructing others is one of the most powerful forms of active learning.

TRAINING CURRICULUM

Suggestions for the content of the basic and laptop literacy components of training are included in the annex.



Activity 1

In groups, reflect on:

- Comments on the training approaches described
- Who will be the peer / in-country trainers
- Potential Linkages to PD and Teacher Education
- Local interpretations of the recommended training approaches
- A basic training plan for the initial trial
- Learner Support

- Try Sugar on a Stick

Annex: LAPTOP TRAINING CURRICULUM

Both students and teachers need to complete training in the basic laptop operation. The general curriculum content is shown below. There is no general rule relating ages to specific activities and laptop skills. Each student will learn to use the laptop at their own speed. However, generally speaking the younger ages will be slower to learn the more complex activities. The following list is illustrative – not comprehensive. For instance, “Paint” can be both easy and complex depending on how it is used, but it is placed in “Easy” category because it is easy to start using it. There are many more activities available. TurtleArt is an excellent entry-level programming activity, and students can go on to explore programming with Pippy, Scratch and EToys.

MINIMUM SKILL SET FOR CLASSROOM WORK

This is equivalent to the students, but teachers need to be fully familiar in order to help the students:

- Start / Shut down / sleep mode
- Four views
- Frame and volume controls
- Starting and stopping activities
- Jumping to home page to start / stop other activities
- The principle of sharing
- how to start a shared activity
- How to join a shared activity
- Inviting
- Network awareness; how to tell what connected to, how to change network connection
- Connecting to the server (needed for reliable collaboration between laptops)
- Saving and naming files on the XO
- Using journal to locate files
- Using a flash drive to transfer files to/fromXOs
- Simple use of the server to browse public folders and locate resources
- Reasonable familiarity with the core set of Activities
- Problems and how to deal with them – for instance
 - the jumping cursor (press all four corner keys same time for a few seconds, and drying fingers)
 - hard reboot (press power key for 10 seconds until all the LEDs are completely off)

The training matrix is on the next page. Note this does not cover curriculum integration. Please see the section on that elsewhere in the workbook.

Basic (Level 1)	Networking and resources (Level 2)	Activities to introduce (Level 2)
<ul style="list-style-type: none"> • Orientation • Opening, closing, “ears” • eBook format • Starting / shut down • The 4 Views • The Frame • Screen rotate • Volume and Brightness • Functions • Sharing • Inviting • Intro to the Journal • Trouble shooting. Restarting if in difficulty • Hard (forced) reboots • Going in/out of sleep mode • Charging and battery monitoring • Help activity • The Control Panel • How to reinstall the laptop operating system and activities with a prepared flash drive 	<ul style="list-style-type: none"> • Finding and connecting to access points • Checking connection status via Frame view • Connecting to school server • Starting and coordinating a shared activity • Joining a shared activity • Inviting someone • Copying files to/from Journal with flash drive • Awareness of memory, checking memory usage • Renaming and deleting files in journal • Using Public Internet • Accessing the OLPC wiki laptop activities and collections pages from Browse 	<p>Easy</p> <ul style="list-style-type: none"> • Record <ul style="list-style-type: none"> - take photos • Speak • Paint • Measure • Chat • Memorize <ul style="list-style-type: none"> - built in games • Stopwatch, Ruler • Clockgame • TamTamMini • Write <ul style="list-style-type: none"> - simple writing • Calculate • Poll • Other simple games
		<p>Moderate</p> <ul style="list-style-type: none"> • TurtleArt • TamTamJam • Memorize <ul style="list-style-type: none"> - create games • Browse <ul style="list-style-type: none"> - access server - search with Google • Moon / Star chart <ul style="list-style-type: none"> - setting time/location etc • Word <ul style="list-style-type: none"> - tables, formatting - inserting photos • Record <ul style="list-style-type: none"> - record and replay sounds and audio • Calculate <ul style="list-style-type: none"> - using variables
		<p>More complex</p> <ul style="list-style-type: none"> • TamTamEdit and SythLab • Pippy • Scratch • E-toys <p>Scratch is the easiest – uses blocks like TurtleArt. Pippy can be used to learn “Python” programming language and even to create new activities! E-toys can be used to create virtual worlds and characters, and to model physical phenomena. See OLPC Wiki for more details.</p> <p>These are a bit harder, and teachers may need some training. But older students are capable of figuring them out themselves.</p> <p>TamTamEdit allows the student to program music and record it.</p>

SOME SIMPLE ACTIVITIES TO START WITH (TEACHERS)

Poll Activity

- Very easy to use and set up
- Once students know it, very easy to manage in class
- Fits very easily into rich task
- Students can take home polls and ask family
- Come back and compare patterns in their results
- We need to test best way of saving students' results on the server
- Build up a list of suggested poll questions for each rich task theme / week

Measure

- Easy to capture sounds
- Can be saved (click "start record") and inserted in Write
- Suggest table with 2 columns, name and waveform image
- Students can use it to appreciate loudness (amplitude) and pitch (high, low) and tonal qualities of sounds
- Can be paired with TamTam etc

Memorize

- Easily integrated into many rich tasks
- Matching pairs
- Need to try out creating games PRACTICE PRACTICE
- Need to work out best way of sharing the prepared game with the class
- One way is to share with groups of 5 max in turn (everyone else has laptops turned off)
- Students can be asked to try creating games (as an option for advanced students)
- Skill requires knowledge of taking and naming photos, saving (keeping) in journal and recovering in Create game

Write

- Can be a standard tool in many lessons
- Can increase productivity (creating tables is quick)
- Teachers should be aware of where it can help
- Learning about tables
- Learning to classify things
- Saves time compared to drawing tables
- Can insert images and paintings quickly (match picture of object with name or text)
- Be aware of downsides, until you are very skilled
 - it is difficult to collect the student's work
 - Initially students need a lot of help
- Good idea to set them a write task each week

Record

- Can be a standard tool in many lessons
- Can increase productivity (creating tables is quick)
- Students find it very easy
- Must help students learn to name and keep images for use in other activities
- Learn also to use audio and video (including naming and keeping and recovering)

Speak

- Use whenever learning new English words
- Helps students to gain confidence speaking
- Can be used in tandem with Write and Record
- Use together with books or blackboard
- Home work idea
- Students take home list of words or a text
- Use Speak to help learn pronunciation
- Use Record to hear how well they did
- NOW HAS CHAT – Works collaboratively! This is an excellent literacy aid.

Chat

- Good way to encourage group work
- Helps them understand sharing etc
- Get groups started independently
- Small groups or pairs work best or it gets unfocused
- Trick will be to think of guiding the conversation and relating it to the rich task
- Idea: Students write sentences to each other, they then have to speak them aloud, they can use Speak activity to help (one laptop running Speak in each group)
- Note: try the Speak version of chat which “talks”

Turtle Art

- This is a bit intimidating at first, but children can learn quite quickly. See the OLPC Australia and Peru guides for specific examples. In Nauru, Year 2 students could be shown how to “work” Turtle Art very easily. Showing them some of the colourful ready-made projects is a good motivator.

eToys

- Creating projects might be considered an “advanced” activity, but eToys also comes with ready-made projects that can be used and tweaked to illustrate various concepts (such as in science). See the “XO in the Class Room” from Peru for specific examples.

Other simple activities to start with

- Paint (good for home work – paint leaves etc)
- Calculator (try out some sharing)
- Moon and Star Chart (home work , rich task)
- Stopwatch to time things
- Use with Distance or measure distance normally
- Calculate average speeds (higher years??)
- Clock game to learn time

SPACE FOR NOTES

STUDENT AND PARENT TRAINING

Student training should be integrated with teacher training. The syllabus is essentially the same as the first two levels of the teacher training; however, the training methods will be different to suit the young children.

Teachers should be involved in the student training as part of their own training. This usually happens at the beginning of a deployment.

It has been found to be unwise to give the students laptops without training and likewise parents should be briefed at the same time. If possible, it is a very good idea to bring parents in to the students training.

SCHEDULE

Note that the training schedule is discussed in the [section on Deployment](#).

TRAINING SYLLABI AND RESOURCE MATERIALS FOR TRAINERS

The same set of reference materials as for teachers are also useful for student trainers. Please refer to that section for details. However, the students will initially rely on the trainers, and then increasingly each other. One of the impacts of the OLPC approach is that it encourages young learners to learn by teaching others!

WHO SHOULD TRAIN THE STUDENTS?

The best trainers are the teachers – and parents (although it is more likely that the students will end up training their parents!). However, it is normal with deployments to incorporate level 1 and 2 teacher training at the same time as the laptops are deployed. Level 2 teacher training should include training the students.

The best approach has been found to use fairly high ratios of trainers to students. They can then work with the students in small groups whilst a lead trainer introduces each part of the training syllabus. It is usually necessary to guide very young students through some of the steps on a one-to-one basis.

If there are already laptops in the school with experienced students, those students could be involved in the training of the new students.

APPROACHES TO TRAINING

Initial training includes the first two levels. There is a much greater emphasis on allowing the children to play and explore as they learn rather than a continuous instruction step by step. For instance, it is best to introduce concepts like collaboration through a game such as Memorize or Connect. This motivates the children to find out how to join other children's games or start and invite others to their own games.

Likewise, an interesting game could be added to the server and then students shown how to get it onto their laptops. In the process they learn about connecting and using the server.

The general sequence of training follows the "minimum skill set for class work", with lots of demonstrations from the trainers/teachers with plenty of time to play. It is not a bad thing to allow children to move around and form groups naturally, as they learn and want to show their friends.

See the annex for training sequence and contents.

CARE FOR THE LAPTOP

An important part of training is caring for their laptops. It should be emphasised right from the beginning that they are responsible for their nice new computer. The following should be explained (also in the parent briefing):

- Keep it away from water, strong heat, dust and dirt
- To be careful not to put it somewhere it might fall

- To close it and store it safely when not in use
- How to fairly and safely share the laptop with the family
- Charging safely
- The XO-1 has a known weakness with the green rubber keyboard. The keys can be peeled off by inquisitive fingernails and this can be irresistible for very young children and babies. The students should be told to keep the laptop away from such risks and to be aware of this fragility.

Resources: Nalder's Teacher Guide has some good advice:

- "Helper Sheet" with guidance for students and trainers on laptop care
- "How to show the XO to the kids"



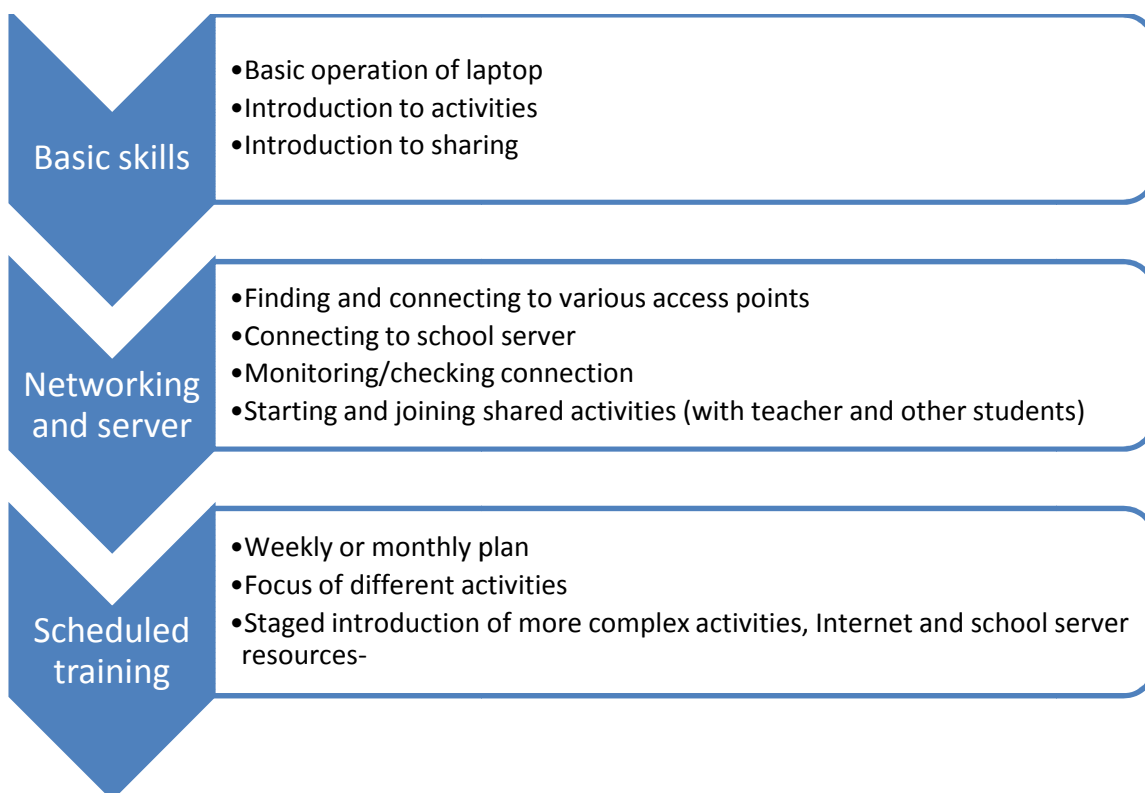
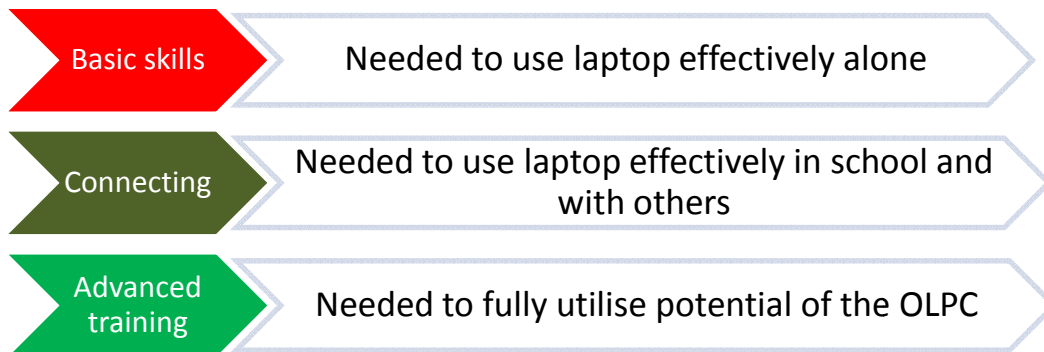
Activity 1

In groups, reflect on:

- Comments on the training approaches described
- Who will be the peer / in-country trainers
- Potential Linkages to PD and Teacher Education
- Local interpretations of the recommended training approaches
- A basic training plan for the initial trial
- Learner Support

ANNEX: STUDENT TRAINING CONTENTS

WHAT STUDENTS NEED TO KNOW



MINIMUM SKILL SET FOR CLASSROOM WORK

The students will learn quickly from each other once the initial operation is shown to them.

