Role of OLPC to Empower ICT Adaptation in the Primary Education

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This chapter presents an extensive evaluation of OLPC Project carried out independently in Sri Lanka. The OLPC project was to empower the ICT adaptation in the primary education considering remote schools. The key research question was whether one-to-one computing based on OLPC vision could change the children learning path in an environment where learning resources and opportunities were scarce. We observed theoretically it is a concept that can be realized but practically it fails due to limitations in the background of developing countries. The critical evaluation and recommendation given in this case study justify this observation.

Keywords One-Laptop-Per-Child (OLPC), one-to-one computing, XO machine, ICT based Pedagogy, School Education

1. General remarks

One-Laptop-Per-Child (OLPC) is a concept that was introduced to promote one-to-one computing at the primary level education. It was based on the assumption that a computer could make a drastic change in the education, irrespective of age and capabilities of learners within an environment of limited resources. This concept was further enhanced by adding the condition of 100$ for the cost of equipment. In many cases, OLPC was introduced as a tool for education rather than another computer to highlight its role pedagogically.

In the early stage of education, children learn lot of things informally rather than what is taught in the classroom. Those who can link the informal learning and formal education in the classroom easily become the smart children. Teachers use instruments, tools, equipment and activities to link these two stages to empower primary education. In schools with enough resources, teachers also use ICT (both software and hardware) to enhance the learning process in the primary education. However, schools with fewer physical and human resources face the common problem of guiding these young learners. That is the story of many places in the developing world. “Can a computing machine could be a facilitator of such children in developing world?” The primary objective of OLPC project was based on validating this hypothesis as proposed by the Nicholas Negroponte who initiated the OLPC project with some other expectations [www.olpcnews.com/people/negroponte/new_olpc_mission_statement.html].

During last few years, OLPC project has spread to many parts of the world, specially with the help of many donor agencies such as World Bank [1]. It was started with a big enthusiasm getting attention from different organizations including some state governments in developing countries. Giving a laptop for a kid who hardly finds enough food from their parents, is highlighted as a political plus point in the society. Unfortunately, the OLPC project got some challenges from IT industry itself due to other one-to-one computing projects such as Intel Classmate. Generally, if we investigate OLPC project in worldwide, we could hear interesting stories that shows effectiveness of ICT in Primary Education but most of them have failed to move beyond pilot stage. All these pilots were ended with sweet dreams for a great expectation together with tough lessons for future decision making.

Sri Lanka, a developing country in the Indian Ocean, follows free education for both primary and secondary schools. However, condition in many rural schools is very sad since those schools did not have enough physical and human resources to provide good services to students. In rural areas, primary schools which conduct classes from grade 1 to 5, are separated from upper schools. Sometimes these primary schools have only one teacher for all grades with 50-100 students. This situation gave an opportunity to experiment the validity of OLPC project in Sri Lanka. Ministry of Education (MOE) launched the OLPC pilot project for selected 13 schools which were very close to conditions specified in the OLPC initiative. Having observed some failure stories in the OLPC implementation, MOE invited the University of Colombo School of Computing (UCSC) assistance to carry out the project with some modifications that suit the local context. This chapter describes those modifications to enhance the role of OLPC in rural schools in Sri Lanka.

It is still debatable to say OLPC or one-to-one computing is the best mode to promote primary education through ICT tools. However, ICT adaptation in primary education definitely brings positive results but in the context of developing world, the ground-situation is not good enough to promote one-to-one computing approach. However, it is not impossible to promote OLPC or one-to-one computing based on the outcome of the study presented in this chapter.

We first briefly discuss the OLPC Vision in general in the Section 2, followed by a brief description of OLPC project in Sri Lanka in Section 3. Some lessons learned from OLPC projects in other countries, identified when carrying out the study are given in Section 4. Our evaluation methodology followed to find solutions, is given in the Section 5. Critical
evaluations and our recommendations, which are the outcomes of this study, are described in detail in Section 6. Finally we conclude the chapter in Section 7.

2. OLPC Vision

One laptop per child is an ambitious education project, introduced in 2005, which can be implemented in more than one way. Many children, especially those in rural areas of developing countries have little access to school resources. While such building programs and teacher education must not stop, another and parallel method advised by OLPC is to leverage the children themselves by engaging them more directly in their own learning [1]. Its’ mission is “To create educational opportunities for the world's poorest children by providing each child with a rugged, low-cost, low-power, connected laptop with content and software designed for collaborative, joyful, self-empowered learning” (MIT Professor Nicholas Negroponte)[2]. OLPC followed 5 core principles as given below.

