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**Formative Evaluation of One Laptop per
Child (OLPC) Project Nepal
June-August 2008**

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List of Abbreviations

CDC	Curriculum Development Center
DoE	Department of Education
GoN	Government of Nepal
ICT	Information and Communication Technology
MoE	Ministry of Education
MoU	Memorandum of Understanding
NGO	Non-Governmental Organization
OLE	Open Learning Exchange
OLPC	One Laptop per Child
SMC	School Management Committee
NCED	National Center for Education Development

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Executive Summary

Background

The Nepal government's Department of Education (DoE) and the Open Learning Exchange Nepal (OLE Nepal) had selected Bishwamitra Ganesh Secondary School and Bashuki Lower Secondary Schools, both in Lalitpur district of Nepal, as test schools for the One Laptop per Child (OLPC) initiative in Nepal. The laptops were distributed to all 135 students in grade 2 and 6 in those two schools on April 25, 2008. The students were also allowed to take laptops home. However, charging of the laptops could only be done in school. The implementation of the OLPC initiative has focused on four areas: digital content development, teacher preparation, network and power infrastructure development and government capacity building.

Study design and method

This study was initiated after about two months of program implementation. The objective of the present study is formative evaluation which assesses on-going project activities. This evaluation focuses on how the initiative is being implemented in the two test schools and looks at how the implementation can be improved.

The study period was between mid-June to mid-August 2008. The first week was spent preparing survey questionnaires. The first round of field visit was conducted between June 22 and 27. The first three days were spent in Bishwamitra Secondary School while the last three days in Bashuki Lower Secondary School. The 2nd round of field visit was conducted between July 27 and July 31, 2008.

This study is based on the information collected from surveys with teachers, head-teachers, students in grade 6 and their family members, some School Management Team members, school records as well as detailed discussions with OLE Nepal officials and postings in the OLE Nepal blog pages (<http://blog olenepal.org/>). One-on-one meetings with teachers were also conducted in addition to filling out the survey questionnaires.

The questionnaires were designed to elicit as much information about how the initiative is being run. Because of time constraints, we tried surveying only those students who roll numbers were odd (or only even numbered in other cases). All the teachers who were present in both the schools were surveyed. In total, 31 students from grade two, 45 students from grade six, 19 teachers that includes 2 head teachers, and 20 households were surveyed for the purpose. We also had discussions with many OLE Nepal officials, which aided us in putting our observations in proper context.

The current study revolves around evaluating how the digital learning materials and laptops are being used in the teaching learning process and how the teachers have been trained to integrate the new instructional approach and digital materials in the regular classroom process.

Teacher training

The teacher training was divided in two parts: residential training and in-school training. A four day residential training was conducted from March 29 to April 1, 2008 and four-day in-school training followed after a couple of weeks in between and was completed on May 2, 2008. The residential training included teachers from both the schools together and was held in Panauti, in the outskirts of Kathmandu Valley (35 kilometers from Kathmandu), while the in-school trainings were separately conducted in their respective schools. 10 teachers from Bashuki and 11 from Bishwamitra participated in the residential training.

One of the goals of the training was to make teachers feel comfortable in integrating laptop use in regular teaching. When the teachers were asked whether the complete training was sufficient for enabling them to properly integrate laptop in the regular classroom instruction process, 50 % of the teachers' response was positive. This response underscores the need to have refresher training on a regular basis since most of the teachers are using computer for the first time.

Residential training

Teachers found the following aspect of the residential training particularly useful:

- Using the laptop for instructional purposes to make teaching more effective
- Make lesson plans
- Linking theoretical and practical aspects of teaching
- Meeting colleagues and learning from them (peer learning)

All the teachers who said that some portions of the training program needed to be removed or trimmed pointed out that a lot of time was spent on going over theoretical parts. They felt that theoretical discussions cut into the time allocated for hands-on experience in utilizing the laptop and digital materials for classroom teaching.

When the teachers were asked whether it was a good idea to run residential and in-school trainings separately, almost everyone (15 out of 16) said that it was a good idea and wanted it to be that way in future as well.

In-school training

Our discussions with the teachers revealed that, in general, they found the in-school training very useful. They were particularly satisfied by the knowledge they gained in class management (in a class where each student has a laptop) and in making lesson plans. The training also helped to make it clear that the laptops are one of the many tools used for teaching rather than an end in themselves. They highly appreciated the teaching tips and critical comments on their teaching styles during the feedback sessions. These sessions not only clearly pointed out their mistakes and weaknesses, but also helped them to improve their teaching. They

felt that the training was also quite useful for those teachers who could not attend the residential portion of the training earlier.

Sixteen out of 17 teachers found nothing in the in-school training that was not useful and should be reduced or removed in the future. They considered the discussions and interactions in this portion of the training to be very informative and helpful. They found class observation and feedback sessions extremely constructive. Teachers were able to identify and solve a number of practical problems and issues by watching their colleagues present in the class.

Classroom teaching learning process

Teaching learning digital materials

All the teachers said that the materials in the laptops were, in general, consistent with the interests of the students in their classes. However, when asked whether the materials in the laptops, in general, were consistent with the level or capacity of the students in their classes, the answer was rather mixed. Teachers were generally satisfied with the grade 2 contents, but had different views on grade 6 digital content. The teachers found many initially uploaded activities for grade 6 either too easy or too difficult. To the question about whether the materials in the laptops are able to meet the aims and objectives of their class as prescribed in the curriculum, the teachers feel that the recent digital contents are more relevant in this front.

The teachers also mentioned that there were not sufficient exercises, especially for grade 6 students to work on. Since the teachers are so used to following the chapters in the book, the teachers suggested that the teaching materials in the laptops be sequenced according to the chapters in the textbooks. This way, they will not have to spend a lot of time figuring out which activity corresponds to the relevant chapter in the book.

The teachers also recommended that there be multiple choice question answers and practice questions. Some teachers proposed having different levels in the activities so that students develop a competitive spirit and try harder to go to a higher level. This could motivate them to study harder.

Classroom teaching learning

It is important to understand how classroom teaching learning has been affected by laptop use in classrooms. All the 17 teachers in both the schools feel that use of computers has helped their teaching. All teachers teaching grade two and six English and math felt that their lectures are now more organized and that it is easier to teach students new concepts. They are also of the opinion that laptop based instruction has made it easier to give students more practice exercises. The classes are also more interactive.

When the students were asked how learning has been affected with the introduction of laptops in their classrooms, almost all grade 6 students mentioned that it easier to learn new

materials using the laptop. These responses are consistent with the teachers' views that laptop based exercises have helped the students to learn concepts more easily.

As to why it is easier to learn concepts using the laptop, the most common student response was that it was possible to do each exercise or activity as many times as necessary. The next most common reason was that these computer based activities were fun and very enjoyable. The students also appreciated the fact that they could do these activities at their own pace. All these reasons were cited by more than 50% of the students.

One question designed to obtain information on how the students are using the laptop asked what the students did the most with the laptop. They were asked to select one answer from a choice of 6 options: playing with learning activities (the E-Paath activities developed by OLE Nepal), taking pictures using the camera in the laptop, chatting with friends, surfing the internet, reading books online, and others that needed to be specified. At Bishwamitra, 68% of the students (15) said they mostly used the laptop for playing with the digital learning activities, while 23% (5) said they mostly used the laptop to take pictures. The corresponding number for Bashuki was 32% for learning activities and 42% for taking pictures.

Class preparation

When teachers were asked "Compared to the effort you had to put in the teaching learning process before receiving the laptops, how much effort do you put in now?," the overwhelming majority of the teachers feel that they put in more effort now.