- Start / Shut down / Sleep mode
- Four views
- Frame and volume controls
- Brightness control
- Starting and stopping activities
- Jumping to home page to start / stop other activities
- The principle of sharing
- how to start a shared activity
- How to join a shared activity
- Inviting
- Network awareness; how to tell what connected to, how to change network connection
- Connecting to the server (needed for reliable collaboration between laptops)
- Saving and naming files on the XO
- Using journal to locate files
- Simple use of the server to browse public folders and locate resources
- Reasonable familiarity with the core set of Activities
- Problems and how to deal with them – for instance
 - the jumping cursor (press all four corner keys same time for a few seconds, and drying fingers)
 - hard reboot (press power key for 10 seconds until all the LEDs are completely off)

EXAMPLES OF ACTIVITIES TO USE IN STUDENT TRAINING

Please refer to the “XO comes to Class” and “XO in the Classroom” guides for ideas and instructions. Also see the syllabus in the annex of the Teacher Training section. Some additional hints are given below.

It is usually good to start with the most spectacular Activities to quickly get the interest of the students. These include:

- Speak. Start with the stand alone “face” view, and then later show them the collaborative chat.
- Record. Taking pictures of each other. Later, you can show them how to share pictures with each other
- TamTamMini.
- Paint
- Chat
- Memorize Game (in groups – be careful as games get stuck when students join an game already started)
- Connect Game (in pairs)
- Puzzle Game

SPACE FOR NOTES

ENSURING PARTICIPATION OF PARENTS, FAMILIES AND COMMUNITIES

This section borrows with permission from "One Laptop per Pacific Child: creating OLPC Oceania", by Michael Hutak, Regional Director, Oceania, One Laptop per Child

Bringing new technology and access to the internet into remote and/or traditional communities should only proceed in partnership and cooperation with the local community. The XO Laptop should only be deployed through a process of community consultation; taking account of the needs and concerns of local populations and integrated with sensitivity into existing practices, conventions, systems and tools.

Without compromising the education of the child or the integrity of the OLPC project, access to the XO should be available not just for the child, but the family and the community. The XO should be a tool to enhance social inclusion and open up gateways to accessing knowledge and information for the whole community.

Local communities, teachers and participants also have a crucial role to play in M&E. At the SPC/OLPC trial begun in June 2008 in the PNG village of Dreikikir, the teachers came up with their own criteria:

- ✓ Teachers would keep a log book/diary and update it with any feedback on how the laptops are being used, new ideas on classroom integration as they develop, and feedback on student's uses.
- ✓ Every morning, the first lesson is an "oral session" where teachers can discuss the laptops with the children. This session will be used to get daily feedback.
- ✓ Parents evenings and staff meetings will also be used to get feedback and share ideas.
- ✓ The district school standards officer and education advisor have been trained and fully participated in the deployment. This is very important, as they are available "on the ground" to make evaluations and carry reports from the school to the Province and Department.

The role and effectiveness of such grass-roots efforts cannot be underestimated.

COMMUNITY ENGAGEMENT GUIDELINES FOR DEPLOYING LAPTOPS

At the OLPC Asia Learning Workshop, in Bangkok August 2008, a list of principles for deploying the XO laptop at the community level were developed.

A **Community Engagement Plan** should be developed and implemented to ensure the community is fully involved in the deployment of their laptop in their schools, with their children and in their communities. We recommend holding a separate session with parents and leaders in the community covering such topics as:

- Parents' responsibility in caring for the laptop and supporting their children's learning with it;
- Establishing rules for sharing the laptops at home;
- Looking out for bullying involving the laptop, especially from older siblings and children;
- Safely charging the laptop (this is important with mains power and young children);
- Adults learning about the laptop and Internet from their children;
- Making sure the child takes the laptop, fully charged, to school.
- Asking parents to sign a simple agreement covering the above points.

Other recommended* actions are as follows:

- The XO Laptop should be deployed through a process of community consultation; deployment should only proceed with assent of the entire community, taking account of their needs and concerns; and should be fully integrated into existing systems and tools
- Without compromising child ownership or education, access to the XO Laptop should be available not just for the child, but the family and the community
- Communities should develop their own principles and guidance for coordinating communal use of the XO Laptop

- Where appropriate, children should be included and encouraged to actively participate in using the technology for whole-of-community actions and projects
- The technology should be available to contribute to community efforts and solve community problems and not be leveraged for private personal profit or commercial gain
- Knowledge and data generated with the laptop is in the public domain, and needs to be freely available and shared
- Without discouraging community-level market activity which supports sustainability – such as microfinance, technical services, spare parts repairs and maintenance – communities should put in place disincentives to the emergence of a secondary commercial market for the XO.
- Communities should share local knowledge, best practices and lessons learned with like communities and within their sub-regional, national and regional contexts.
- Deployment should, wherever possible, proceed in alignment and harmony with existing regional and national efforts on education for sustainable development, and should be designed to strengthen and enhance those efforts.
- An "end of life" program should be put in place to recover derelict laptops to avoid environmental damage and hazard.
- An Internet Safety program should be established wherever the XO is deployed.

An example of a Parental and Community Agreement is given in the annex. This has been used with general approval of parents and communities in deployments in Nauru, Solomon Islands and PNG.

COMMUNITY AND PARENTS' BRIEFING

Before and during deployments, time must be dedicated to Community and Parents Briefings. This can include:

- Background to OLPC and regional OLPC trials programme, and Nauru's trials;
- Educational theory of the OLPC;
- 5 core principles of OLPC;
- Activities and server content (with demonstrations);
- OLPC in teaching and curriculum;
- OLPC in the community;
- Community OLPC Club;
- The Parent's Agreement;
- The Community Deployment Guidelines;
- Child and cyber safety;
- Re-cycling;
- The governance system agreed for the OLPC programme

COMMUNITY SUPPORT GROUPS

The child ownership principle, together with active community participation in OLPC programmes, is useful in many ways, for instance:

- Parents can better understanding and follow their children's learning;
- Improved engagement of parents and communities with their schools;
- Possibility of improved communication and active reporting between parents and teachers;
- OLPC provides community access, via the School Server and/or Internet connectivity if available. The School Server can be thought of as a community library as well as for the school;
- OLPC is a form of community media, with potential for parents and families to participate in local content development;
- Community OLPC clubs can involve young and older people whilst providing technical support. In Nauru's OLPC pilot, parents were invited to the school to be trained to use the laptops, and a school OLPC committee joined forces with volunteers and enthusiasts in the community to start an OLPC

technical club, which aimed to provide technical support to the teachers as well as involving school leavers in creative work.

In order to scale up a small OLPC country pilot community participation and support is essential.



Activity 1

In groups, reflect on:

- How do you see community participation working in Tuvalu?
- What potentials, partnerships or other ideas do you have for community participation? Are there any existing clubs or organisations which might provide a foundation to build on?
- What issues and risks can you identify and can you suggest ways of mitigation?

Please provide feedback on the community and family participation, and this will be used to develop the Tuvalu OLPC Country Plan.

one
laptop
per
child

1



OLPC PARENT AGREEMENT

As a parent of

- I will follow the principles of the OLPC Program
- The laptop is for my child's education
- I will look after the laptop
- I will make sure the laptop is safely charged
- I will introduce rules about sharing the laptop at home
- I will make sure the child brings the laptop to school every day

Signed by Parent

Approved by Principal

Issued (date)

Please encourage your child's OLPC journey of learning



Community consultation guidelines for deploying the XO laptop in communities

- The XO Laptop should be deployed through a process of community consultation; should only proceed with assent of the entire community, taking account of their needs and concerns; and should be fully integrated into existing systems and tools
- Without compromising child ownership or education, access to the XO Laptop should be available not just for the child, but the family and the community
- Communities should develop their own principles and guidance for coordinating communal use of the XO Laptop
- Where appropriate, children should be included and encouraged to actively participate in using the technology for whole-of-community actions and projects
- The technology should be available to contribute to community efforts and solve community problems and not be leveraged for private personal profit or commercial gain
- Knowledge and data generated with the laptop is in the public domain, and needs to be freely available and shared
- Without discouraging community-level market activity which support sustainability – such as microfinance, technical services, spare parts repairs and maintenance – communities should put in place disincentives to the emergence of a secondary commercial market for the XO.
- Communities should share local knowledge, best practices and lessons learned with like communities and within their sub-regional, national and regional contexts.
- Deployment should, wherever possible, proceed in alignment and harmony with existing regional and national efforts on education for sustainable development, and should be designed to strengthen and enhance those efforts.
- An “end-of-life” program should be put in place to recover derelict laptops to avoid environmental damage and hazard
- An Internet Safety program should be established wherever the XO is deployed

SPACE FOR NOTES

CURRICULUM INTEGRATION: THE XO IN THE CLASSROOM

References:

1. *The XO In the Classroom (Peru)*
2. *OLPC Australia Class Book (OLPC)*
3. *Teachers Guide to OLPC by Jonathan Nalder, Education Queensland*
4. *Curricula development and pedagogical guidance on introducing ICT in schools, MCEETYA (AU/NZ)*
5. *Annex: Some examples of lesson planning with the XO from Nauru*

This section is closely related to the chapters on Activities and Teacher Training.

In this section we focus on a definition of curriculum integration as the way in which teachers and students make use of the XO laptops and XS school server in the classroom and how it affects teaching and learning.

It should be noted that we do not have a great deal of direct experience to go by. The early trials in the Pacific did not have in-depth guidance for teachers in this respect, and the results from the first serious evaluations are only just coming available. However, we do have some feedback of emerging best practice that has been developed from small scale deployments that have introduced the XO into the classroom. Because of the “openness” of the “OLPC development community” this knowledge is being made freely available in publications such as those referenced above. In this respect we are at a much greater advantage than we were 12 months ago.

One of the main challenges for teachers, is to learn how to integrate OLPC into their lesson planning. Although the OLPC laptops are designed to promote learning from the outset, the teacher needs to provide guidance and to steer the learning activities towards the particular learning objectives laid out in the curriculum and in the their lesson plans. This requires a significant input is required in terms of teacher training. Students also need to have a basic set of skills, depending on the way the XO is to be used as specified by the teacher.

Teachers should be aware of different modes in which the XO helps with a child’s learning and their learning environment, all of which merit allocation of classroom time and “home work”. These include:

- Using the XO directly in support of curricular learning objectives; This includes two related inputs:
 - Integrating activities with the laptops into lesson plans
 - Using the “attributes of OLPC” to introduce improved teaching methods and pedagogies in line with the national education strategies
- To facilitate self learning and research, which may or may not be directly connected with the curriculum but widens and enriches the learning environment, and helps the child “learn learning”;
- For learning ICT skills and information literacy, with regard to electronic offline and online resources and modes of communication;
- To facilitate and promote improved engagement of parents in their student’s learning and improved engagement of the community with their school

In regard to using the XO directly to support curriculum tasks, the teachers should consider the following questions/areas. A “toolkit” is provided in the annex, with more guidance.

- Which attribute(s) of the ICT are you (the teacher) hoping to apply with the XOs?
- Which desired teaching methods will the XO activities enable?
- What are your classroom management methods for the use of the XO?
- What added value does the XO provide?
- What are the risks, including the added burden on the teacher’s workload, and how will they be managed?

Examples of how the XO is being used in the classroom

There is now increasing feedback and documentation from country programmes elsewhere regarding their strategies for curriculum integration. Three examples are provided. These will be useful as reference materials for teachers, and copies should be distributed in hard copy as well as on the XOs and school servers.