- **Child ownership:** The laptop given under OLPC project is called XO and it is given as a gift to a child as a magic box if he/she has no experience in computing and also has rare opportunity to access modern digital devices. It was assumed that this laptop would be a portable learning environment to connect with others together with family members at home. The ownership of the XO is a basic right, coupled with new duties and responsibilities: including protecting, caring for, and sharing this creative environment.

- **A machine for Children in ages 6–12:** Children do not need to know how to write or read to enjoy and learn with an XO. Playing is the basis informal learning, and the digital activities on an XO help with acquisition of reading and writing.

- **Saturation:** OLPC is committed to elementary education in developing countries where the social variance is high. XOs are supposed to distribute everyone in a community without discriminating their personal status.

- **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.

- **Free and open source:** the spirit of collaboration is amplified by free and open source tools. A child with an XO is supposed to be 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.

OLPC’s vision is strongly shaped by Negroponte’s background and views which is based on the learning as highly dependent on students constructing ideas and individual laptop computers as essential for carrying out such construction in today’s world. Since, the sharing a single pencil affects negatively the child’s creativity, giving one for each as “children’s machine” would empower them to learn without their teachers and resources in the school. However, there is a difference what was theoretically imagined and the practical ground situation as we assessed the situation in rural primary schools in Sri Lanka. Without changing the original vision of OLPC, we worked out to enhance the concept based on the ground situation. But we didn’t follow Negroponte’s approach of simply handing computers to children and walking away, but we worked out a socio technical framework to integrate education improvement efforts.

3. OLPC Project in Sri Lanka

OLPC project in Sri Lanka is governed by the direction of Ministry of Education (MOE) with the help of World Bank to deploy 1000 XOs to 13 rural primary schools in the nine provinces considering various aspects of social, economical and linguistic differences in the country based on the core principles. MOE appointed an expert group to advice the project to customize it according to local needs. Following actions were carried out to localize the project:

1. Localization of XO interface to Sinhala and Tamil languages since it is the medium of instruction in the primary education of Sri Lanka
2. Development of learning activities as interactive games based on the primary education curriculum
3. Conducting teacher training to show them how to integrate OLPC into classroom activities
4. Establishment community based supporting model for teachers and students who have less experience in hardware devices and software tools
5. Setting up a collaborative learning environment from the classroom to the outside world

Above changes were integrated to enhance the role of OLPC to cultivate a new learning model in the primary education. Before starting the of the project, it was decided to evaluate the status of those selected schools to monitor the existing scenario as well as to take quick actions for project activities. Considering the complexity, a volunteer network was set up where UCSC is the focal point to empower the network. Hence, the key stakeholders set up following objectives to be achieved as a part of project,
• Critically evaluate the adoptability and the impact of the OLPC pilot
• Distribute learning materials/resources, and facilitate young learners for self-learning based on XO
• Develop a pedagogy based on the students’ knowledge and the skill levels in the XO and curriculum
• Set up a networked learning environment based on the students-teachers-outside facilitators

The main purpose of these objectives was to enhance the adaptation of ICT in primary education which could be taken beyond the scope of OLPC. However, our modification didn’t violate initial objectives of OLPC project.

4. Lessons learned from OLPC Projects in other countries

Before launching OLPC project in Sri Lanka, there were number of projects to empower the ICT adaptation in school curriculum. Computer labs in schools started immersing and they have now become more popular than libraries among young learners. In developing countries, having a computer is regarded as a luxury resource rather than a tool for learning. In some cases, there was a fight to access a computer since the ratio of computer: student is high. On other hand, computing resources are highly underutilized since curriculum is not aligned with computer based learning activities. Desktops are mostly used in schools and laptops are hardly available in schools.

OLPC is the first one-to-one computing programme in many developing countries. Laptops are viewed as one component of an overall educational reform based on broader technological infrastructure. Research suggests that such programs result in improved student writing, increased student engagement, improved information literacy and, in many cases, higher student test scores [2].

OLPC pilots in a half-dozen countries report positive changes (such as increased enrolment in schools, decreased absenteeism, increased discipline, and more participation in classrooms), but it is not clear as these changes are caused directly due to the OLPC project, as many evaluations are neither independent nor systematic [3]. Among all countries which implemented OLPC pilot projects, Uruguay has the largest OLPC distribution among children [4]. Peru and Maxio are also having large distribution compared to other pilot projects [5]. The variance of OLPC evaluation is mainly due to the purpose and target audience. For example, Ministry wants to know whether the introduction of XO computers in a classroom has led to greater student engagement or performance, where funding agencies are keen on finding about the issues affecting deployment or infrastructure. This has resulted to identify the global picture of impact across different developing countries.