Some of the reasons cited by the teachers on why the effort has increased:

- Making lesson plans
- Preparing how to incorporate laptop while teaching
- Selecting which activities matches the subject matter being taught
- Extra effort to bring down the noise level
- Preparing for the security and management of the laptop in the classrooms.

Laptop and network issues

Almost all teachers (16 out of 17) found the laptop and its layout easy to use. They thought the operating system interface is very intuitive and felt that students too have little difficulty. Most of the teachers say it takes about 1.5 hours to fully recharge the computer and that the charge lasts for about 3 hours when the computer is in use.

We had also asked the teachers, students and their family members whether they had any problem with different aspects of computer use. The biggest problem more than 50 % of the respondents mentioned was the jumpy cursor. The dust, the humid climate and the student's sweaty hands as a result of running around might be contributing to the situation. The problem seems to be slightly more acute in Bashuki.

More than one-third of the teachers thought the sound quality needs to be improved. There either is some problem with the sound quality or that some teachers might have difficulty adjusting the sound. Since earphones are not available, difficulties arise for students and teachers when using sound related activities.

The school, students and their family members in general are spending a lot of time protecting the laptop. At home the students keep the laptop away from fire and water. Those who have a closet at home keep the laptop there when not in use. Other students securely keep the laptop in the bag. The family members are aware that the laptop should be stored securely.

Difference between the two test schools

Looking at some of the responses to critical questions that we discussed in this report, it is apparent that the two schools are very different. The teachers and students in these schools have given vastly different answers to some of the questions that one would expect to be similar if the schools were similar. For example, the residential training component of the teacher training was given for both the schools together. So, their experiences should have been similar. Similarly, the same digital contents were uploaded in the laptops in both schools. There, again, their views on the different questions related to digital contents varied a lot. Even responses to some of the questions by students produced different results.

These discrepancies underscore the need to identify the root causes behind these differences. One could argue that these differences are hinting at the fact that there might be certain enabling conditions that need to be in place to make sure that the program's objective are met. It could also mean that it might take time in some places to fully benefit from the initiative while we could see tangible results in some schools right away. For the pilot study, the OLE Nepal might want to seriously consider whether all the schools in the pilot phase need to be treated similarly or whether some activities, like sensitizing the community about the merits of ICT- in-education, need to be conducted in certain areas beforehand.

Some Suggestions and Recommendations

E-library and internet access

We think OLE Nepal should try to upload all the books that are in their website to student laptops sooner rather than later. This serves at least two purposes. First, students who want to read those books could easily read them. Second, the users (teachers, students and their family members) might offer some suggestions that might help further improve the way e-library is accessed (e.g. layout of the books). Needless to say the parents and teachers are really looking forward to using the e-library.

Without internet access at home, convincing others that one laptop per child is preferred to, say, a well-planned computer laptop in the school might be tougher, especially when the cost difference between these two alternatives can be substantial.

Work load on teachers

Most teachers in both the test schools feel that their workload has increased significantly. This is a serious concern. If this trend continues, it is likely that they will revert, to a large extent, to traditional ways of teaching and ignore the materials in the laptop once the initial enthusiasm of laptop fades away. If this happens, the effect of laptops with educational content on student learning might be minimal. Steps to further reduce workload and encourage laptop use in classrooms need to be devised carefully.

Some ways to decrease teacher's workload include:

- Better integration of textbook and materials in the laptop.
- Include 'sample' lesson plans for at least those lectures that use activities developed by OLE Nepal which teacher's can follow if they like.
- Refresher trainings to the teachers on a regular basis where different ways to use laptops/digital materials and the concerns teachers have are addressed.

It is apparent that teachers don't have much free time in the two test schools. Most of them have to teach for six periods (out of seven) in Bashuki. The case is not much different in Bishwamitra. Moreover, for the teachers' at Bashuki, almost all the teachers there have to walk more than 2 hours a day to and from school. All these factors coupled with extra effort in using laptop in classrooms might tempt teachers to revert to the style they are most comfortable with.

Chargers

We strongly feel that OLE Nepal should take steps in allowing students to take chargers home so that the laptop can be used longer and other family members and community members can also benefit. If the charging is only done at school, there is concern that students might not be able to use the laptop adequately at home once more activities are uploaded in the laptop. If OLE Nepal expects students and their family members to adequately use the laptop at home, it makes more sense to allow students to take chargers home.

We think the OLE-Nepal should go ahead with the plans about providing 2 chargers per student with laptops, so the students can take one charger home and the other one can be permanently kept at School. This way, the students do not need to worry about carrying charger every day. The chances of losing or misplacing ones chargers are also minimized.

Books by Janak Shikshya Samagri (the center that distributes textbooks used in public schools) in the laptop

One concern that was raised by teachers and family members in Bishwamitra School was that the load the students carry is huge. It is particularly dangerous during the monsoon season. Many suggested having soft copies of the books used in the school included in the laptops. This would also be one of the immediate and tangible result of the laptop provision. Disruptions in classrooms due to late delivery of books, which happened this academic year, would also be minimized.

Allowance and recognition for teachers

Some arrangements should be made to compensate teachers when they attend programs like teacher trainings. In addition, OLE Nepal might also want to provide them some recognition (e.g. letters) that teachers, for example, could use for professions development.

Conclusion

Considering the fact that this is the first time such initiative is being implemented in Nepal, the test phase in the two schools in the outskirts of Kathmandu Valley is running very well. The teachers, family members and the SMC members all see great promise in this initiative to improve student learning. The head teachers in both the schools consider the pilot program as very effective and see great promise in reducing the disparity in educational quality between private and public schools.

Almost all the teachers and parents think that there is positive relationship between laptop provision and student learning. With this student-centered approach, students are interacting with each other more often. It has made students more curious and they are eager to learn new things. It has also helped in developing co-operative spirit as students are willing to help each other learn new technology.

1. Introduction

The quality of education in many developing countries is poor. So it is no surprise that the academic performance that reflects educational quality of students in many developing countries is very weak. The enrollment rate of school age children is low, and the drop-out rate is high¹. There is also a shortage of qualified teachers in many countries. Since education has the potential to play a large role in a country's development, this low performance is a matter of great concern. Thus, many researchers have been evaluating different ways to improve student performance. Many different policies, like tuition reductions and conditional cash transfers, have been evaluated. However, the improvements are not on a scale policymakers would like to see before implementing policy changes.

Many observers of education claim that "technology is the future", which implies that teaching practices should incorporate Information and Communication Technology (ICT) to enhance student learning. It is clear that using computers in the classroom provides opportunities that cannot be realized using conventional instruction methods. For example, interactive tools provide more customized instruction to children with different learning styles (visual learners, experiential learners, etc.). Another example is from the teacher's perspective. Teachers in developed countries can consult open source textbooks and similar web sites, which are being developed at a rapid pace, to learn about better instructional practices. Even students could gain from referring to those sites. A third potential benefit of using computers is that students may also be more motivated, at least initially, to use laptops for educational purposes because of the prestige associated with possession of this highly respected technology.

Convinced that technology has the potential to play a huge role in children's education, a number of developing countries have begun to test some version of the One Laptop per Child (OLPC) program (OLPC Wiki: <http://wiki.laptop.org/go/Home>). Nepal is one of the countries making a serious effort to implement the OLPC concept in a systematic manner. The OLPC Initiative in Nepal is being implemented jointly by the Government of Nepal (GoN) and Open Learning Exchange Nepal (OLE Nepal), a non-governmental organization (NGO) that includes both Nepali and international experts. The Department of Education (DoE), Government of Nepal and OLE Nepal signed a Memorandum of Understanding (MoU) on November 18, 2007 to work together in the OLPC initiative.