1. The XO In The Classroom. This is a book of over 20 lesson ideas, based on a deployment of over 40,000 laptops mainly to rural primary schools. It represents the experience of over 3000 teachers over two years and as written by a research student who has worked extensively in the Peruvian schools and with leading theorists of constructivism and technology-enabled learning such as Alan Kay and Seymour Papert. This publication is published as an open education resource in book format. Soft copies are provided to workshop participants on the CD.
2. The XO Comes to Class. This is both a detailed guide to the XO laptops and their Activities and a guide to classroom usage with lesson ideas produced by OLPC Australia, which has strong linkage to the OLPC in the Pacific Islands. This publication is also provided with the complements of OLPC Australia in book format. Hard copies are available from OLPC Australia. Soft copies are provided to workshop participants.
3. Experiences with teachers in Nauru's OLPC programme, from a teacher training mission by this author in April 2009, that focused on curriculum integration. A toolkit produced during the Nauru workshop and two examples of lesson plans designed and tested during the mission are included in the annex.
4. Teacher's Guide from a small deployment by Education Queensland (Jonathan Nalder). This has some useful perspectives, feedback and impressions from an education professional, and two good examples of lesson plans using the XOs.

Strategy ideas for using the XO in the Classroom

These are some of the ideas that were developed during the Nauru mission:

- (1) Teachers should start with simple activities and evaluate how well these work before trying more ambitious activities with the XOs. A list of some "standard" tools and activities that can work well in many lessons is given in the "Activities" chapter of this work book.
- (2) Teachers should employ proper methodology in lesson planning for the XO, including clear objectives, identification of skills learned / knowledge to be gained, evaluation, grading and future recommendations. The Nauru lesson plans in the annex may be used as examples.
- (3) Teachers should meet regularly to reflect on experience and share ideas. Teacher OLPC clubs or committees should be formed in each school for this purpose. At these meetings, other resource persons could be invited, such as community volunteers willing to help with technical support;
- (3) Trial lessons using the XO in the classroom should be reviewed by teachers in their meetings and the experienced documented and shared with the Ministry OLPC team. This can be part of an official monitoring and evaluation framework.
- (4) Best practice and proven lessons using the XO should be documented for future reference and use by other teachers. A standard approach to this could be developed leading to the creation of a national resource for teachers, following review and approval by the curriculum department;

(5) The Ministry should consider how to progressively incorporate the proven experiences of teachers and recommendations from official evaluations into the curriculum reform process and official curriculum materials such as teacher's subject guides.

(6) Teachers will be the pioneers of curriculum integration. The key to success will be to provide adequate teacher training and establish the support mechanisms, including self-help groups and school OLPC clubs.

The learning "hump"

Teachers involved in OLPC trials in the Pacific have noted that there is a learning curve (or rather a learning "hump") to overcome for the teachers. Initially it is VERY hard work for teachers to manage 40 students with laptops when everyone is not that familiar with the basic operation. The XOs are designed to be easy for children but initially you need to shepherd them through the basic operations. So it takes some faith from teachers that they will eventually get over the curve and start to enjoy the productivity gains when the children become used to routine things like starting and stopping activities, connecting to the server or to each other, locating resources on the school server etc. Therefore, a clear vision and continued training inputs are important to help teachers move through these initial stages.

The impact of OLPC on productivity

In an online discussion the following point was made:

"We want the XO laptops to improve quality and productivity and not serve as a distraction. If in the analysis the XO doesn't have a positive effect, then they stay firmly shut. Likewise, pen and paper might in some/many circumstances be the correct tool to use. For instance, if we are learning about graphs, then a picture flashing up on a screen might not achieve the same effect as if the children have to conceptualise and draw the graph by hand. Of course, the computer can provide tools to help draw graphs too. On the other hand, if we are learning about trends and comparing patterns of things using graphs, then the computer can be very useful in improving productivity by providing the framework. You need to understand the framework, but that can be taught separately. A class of 40 grade 2s might take all lesson just to draw a graph, when the objective is to learn from the DATA".

Widening the learning environment with OLPC – example from Nauru

Nauru has a "Rich Task" primary school curriculum. This uses themes, closely linked to life and society, culture and history and "who we are". The subjects (maths, social science, etc) are then intertwined around the theme such that the learning is not disconnected between lessons. The Rich Task also creates an extension of the learning environment to the children's home environment and the community. Because activities on the XO can also be themed and cut across the curriculum, the OLPC works very well with the Rich Task approach.

In other places in the islands, a more traditional curriculum is followed but there is still opportunity to link XO projects across the curriculum. This would encourage a team teaching approach, also highly resonant with OLPC "theory". Teachers could meet to coordinate and in doing so support each other's ideas and methods.

OTHER REFERENCES – INTRODUCING ICT IN THE CLASSROOM (GENERAL)

Michael Hutak, Director Oceania, OLPC, has reported the following to the NOPE email list. Please note that the two reference documents recommended by Michael are included on your resource CD.

As countries develop their own approaches to working with ICT in the classroom, several have asked what resources are available on curriculum development. One example is the materials developed by the Australia and New Zealand Ministerial Council on Education, Employment, Training and Youth Affairs. MCEETYA have produced valuable curricula development and pedagogical guidance on introducing ICT in schools, documents which Pacific educators might consider adapting to their own needs in the absence of existing resources.

- **The Statements of Learning for ICT** is specifically for curriculum developers, and provides a description of knowledge, skills, understandings and capacities that all students should have the opportunity to learn, and identifying baseline essentials for all students to learn. There are statements for all subject areas but the ICT document is particularly useful.
See http://www.curriculum.edu.au/verve/_resources/StmntLearning_ICT_2008.pdf
- **The Pedagogy Strategy** – Learning in an online world focuses on ICT as an enabler of good pedagogy.
See: www.mceetya.edu.au/verve/_resources/pedagogy_strategy_file.pdf
- **More resources** can be found here:
<http://www.mceecdya.edu.au/mceecdya/default.asp?id=11582#Information%20and%20communication%20technologies>

In Australia, many of these resources were developed under the last Howard government. Now the Rudd government is rolling out its "Digital Education Revolution" and is providing a welter of resources online for educators, meaning Pacific countries dealing with capacity constraints can leverage these and adapt them for use in a Pacific context. Here's an interesting place to start:

- http://www.curriculumsupport.education.nsw.gov.au/digital_rev/english/gettingstarted/index.htm



Activity 1

In groups, reflect on approaches to :

- Lesson planning
- Teacher training
- Support for teachers
- Linking to curriculum development
- Alignment with / issues stemming from National Education plans
- Improve the "toolkit"

Annex: TEACHER'S TOOLKIT TO HELP WITH CURRICULUM INTEGRATION

SOME ATTRIBUTES OF OLPC

The laptops can support the learning objective by:

- Motivating and engaging students
- Promoting creativity
- Promoting collaboration and team work
- Promoting inquiry-led learning (research, etc)
- As a scaffold for higher-level thinking (modelling)
- To promote affirmation and discovery learning
- Tool for investigating reality
- Improving access to resources – massive collections of content online or on the server
- Helping disadvantaged and disabled students
- Promoting support from family / community

INITIAL QUESTIONS TO ASK

- Which attribute(s) of the OLPC are you trying to leverage?
- How will the laptops help learning?
- How will the laptops help teaching?
- Will the laptops add value?
- What is the risk of the laptops diverting your focus? (and other risks)
- Will the laptops give you extra work load? (and if so, is that worthwhile? How can it improve your productivity / efficiency?)

TEACHING METHODS

The laptops can support teaching methods:

- Student centred
- Active Learning
- Group work
- Discovery learning
- Learning by doing
- More time to focus on specific/each child
- Tests / quizzes
- Using multimedia

LESSON PLANNING

- An example template lesson plan from Nauru is provided below.
- The book “The XO in the Classroom” has many examples of using XO activities in the classroom
- Lesson plans can be collected by one support teacher and put onto the Wikieducator. This also allows high quality PDF print outs and will promote pooling of resources (scalability).

WHICH XO ACTIVITIES WILL I USE IN MY LESSON?

For each learning objective:

- Use your knowledge of what the activities do
- Consult the growing collection of reference materials with lesson ideas, such as the guide books from Peru and Australia
- Get help from each other at OLPC club (Thurs)
- Get help/ideas from regional discussion forum
- Document what you did and how well it worked, and share you experiences with the other teachers

CLASSROOM MANAGEMENT

- You don't have to do the same thing with whole class. Have one group using Chat, another doing blackboard work, etc
- You don't have to use every laptop all the time - sometimes just one or two laptops per group to make it more manageable
- When sharing a prepared resource like a poll or memorize game, try doing it in small groups with others having laptops turned off
- Practice and test before hand!!!!

FEEDBACK FROM NAURU

Although limited time was spent on trial lessons, the following observations were made:

- The lesson on comparing sounds worked very well. Students were able to capture sounds using Measure, create tables more quickly than drawing them by hand, and insert the captured waveforms.
- The lesson with Polls also went well but we forgot to tell them to save the polls before they went home.
- Initially the task of helping students to do basic operations is time consuming, but one can expect this to be easier and quicker with time once the students know basic things such as checking connection, neighbourhood view, the server, keep/save and locating saved files, etc
- Class management is needed. For instance, students can be given some set work to do (not using laptops, or simple things such as games) whilst the teacher helps a smaller group of students at a time.
- Sharing resources with students is much more efficient and reliable if the resources are put on the server. For instance, photographs of fish were shared from the teacher's laptop but they were unavailable on the student's laptops, because Browse shares a link and not the file itself. When tested using the server the photographs share reliably and quickly.
- Initially the task of integrating the laptops is very time consuming and places extra burden on the teacher. But with time it will become easier and when students can be managed efficiently, when they can quickly follow instructions, lessons can be planned to free up time for the teacher to help and facilitate individual students.
- It was recommended that teachers start with simple activities and evaluate how well these work before trying more ambitious activities with the XO's. A list of some "standard" tools and activities that can work well in many lessons is given in the annex. For instance, teachers practiced using the Poll activity, which can be used by students to do community surveys associated with much of the rich task. This was actually tested in class.
- In group sessions throughout the training, teachers worked on some simple lesson plans. Although time did not permit extensive testing, a few of the "core group" of teachers (Mary, Lavina, Nona, Salodina with help from others) did manage to test out some planned lessons with XO integration, directly following the rich task for that week. These example lesson frameworks are given in the annex. The test lessons included the below
- Using Measure, TamTam and Write activity to investigate sounds in the environment, and classify and document them. (Rich Task An Kiwiwud Bwio Naoero, Week 11, Environmental Area, Energy and Force, Compare, identify, clarify between sounds)

- Creating a poll about where the family buys fish, and then comparing photographs of different types of fish using photographs on the server. (Rich Task An Kiwiwud Bwio Naoero, Week 11, Environmental Area, Identify... and name services in the community)
- Using Memorize Game to match value of different groups of coins. This is also part of Rich Task An Kiwiwud Bwio Naoero, Week 11, Environmental Area, Recognize and name coins)
- Teachers also searched for open educational materials to support each week of the rich task. For instance, useful articles “Nuclear Family” and “The Family” were downloaded from Wikieducator and Wikipedia in PDF format and place3d on the server, to support Week 1 (Identify and Illustrate Nuclear and Extended Family). Articles on Hygiene and Food Poisoning were downloaded to support Week 5 (Personal Hygiene – investigate traditional and modern methods).
- Teachers should employ proper methodology in lesson planning for the XO, including clear objectives, identification of skills learned / knowledge to be gained, evaluation, grading and future recommendations. A template / example of suggested framework was developed with the teachers.

ANNECDOTES, STORIES, OBSERVATIONS

“In Nauru during the training the children were learning about “services in the community”. The teacher wanted them to do a survey of family members and relatives to see “where they bought their fish” using the “Poll” Activity. This creates bar charts with percentages from a simple multiple choice poll that is very easy to set up. The teacher wrote the poll question and multiple choice responses on the board and in no time at all the children had entered it in their laptops. They could then take them home and do the poll with their families and bring back the results next day and look at each other’s results to learn from patterns in the data. The focus is therefore on learning about “services in the community” and not about “what a bar graph is”; a separate lesson with pen and paper would achieve that learning objective. Thus, the XOs helped to support teaching that learning objective and improve productivity.”

Examples of a Lesson Plans developed by Nauru Teachers (April 2009)

Rich Task : “An kiwiwud bwio Naoero”, Year 2, Science, Week = 10/11

Lesson Objective	Subtopic	Activity	OLPC related activity	Skills / knowledge to be learned
Compare, identify clarify between sounds	Energy and Force	To be able to identify and measure sounds within the environment using the laptop	<p>STEP 1 Divide class into groups of six. Explain and discuss what children are required to do. Demonstrate with laptop.</p> <p>STEP 2 TamTamMini activity. Play different sounds in activity, Discuss findings, record and compare known sounds in each group.</p> <p>STEP 3 Write activity. Type in recording/findings. Name sounds and type under group column. eg. animal / transport / other</p> <p>STEP 4 Groups choose 5 items to record and capture (items within school boundary) eg. Bell, voices</p> <p>STEP 5 Measure activity Groups combine into one group</p> <p>STEP 6 Compare different wave band according to their findings and discuss which has a higher/lower pitch on laptops.</p>	<p>Comparing sounds Knowing sounds Working in a group Using TamTamMini</p> <p>Analysing and creating categories Expression / writing Using Write (word processor)</p> <p>The nature of sound Sound having patterns</p> <p>Physical properties of sound</p>
Special preparations and considerations:				

SPACE FOR NOTES

CONTENT PLAN

From our experience in the Pacific we have found that providing rich sources of educational content can be one of the main challenges for OLPC deployments. The need for locally relevant content including in local languages, is one of the barriers. Lack of affordable Internet connectivity in rural areas is another. However, the OLPC embraces approaches that offer solutions to these issues in many ways.