Generally, there is an enthusiasm among students, teachers and others when XO machines are being distributed. However, some reports suggest the lack of teacher training, and willingness to adopt new pedagogy for learning and teaching based on XO has met resistance [6]. Children are excited when they receive a laptop but they are confused about the use of machine when there is little guidance. Child ownership also has led many issues in managing machines. B. Everts, et. al [7] evaluated the impact of OLPC in Ethiopia and they have utilized variety of methodological approaches in collecting data to measure the impact of OLPC. The project was based on 5000 machines and positive impact on studies of children.

In Afghanistan, Niazi, et. Al [8] evaluated the OLPC project to find out the improvement of art skills, reading skills, writing skills, mathematical skills, and active learning skills of students with the adaptation of XO in to their learning. Children’s activities were measured before receiving the XOs and at regular intervals afterwards to measure the impact on reading, writing, mathematics, comprehension, art, and creativity. Measurements were based on the students’ performance of assignments in related areas. OLPC had also been used as a change agent to motivate students in the education system. David et. al [9] have identified how these changes impact on the pedagogic in the classroom, again showing a positive development.

Each OLPC programme implemented in different countries had their autonomy and results vary depending on the context and culture. However, we can observe some common trends among them [10]. Although, it was price tag as 100 US$ computer, it was never sold near that price. In fact, the actual price was double and this was resulted many pilot projects to cut down their initial plans. Indirect cost and maintenance cost were never accounted in the planning and implementation. Unfortunately, there was no clear programme how to repair machines and there were no experts to attend in many contexts.

OLPC project believed by simply giving a computer to children many things happen by inventing themselves to find the correct path for learning. However, the reality is different since XO is not a magic box to get things done as people dreamed. Many students failed to get the maximum out of it, although there were few exceptional cases. ICT is more of a socio technical network and many students failed when they couldn’t get a support from their environment (school and home).

5. Evaluation Methodology

More than 1000 XO machines were distributed among 13 schools considering every province in the country. These 13 schools are again notin the same status with respect to resources and surrounding social status. Hence, 13 schools were
divided into three groups with respect to social and physical resources and one school is selected from each group for in-depth evaluation to identify the role of OLPC project. Evaluation was conducted at pre-distribution stage as well as post-distribution stage of XO machines. Another school, which didn’t receive XO machines and had similar conditions of resources and social status, was selected for the evaluation. Since the population of these selected schools were not very big, all students, teachers and administration staff were taken into account.

Both quantitative and qualitative approaches were used for data gathering. Since they were young children we had to follow different approach to gather some data in an informal way. The consent for data gathering was obtained from respective principals of the schools. Following parameters were used to gather data for the evaluation.

- Students’ participation in the classrooms
  - Interaction with students & teachers
  - Learning engagement
- How actively a student is doing the activities?
  - How the student is engaged with activities actively in the classroom?
  - Whether he/she is doing an active role or not?
  - How the student is attending the homework?
- Creativity /exploration
  - Ability of recording songs and playing it back
  - Drawing ability
  - New experiments
- Skills
  - Writing skills
  - Numerical skills
  - Art skills

In the pre-distribution stage of XO machines, we gathered data to identify students’ performances and their readiness to accept the XO machines. In the post-distribution stage, we gathered data about how students and teachers faced challenges due to XO machines in addition to changes in students’ performances with respect to above parameters. Following tools were used to gather data:

- Observations – Students’ and teachers’ behaviour were observed to understand the usage of XOs in the classroom as a learning tool. The patterns of XO usage and the attitudes among students and teachers were considered when continuing the observations.
- Interviews - Several informal and formal interviews were conducted with students, teachers and school administration. Students were asked about; their views about XO, focused on collecting data on which activities they like most, Problems faced when operating XO and doing its activities.
- Referring official documents - School log books, students’ registers and personal files were observed under the supervision of schools’ administration.

When conducting interviews, discussions and observations the team interacted with students as their friends or colleagues. Since these children were in their small ages to gather students’ true and own ideas, we had to behave as we were in their age and their educational level. When they felt as we were friendly with them and no distance with them they started to express their free ideas very comfortably. In fact, it was an enjoyable experience. (Some pictures were published at https://picasaweb.google.com/112412521184895501067/OLPCPromtion). Detail report of data collection of the project is published at the project website [11].