In subsequent months, DoE and OLE Nepal selected two test schools for the project: Bishwamitra Ganesh Lower Secondary School and Bashuki Lower Secondary School, both on the outskirts of Lalitpur district. Details on these two schools are provided in the next chapter. The Department of Education also decided to provide all students in grades 2 and 6 in these two schools with laptops at the beginning of the new academic year, i.e. April 2008 (Baisakh 2065 B.S.). As planned, 135 laptops were distributed to these students on April 25, 2008 in a function that was attended by the Secretary of Ministry of Education and officials from the Department of

¹ Glewwe, P. and Kremer, M. (2006). Schools, teachers, and educational outcomes in Developing countries, in *Handbook of the Economics of Education*, edited by Eric A. Hanushek and Finis Welch. Amsterdam: North Holland, 943-1017.

Education, the National Center for Educational Development, and the Curriculum Development Center. It needs to be mentioned here that the Nepal initiative is, in many ways, very different from initiatives in other countries, a fact that be discussed further in subsequent sections and chapters.

1.1 Objective of the study/evaluation

This study was initiated after about two months of program implementation. One could be tempted to argue that this is a relatively short span of time to evaluate a project. However, one should keep in mind that evaluation work should be done on a regular basis and conducting the first round relatively early makes sense. This is more so in programs like this which is a completely new initiative in Nepal and that there are not much lessons to learn from elsewhere as well. You would also make sure that preparation and implementation early on are going smoothly so that future scaling up of the project can benefit from the evaluation. In addition, if there are many rounds of evaluation at different times, the focus among different rounds could vary, so one of the rounds of evaluation could be done relatively early. In such scenario, it is essential to clarify early on what each round of evaluation hopes to accomplish.

The objective of the present study is a formative evaluation to assess on-going project activities. To understand what formative evaluation is, Robert Stake's famous interpretation of formative and summative evaluation is particularly helpful:

“When the cook tastes the soup, that's formative;
When the guests taste the soup, that's summative”²

When the cook tastes the soup, he can identify which ingredients are adequate and which ingredients are inadequate. He may also be able to identify ingredients he has forgotten to include and ingredients he has used excessively. Most importantly, he still has time to address these problems. The formative evaluation of the OLPC program in Nepal can serve a similar purpose. In short, this evaluation looks at how the initiative is being implemented in the two test schools, identifies the strengths and weakness in the current process, and explores how the implementation can be improved in the future.

Since this type of initiative has never before been implemented in Nepal, the current formative evaluation can be considered an integral part of the project's learning process. There could be instances where certain important components of the program have not been given much prominence. In other instances, one might be excessively focused on certain components that the main stakeholders do not find absolutely necessary. In a program that has many components, striking up the right balance might prove to be a daunting challenge.

The importance of proper implementation cannot be exaggerated. At some point, it will be necessary to analyze the impact of the project on the learning outcomes of students and on the teaching learning process. If there are no known implementation failures, then the impact of the

² *User-Friendly Handbook of Project Evaluation*, National Science Foundation (2002).

whole program can be reasonably assessed (assuming relevant data are available). However, if there are weaknesses in the implementation process itself, then the impact evaluation will not be credible. More specifically, if the program is observed to be ineffective, we will be unable to ascertain whether the observed ineffectiveness is the result of theory failure or simply an artifact of the implementation process. The findings from this formative evaluation should help the project implementation team to identify implementation problems and address them in a timely manner so that a proper impact evaluation can be done in the future. Regardless of whether or not an impact evaluation is done, however, it is essential that the implementation process be fine tuned in preparation for the project's expansion in the upcoming pilot phase and subsequent phases.

The goal of the formative evaluation is to identify the problematic issues related to program implementation and to propose ways to improve implementation. Thus, when the pilot phase is reached, the program can be confidently implemented and one can focus more on the true impacts of this project. The formative evaluation should still be conducted, but its importance might be less than in the test phase.

1.2 Study design and method

1.2.1 Data collection methodology

To gain a comprehensive understanding of how the project is being implemented, we got feedback about the program from all categories of stakeholders who have been directly affected by the project. This study is, therefore, based on information collected from teachers, head-teachers, students in grade 2 and 6 and their family members, some School Management Committee (SMC) members, and school records. It also utilizes information obtained from community surveys of the two test schools, OLE Nepal's internal documents, detailed discussions with OLE Nepal officials, and postings in the OLE Nepal blog pages (<http://blog.olenepal.org/>). One-on-one meetings with teachers were conducted in addition to filling out standardized survey questionnaires. This was done so that topics that were not covered in the survey could be openly discussed. A second round of discussion with the teachers was done about a month after the first set of interviews was conducted. This discussion provided an opportunity to go deeper into some of the questions asked in the earlier survey so as to have a complete picture of their opinions about the OLPC project. More details on survey design, including sample selection and questionnaire design, are provided in subsequent sub-sections.

1.2.2 Questionnaire design

The questionnaires were designed to elicit as much information as possible about how the initiative is being run. We wanted to know the general background of the people surveyed as well as questions pertinent to the use of laptops in the teaching learning process. So, in some cases we included two different sets of questionnaires where one set contained general questions and the other set contained questions related to laptops. In each set, questions were grouped topically into multiple sections and subsections. The teacher survey, including that of head

teacher, and student survey fall into this category. The family survey had one set of questions. Detailed information on each school was collected using separate school questionnaires that were filled with the help of school officials.

DoE also played a vital role in the questionnaire design process. It held a couple of workshops to identify key questions that should be included in the survey. We developed our own questionnaires—but incorporated the findings of the DoE workshops.

1.2.3 Sample

Because of time constraints, we were not in position to interview all the students and their families. Hence, we surveyed only a sample of students in grade 2 and 6 since they were the ones receiving the laptops. In order to make the sample reasonably representative, we tried surveying only those students whose roll number was odd (or only even numbered in other cases)³. Since not all students were present in school, this strategy could not be strictly followed. In situations where a particular student was absent, we tried surveying the student whose roll number immediately followed the absent student's roll number. There were instances when both the students were absent, in which case we had to select another student.

One could argue that the family survey is less representative of the actual population. We made a conscious decision to survey family members in their respective houses so as to minimize disruptions in their daily routines. Asking them to come to school would have required them to set aside a substantial portion of their day for this survey. This decision had some consequences. For example, we could not survey family members who lived very far from school (more than half an hour walk). Since it was monsoon season and many family members would be working in the farms, we were worried that we would not find them home. In addition, time was always a constraint. So, we surveyed family members who were close-by. Nevertheless, attempts were made to make the family survey somewhat representative. We wanted to select families of students from different ethnicities (this was not an issue in Bashuki as almost all the students are from the same ethnic group), and different grades. We also wanted to represent families of both male and female students and families with different economic conditions. We asked the head teacher and other teachers to recommend names of families to be surveyed, based on the criteria we outlined. In retrospect, the list they provided looked fairly representative.

We wanted to survey all teachers from both the schools. However, in the case of teachers who did not take the training offered by OLE Nepal and/or new teachers who did not know much about the initiative, only general information about them was collected. We could not survey a couple of teachers from Bishwamitra because they were not able to come to school due to a transportation strike.

³ There were no recurring patterns in the way roll numbers were assigned. If there were a recurring pattern, then the method we used could have been problematic (e.g., if the roll numbers listed males and females alternately, then the sample would have been biased.)