Perhaps the most important message to give in this section, is that **content can be an activity**, and not merely a resource. A content plan should focus on systems to facilitate participatory content development, including by children themselves. What better way to learn about a subject than to be actively involved in creating open content? Of course, we must look at ways of aligning the curricular content with OLPC deployments as well.

The OLPC School Server can also be thought of as a community library. The vision for content must therefore be extended to vocational and community education. Potential sources will include government departments like Health and Agriculture, regional educational institutions, church/religious organisations, Women and Youth associations, regional organisations like SPC, development programmes such as UNICEF and the NGO partners of all of these. Many of these produce, or would like to produce, materials that will be available for the wider community.

Here are some of the “pillars” of a sustainable and scalable content plan as advocated by the OLPPC technical working group.

Open Educational Resources (OERs)

Reference: The OER Handbook, Commonwealth of Learning, available as a free download from <http://www.lulu.com/content/3692829>

Versions for educators, institutions and policy makers are being developed at http://wikieducator.org/OER_Handbook

OERs are naturally aligned with the “Open Source” principle of OLPC. OERs do not rely on expensive programmes with paid development teams but harness the power of “open source communities” which makes for a highly scalable solution, providing there is a means for networking and the skills can be developed. OERs can then be developed by communities of educators and others – including school children and subject specialists. OERs often use an online collaboration tool called a “wiki”. Wikis can also be offline (i.e. a school intranet).

A closer look reveals that there in fact a wide range of content available for schools and communities. For instance:

- UNESCO ASEAN SchoolNet resources (computer-based animated materials that work very well)
- The Wikieducator, Commonwealth of Learning’s flagship tool for content collaboration and repository of OERs, such as lesson plans from around the world. Content can be downloaded for offline access.
- The OER Foundation, newly established in New Zealand, the Foundation now hosts the Wikieducator, and is a potential partner for content projects such as the OER Commons of New Zealand.
- The OLPC school server can be loaded with offline copies of the Wikipedia.
- Platforms and tools such as Curriki (www.curriki.org) and
- Many online resources (for instance see the links at www.schoolnet.net.sb/courses)
- The Shuttleworth Foundation is one of many educational institutions (including MIT) to offer OERs. This one provides free high school science resources (www.fhsst.org) as an OER project
- The OLPC community is developing a system for sharing content involving volunteers who curate and maintain collections of open content by topic and source, and help to make specific subsets of the collections available for OLPC programmes to meet their local needs..

Here are some examples of regional content that could be made available on the school server. Some of these may not be strictly OERs but could be made available on request.

- The Virtual Museum of the Pacific (collaboration between University of Wollongong and Australian Museum with Pacific Islands partners)
- School eBooks (Tonga, Niue, others)
- Summer Institute of Language, very active in PNG, is helping primary school teachers producing local language primary school books
- Resources from CROP agencies such as SOPAC and SPC, and international organizations partnering with them, such as CTA, universities, etc
- In Tuvalu.....

Armed with some of these sources (the list above is only the tip of the iceberg), an OLPC deployment could start up with a decent collection of resources on the school server ready for use.

Content Curators

The OLPC Foundation envisage a global network of open content providers and have suggested some approaches that will link these sources with schools around the world. They explain their vision as follows:

Every OLPC school will be part of a content network that spans their country and the world. Each school will have a server with a digital library of materials. These school servers will store what children and teachers create, as well as collections from every subject area, drawn from national libraries and museums, and from creators around the world: from classics of art, music, [mathematics,] and literature to images of the world to workbooks and texts.

The servers will themselves be windows into a repository of content larger than an individual school server can hold. They will be exchange materials with other schools and with collections on national servers and across the world.

The servers will provide tools for collaboration across and among XO networks. These include a wiki for the shared development and localization of texts, and a media server for storing and streaming audio and video recordings.

A key concept in the above, is the role of “Curators”. These are volunteers who “curate” and maintain particular repositories of content. Schools will be able to request subsets of content as required from the sources, specially set up for the OLPC deployments around the world. A growing network of curators who have volunteered already, is given on the OLPC website. One can then replicate with curators at every level; regional national, community, school and even the children themselves. [This approach might dovetail with the PRIDE library project]. A regional interpretation of this approach might involve organisations such as USP, SPC and also volunteer communities such as OLPC Friends, and a regional network of content curators could be built.

Comparison and critique of shared work leads naturally to grouping and curation. Curation is integral to effectively finding and sharing content. Curators will help to present comprehensible subsets of reference materials and cultural archives, to the choice of core software tools for creation, to the organization and amplification across the network of great local collaborations.

The curation of content will be done at every level; children will learn to organize and curate knowledge by creating collections for themselves and for one another, and countries and teachers will curate collections for their children and students. The Journal and Library will let children tag materials and associate them with collections from the moment of creation.

A community of curators will help to identify and build collections of excellent resources for children in each subject, and to connect communities of XO users with communities in the wider world that are already creating and organizing free knowledge.

Participatory content development

Collaboration is of the essence of OLPC. The technology makes it easy to create and share and distribute content. This also makes distributing content very scalable compared with printed materials. The key to scalability, sustainability and local relevance is participatory content development. OLPC describe their vision as below:

OLPC is designed around the idea of the free sharing of knowledge. Our goal is to empower children to share and build on what they learn in every way imaginable. There should be no barriers to children who wish to re-create and build on the materials they are given.

XO will bring a world of new ideas, images and materials within reach of children around the world. It will also bring children and teachers new ways to collaborate, create, and transform works over time. Our focus on collaboration as a fundamental element of learning drives a commitment to editable document formats, revision tracking, and careful attribution of authors and sources.

XO provides children with new ways to derive knowledge from what is around them -- ways to record and to try things out, as well as ways to share, compare, and shape the ideas and work of others. This collaboration should be transparent, with the history of contributions and commentary, and each child's own history of contributions, given a primary place in descriptions of any work. At many levels, from clusters of laptops to digital libraries at schools, OLPC tools for creating, storing, and finding content are designed to make sharing easy.

Some methods that can be used include:

- Train teachers to create their own lesson plans and lesson resources and save them on the server. Then train them to share them with other teachers and to collaborate within the school, community, and wider context.
- Training teachers in collaborative platforms for finding and creating OERs
 - The Wikieducator
 - Curriki
- Build a culture of sharing and collaborating in the school (and wider afield) and create online communities
- Create supporting mechanisms, involving volunteers, “champion teachers” and support groups

One barrier to collaboration is the lack of connectivity in rural areas. However, the laptops themselves automatically create networks and simple content collaboration is possible even without the school server. The School Server makes available a number of tools including Moodle, which has built in communication and collaboration functionality. It is expected that a local “Wiki” can also be installed on the School Server, or perhaps initially on a separate machine, which will allow collaborative content development at the school level, regardless of the availability of Internet connectivity. The teacher training should include these techniques and should aim to build a culture of collaboration and local content creation. This topic is discussed further in the section on teacher training.

Linkage to Learning4Content

Tuvalu educators, especially teachers, have enjoyed Wikieducator training courtesy of the Commonwealth of Learning’s Learning4Content programme. Teachers generally find the L4C workshops very empowering but often they have few opportunities to make use of their skills due to lack of affordable Internet access. The

Wikieducator would be an ideal tool to have available at the school for teachers to collaborate on resource and lesson materials.

It is possible to install the MediaWiki (the open source software which is used by Wikieducator) on the school server. Better still, the actual Wikieducator software (which is really just MediaWiki but has some specially customised pedagogical features). To achieve this end, the regional partners of OLPPC could negotiate with OER Foundation of New Zealand, who host the Wikieducator. However, it is established that the basic software MediaWiki will install on the school server.

Joining with the local community in project-based content development

Another good strategy is to identify ongoing (or start new) projects involving the community and organise activities for students to use their laptops to create related content as a contribution to the project. Suitable projects could concern local customs and culture, history, marine biodiversity, livelihood related, climate change, etc. Various groups within the community can provide creative energy and leadership, for instance women's and church groups. These could be run as either extra-curricular activities or if possible/appropriate linked to curriculum objectives. Content created as part of these projects could be any type of multimedia. One good example that could be used is the Virtual Museum of the Pacific (<http://epoc.cs.uow.edu.au/vmp/>), which aims to use participatory methods to engage with Pacific islands communities to catalogue cultural objects. OLPC's website explains their vision:

Networks of laptops and school servers provide a platform for sharing both existing knowledge and new ideas. Our focus is on how these networks will be used to create and discover new things, and to build new communities of learning.

Shared projects hold great power to engage and inspire creative effort. Projects shared across a small group help children to discover their own capacity for teaching and learning. Those shared across a group of thousands have the power to create tools, artefacts, and resources with a diversity, specificity, and comprehensiveness that could not otherwise exist.

Until recently, the simple costs of publication and distribution have made the sharing of locally created projects and learning materials beyond a single school prohibitive. Networks of XO's, and the publishing tools that come with them, will make possible the development and free sharing of learning materials customized to every locale and culture.

Linking OLPC with community radio

It has been said that OLPC is a form of community media. Linking OLPC with other media, in particular community radio, could be a very effective way to stimulate content development. Community radio is based on participatory methods by definition. The radio stations can involve schools in the development of radio programmes on issues of high local demand and relevance providing themes for educational activities and opportunities for the creation of all kinds of related content. In return, the OLPC project provides a creative engine as well as connectivity and resource information for the radio station. Most good teachers will be quick to spot such opportunities. OLPC and Community Radio share the ability to reach and share information with a mass audience. A community radio station with access to the school server established as a community library would become a very important resource for the community.

Networking

The potential of networking to support content development cannot be over emphasised. Teachers and other active participants should be empowered to use the technology to communicate and collaborate – and receive support – from a wider community. This is why providing Internet connectivity can amplify the impacts and

sustainability of an OLPC deployment. It removes the isolation of the teachers and local participations, as well as connecting them to masses of online resources, including the content curator networks.

Curriculum

It is highly recommended that the Content Plan is aligned with the curriculum (as in making educational resources available to support curricular learning objectives) as well as the policies and national education objectives (for instance TVET and increasing access to non-formal and continuing education).

In some Pacific OLPC trials, the Curriculum departments have not been strong participants. There are various reasons for this, for instance lack of awareness of e-learning and of the potentials of OERs, fear of costs, and inflexibility with regard to curriculum reform (i.e. they may be locked into a reform programme with little opportunity to divert scant resources to ICT pilots). However, the OLPC programme offers Curriculum departments a unique opportunity to gain some experience of electronic curriculum resources because of the wide scope. Many ICT for education initiatives are quite narrow in scope, whereas in the OLPC approach all the technology choices are taken care of, and sub-sectors such as teacher professional development are included in the programme.

One fear is that developing e-learning materials is too expensive, time consuming and requires external expertise and capacities that the Ministry may not have. However, the OER approaches above can apply equally to formal curriculum materials as well as for the informal and vocational sub-sectors.

For instance lesson plans for primary schools are available on the Wikieducator, Curriki and other OER sites. These can be used, adapted and localised - and then returned to the source as a contribution to a growing pool of open curriculum materials for the Pacific region. Depending on the availability of networking, teachers can be selected and trained to collaborate with the curriculum department and thus reduce the costs whilst scaling up the outputs. OLPC provides the opportunity for teachers to have a greater role in curriculum development.

The Wikieducator provides a very cost effective means of creating official resources. Teachers, curriculum officers and subject specialists should be given Wikieducator training linked to specific curriculum-linked projects to develop materials linked to the curriculum. Although some may fear the “open” approach used, it is entirely possible to include review mechanism and version controls, and then distribute non-editable approved versions (whilst anyone is free to continue their development on the wiki). The Learning4Content training is now available through the OER Foundation.

Thus, it is recommended that the Curriculum department should actively participate in a country’s OLPC programme from the beginning. They can then advise and steer the programme in regard to:

- Existing curriculum materials that can be made available on the SchoolServer
- Suggestions for collaborative resource development projects, involving selected educators networked through “communities of practice” and tools such as the Wikieducator
- Coordination with other programmes of the curriculum department
- Making secondary school materials available on the school server for learners who have left school (push-outs, mature students, etc). (See also Open Schooling).

Formats can include:

- PDF. Materials developed on the Wikieducator can be downloaded as high-quality PDF documents. It is a very efficient way to publish materials, as much of the time consuming formatting is taken care of automatically. Further refinement can be made by using landscape format and a standard font size suitable for the XO laptop screens, such that one page at a time can be displayed.