6. Critical Evaluation and Recommendation

It is important to mention that the work presented in this chapter was not funded by the organizations who undertook the responsibility carrying out OLPC project. The group who are authors of this chapter was working as an independent volunteer group to the Ministry of Education and evaluation was carried out as a research project of National e-Learning project (http://www.e-learning.lk). Hence, we were able to maintain our independence in the evaluation while contributing within our capacity.

6.1 XO distribution

There were several issues with respect to distribution of XOs even after selecting relevant schools. Unfortunately, some of them were related to political matters which badly link and affect to the education system in Sri Lanka. The distribution of XOs was delayed few months after receiving the contingency and official launch of machines due to the elections in 2008/2009. A big ceremony was held in Colombo to mark the distribution of XO machines to a small group of students but students who didn’t get a chance to attend this function had to wait for many months to get their ones. In our evaluation, we felt very sad when we observed several students without XO machines in the classroom. School principals and teachers were helpless in this case. These types of administration issues which were common in many
developing countries affected badly at the beginning of project, especially with respect to *Saturation* objective of OLPC.

Most of students didn’t have electricity at their home and they found very difficult to charge their XO machines. On other hand, there were no enough resources to charge these XO machines in Schools. When these XO machines were distributed, solar power panels for recharging XO machines were not distributed among the students and it affected badly for the use of machines daily.

XO machine and Sugar interface were totally new products in Sri Lankan society. There were no existing experts who could help or repair machines when those children faced problems. According to our observation there were so many cases that machines were set aside because of small mal function. The most common problem was batteries were not working and power cable got some problems. In the OLPC project, it was described these XO machines were self-maintenance equipments, but the ground situation was completely different.

Sugar interface was a challenging one even after providing a localized version of it. Due to a small mistake, application icons could be erased and many students were very helpless to correct it. Teachers did not know how to correct these issues technically. In some schools, a technical assistant visits once in a week to correct some of these problems and students had to wait for him. We strongly recommended every school must have a fulltime trained technical assistant or teacher to look after those technical issues. However, those schools were very far remote ones where they could hardly get a full time support.

Unfortunately Number of machines which couldn’t be used was increasing weekly and, it looked like there would be a day that OLPC concept has to be given up and get back to normal teaching and learning activities in those schools.

6.2 Interaction and Usage of XO machines

XO was designed and developed for rough use by students in a developing countrie. However, there were many technical and usability issues with respect to its operating system as well as its interface known as sugar. Starting the machine, moving the cursor, using a finger on the touchpad and interacting with applications took a considerable time and it was not quick as we imagined. Those limitations prevented those using XOs whenever they want in the classroom.

Teachers strongly believed, if they allowed students to access their XO machines during teaching sessions in class room, these young students would lose the attention to lessons. Therefore, XO was considered a supporting extra tool. At the same time, all students in the primary level (grade 1-5) were not in the same level with respect to activities, knowledge, and skill. At that moment, there was no policy on giving access to machines and promoting the usage. After several discussions and studies we proposed a model for XO machines utilization in classrooms and distribution of machines, as shown in Figure 1.

![Fig. 1: (a) Use of XO machines wrt time in the class grade (b) Distribution and promoting use of XO machines](image)

In the first two terms of grade 1, the school environment is very new to all students and they need at least two terms to be familiarized as well as to understand the school and classroom based learning environment. Therefore, in first two terms XO machines are not necessary for new comers to the school. From the third term onwards, there must be sessions to familiarize the student with XO machines. Also these small children in grade one are not in a physical position to carry them daily to home. Therefore, we recommended teachers to keep them in the classroom and let students to bring them home at the end of third term. The model, shown in the Fig. (a) and (b), is based on this recommendation From grade 2- to 4, the use of XO machines must be promoted in a methodical way to keep the student engagement with learning through gaming. At the same time, the student should be gradually exposed into other ICT based learning environments starting from Grade 5.
6.3 Teacher Training and Pedagogy

Selected teachers from those schools received an initial training about XO machines but most of these teachers’ ICT literacy was very poor. Unfortunately, the training was not linked to give them a personal XO machine and the training hardly made any impact on teachers. As a result, teachers failed to understand how it could be integrated with their classroom training and they became helpless adults when children started facing problems with XO machines in the classroom. Giving a machine without proper guidance, would result low usage and it could eventually become another broken toy in student’s play yard.