In total, 31 students from grade two, 45 students from grade six, 19 teachers including two head teachers and 20 households were surveyed for the purpose. Though we had interactions with School Management Committee members as well to understand how they perceived the program, this was not as extensive and systematic as with other stakeholders. We also had discussions with many OLE Nepal officials, including Rabi Karmacharya (Executive Director) and Saurav Bhatta (Education Director), which aided us in putting our observations in proper context.

1.2.4 Analysis approach

Since the OLPC project is currently being implemented only in the two schools included in this study, a rigorous quantitative evaluation of the project is neither appropriate nor feasible. A much larger sample size is a pre-requisite for a quantitative evaluation study, which might be conducted in the pilot and subsequent phases. However, since a rich set of information was collected during the field visits, a sound analysis can be undertaken with the information at our disposal.

To make the study as comprehensive as possible, the study employs both qualitative and quantitative evaluation methods. It not only provides some descriptive statistics on what different stakeholders think about the program, but also attempts to answer why we observe the particular pattern. This, we believe, will be more useful to various stakeholders, including OLE Nepal and DoE, not least while implementing this program in other schools in the future.

1.3 Study period

This evaluation was conducted between mid-June and mid-August 2008. The first week was spent preparing survey questionnaires. The first round of field visit was conducted between June 22 and 27. The first three days were spent in Bishwamitra Secondary School while the last three were spent in Bashuki Lower Secondary School. The next four weeks were spent entering the data, doing the preliminary analysis, holding discussions with OLE Nepal officials, and presenting preliminary findings to OLE personnel. The preliminary analysis and feedback from those attending the presentation were particularly useful in helping us identify information that needed to be collected in a follow-up survey of the schools. The follow-up field visit was conducted between July 27 and July 31, 2008. We, however, were in regular phone contact with teachers in both schools over the entire study period.

1.4 What will the study cover?

This report will largely dwell on the service delivery aspect of the OLPC project. Providing formal school-level education through the medium of ICT in general and laptops in particular is the core focus of this initiative. Hence, the current study revolves around evaluating how the digital learning materials and laptops are being used in the teaching learning process and

how the teachers have been trained to integrate the new instructional approach and digital materials in the regular classroom process.

1.4.1 Training in the use of ICT for instructional purpose

Since teachers play a crucial role in determining whether the whole initiative is a success or failure, it is essential that they 'buy-into' the problem. They need to be convinced that this initiative has great promise. In order for them to be convinced, they not only must be fully informed about the program, but they must also be confident in using the technology and new teaching/learning approach. In other words, they need to be trained properly. To inform them about the opportunities and challenges of ICT in education, a training program needs to be conducted before the laptops are provided to students.

Taking this into consideration, OLE Nepal had conducted two 4-day training --residential and in-school -- about the use of ICT for instructional purposes beginning March 29, 2008. Since this is the first time this type of training has been conducted in Nepal, it would be interesting to see how the teachers who participated in the training felt about different aspects the training focused on.

The evaluation of the training is largely based on interviews and surveys conducted with teachers. Among issues that were presented in the training, one would be interested in finding out whether the materials covered in those training sessions were adequate, what the teachers particularly liked and what they thought could be reduced or removed next time. The feedback obtained from this part of the evaluation should help in designing future training sessions.

1.4.2 Classroom teaching learning process

Evaluation of the classroom teaching learning process will focus on three main areas: the teaching learning digital materials, the classroom teaching learning process, and the class preparation process. We use feedbacks from teachers and students to do the evaluation for the first two areas, while only those of teachers for the class preparation process.

1.4.2.1 Teaching learning digital materials

OLE Nepal has developed Math and English digital learning materials for grades two and six. This subsection will look into topics like how digital materials have been incorporated in classroom teaching, whether the materials are consistent with the level and capacity of students and meet the aims and objectives prescribed in the curriculum. This information would help in preparing future digital materials. Please note that while the digital materials have been designed specifically for grade 2 and 6 Math and English courses, they are sometimes useful for other subjects and classes as well.

1.4.2.2 Classroom teaching learning

In this subsection, we discuss about how the digital materials and the laptop are being used in the classroom, and at home as well, and how this has affected teaching and learning. These changes are not ‘impact’ per se, but those that have been observed or perceived. It will also be instructive to see which aspects of teaching have been made easier and which aspects more difficult.

1.4.2.3 Class preparation

This section will detail how class preparation has varied after this program came into effect. Issues like the time spent preparing for class and making lesson plans will be considered. Where possible, comparisons will be made between classes that use laptops and classes that don’t. This information will be available from the teacher survey and one-on-one interviews with teachers.

1.5 Laptop and Network Issues

Here we will discuss different issues and problems related to the use and protection of XO-1 laptop, which is the laptop that has been provided to the students, and is distributed by the OLPC organization⁴. Information from the teachers, students and their family members will be used. We will also talk about how the computers are networked among themselves and with the central server. Problems encountered in this front will also be explored.

1.6 Preparations for future phases

One of the aims of this study is to provide OLE Nepal and DoE with suggestions for strengthening the implementation of the project in subsequent phases. Some suggestions will be obvious from the discussions in subsequent chapters. For example, if teachers appreciate certain components of the teacher training program, chances that those components are important. The chapter on suggestions and recommendations should also be helpful. Most of these suggestions are compiled largely based on the interactions with teachers and family members.

1.7 Limitations of the study

As discussed earlier, this study is a formative evaluation and not an impact evaluation/assessment. One of the pre-conditions for assessing the impact is that the implementation is done as planned and that there is no implementation failure. This condition is hard to guarantee in this test phase. In addition, to make a credible impact assessment, some version of a randomized experimental design (or, at the very least, a quasi-experimental design) must be used. We also need a larger sample size and baseline data for making before-and-after

⁴ The XO laptop have been developed keeping in mind the needs of the developing countries. It is relatively cheap and includes materials children find interesting. For more details, please check: <http://laptop.org/>

comparisons. A preliminary impact evaluation could be done along with another formative evaluation during the upcoming pilot phase of the program.

This study is also not an evaluation of OLE Nepal per se. The focus is on service delivery by OLE Nepal rather than on the internal efficiency of the organization. Similarly, this study does not evaluate the technological aspects of the project. For example, it does not evaluate the digital content development process. Neither does it scrutinize the appropriateness of the technological solutions used by OLE Nepal. It should also be noted that this study does not cover the financial side of the project.

OLE Nepal's OLPC implementation plans include providing internet and e-library access to the two test schools. However, this study does not formally evaluate these components of the project since internet connection at the schools became fully functional only during the study period and the e-library was not yet accessible at that time. Since both of these components are potentially very important and can alter the present environment substantially, it is essential that a separate evaluation of these components be done sometime before the end of the test phase. We will, nevertheless, briefly discuss these components in this report as well.

1.8 Organization of the report

This report is divided into six chapters. Chapter 2 provides background on OLE Nepal and the OLPC approach in Nepal. We also provide some details on two test schools there. Chapter 3 largely discusses the findings from survey on teacher training. It includes residential, in-school and refresher trainings conducted by OLE Nepal. The classroom teaching learning process is covered on Chapter 4. Salient features related to the teaching learning process like teaching learning digital materials, classroom teaching learning, and laptop and network issues will be explored. Since this report focuses on the implementation aspect of the program to help both present and subsequent phases, Chapter 5 provides suggestions and recommendations on how to make the OLPC program in Nepal even more effective. Chapter 6 concludes.