- Editable materials (worksheets, tests, etc) can be produced in Word or ODT (Open Office equivalent).
- OLPC brings the possibility of more widespread use of multimedia formats including audio and video.
- As the OLPC programme matures in the region, expertise may develop in producing new Activities for the XO laptops specifically designed around curriculum objectives. These could be games or interactive learning applications.

Localisation

The OLPC is designed around the concept of localisation. This includes:

- The operating system of the laptop, and all the applications (Activities) can be translated into local language. The OLPC has set up a collaborative online system for volunteers to work on localisation projects for different languages. It uses open-source software Pootle. A request to open a Tuvalu project has been made.
- Phonetics for Tuvalu can be developed for the text-speech synthesiser. This already has English and about 30 other languages phonetics installed. In the meantime, we can see which of those existing phonetic schemes sounds similar to Tuvaluan.
- Localisation of content is largely part of the collaborative content development, where open educational resources are adapted with local languages, cultural icons and local interpretations.

A **Localisation Team** can be agreed – this can be a group of volunteers (teachers, education officers, volunteers) who can be quickly trained to log on and work on the translation files over a few months. Once complete, translated files can be loaded on the XO laptops and it will be possible to “toggle” between English and Tuvalu.

Open Schooling and Content

OLPC originally aspired to extend education opportunities to those who currently do not have the chance to attend school, or who drop out at an early stage. There is now a

Partners in Content

As described above, content development needs to take place at local, national, regional and International levels. For instance:

- Local partnerships with community groups such as women, youth and church organisations;
- National partnerships with government departments, NGOs and programmes, and private sector organisations that wish to share or collaboratively develop information resources; This includes regional programmes such as those of SPC;
- Radio stations and other public media
- OLPC clubs that can learn to develop Activities (and projects using existing Activities such as eToys)
- Educational institutions, such as USP, UQ and others
- The OLPC Oceania Technical Working Group (see separate section)

Some examples of content strategies

Australia

Nauru has adopted a Rich Task Curriculum for primary education. The curriculum is based on themes within which the different subject areas are intertwined and the learning takes place through activities extending to the students’ homes and the community. This aligns the learning environment with the local environment, including cultural factors. This approach encourages collaborative content development associated with the themes.



Activity 1

In groups, reflect on:

- What potential local sources of content can you identify?
- What other open educational resources can you identify, including local, international, online, etc?
- Can you identify any local, national and regional partners for content?
- How can we build and sustain a culture of collaboration and participatory content development?
- How will the curriculum department be involved, and what recommendations do they have for the programme?
- What other comments and ideas regarding content do you have, including how to align the process with national education policies and objectives in all sub-sectors?

2. Check out some online sources...

ideas - free etexts:

<http://www.peacecorps.gov/wvs/publications/voices/pdf/VoicesFromtheField.pdf>

<http://www.freebookcentre.net/>

<http://www.e-booksdirectory.com/>

<http://gutenberg.net.au/>

<http://about.ck12.org/>

<http://www.archive.org/details/texts>

blogs in vernacular

newspapers in vernacular

SPACE FOR NOTES

SERVER AND INFRASTRUCTURE

OVERVIEW

When we deploy one laptop per child, we must also provide additional infrastructure extending the capabilities of the laptops. While the laptops are self-sufficient for many learning activities, other activities and services depend on the School Server providing connectivity, shared resources and services. Services, tools and activities running on the School Server allow asynchronous interaction, can use larger storage capacity, and take advantage of the processing power of the XS. The School Server (called the “XS”) complements the deployment of XO laptops in the classroom environment in the following ways:

- Ensures reliable collaboration between a class-size group of XO laptops
- Provides a reliable way for the teacher to manage resources and group activities
- Allows grouping of students and resources into classes, subject and courses
- Acts as a massive repository of resources, important if Internet is unavailable or insufficient
- If Internet is available, it allows controlled access for students and teachers
- Storage for materials created by both students and teachers

MOODLE

The School Server from version 0.6 has a tailored version of the award-winning Moodle course management system. Many institutions, such as USP, Divine Word University, Open Polytechnic of New Zealand and others offering distance learning use Moodle as their main system for course administration. Moodle has many built in features that add to the teacher’s toolkit for teaching, communicating with students and assessment.

The XS School Server has a version of Moodle especially tailored to be as child (and teacher) friendly and as simple to use as possible. When a student logs on to the School Server, the first page he/she sees in the browser is Moodle home page, with any announcements or links that the teacher has put up for the lesson. Moodle allows the following:

- Dividing students into class groups and allocating resources as required (for instance, as an open library permanently available or for a particular subject or lesson)
- Broadcasting announcements and news to students via the Moodle home page
- A “question for the day”, quizzes and surveys
- Messages to individual students, feedback from individual students
- The teacher can upload materials to the server and make them visible for students as required
- The teacher can set assignments and students upload their completed work for assessment



Activity 1

Look at some examples of how Moodle is used around the region:

- USP’s E-Learning centre <http://elearn.usp.ac.fj/>
- DWU’s distance learning centre <http://learn.dwupng.net/>
(“Careers” allows free/guest access)
- OPNZ – OER Repository <http://oer.repository.ac.nz/>
(OER=Open Educational Resources)

HOW RESOURCE MATERIALS ARE MANAGED ON THE XS

With version 0.6 of the XS, content can be placed on the server as (a) public folders and (b) uploaded as “course files” or “site files” within Moodle.

It is also important to understand that groups of students (and teachers) can be segregated into groups for the purpose of managing classroom activities and resources. It is entirely flexible, but the simplest scheme would be to divide students into class groups with one or more teacher “administrator”. In a large school, if this is not done then the server and/or access points can become overloaded, and the “neighbourhood” screens of the laptops become impossible to use for so many users.

Public folders

Public folders are simply folders that can be accessed from any machine on the network using a browser. This means of providing content does not make use of Moodle. At the time of writing the easiest way to transfer content to public folders is to copy it onto the appropriate directory from a flash drive, which requires some technical skills, or by “drag and drop” from a connected Windows computer using WinSCP3, as described below. Suitable content formats include:

- HTML. Content arranged as linked HTML pages with an “index.html” home page can be browsed just like any web site;
- HTML can have embedded Flash animations;
- PDF files, which will open on the XO is the “Reader” activity;
- Microsoft Word (.doc) and Open Office (.odt) files which will open in the “Write” activity;
- XO Activity (.xo) files that have been downloaded from the OLPC or SugarLabs websites;
- A variety of files created on the XOs themselves using the activities.

Once the public folders have been set up as described below, they can be accessed on any XO connected to the server by simply typing the URL <http://schoolserver/content>. This will display in the browser EITHER of the two below:

1. If an “index.html” file is found in the root public folder, this will be displayed in the browser;
2. Otherwise, a directory listing is shown. One can then click on any file or folder. The same applies to subfolders; if an “index.html” file is found it will open by default, and if not, the directory contents will be listed.

Note that the XS is fully customisable and someone with Linux skills can modify any of the default behaviours described above.

These folders can easily be made available within Moodle by adding the URL (i.e. <http://schoolserver/content>) as a link in a course or on the Moodle home page. (Note; only the XOs which have been given administrative rights can do this).

Setting up Public Folders (this sub-section is intended for technical administrators)

The most usual place to locate public folders is in the folder

```
/var/www/html
```

As this folder contains some default files, it is better to make a new directory

```
/var/www/html/content
```

You can now copy all your content folders into the above folder. The scheme adopted with the Solomon Islands demonstration server uses a Home page “index.html” written in HTML, with a link to a second “content” folder containing all the content sub-directories.

In order to make these folders “public” one has to first create a configuration file (on the server). This can be done using a text editor (such as *nano*). This file should be written/copied to the location:

```
/etc/httpd/conf.d/
```

The code is as below.

```
Alias /library /var/www/html/content
<Directory /var/www/html/content>
Order allow,deny
Allow from all
</Directory>
```

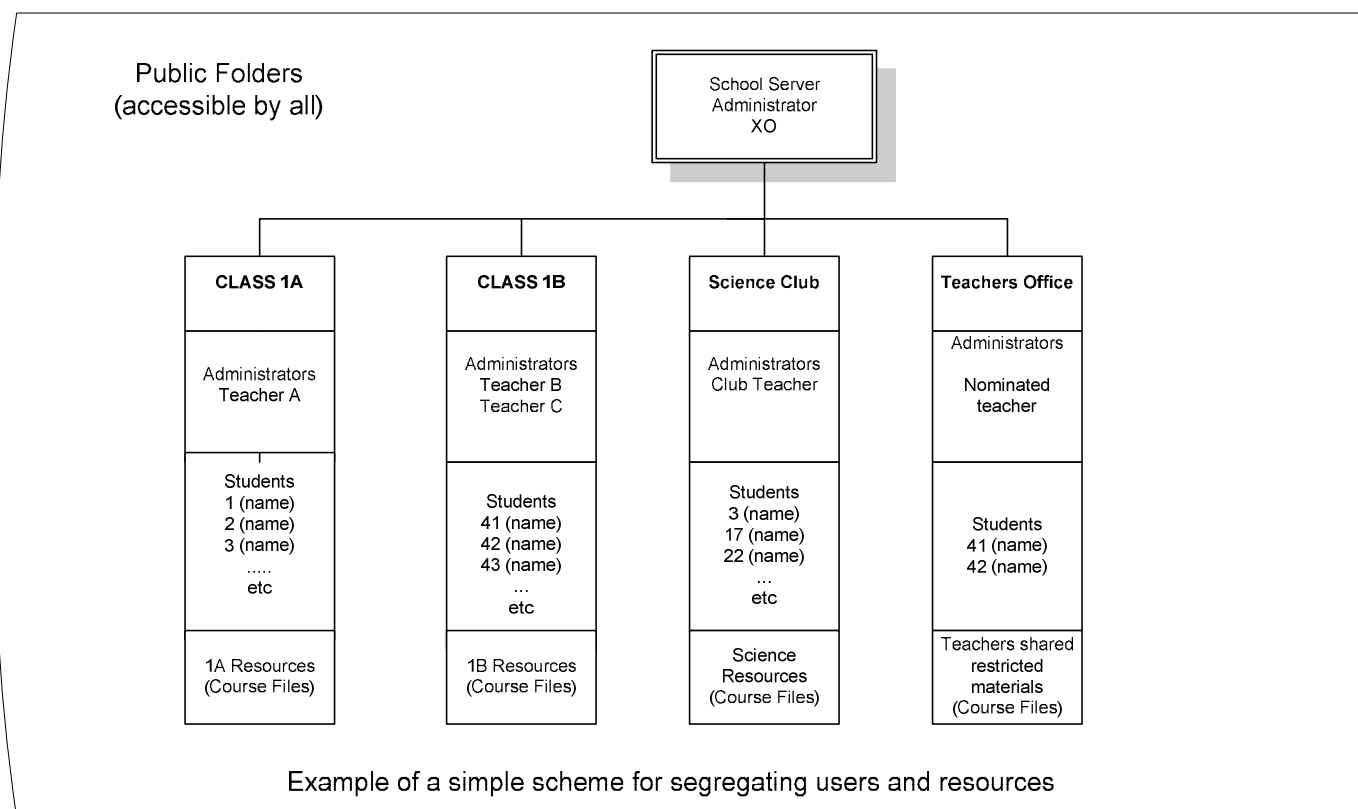
This will create public folders that can be accessed on the XO's by typing the URL below. If the folder is called something other than “content” then the code above should be changed accordingly.

<http://schoolserver/content/>

Segregating users and resources into groups: Creating “courses” in Moodle

Very small schools with less than 50 students may not need to be divided into groups. However, in most cases it is necessary to avoid overloading the infrastructure and XO's with too many users in the same network “cloud”.

Moodle allows groups of students and resources to be segregated into classes, courses or any other schemes. This is done using the “course” functionality of Moodle. For instance, one simple scheme is shown in the diagram below. Note that users can only “see” the public folders plus the course files in the “courses” to which they belong. In the simplest scheme shown below, a “course” is set up for each class group and teacher.



To set up the courses, the administrator XO laptop must be used. This is the first laptop to be registered to the server. Thus, please observe the following:

1. Plan the server groups (aka “courses”) and administrators (teachers) for each group before registering the laptops.
2. Decide on the “administrator” laptop from the start. The first XO to be registered will automatically be made an administrator. Moodle will remember the serial number even if the laptop is “re-flashed”.
3. Decide on any other persons/XOs to be given “teacher” and “course creator” rights. Most teachers will not need to be course creators, but it is useful for a few to have those rights in case the administrator XO is unavailable when a course needs to be set up.
4. Other users can now be registered on the server all the other users
5. You can now use the first administrator to change the roles of other XOs to “teachers” and “course creators”.
6. In each course (i.e. class group) the “teacher” now joins all the students in that group using the administration functions on the left pane.
7. Finally, the admin XO must be used to change the status of the “presence service” so that it splits the users “by course”. This is done using the control on the front page, left pane, “courses>presence service” and check the check box to split by course. At any time this can be changed if you want all users to see each other in neighbourhood view.