However, the Ministry of Education initiated a good project of developing interactive activities based on curriculum as a kind of games to distribute with XO machines. This made a very good positive impact on promoting OLPC project in primary schools. It helped students to link playing games in XO and classroom activities. These learning activities were developed considering all grades from 1-5 with respect to different subjects students learn in the classrooms.

Teachers follow a time table and a syllabus for lessons within an academic session. When XO machines are integrated with learning activities, teachers need more time to cover the syllabus. Since they are very young kids, teachers find very difficult to find any extra time outside the time allocated for classroom activities. After several discussions, we felt the best would be to have a separate time slot for XO activities in the time table.

In the original OLPC vision, teacher training was not highlighted due to various cited issues but those situations are not the case for every location. Teachers would be the best facilitators in learning based on XO. Hence, it is very important to provide proper (at least brief) training to achieve original objectives of OLPC. When children were given a new toy, they are naturally enthusiastic to explore it while playing with it. But this trend comes down and the toy becomes unused one gradually. We observed the same situation in OLPC project and proposed a facilitation model based children’s motivation pattern as shown in the Fig 2. Therefore, we recommended a good facilitation in the classroom by allocating a time slot in the class time table regularly.

![Fig. 2: Student Interest comes down in the time and it is required to promote the use of XO in the classroom](image)

Generally, teacher training is considered as one time activity or discrete activity with respect to vacation periods in the school time tables. Eventually, OLPC environment has to be linked to an online environment to get the maximum benefit from the initiative. Hence, all teachers in the schools could be easily linked with this online environment for continuous teacher training. The sub-section 6.5 introduces this proposed online learning and supporting model for teacher training too.

Coming up a suitable pedagogy for OLPC was a challenging task. We clearly observed only giving XO machines didn’t make a big change among these young learners in general, except few exceptional students. Teacher training and interactive learning content need to be combined to develop this pedagogy. Usage of XO in the classroom requires careful rethinking of how to link learning activities and XO activities in the classroom. Since kids like playing with XO, we suggested teachers to try out interactive learning activities as a challenge in the classroom before they begin the relevant lesson. This motivates the students informally learn about the subject content. After the lesson, teachers could again try out those activities with the students as a kind of revision. We were able to propose this recommendation after the discussions with teachers in the school where we carried out the evaluation.

6.4 e-Content Development

Again we would like to emphasis the initiative of Ministry of Education to develop preliminary e-content to distribute with OLPC project. However, it should be a continuous process that covers not only OLPC project. Schools which use normal desktop environments also need these types of open interactive learning materials. So it is needed content developers constantly innovating to produce high quality educational e-content for knowledge portals according to students’ level. Many students who received XOs were in age five or six; others will be in their mid-teenage years.
Since these students may continue to use these machines throughout their education, it is important to develop activities in ways that scale well across age level.

When XO machines were distributed, some selected interactive games and content together with locally developed materials were uploaded to each machine. Students who did not have internet connection, failed to update these machines and there was no policy or mechanism to reload new interactive e-content. As a result, students gradually lose the interest. Giving all e-Content at once doesn’t make a sense, and they need a good e-Content for their learning engagement with XO. Students heavily use text books and sometimes they were very heavy to carry. We recommended uploading the soft version of all these text books as a local library to XO machines. This gave an immediate alternative to access all text books at once and students, who did not have text books, could still study using content in the XO. This helped to develop a good relationship between XO and classroom activities.

At the same time, we proposed that each XO machine need a content collection and customized interface of Sugar with respect to grade in which they study. At the end of year, the system must be upgraded to a new content collection and different interface compared to previous year of use. Then XO could become a new tool and keep the students motivation high for engaging/learning through XO in the next academic year.

In the original OLPC vision, it was assumed to make students also contributors into the domain. This was not practical due to various reasons, specially due to their young age. However, we felt teachers who facilitate these students could become good contributors for OLPC community. Teachers need some guidance to become contributors by developing small learning resources and activities. Of course, they can get students also involve in this small development of learning activities/resources.

In the original OLPC project, a large number of games and learning activities, materials were distributed. We strongly felt, they must be categorized based on the educational level in primary classes to get the best use to enhance children. Even within the same grade, these resources could be categorized based on the difficulty level as Easy, Medium, or Challenging. Full report of this activity categorization was published at [11]

### 6.5 Networked Learning Environment

Machines don’t create a learning environment. XO comes with an interesting mesh networking facilities but hardly it was being used at the ground level. Both students and teachers had a very little knowledge and experience of using a network. Therefore, we proposed an introduction of two learning environments, where one uses mesh network through all XOs and other one uses client-server architecture through Internet connection. The aim of the network learning environment is building an effective interaction among relevant and responsible parties. We developed two types of portals to highlight the interaction in this learning environment.