2. Background on OLE Nepal and OLPC program

The OLPC Nepal Program is developed by Open Learning Exchange Nepal (OLE Nepal), a non-governmental organization (NGO) that includes both Nepali and international experts. The objective of the program can be divided into two parts: the directional objective and the immediate objective. The directional objective of the program is to provide open and free access to quality education and an innovative learning environment for all Nepali citizens using ICT. The immediate objective is to provide grade 2 and 6 students in the two test schools open and free access to high quality and innovative education using ICT. Obviously, the directional objective is broad and will require many phases and hence take many years to realize. This report will focus on the immediate objective. Since the program in the test phase has only been implemented for about two months, a comprehensive evaluation even in this front is not possible. So, it will address a subset of the immediate objectives. To realize the objectives of the program, OLE Nepal has focused on four main areas: digital content development, teacher preparation, network and power infrastructure development and government capacity building. More details on these areas will be provided later in the chapter.

As discussed in Chapter 1, OLE Nepal and DoE selected Bishwamitra Secondary School and Bashuki Lower Secondary School as the test schools. The laptops were provided to all the students in grade 2 and 6 in those two schools on April 25, 2008. Each laptop was assigned to a particular student. The students were allowed to take the laptops with them home. This allowed opportunities for others in the family and community to use the laptops. To what extent they were used will be discussed in subsequent chapters.

After much deliberation, the schools decided that students would not be allowed to take the chargers for the laptops home. The schools were worried that the students would forget to bring their chargers to schools and come to class with uncharged laptops. This would cause problems in the classroom teaching learning process. They were also worried that the students might lose the chargers. There was also a concern that frequent plugging and unplugging the chargers in the classroom charging rack could break down the charging rack sockets. The teachers later found out that having chargers in schools would encourage students to come to school more regularly. Some students who do not like to come to school, but want to use the laptop would be forced to come to the school to have their computers charged.

It is also worth mentioning here that the students in Bashuki were allowed to take laptops home only after the second week of school. This was based on the suggestions given by the teachers and the School Management Committee. They argued that students who came to school on the first day of school could not be automatically counted on attending school later. In the past, quite a few students would disappear after the first few days. Although none of the students have officially dropped out, the teachers estimate that nine students might have not come to school after the first week had the laptops not been provided.

2.1 Theory behind OLPC Initiative in Nepal⁵

According to the school effectiveness research, the student outcome (cognitive, attainment, affective, socio-economic) is affected by three main factors: inputs (student, teacher, school, family), school process (classroom/teacher level, student level process) and contexts (national, community, school). The context can either directly affect student outcome or indirectly affect the outcome through changes in inputs or school processes. Inputs and school processes have the ability to influence one another. One can understand why previous interventions in Nepal that largely focused on inputs failed to bring desired changes—they overlooked the fact that other factors besides inputs are also important in improving student outcomes. For example, classroom and teacher processes changed very little then. Modern child-centered, interactive teaching approaches were largely ignored in previous initiatives.

The OLPC Initiative in Nepal expects there to be greater interactions between teachers and students in the classrooms so as to develop a more conducive environment. Many believe students learn more when they actively engage in the topic they are being taught than when they are passive absorbers. For that, move towards a more discussion-oriented and self-learning approach is needed. The teacher acts as a facilitator in this case. This more scientific approach will be achieved by developing high-quality digital contents, like interactive activities and digital library. More details on digital contents will be provided in later chapters.

2.2 Why OLPC?

In addition to the one laptop for every child, there are other options like creating a computer lab, a mobile computer lab, providing laptops to teachers only and one laptop per small group of students that would use computers to assist student learning⁶. There might be genuine disagreements among policymakers on which model to go after. Some could argue that compared to the one laptop for every child, all these other alternatives could be substantially less costly. So, it might be relevant to mention why OLE Nepal and DoE decided to implement the OLPC initiative and not the other initiatives.

The main argument in favor of the OLPC approach is that when each student has her own laptop, students are likely to view the computer as an integral part of their learning process. The learning does not have to be confined to the classroom and school – the students can use the computer both inside and outside their classrooms (e.g. at home). This might also help them develop a sense of ownership of the computers. This OLPC approach also expands opportunities for self-learning and independent inquiry. With other approaches, they might associate it more with school and class rather than view it as an essential part of their general learning environment. For example, they might view the labs as something external to them⁷.

⁵This section is largely based on Bhatta (2008)'s "Tackling the Problem of Quality and Disparity in Nepal's School Education: The OLPC Model" (<http://www.olenepal.org/images/olpc-model-in-nepal.pdf>)

⁶ Bhatta (2008): see reference above

⁷ Bhatta (2008): see reference above

As the OLPC model advocates allowing students to take the laptops home with them, the benefits of the laptops and available digital learning materials will not necessarily be limited to the student alone. In particular, the student's siblings and other family members can also use laptop for their personal development. For example, they can take advantage of the e-library materials. They might also learn how to use a computer and become computer-literate.

2.3 Difference between OLPC initiatives in other countries and in Nepal

At the risk of broad generalization, one could argue that most of the OLPC initiatives around the world are primarily interested in reducing the digital divide. Though bridging the digital divide in itself is a worthy goal, the implementation of OLPC in Nepal takes a broader view of what any OLPC initiative should aim to achieve. The Nepal program focuses not so much on reducing the digital divide as on bridging the education quality divide between public and private schools and among schools from different geographic and socio-economic locations. It views the laptop as a tool through which teaching learning materials in different subjects can be effectively delivered to the students in both the classroom setting and outside the classroom, and emphasizes the importance of integrating the use of the laptop in the regular instructional process by teachers. Thus apart from distributing laptops to students and teachers, it is simultaneously focusing on four areas: developing course specific digital content that can be used in the regular classroom process and beyond, providing access to the internet and an electronic library through a computer network, training teachers to effectively integrate the laptops and digital learning materials in their teaching, and building the governments' capacity to expand the project in the coming years. This more comprehensive approach should have a larger impact on student learning than simply providing laptops.

In short, the Nepal OLPC initiative is more concerned with improving student learning. They want to provide quality education in public schools and reduce the disparity in education between private and public schools that is very apparent. This disparity in educational quality is one of the reasons why OLE Nepal attempts to prepare digital activities that are in line with the Nepalese curriculum. This way, the teachers have an incentive to use these materials in class more regularly, and students are exposed to some high-quality materials.

2.4 Program implementation approach

To realize the objective of OLE Nepal that was discussed in the preceding chapter, OLE Nepal has been focusing on four main areas while implementing the OLPC program. These areas are digital content development, teacher preparation, network and power infrastructure development and government capacity building. The details on digital content development and teacher preparation have been discussed in chapter 1. So, this section will focus on the remaining two.

To take full advantage of ICT, a good networking facility that helps connect students to the wider world is essential. The networks can be networked at various levels to help effective flow of information to aid teaching and learning processes. The frequent disruption on electric power, for example, because of load shedding (power-cuts), necessitates a thorough preparation on this front.

Since the long term goal of OLE Nepal is to implement the OLPC initiative through-out the entire public school system of the country, it is essential that the government is fully on-board. Without their active support and participation, this initiative cannot go beyond a certain point. The government needs to be well aware of the challenges ahead and have the necessary capability to move forward. According to an internal document from OLE Nepal, it “seeks to build capacity of DoE (as overall implementer of the program), NCED (as teacher trainers) and CDC (as curriculum developers) so that they can sustain and internalize the project as one of their core programs in near future. In the district level, OLE seeks to build capacity of respective District Education Offices, particularly School Supervisors and Resource Persons who can play a vital role in seeing that the program implemented in schools area a success.”