Note, to re-register a laptop you have to first delete the configuration file. This is done by using the Terminal Activity. Type the lines below and reboot. You then have to enter the name and colours again, and you will find the “Register” option re-appearing on the XO.

```
su
rm /home/olpc/.sugar/default/config
reboot
<enter>
```

Moodle Site or Course files

Public folders make resources on the server available to anyone who connects, regardless of the Moodle “course” or user group. However, files can also be uploaded using Moodle by the administrator for the whole site, or the “teacher” allocated to any “course” (or class group). These can be made generally available or just for the day’s lesson. They can be uploaded from the Journal of the teacher’s XO. Files from other sources can be transferred to the journal easily from a flash drive.

To add folders (directories) with files that are available for anyone who has logged on to the Local School Server, the administrator XO is needed. The process followed by the administrator is as follows:

1. On the Moodle Home Page, click “turn editing on”
2. Click “Front Page” and then “Site Files”
3. Use the screens to create folders where you wish to save specific contents. Remember that some thought is needed to categorise the categories of content effectively and create a logically ordered archive.
4. The same screens contain an “upload a file” option to upload files to the directories. If you select this, you will be asked to locate the file you want to upload from your XO’s journal.
5. When the file has been uploaded you can rename it and move it between the site folders as required.
6. The file is initially given a random name so remember to rename it, using the link provided
7. To make the directories appear for any user on the Moodle home page, click “add a resource” and select “Display a Directory”

8. To make a particular file appear on the Moodle front page, use “add a resources” and “link to a file or website”. Note that on the next screen that appears “Adding a new Resource”, there is an check-box option “force download”. It is just off screen below the “choose or upload a file” button. Please check this now. Then click the “choose or upload a file” button and “choose” the file you want from the site directories.

To add a file within a course (class group), the teacher enters the Local School Server using the browser, to access Moodle. He/she then:

1. enters the course (for instance “Class 2B”)
2. turns “editing on”
3. If the file you want to link to is not already uploaded into the course, you must first do so:
 - a. Locate on the left side “Files” under “Administration” and click it
 - b. Follow similar process to the site files (above) to create course directories and upload files to them
4. Now, in one of the course areas (centre pane) click “add a resource”
5. You can either add a link to a specific file (remember to select “force download”) or “Display a directory”
6. The files or directories will now be available to users entering the course.

Uploading files from Students

It is now possible for students to upload a file (which could be a written text file such as an essay or story, a picture, or any files created with their XO) and it is automatically made available next to the student’s name for the teacher to mark and assign grades.

To set this up, the teacher with admin rights for the “course follows this procedure”:

1. Start a browser and click “Local School Server” to access the Moodle front page and enter the course
2. Turn editing on
3. In the course area (centre pane), click “add an activity”
4. Under “Assignments” select “advanced uploading of files”
5. Follow the screens and enter required information and this will then appear as a link for students.
6. When students select this option, they will find a simple screen that asks them to upload their “assignment” file with your words of guidance appearing above. Optionally, they will have only a certain number of attempts (usually only one) to upload a file, so that they can’t replace their class work with a later edited version.
7. When students have uploaded a file, the teacher can click “assignments” in the left side course administration area and a list with all the uploaded files, with the student’s names and place to add grades/marks.

There are other ways and subtleties to managing classroom resources in this way. The Moodle skills required should be the subject for teacher training. We can decide what training is needed during this workshop.

Tools to manage content

With the current version of the server (0.6), it is not possible to transfer large quantities of files to the Moodle site and course files areas at once. They have to be added one by one by uploading from an XO.

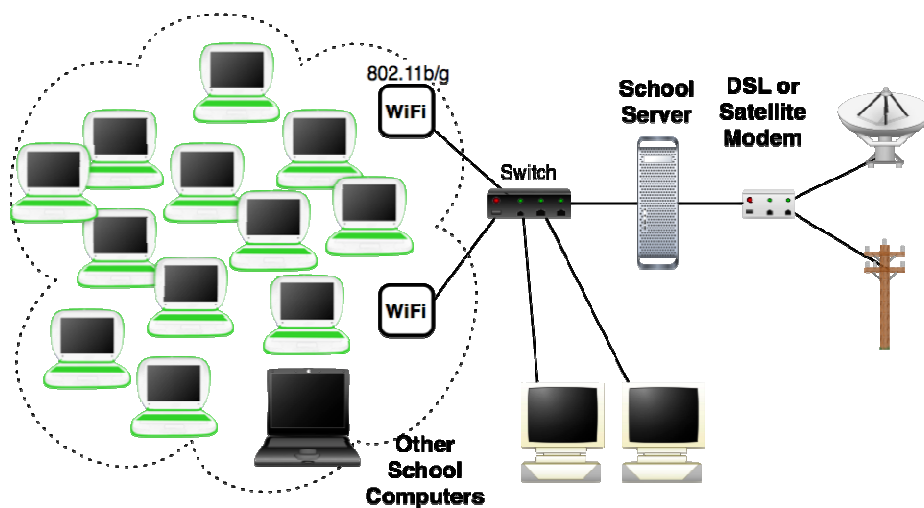
If you want to make a lot of resources available quickly, the best way is to use the Public Folders (i.e. outside of Moodle). You can manually copy the folders and files (i.e. from a flash drive) to the /var/www/html/content folder as appropriate. This requires some knowledge and skills with Linux and there is a danger of copying to

the wrong locations. However, with care it can be done. It is advisable to make regular backups of the public folders so that if any mistakes are made the folders can be quickly restored to a previous state.

It is also possible to use any Windows computer connected to the school server on the LAN side (i.e. via eth1, the same network as the access points) and use a service such as WinSCP3 to allow “drag and drop” management of the Public Folders. Please contact the author for information on setting up WinSCP3 to connect to the XS.

SCHOOL SERVER INFRASTRUCTURE

The basic system is shown below. To ensure that the access points do not become saturated, you need one AP per 20 users. Thus, in a typical classroom with up to 40 students, two APs are needed. In a double classroom block, four are needed.



The XS school server machine must have two network cards. One (eth0) is used for any external or Internet connection. The other card (eth1) is used for the internal local area network, on which the access points (set up with identical SSIDs) plus other school computers can be connected. Internet will be shared with all the XOs and school computers by default. If access is to be controlled, this must be configured on the XS. There are several ways to do this, but it is not within the scope of this document (we can provide assistance to the ICT team at a later stage).

The capacity of a single server depends on the hardware specification. There are no hard and fast rules, but we can learn from experience as the school server is introduced in other countries. See the links below for hardware specifications and other guidelines.

The choice of server hardware depends on the school situation. In a location with reliable power and access to an air-conditioned server room, it might be best to use a single high performance server to cater for the entire school, and to employ standard IT maintenance and backup procedures. In a typical remote Pacific Islands primary school power may be at a premium or unavailable, and therefore the use of multiple small “eBoxes” (such as the one tested by SPC below) might be the most reliable way to maintain access to resources throughout the school day. In this case, perhaps one eBox server per double classroom block would be sensible.

As the regional experience grows with this technology, more advice and hard and fast rules can be given.



An example of a small, low power, “eBox” suitable for a solar-power

PLANNING FOR THE SCHOOL SERVER

Simple Roadmap for School Server

1. How will you segregate access for students (simplest way is by class)? Try to avoid groups of over 40 students.
2. Will you have any other groupings (teachers, subjects, restricted access resources)?
3. What resources do you have available?
4. Which resources will be public?
5. Which resources will be by class group?
6. How will you make library access available?
7. The first XO to be registered is the “admin” XO. Other XOs (i.e. teachers) can be given administration rights for each group. These rights are called “roles”. A group is called a “course” in Moodle). Each administrator will be given the role of “teacher” for that particular “course”.
8. Decide who will be the “teacher” (administrator) for each “course”. You can have more than one “teacher” per “course”.

The administrator XO is used to set up the courses and allocate students and teachers. Teachers can then manage everything within the course for which they have been granted rights.

LINKS

All the information available on XS configuration, techniques and hardware specification can be found here (note this link is case sensitive):

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

It is also highly recommended for ICT officers involved in maintaining the school servers to subscribe to the OLPC XS School Server development list (email group). Do so here:

<http://lists.laptop.org/listinfo/server-devel>



Activity 2

Hands-on Demonstration of an XS School Server

- Connecting
- Finding the Local Schoolserver using Browse Activity
- Moodle home page – segregation into class groups
- Accessing public folders (UNESCO resources, SIL readers)
- Teacher sharing resources with a class
- Teacher creating a Poll and making it available for the class
- Moodle functions – Quiz, Questions, Announcements
- Setting up an assignment with students to upload their assignment files
- Try it yourself

TECHNIQUES FOR THE SCHOOL SERVER IN THE CLASSROOM

This topic will be explored in the chapter on “Activities and Classroom Integration”. Some possibilities include:

- The teacher can start up an activity, or open a resource from the server, and “push it” to all the students as part of a whole-class activity managed by the teacher
- The teacher can prepare a lesson resource in advance and link it to the Moodle front page or the class “course” page for easy access by students
- The Assignments facility allows the teacher to collect student work and then mark it
- The school server can be used to update laptops’ activities
- Some activities such as video chat require the school server
- The school server is essential to ensure reliable collaboration (i.e. “sharing” of Activities) between a large group of XO’s.

SPACE FOR NOTES

THE ACTIVITIES ON THE XO

THE XO OPERATING ENVIRONMENT - SUGAR

The OLPC's XO laptop runs an operating environment called "Sugar". When you start up an XO, the interface you see and the various frames, views and functions is Sugar. Unlike Windows, it is specifically designed for children's learning rather than as an office productivity tool. It will run not only on the XO, but on any computer which is able to run the open source Linux software. Sugar designed around the following principles:

- Sharing and Collaborating
- Interacting
- Discovering
- Reflecting

There is a more detailed discussion of Sugar in the book "The XO Comes to Class" by OLPC Australia (on your resource CD). The book also has a very detailed user guide to the laptop itself.

Note that Sugar and the Activities can be run on a flash drive "Sugar on a Stick", which will boot up on any desktop or laptop computer so that people can experience the Sugar learning experience without access to an XO laptop.

This is an important illustration that OLPC is much more than just a "low cost laptop."

THE ACTIVITIES

The programmes that run in Sugar are not called "applications". They are called "activities" because the focus is on interactivity and collaboration.

For instance, a traditional computer application consists of a programme, which saves the work in folders and files. There are no folders and files in Sugar. Instead, Sugar saves a history of a child's progress through his/her learning in the form of a Journal. The Journal is a day-to-day account of what activities the child has engaged in, and what he or she created along the way. Thus, work created during activities is saved in the journal as well as a record of what he/she did on that day.

Work created on the XO is auto-saved. This means it should be difficult to lose work, and the school server contains means to automatically make back-ups as the student works. Work saved on the XO can be uploaded to the server (using Moodle) and transferred to/from other computers using a flash drive (some Activities create files that can be viewed in Windows, especially if Open Office is installed).

DETAILED DESCRIPTIONS OF ACTIVITIES

A basic outline of some of the core Activities is given in the annex.

The "XO Comes To Class" is an excellent introduction to the core set of Activities. The "XO In The Classroom" also has descriptions of activities although it is more focused on classroom ideas. However, it has some very useful guidance to the more sophisticated programmable Activities such as eToys and TurtleArt. In addition, the laptop itself has a Help Activity, which describes some Activities.

HOW TO GET NEW ACTIVITIES

New Activities can be located on the OLPC Wiki and the Sugar Labs websites. Activities can be downloaded directly onto an XO or to any Windows or Linux computer and loaded onto the XO with a flash drive.

The most effective way to make activities available to a class of students is to save them in a public folder on the school server. Children will love to explore and try out new Activities, and this also is far less time consuming than physically doing upgrades for the students.

There is a continuously growing pool of varied Activities developed by the community of OLPC developers around the world. This process illustrates how open source principles can drive forward massive development projects that would be impossible for small, modestly funded organisations like OLPC and Sugar Labs to do alone. This principle applies equally to OLPC country programmes, which need leverage wide partnerships and “cascading” approaches to capacity building and content development in order to scale up to national level.

CREATING NEW ACTIVITIES

Everything about the OLPC technology is open, visible and adaptable – and accessible by the students themselves. This even includes Sugar itself. Sugar and the Activities are written using the Python programming language, which is an easy-to-learn interpreted language. The XO includes a Python editor (Pippy Activity) to enable students to start exploring this new highly creative environment.

Thus, in time it will be possible for Tuvaluan students and people with interest in IT on the OLPC programme to programme up new Activities, perhaps highly localised and relevant to the needs of young learners in Tuvalu.

This potential can also be seen as a powerful medium for development partners of Tuvalu to use to reach and interact with young people and their communities. For instance, an activity might be written (using Tuvaluan language) about marine biodiversity or climate change, mother and child health education, HIV/Aids or other high priority subjects. A focus on content can often result in strong partnerships with cost sharing.



Activity 1

In groups, reflect on:

- Try out some activities, with the help of the facilitator.
 - Demonstration of sharing and collaboration the “Complete” lesson
 - Speak – including collaborating with chat mode
 - Record – including with sharing
 - Memorize – played as a game with four people
- Look through the reference books and Help Activity
- Locate the Activities pages on the OLPC and Sugar Labs websites
- Add a new Activity from the server
- What would make for some good Activities for Tuvalu?