1. OLPC learning community at a school - eSchool Portal (For Students and Teachers)
2. OLPC virtual community in Sri Lanka - Teachers’ portal (For teachers, technical teams and advisors)

eSchool portal is hosted at the OLPC School Server. It mainly focuses the primary students with the purpose of Building OLPC learning community of students within the school. This facilitates them to keep on more effective local collaboration among each other. Main objectives of the proposed learning community are breaking the fear of the students regarding new technologies and introducing blended learning environment to the class room. With eSchool portal Students are able to publish their creations, do assignments, and get evaluation reports for their performance. One of the critical advantages of this portal is, automatically generation of graphical representation of the analysed information related to students’ interaction with XO. It also updates the log of XO usage of each student such as the activities students have engaged and total time of the activity usage.

Teachers’ portal is hosted at the Main School server and focused on communication among teachers and related parties like MoE, OLPC technical teams and advisors. Teachers need help and guidance from technical teams when technical issues are raised and teachers can’t handle by themselves. Most of the time teachers ask help from technical teams over the phone or sometimes technical teams visited to the schools to solve those problems. This is not an effective solution to the problem and it slows down the progress of the overall process. But with the introduced Teachers’ Portal, teachers can interactively discuss their problems and doubts with technical teams and technical members also can put detailed instructions regarding the troubleshooting and fixing bugs of XO.

When OLPC School Server connects to the Main School Server, teachers can access to teachers’ portal via eSchool portal. Teachers can upload and download related materials, contents and activities to the eschool portal from the teachers’ portal. Teachers’ portal retrieves necessary information from the eSchool portal when the connection is established between two portals. Details of this architecture were published in the web portal of National e-Learning Centre (NeLC) Project [11].

### 7. Discussion and Conclusion

This chapter presents an independent evaluation of OLPC project in Sri Lanka together with modifications which were tried out to enhance the effectiveness of OLPC in primary education. Authors maintained their independence in carrying out of the work while contributing within their capacity.
One-Laptop-Per-Child (OLPC) is an ambitious international educational project targeting to developing countries to promote primary education through informal and game based learning activities. This children’s machine is an educational tool for a kid who will not use it primarily for word processing and web browsing. Hence, it has a quite different approach compared to other ICT projects for education. OLPC project was established based on some core principals based on the theoretical visualization of smart kids who struggle to engage in learning in the developing world. Unfortunately this group doesn’t represent everyone in this community.

OLPC has been launched at several countries and it got bit late to start the project in Sri Lanka. It helped us to evaluate the outcome and customized the background to maximize the outcome of the project. Political and administration weaknesses affect many initiatives in developing countries and they are sometimes beyond the individuals who are responsible to carry out those projects. We observed this situation in the OLPC project in Sri Lanka. Rather than criticising those limitations, we tried to cooperate as volunteers to minimize the negative effects.

After localizing the XO machines to local languages (Sinhala and Tamil) and developing learning activities based on the primary education curriculum as interactive games, machines were distributed among selected schools. Teacher training was provided for some teachers in those schools. An advisory panel and volunteer community were set up to support and guide the project in the correct path. Hence, we commend the relevant authority, Ministry of Education, has done a good ground work to launch the project.

ICT literacy, limited resources and availability of access were some of key negative factors affecting badly for the project. We evaluated the situation before and after distributing XO machines to identify corrective decisions to guide the project in the correct path. As presented in this Chapter, we were able to convince relevant authorities to accept many recommendations given based on our critical evaluations. However, the situation was not progressive due to various reasons. Hardware issues and sugar interface of XO machines were main reasons that were affected to the popularity of OLPC based approach in Sri Lanka. We observed a positive development of knowledge, skill and attitudes of children as a result of introducing XO machines.

It is not possible to address some issues in the educational context only by distributing computing machines. More than machines, the background must be prepared in order to empower ICT adaptation in the education. Specially, teacher training and ICT based pedagogy for education in the classroom. However, OLPC project was a good opportunity to understand the requirements as well as to set up the foundation for this need. Whether it is laptop, a desktop, one-to-one, or shared computing, are secondary for the ICT adaptation in education. Laptop or desktop is not a magic box that could solve educational problems in developing countries. It is required to have a proper guidance and methodology for connecting any ICT equipment to the local educational system to achieve the best outcome.

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