2.5 Implementation approach in each area

Here we will focus on the way the implementation is being done in the above mentioned four areas by DoE and OLE Nepal. The philosophy behind the whole initiative can also be inferred from the way the project is being implemented.

2.5.1 Content development

The digital content being developed by OLE Nepal has been specifically designed to meet the aims and objectives prescribed in the national curriculum. This way, it is hoped that the teachers will have an incentive to use these materials regularly in their classes.

Two types of content are being developed: interactive learning activities and an electronic library. The digital contents are called ‘e-paath’ in Nepali (the laptop itself is called e-paati). With regards to interactive learning activities, a team of thirteen personnel work on content development in the OLE Nepal’s office in Sanepa, Lalitpur. The team includes curriculum experts, graphics designers, and software engineers. Once the interactive activities have been developed, they are installed in the laptops. OLE Nepal is also currently working on a mechanism through which new materials can be uploaded in student computers automatically from the server and replace the practice of OLE personnel using pen drives to load new materials in individual computers.

2.5.2 Teacher preparation

Trainings and regular interaction with teachers are very important to prepare them to integrate ICT in their regular teaching. An interaction program between the teachers from the two test schools, officials from DoE and OLE Nepal took place on March 13th, 2008 to get to

know each other and to sensitize teachers about the new initiative and the roles each one had to play. The District Education Officer of Lalitpur, the district where the test phase schools are located, also attended the program. The teachers were obviously very pleased that their schools were selected to implement the program. This meeting stressed the importance the test schools in making the 'One Laptop per Child' a reality for all the school-going students in the country. The teachers were aware of the challenges ahead and were willing to support the initiative in whatever way they could. This meeting also fixed the dates for the teacher training program and developed guidelines for how it should be conducted.

A four day residential training was conducted from March 29 to April 1, 2008 and a four-day in-school training followed after a couple of weeks. The in-school training was completed on May 2, 2008. The residential training included teachers from both the schools together and was held at Malpi International School, Panauti, on the outskirts of Kathmandu Valley (35 kilometers from Kathmandu). The in-school training programs were conducted separately in the two schools. Ten teachers from Bashuki and 11 from Bishwamitra participated in the residential training.

The goal of the residential portion of the training was to provide adequate training in three areas: Information technology literacy, child-centric interactive teaching and integration of ICT-based instruction in child-centric interactive teaching. Since almost all the teachers had limited knowledge of computers, the first day of the residential training focused on the use and functions of the XO laptop. On the second day, Piaget's theory of cognitive development, Vygotsky's theory on scaffolding and Papert's theory of interactive learning, and how these theories were reflected in the activities developed by OLE Nepal were discussed. A section on classroom management, for example, on how to arrange classroom furniture to ensure laptop safety and maximize interaction both between students, and between teachers and students, was also discussed. Schools were encouraged to formulate classroom rules and job lists. The teachers were urged to make their own lesson plans to incorporate ICT-use in classrooms on the third day of the training. On the fourth day, some teachers conducted sample classes based on the lesson plans they conducted. The remaining time was spent on discussions about how to conduct parent/guardian communications in their respective communities.

Since integrating the laptop and digital materials prepared by OLE Nepal in the regular teaching learning process is a huge challenge, it was decided that in-school training should also be conducted. There are merits to conducting training in regular classrooms. Since each school is different with respect to physical infrastructure, community involvement and student composition, one could argue that conducting classes in the natural setting is more relevant and effective. Teachers can incorporate the new technology, taking into account their students who they know well. In addition, since students themselves needed to be versed on how to use activities in the laptops to enhance their learning, it is more convenient to conduct such trainings in the schools the students attend. The four-day in-school training largely focused on implementing the integrated lesson plans the teachers had developed during the residential training. Teachers would first review the lesson plans prepared by the subject teacher and offer comments. The teacher would then teach according to the lesson plan while other teachers and OLE trainers observed the classroom process. At the end of the day, the participants in the training—including the lecturers and observers-- would critically review the day's experience

and provide comments and suggestions for future classes. Since the laptop currently contains activities for grade 2 and 6 math and English, the lesson plans were prepared accordingly.

Refresher trainings on a regular basis are also in the cards. As a completely new initiative that had not been implemented in Nepal (and there are limited similar initiatives in other countries), it is very likely that there will be confusions on how to integrate ICT in classrooms. These refresher trainings will address those concerns. One such refresher training was conducted while this evaluation was still ongoing. The details are provided in Chapter 3.

2.5.3 Networking and infrastructure⁸

The two test schools are connected to each other, to OLE Nepal office and to the Internet through a combination of high speed fiber-connection and wifi-radios in the form of a local network. Radio links rather than a wired connection are used because the test schools are located in a hilly region where a wired connection would have been very expensive.

The network structure is as follows:

1. The two test schools are connected to DoE through Point to Multi Point radios.
2. DOE is connected to the local ISP through a fiber link, which is also connected to the OLE Nepal office. The fiber connection is used for the Internet and as a local network that enables the schools, DOE and OLE Nepal to be on the same network.
3. The router at the OLE Nepal office is the default gateway for the schools to get to the Internet.

The school server (XS) acts as a router between the schools and the outside network. Each school has two Access Points (AP) that the XO's can connect to. One AP per class provides enough ip's for all the XO's in that class to connect to and each AP is connected to the XS. The XS also acts as a local cache server for e-library (e-pustakalaya), and also enhances the browsing speed of the Internet. The XS is also a repository for all the activities developed by OLE Nepal, and new activities can be remotely transferred to the server.

OLE Nepal has come up with a mechanism to update the activities on the laptop through the network. Rather than updating the laptops manually one at a time, students can now just click on an icon on their screen that downloads new activities to their laptops⁹.

Though both schools have power lines, power related problems are more frequent at Bishwamitra School. Equipment have been frequent broken due to power failure. Backup power supplies have been installed in both schools. Each school has a battery and a UPS installed to run the school server and the wireless access points during power cuts. The battery is connected to the main power line to charge it. The UPS is then connected to the battery, and the equipment are in turn connected to the UPS.

⁸ This part is based on the report by Sulochan Acharya who is a member of Engineering team at OLE Nepal.

⁹ Since this information is relatively new, it can be inferred that activities which were earlier downloaded manually can now be updated by the students by clicking on an icon.

2.5.3.1 Charger rack

A multi-charger rack unit that can hold up to 25 laptops has been designed. The rack units are a cheap local solution that functions not only to charge the laptops but also as a storage unit where students and teachers can conveniently place their laptops. There are 2 rack units placed in each class so that students can safely charge their laptops when they are not using it.

2.5.4 Government Capacity building¹⁰

To build the government capacity in ICT, OLE Nepal has identified two areas: technical capacity and the teachers' capacity.

OLE Nepal has helped setup an OLPC Lab at the Department of Education. The lab at DoE is set up in a way that replicates the network/server infrastructure at the schools so that it can be used by the technical team at DoE. The workstations also contain the activities developed by OLE Nepal that can be used by the lab users. The team was briefed on lab administration, networking, and technical issues. Training in OLE Nepal office was also provided for DoE personnel. The two parties are in constant touch to build government capacity in ICT.