ANNEX: SOME SIMPLE ACTIVITIES TO START WITH

Poll Activity

- Very easy to use and set up
- Once students know it, very easy to manage in class
- Fits very easily into rich task
- Students can take home polls and ask family
- Come back and compare patterns in their results
- We need to test best way of saving students' results on the server
- Build up a list of suggested poll questions for each rich task theme / week

Measure

- Easy to capture sounds
- Can be saved (click "start record") and inserted in Write
- Suggest table with 2 columns, name and waveform image
- Students can use it to appreciate loudness (amplitude) and pitch (high, low) and tonal qualities of sounds
- Can be paired with TamTam etc

Memorize

- Easily integrated into many rich tasks
- Matching pairs
- Need to try out creating games PRACTICE PRACTICE
- Need to work out best way of sharing the prepared game with the class
- One way is to share with groups of 5 max in turn (everyone else has laptops turned off)
- Students can be asked to try creating games (as an option for advanced students)
- Skill requires knowledge of taking and naming photos, saving (keeping) in journal and recovering in Create game

Write

- Can be a standard tool in many lessons
- Can increase productivity (creating tables is quick)
- Teachers should be aware of where it can help
- Learning about tables
- Learning to classify things
- Saves time compared to drawing tables
- Can insert images and paintings quickly (match picture of object with name or text)
- Be aware of downsides, until you are very skilled
 - it is difficult to collect the student's work
 - Initially students need a lot of help
- Good idea to set them a write task each week

Record

- Can be a standard tool in many lessons
- Can increase productivity (creating tables is quick)
- Students find it very easy
- Must help students learn to name and keep images for use in other activities
- Learn also to use audio and video (including naming and keeping and recovering)

Speak

- Two modes, simple and chat. Chat allows collaborative audio chat: Very effective, forces children to write proper phrases
- Use whenever learning new English words
- Helps students to gain confidence speaking
- Can be used in tandem with Write and Record
- Use together with books or blackboard
- Home work idea
- Students take home list of words or a text
- Use Speak to help learn pronunciation
- Use Record to hear how well they did

Chat

- Good way to encourage group work
- Helps them understand sharing etc
- Get groups started independently
- Small groups or pairs work best or it gets unfocused
- Trick will be to think of guiding the conversation and relating it to the rich task
- Idea: Students write sentences to each other, they then have to speak them aloud, they can use Speak activity to help (one laptop running Speak in each group)

Other simple activities to start with

- Paint (good for home work – paint leaves etc)
- Calculator (try out some sharing)
- Moon and Star Chart (home work , rich task)
- Stopwatch to time things
- Use with Distance or measure distance normally
- Calculate average speeds (higher years??)
- Clock game to learn time
- You can use games like Connect, Memorize

SPACE FOR NOTES

POWER INFRASTRUCTURE

OVERVIEW

The XO Laptops have been designed with very long lasting batteries. Depending on what activities and processes are run, the battery life is between 4 and 7 hours, and it takes about 2 hours to recharge. Furthermore, the power consumption during operation is only 5-7W compared to 60-100W for a laptop and 100-200W for a desktop. The XO consumes 17W during charging.

This low power consumption has major implications in opening up the range of affordable options for charging a large number of machines on a daily basis. However, the low power usage is offset by the large number of laptops that will be present at a school. In many of the Pacific Islands countries grid power supplies are not available in much of the rural areas. Schools in such locations sometimes have generators, but they are typically only used for 3-4 hours in the evenings.

This section describes some solutions that have been developed for OLPC deployments.

COORDINATION AT THE DEVELOPMENT PLANNING AND POLICY LEVEL

OLPC deployments require power supplies in schools. There may well exist rural electrification programmes that are being planned, on-going, or regionally available that could assist with this need. The OLPC team in the Ministry should therefore seek to identify and coordinate with such programmes, including any plans the Ministry may already have in regard to power supplies for schools. Likewise, a review of government policy with regard to rural electrification may provide some useful linkages and reveal some potential partners. Power is similar to communications in the way that it's provision can create synergy between different applications which amplify the beneficial impacts and help with sustainability.

CHOICE OF POWER SUPPLY

Some of the issues that affect choice of power supply for rural schools:

- If the children do not have power available in their homes, the laptops will arrive at school the next day with flat batteries. They will nevertheless wish to work with them in class and then go home with a fully charged battery. Therefore, ideally power will be available during school hours so that they can work with them at the same time as they are charged.
- Evening-only power supplies, as exist in many rural schools, allow the possibility of laptops being charged overnight. However, this means that the children cannot take them home, which reduces the potential impacts on the learning environment by restricting the laptops to school. However, this solution is used in several OLPC trials, mainly because they went ahead when the laptops were donated, but without taking power requirements into consideration (often for lack of funding).
- In some deployments (as in Peru) generators have been used, as the total cost taking into account the initial cost and lifetime of the generator, fuel and maintenance is less than the equivalent solar power supply, or the school is situated in an area not suitable for solar power
- Solar power may be more elegant a solution, as it involves no daily running costs besides the eventual replacement costs, is not prone to fuel supply issues and is generally less likely to break down if looked after. Also they do not make noise or pollution and are environmentally friendly.
- Some locations are too cloudy for solar. Tuvalu receives above average insolation (sunshine) and therefore this is not an issue.
- If grid power is to be used, the cost of electricity must be added to the equation during planning. 100 XO laptops used all day may add between 5 and 8 kWh (units) of power (which would cost USD \$3 per day or \$90 per month in Solomon Islands, for instance)

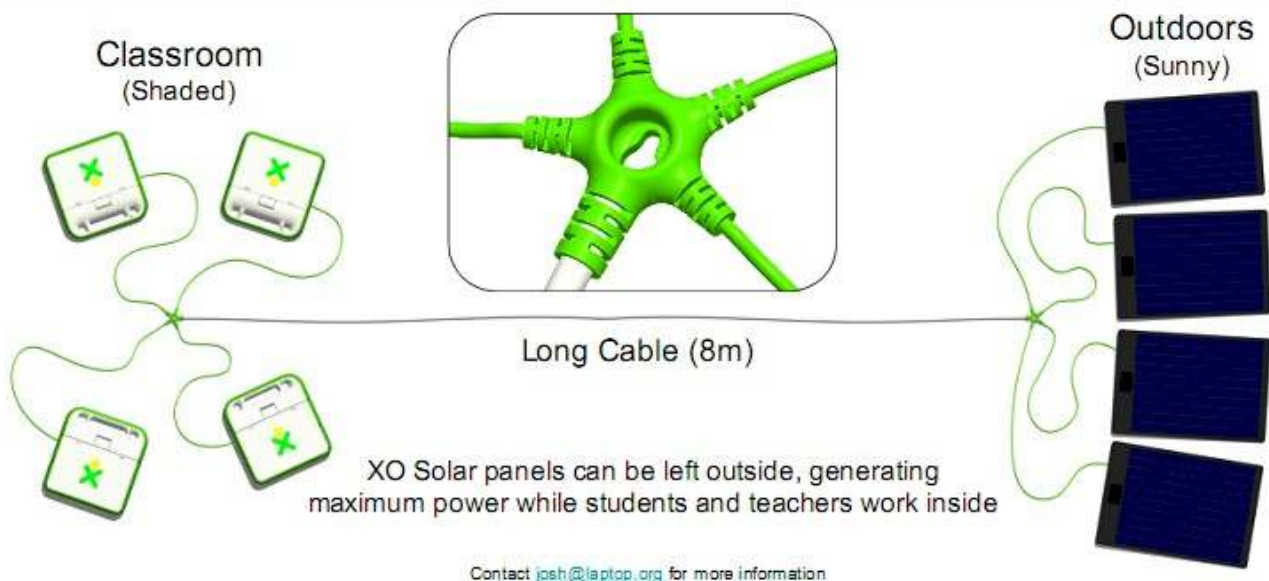
SOLAR POWER

Traditional fixed solar power installations use crystalline panels and battery banks, usually with inverters. The power requirement for a school with more than 100 laptops can make such systems impracticable (a 100 laptop school would need about 10KWh of panels and approximately 4000Ah of deep-cycle battery storage).

In response to the challenges described above, a solution has been developed by the OLPC with partner organisations that does away with the fixed solar approach, in favour of light weight, low cost thin film panels that can be directly plugged in to a laptop to charge it as it is being used. This satisfies the requirement that the laptops can be used during school whilst ensuring they finish the school day with a full charge (mostly – obviously some days will be lost for cloudy weather). It also gives the option for students to take them home. In order to facilitate this in the classroom, the DC Share cable is available. Students can then sit inside, in groups of four, each with a DC share cable that is routed through the windows, with the four solar panels on the other end laid out in the sunshine. The total cost of this solution is much less than traditional solar power. It also does away with the need for batteries and inverters and their associated replacement costs. Furthermore, the thin film panels are very light weight and resistant to damage. There are some concerns about the lifetime of the panels; however with the cost at only USD \$60 - \$70 for a 20W panel, it will be easier to provide a stock of spare units and consider the cost as part of the “total cost of ownership of an XO”.

This system is being trialled in PNG by PNG Sustainable Development in association with Divine Word University.

DC Power Share Utilise XO Solar throughout the day



SERVER REQUIREMENTS

The school server and wireless access points will also need power to be available during school hours (and preferably most of the day and evening). Considerations of power supply will affect the hardware to be used.

A school with good reliable grid power could consider a single high-spec server, maintained carefully in a cool room.

If solar power is to be used, a better choice might be to use a small “eBox” as the school server, with one for each double classroom block (for example).



An example of a small, low power, “eBox” suitable for a solar-power
Cost is about USD 500 or less. Power consumption (with screen off) is less than 15W
Storage is 160-300GB.

Thus the school would need several servers, but each would be very low cost and low power. Each would then have its own solar power supply. In a typical rural school consisting of double classroom blocks, each would have its own small fixed solar power supply consisting of about 240W of solar panels with 200Ah of battery storage, and with care, no need for a fragile inverter.

POWERING THE WIRELESS ACCESS POINTS

One AP is needed or every 20 laptops. Hence, a single classroom will usually need two APs. If the small servers shown above are used with solar power, an elegant way to power the APs without needing 240V AC power is to use Power Over Ethernet (POE). This uses the Ethernet cables to carry the DC power (usually from the 12V source) to the AP. Cable length must be limited to 20m or so, but if the solar batteries are located in the centre of the double classroom block (often the location of a small office) then this would work well. Linksys do a version of the popular W54 wireless access point that supports POE.

CHARGING RACKS

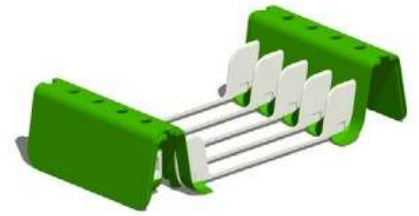
Hundreds of laptops in a school present a problem when it comes to storage and charging whilst not in use. The OLPC and partners have come up with a very neat modular solution called the XOP racks, which have integrated “daisy chained” power. Thus up to 24 laptops can be simultaneously racked neatly whilst being charged from a single power outlet.

Powered Storage Rack for XO Computers

Charge all your XO's in one place - using one power outlet

→ Modular Storage Rack

- Comes in sets of 5 storage slots to hold 5 XO's
- Each set is easily assembled / disassembled - no tools required
- Sets connect together to accommodate 10, 15, 20, 25 or more XO's per rack
- can be secured down for additional robustness



→ Modular Power Source

- Comes in sets of 5 low-voltage power connectors, spaced to match the modular storage rack
- Each set easily threaded through the holes in a matching rack
- Sets can be daisy-chained together, so that all XO's are powered from a single power outlet
- Children handle only low-voltage sources



→ Modular Power Source

- Creates a tidy classroom - no stacks of XO's on the floor or draping power cables
- XO's are quickly and easily stored / retrieved with minimum classroom disruption in a simple classroom
- Routine will keep XO's near fully-charged for spontaneous use
- Simplifies the integration of XO's into the teacher's daily Lesson Plans



Activity 1

In groups, reflect on :

- The availability of power in Tuvalu's schools
- The choice of generator vs solar power in the Tuvalu situation
- Possible linkage to rural electrification programmes and policies

SPACE FOR NOTES

MONITORING AND EVALUATION

(this section is rough draft only)

Monitoring and Evaluation is an essential component of an OLPC programme. This should be designed at the beginning of the programme in connection with setting firm goals and vision.

An example of an objectives framework from the Solomon Islands is given in the Annex. The Solomon Islands trials programme were started from the outset with the intention of evaluation over a period of time. The independent evaluation has been carried out (by the Australian Centre for Education Research ACER) and a draft report is expected by the Ministry of Education in January 2010. The results should be made public after the report has been finalized.