On January 14, 2008, OLE Nepal in co-ordination with DoE organized a day-long interaction program at NCED with 25 public school teachers from 12 public schools from Kathmandu, Lalitpur, Bhaktapur, Kavre, and Surkhet districts. The goal of the program was to inform teachers about the development of digital educational materials and its implementation through the OLPC project, as well as to gather teachers' perspective on the usage of such material in the teaching-learning process. The teachers also discussed the challenges in implementing the OLPC project in the classroom level, which OLE Nepal took into consideration while implementing its program in test phase schools and while preparing a teacher training manual.

OLE Nepal also held three presentations at CDC to make them familiar about digital content development. They are now familiar with the process and are also at a point where they can review contents developed by OLE Nepal. In future, OLE Nepal hopes to provide them training on how to develop content development.

2.6 Introduction to the two test schools

2.6.1 Bashuki Lower Secondary School

One of the test schools is Bashuki Lower Secondary School located in Lakuri Bhanjyang in Lalitpur district. It is about 30 km east of Kathmandu. The school has pre-school to grade 8 and for the academic year 2008/2009, 221 students are enrolled in the school. According to school records, there are 35 students in grade two and 34 students in grade six.

¹⁰ Some of the materials here are based on OLE Nepal's internal report, provided by Rajeev Adhikari (Government Affairs).

Though Lakhuri Bhanjyang is pretty close to the capital of the country, all the socio-economic indicators point to it being a typical Nepali rural school. In the community that has about 1300 inhabitants, only 21 % of the inhabitants are literate (based on a recent study by the teachers there). Very few people from the community have passed the School Leaving Certificate (SLC) exam, which is a pre-requisite for obtaining a teaching position at the primary level. This partly explains why only one of the teachers at Bashuki is from the local community (based on school records). Almost all the teachers are from the nearby village (most are from the same Village Development Committee) and they walk more than one hour each way to and from school.

Almost all the people in the community are from the Tamang ethnic group, one of the disadvantaged ethnic groups in the country. Lakuri Bhanjyang is a poor rural community where many people have difficulty meeting their daily needs. Most of them have agriculture as one of their occupations. For example, all the households we surveyed were engaged in agriculture. Most of them also engage in wage labor in the city to supplement their incomes. Largely because the literacy rate is pretty low here and that there are very few people who have completed higher education, many people here do not value education as much. Though the situation is improving, a lot still needs to be done to raise general awareness about education.

There are altogether 10 teachers in the school for the 9 grades (including pre-school). The school helper generally helps with the pre-school class. On a regular school-day (Sunday to Thursday), the school day is divided into 7 periods. The teachers, on average, have to teach 6 periods on any given day. When some teachers are absent, the teachers who are present teach those classes. This effectively means that the teachers do not have any free time during school hours. Add to this the fact that the teachers have to walk about one hour and fifteen minutes each way, this is indeed a huge commitment.

When the head teacher was asked to identify the five biggest challenges facing the school, he highlighted the following problems:

- Inadequate number of teachers
- Lack of awareness among local residents/parents of the importance of education
- Need for School Management Committee to be even more serious with their responsibilities
- Low student attendance
- Limited opportunity for teacher training

2.6.2 Bishwamitra Ganesh Secondary School

Bishwamitra Ganesh Secondary School is in Jyamirkot, Lubhoo also in Lalitpur district. It is about 30 minutes walk from the nearest main road, which at places is unpaved. Until last year, the school had grades 1 to 8, but the school recently obtained permission to upgrade it to a high school. So, for the academic year 2008/09, the school has grades 1-9 and it will add grade 10 next year. One of the driving forces behind this move is the belief that some students, especially those from marginalized communities who live far away from the nearest secondary

school, would drop out of school. For this academic year, 284 students are enrolled in the school. There are 22 students in grade 2 and 38 in grade 6, the classes that are provided laptops.

The community has a diverse ethnic composition. Brahmin, Chhetry and Dalit (so called untouchables) reside here. Though this is also a relatively poor community, the awareness about education is more than in Lakuri Bhanjyang where Bashuki Lower Secondary School is located. Almost all the families here are engaged in agriculture. For example, except one, all the household we surveyed for the family questionnaire identified farming as one of the occupations.

The teachers here are from a relatively close location. Unlike in Bashuki, many students also are from teacher’s village. Altogether, there are 12 teachers in the school. Three of the teachers had earlier attended Bishwamitra.

When the head teacher was asked to identify the top five problems the school was facing, he mentioned:

- Not enough teachers to teach lower secondary level and above
- No adequate buildings
- No adequate funds to repair buildings
- Limited management and teacher training
- Limited furniture in the classrooms

2.6.3 Comparing test scores for grade 2 and 6 students

If feasible, it is always a good idea to test the students before any major initiative is undertaken. This will, among other things, act as a baseline score to monitor the progress of the students once the program is implemented. This baseline data also allows one to make before and after comparisons. Since collecting test scores of grade 2 and 6 students was not possible before program implementation for this phase, the OLE Nepal had taken one test soon after the laptop provision. The same set of questions was used in both the test schools. Though one needs to be very cautious while making inferences, the data could provide some insights if all indicators point towards supporting (or not rejecting) a particular hypothesis.

The table below shows the average test scores (percentage) in Math and English for grade 2 and 6 students in Bashuki and Bishwamitra.

Table 2.1: Average test scores in two test schools

	Math		English	
	Grade 2	Grade 6	Grade 2	Grade 6
Bashuki	45.0	29.8	40.8	26.2
Bishwamitra	63.0	44.9	58.9	38.5

The students in Bishwamitra, on average, did much better than the students in Bashuki. More students in Bashuki were absent on the day the tests were taken-- almost 40 % of the grade 2 and 6 students were absent in Bashuki while the corresponding figure was about 10 % in

Bishwamitra. The absentees were not considered when calculating the average. One could argue that had all the students been present and taken the test, the discrepancy would have been even larger as the ones absent are generally the weaker students.

These results along with information obtained from discussions with teachers suggest that there is a notable difference in the academic level of students in these two schools. It is beyond the scope of this evaluation to determine the factors that lead to low academic performance. However, the disparity in academic performance between the two schools should be considered while trying to explain different facets of the program.

3. Teacher training and orientation for other stakeholders

This chapter largely focuses on how the teachers perceived the teacher training program and other activities that were done to prepare the teachers and familiarize other stakeholders in the community with the new initiative. These perceptions and suggestions can provide valuable inputs for program implementation in the future. As has been repeatedly mentioned in the report, without active participation of teachers in this initiative, the program cannot realize its goals.

Altogether 10 teachers from Bishwamitra and 7 from Bashuki filled out the questionnaires. All these teachers had participated in the training programs organized by OLE Nepal. Since one of them had only attended the in-school portion of the training, the residential portion has 16 teachers who took part in the survey.

One of the survey questions focused on the teachers' general impression about the delivery of the training as a whole. To the question "Do you feel that the training was delivered properly?," the teachers' responses are summarized in Table 3.1 below.

Table 3.1: Whether the training was delivered properly?

School	Yes	No	Total
Bishwamitra	9 (90%)	1 (10%)	10
Bashuki	4 (57%)	3 (43%)	7

We see that almost everyone at Bishwamitra had a positive opinion about the training. Although the delivery of the training was evaluated favorably by the majority of the teachers at Bashuki as well, a substantial number of teachers in this school held an opposing view. This difference merits serious consideration. As mentioned earlier, the training consisted of a residential component followed by an in-school component. The teachers from the two schools participated in the residential component together. However, the in-school training was conducted separately in the two schools. So, if the responses to residential training questions are similar while the ones for in-school are different, then one could reasonably argue that the difference in in-school training delivery is driving the result. On the other hand, if the responses to the residential component questions are significantly different for the two schools, then that line of argument will not hold much ground. The extent to which the responses from these two schools are similar or different will be scrutinized in the sections below.