References concerning M&E available on the resource CD:

- A Guide to Measuring ICT in Education, UNESCO
- Challenges and Impacts of OLPC, Leeming, Thomson (PRIDE pub.) (see annex)



Activity 1

In groups, reflect on:

- Make suggestions for what should be included in an M&E framework for the Tuvalu OLPC programme

ANNEX : SOLOMON ISLANDS OBJECTIVES AND EVALUATION FRAMEWORK

Objectives	Expected outputs	Indicators and instruments (how it is measured)
Awareness raised about OLPC and the objectives of the trial in Western Province	Ministry, teachers, sector partners and communities aware of: The vision of OLPC The function of OLPC/XO/XS Objectives trial in the Western Province.	Consultation and briefing meetings held with the Ministry, schools and communities Interviews and survey
To assess the impact of OLPC in the area of Teaching and Learning (In each sub-sector: Early Childhood, Primary, Secondary, TVET)	The XO is used in Teaching & Learning at schools and centres The XO is utilised in particular for some of the subjects The XO is integrated into normal/formal T & L-formal education delivery Teaching methods are affected positively through the use of the XO in T & L, including more/improved: (a) Learning by Doing (b) Child-focused teaching (c) Group work/sharing/collaboration (d) Inclusion / engagement of all students (e) Curriculum changes as a result of the XO/OLPC project (f) Impacts seen in all sub-sectors, but mostly with early age education (Early Childhood Education and Primary Education) (g) Also assess any possible negative or non-impact; learners and teachers not using XO or only after school hours	Interviews and surveys with school managers, teachers, students, students, community members Teacher log books/diaries Class observations Demonstrations by teachers about the workings of XO Increased use of XO by learners in formal lessons and after school hours
To assess impact of OLPC on enrolment or attendance	Increased enrolment or improved attendance at selected schools compared to schools where OLPC or XO has not been introduced	Attendance register
To assess impact of OLPC or XO in delivering/producing new curriculum materials/learning content	New electronic content made available (in schools) The school server is an effective source of content 'Wiki Educator' more frequently used	Materials provided by School Ministry/curriculum NGOs / partners of education sector OLPC Oceania / SPC
To assess if OLPC/XO- technology is technically feasible and sustainable	Teachers and students are able to use and continue to use the laptops Power supplies are feasible, affordable Good quality Internet connectivity Required level of technical support, maintenance is available XO-Equipment is reliable, functional and still working Interviews, consultations and surveys	Demonstrations by students, teachers Technical report on power and connectivity infrastructure Options, performance, cost, Number and type of equipment failures
To assess impact of capacity building for teachers (and learners) in the OLPC project	Training (for XO) has built sustained capacity Training system/schedule and methodology is effective Teachers are able to integrate the use of XO in formal and informal class-work Teachers have improved access to resources and training support	Interviews, consultations and surveys with trainers, teachers and learners Evaluations of training, capacity building
To assess the impact of OLPC on the learning, and school environment	Teachers and students regard the XO and OLPC project positively School seen more positively by the community Teachers have improved morale Absenteeism under teachers and learners is reduced Higher demand / enrolment / retention (teachers and students)	Interviews, consultations and surveys with teachers, learners and community members School records, minutes of school board/committee meetings Public meetings Parents meetings Inspectorate visits Note: OLPC/SPC will provide advice on survey instruments/questionnaires/inspections
To assess the impact of OLPC, XO's on the community	To assess the impact of OLPC, XO's on the community Also community members involved in the use of XO's Community regards the OLPC positively or negatively Community have improved access to information and communication services More involvement or active participation of parents in the school	Interviews, consultations, surveys with community members, teachers, learners Minutes of school committees and boards Group interviews with community members Demonstrations of parents using these XO's

SPACE FOR NOTES

CHILD ONLINE PROTECTION AND CYBER SAFETY

This is an issue that is of paramount concern to parents whose children are involved in OLPC projects, and the educators and administrators alike. A clear strategy must be communicated to all participants from the outset.

When looking for expert technical advice on this issue, we can turn to the ITU who are leading a global participatory initiative towards a consensus on the best practices and approaches to child online protection. We can then turn to the regional OLPC partners for regional interpretations and localised sources of assistance.

THE ITU'S CHILD ONLINE PROTECTION INITIATIVE (COP)

References:

1. *The COP Initiative:* <http://www.itu.int/osg/csd/cybersecurity/gca/cop/policy.html>
2. *Draft Guidelines for Children, Parents, Guardians, Educators, Industry and Policy Makers*

Child Online Protection (COP) is a global initiative created by ITU, as part of the Global Cybersecurity Agenda, which aims to tackle cybersecurity holistically. COP aims to tackle cybersecurity holistically, addressing legal, technical, organizational and procedural issues as well as capacity building and international cooperation. Our children are our future. This universal fact, coupled with young people's particular vulnerability in an online environment, made a specialized initiative within the larger GCA framework a necessity.

The legal, technical and institutional challenges posed by the issue of cybersecurity are global and far-reaching and can only be addressed through a coherent strategy taking into account the role of different stakeholders and existing initiatives, within a framework of an international collaborative network.

Key Objectives of COP:

- Identify risks and vulnerabilities to children in cyberspace
- Create awareness
- Develop practical tools to help minimize risk
- Share knowledge and experience

Using a participatory approach, the COP prepared draft guidelines for the following, which constitute a comprehensive set of guidance documents (250 pages in total).

1. Guidelines for Children
2. Guidelines for Parents, Guardians and Educators
3. Guidelines for Industry
4. Guidelines for Policy Makers

These are made available for workshop participants on the resource CD.

An example of a Harvard research project feeding into COP is given in the annex. This identifies an emerging consensus on three main approaches to child online protection (see annex for more detail):

- technological measures (filtering),
- parental supervision, and
- digital literacy education.

REGIONAL ADVICE ON CHILD ONLINE PROTECTION

SPC's advice is that every OLPC program is accompanied with a National Internet Safety component.

Such programs should address children, teachers parents and government agencies. SPC is working with a number of partners to develop a culturally appropriate model Internet Safety program and will provide technical assistance to commence such programs on request.

For instance, SPC and OLPC Oceania are discussing cooperation with UNICEF regarding their Child Protection programme.

Tuvalu Education should make a request to SPC to provide advice on recommended child protection and cyber safety programmes suitable for the OLPC programme, and also discuss this with in-country offices of UNICEF and other appropriate partners.

SOME IDEAS

As part of the educational component of digital safety, a survey could be undertaken of parents, community and educators on their views.

The child online protection component should be accompanied by monitoring and reflection.



Activity 1

In groups, reflect on :

- Potential partners and culturally appropriate approaches to child online safety

ANNEX: REFERENCE MATERIALS

CHILD ONLINE SAFETY IN THE DEVELOPING WORLD

(http://www.digitalnative.org/wiki/Child_online_safety_in_the_developing_world)

Harvard University's Berkman Center for Internet and Society and UNICEF are in the beginning phases of a collaborative research project concerning the online safety risks to children in developing countries. The digital divide between developed and developing countries is narrowing, and while this brings many new opportunities and resources into the lives of young people, it also exposes new groups with less digital literacy to a range of cyber threats.

Many organizations are working to make information and communication technologies (ICT) available to children in developing countries to improve education and quality of life. While some of these groups acknowledge online safety as an issue that should be addressed in the future, this has not, as yet, been targeted as a priority. Because of basic resource constraints, the time and resources of the organizations are instead focused on increasing accessibility of ICT in these communities. We hope that this project will be an opportunity to provide the additional time and resources necessary to work towards solving the safety issues that have been identified but not yet addressed.

As of July 23rd, 2009, the community participation page is now live. An important part of our research relies on personal observations and experiences, and here you will find some questions designed to encourage this kind of dialogue that you can respond to. Read more about how you can contribute.

Literature review and findings

In June/July 2009, Berkman conducted a preliminary literature review of the existing body of research on these issues. This is a brief summary of some of our key findings; we hope to make a PDF version of the full text available soon.

Existing Research

There are few studies or recommendations specifically related to addressing technological safety issues for children in developing nations. Instead, we have approached the issue tangentially by looking to two main bodies of research: those related to technological safety for children in developed nations and those focusing on technological penetration and usage in developing nations. We have found a number of organizations, such as the ITU's Children and Youth Special Initiative, that have emphasized their commitment to ensuring a safe technological environment for children in the developing world, but have found only few organizations with education modules, policy recommendations, or explicit plans of action.

During our preliminary literature review, we found that studies in developed nations indicate that the biggest risks to children online are cyberbullying, exposure to inappropriate or illegal material, and sexual or other abuse either over the Internet or in-person.

Responses

There seem to be three main approaches to protecting children online: technological measures, parental supervision, and digital literacy education.

1. Technological measures

This category includes any kind of hardware- or software-based tool used to make the browsing experience more secure, such as content filtering, virtual sandboxes, and age/identity verification software. With these methods, it is important to consider issues like scope creep, over- and under-blocking of content, reliability of ID verification, and cost.

2. Parental/Adult supervision

Much of the literature and existing curriculum for online safety education focuses on the importance of parental involvement, advising parents and guardians how to protect their children. We must consider that Internet access points for children in the developing world are much more likely to be in a school or Internet cafe instead of the home, where parents are less likely present.

3. Self-protection

The third approach centers on educating children about how they can take steps protect themselves online. Most existing digital literacy curricula aimed at children are not sufficiently comprehensive. However, this approach is promising because it helps reduce the reliance on a third party for protection, and can be adaptable from one country to the next based on individualized situations and needs.

Emerging issues

The mobile market has taken off in developing countries, and there are many indications that mobile Internet is soon to follow. This is predicted to be the easiest, most accessible and cost-efficient way to provide Internet access in areas where the information environment is often underdeveloped because of a barriers like lack of infrastructure for fixed-line broadband, lack of accessible computers and electricity, competition, literacy requirements, regulations, and high costs. If the trend develops as expected, this could be a good opportunity to take actions to ensure children use this medium safely as many of them encounter it for the first time, encouraging the spread of best practices.

Further questions and action

This overall problem encompasses many more specific issues, and it will be important to take a multi-pronged approach. One of the next steps should be identifying the problems children in developing nations are facing and map these issues in the respective technological, social, and economic context; from there, we will be better equipped to develop tangible, accessible targeted solutions and resources. Drawing upon ideas from the ITU's Child Online Protection initiative, we will need to engage all levels of players: children, parents/educators, industry, and government.

SPACE FOR NOTES

MAINTENANCE AND RECYCLING

If the OLPC Country Trials lead to a Country Programme, it will be important to plan for how the programme will be maintained. It is therefore a good idea to consider what is involved during the trials.

Maintenance will involve:

1. Annual procurement and distribution of laptops for the new Year 1 entrants
2. A repair and replacement programme. The expected lifetime of an XO is five years, however there is a measurable failure rate. Mostly the failures are repairable. The XO is designed to be easily repaired and components changed. In fact the intention is that children will be able to do some of the repairs themselves. Certainly, compared to a standard laptop the XO is much stronger (resistant to dropping on carpeted concrete from 1.5m), water-resistant and generally more robust. If parts do need replacing, it is much easier than with a standard laptop. Parts that might need replacing include the keyboard, battery and (rarely) the screen. These can be procured separately and stored.
3. Technical support. As the XO will be in every rural primary school, there will need to be local sources of technical support. There are two aspects to this; enthusiasts and volunteers within the community can help through the creation of Community OLPC clubs in partnership with the schools, and a culture of self-help can be encouraged. It has been proven elsewhere that the natural curiosity of children will learn quickly how to do simple maintenance, and they will then help each other. This is of the essence of OLPC.

RECOMMENDATIONS

A database should be started and maintained by each school with a record of each XO, with serial number, owner and history including faults and repairs. This should be periodically synchronised with a national database maintained by the Ministry. The school databases can also function as the user authentication system allowing control over access to the school server and Internet.

Each school's host community should start a Community OLPC Club and a small pool of 5-10 laptops could be provided. These can be used by ICT enthusiasts, older students and school leavers for technical training and research, in partnership with the school. Where possible, partnerships can be made with local IT businesses and private sector organisations that might be prepared to offer sponsorship. The club can then support the programme repairing laptops, developing new lesson ideas, investigating (and even creating) new activities and content, updating and translating the laptop to Tuvaluan (requires Internet). The Club should be represented in the OLPC Committee Meetings.

When/if the trials lead to a wider rollout, the cost of local repairs should be included in the budget.

PREVENTATIVE MAINTENANCE

In trials in other Pacific countries, it has been observed that about 5% have locally repairable faults or damages, predominantly rubber keys peeled off the keyboards - a type of damage easily avoided by teaching the children to be careful. Therefore, care of the device including preventative maintenance should be included in training and the known risks (such as the keyboards) should be mitigated through repeatedly reminding the children of these issues. Parents can also be briefed on these minor weaknesses. As the XO-1 is replaced with the XO-1.5 and then subsequent versions, these issues will be addressed.

Reference: The Helper Sheet, Teacher Guide, Nalder, EQ

RECYCLING

Tuvalu Education should make a request to SPC, or through the OLPPC to provide advice on a recycling programme.

All failed and worn-out XOs should be stored safely in the meantime, as they can be “cannibalized” for parts and must not be allowed to accumulate as rubbish in the village. The XO is designed to be as environmentally friendly as possible but it nevertheless still contains toxic and non-biodegradable parts. In particular, toxic components such as batteries should be stored and recycled safely;

Records should be kept of all failures and inventory of parts etc, in the school database.

SPC strongly recommends an “off island” policy of disposal and will work with Tuvalu on setting up a program for this.



Activity 1

In groups, reflect on :

- Suggest ideas for the maintenance and recycling, support clubs and record keeping

SUPPORT FOR COUNTRY PROGRAMMES AND FUNDING

To be completed.