3.1 Training in the use of ICT for instructional purposes

One of the primary goals of the training was to make teachers comfortable in integrating the laptop and digital learning materials in the regular teaching process. Hence the evaluation had specific questions related to the integration of laptop use in the classroom. At the same time, it is also relevant to find out how comfortable teachers feel using laptops because one could

argue that people who are comfortable using laptops are more likely to integrate them in their classroom teaching. A number of questions were asked to elicit the opinions of teachers on this issue as well.

To the question “Was the complete training sufficient for enabling you to use the laptops comfortably?” we obtained the following responses:

Table 3.2: Whether the training was sufficient to use laptops comfortably?

School	Yes	No	Total
Bishwamitra	6 (60%)	4 (40%)	10
Bashuki	2 (29%)	5 (71%)	7

With regards to the question “Was the complete training sufficient for enabling you to properly integrate the laptop in the regular classroom instruction process?” the responses are given below:

Table 3.3: Whether the training was sufficient to integrate laptop use in classrooms?

School	Yes	No	Total
Bishwamitra	5 (56%)	4 (44%)	9
Bashuki	3 (43%)	4 (57%)	7

The responses for both the questions are different across schools. The majority of the teachers in Bishwamitra had positive responses while most teachers in Bashuki had negative responses. At Bashuki, positive responses were higher for the question on integrating laptop use in the classroom teaching process. One would assume that teachers who had taken computer training before might be more comfortable with the laptops than those who had not. However, there was no notable difference between the responses from teachers with prior training in computer use and responses from teachers with no prior training. It would have been interesting to see whether prior computer training and its use were correlated. Unfortunately, we do not have information on prior computer use.

Since only Math and English teachers in grades two and six are regularly using the laptop for instructional purposes, it is useful to separate their responses from those of other teachers. Among the teachers who taught English or Math to grade two and six students, 3 teachers (out of 5) at Bishwamitra said that the training allowed them to properly integrate the laptop in the regular classroom instruction process while the corresponding figure for Bashuki was 2 (out of 4). The number is slightly better than when asked to all the teachers, but not to a level one could be comfortable. The future refresher trainings should look at this carefully since if they are comfortable using laptops for instructional purpose, it is likely they will use the laptops in classrooms more often.

When the teachers were asked whether it was a good idea to run residential and in-school trainings separately, almost everyone (15 out of 16) said that it was a good idea and wanted it to be that way in the future as well.

When the teachers were asked whether a refresher training is necessary, all the teachers in both schools said that it was needed in the very near future and on a regular basis. The refresher training can be used as a venue to address teachers' concerns so that they are comfortable using laptop in classrooms. During discussions with teachers, we observed that one area where teachers seemed confused and at times had contradictory views was the optimal time to be spent using laptops in the classrooms. Some thought between one-third and one-half of the class time on days laptop is used is optimal while others thought the laptop had to be used for a full period. Though the educators at OLE Nepal encourage teachers to integrate laptop-based learning with other teaching approaches so that no more than 50% of the class period is dedicated to computer use, there is clearly confusion among some teachers on this issue. It might be helpful to revisit this issue soon in one of the refresher trainings to clarify any lingering confusion.

3.1.1 Residential training

Teachers were asked separate questions about residential and in-school training. With regards to whether the materials in the residential portion of the training were adequate, we obtained conflicting answers from the two schools. While the overwhelming majority of the teachers at Bishwamitra (89%) thought that the materials were adequate, less than one-third (29%) of the teachers at Bashuki said that they were adequate. Among those who felt the training materials were inadequate, the majority suggested that there should be a stronger focus on practical issues rather than on theoretical aspects of the teaching learning process. Some teachers wanted more examples on how to teach using laptops. Though teachers at Bashuki found the materials inadequate, most of them (71%) agreed that the residential training was delivered in an understandable manner and said that it was easy to follow. For Bishwamitra, the corresponding number was 89%.

In general, teachers found the following aspects and topics covered in the residential training particularly useful:

- Using the laptop for instructional purposes to make teaching more effective
- Make lesson plans
- Linking theoretical and practical aspects of teaching
- Meeting colleagues and learning from them (peer learning)

When the teachers were asked whether there were portions of the residential training that were not useful and should be reduced or removed next time, slightly more than two thirds said that there were no such parts. Their responses are summarized in Table 3.4 below:

Table 3.4: Whether portions of residential training needed to be reduced or removed?

School	Yes	No	Total
Bishwamitra	3 (33%)	6 (67%)	9
Bashuki	2 (29%)	5 (71%)	7

All the teachers who said that some portions of the training program needed to be removed or trimmed pointed out that a lot of time was spent on going over theoretical parts. They felt that theoretical discussions cut into the time allocated for hands-on experience in utilizing the laptop and digital materials for classroom teaching.

Peer-learning (learning from colleagues rather than simply from the instructor) was strongly encouraged during the training. And all the teachers found this learning approach very effective. After the training, they have been using this approach in their own classrooms as well. This approach should definitely be continued in subsequent training sessions.

3.1.2 In-school training

The strong emphasis OLE Nepal put on in-school training is a unique feature of their training program. Most teacher training programs conducted by the government are almost entirely residential. Thus the approach taken by OLE Nepal was new to the teachers.

Our discussions with the teachers revealed that, in general, they found the in-school training very useful. They were particularly satisfied by the knowledge they gained in class management (in a class where each student has a laptop) and in making lesson plans. The training also helped to make it clear that the laptops are one of the many tools used for teaching rather than an end in themselves. They highly appreciated the teaching tips and critical comments on their teaching styles during the feedback sessions. These sessions not only clearly pointed out their mistakes and weaknesses, but also helped them to improve their teaching. They felt that the training was also quite useful for those teachers who could not attend the residential portion of the training earlier.

Responses recorded in the survey questionnaires suggest that the lesson planning practice the teachers got during the training was particularly useful. Sixteen out of 17 teachers gave a positive response to the question “Was the lesson planning practice you got during the training useful?” To the question “What aspects in the lesson planning practice did you find useful?” they mentioned that one of the main benefits of the lesson planning exercise was that they felt encouraged and more confident to teach according to the lesson plan. They also said that this exercise helped them to manage and allocate their class time more effectively, taught them when and how to use the laptop in class, and gave them a better understanding of how to present materials in the classroom. All 17 teachers said it was very useful to review lesson plans together in a group.

Sixteen out of 17 teachers found nothing in the in-school training that was not useful and should be reduced or removed in the future. They considered the discussions and interactions in this portion of the training to be very informative and helpful. They found class observation and feedback sessions extremely constructive. Teachers were able to identify and solve a number of practical problems and issues by watching their colleagues present in the class.

The discussion above provides ample evidence that the teachers found the in-school training very effective. This is, however, somewhat ironic because many teachers in both

Bashuki and Bishwamitra did not consider the in-school training as training at all. We had to remind many teachers that the in-school component is also called a part of the training! Their not recognizing the in-school training component as part of the training package might be due to the fact that this training was very interactive and focused on peer-learning, which is in sharp contrast to the more common lecture-oriented training sessions they have attended in the past.

3.1.3 Training in general

When the teachers were asked if they had suggestions on how to make the overall training better in the future, they largely repeated many of the points mentioned earlier. Their suggestions are summarized below:

- More information on making lesson plans should be provided
- Focus should be on practical aspects
- Refresher training should be provided on a regular basis
- Trainers should pay attention to proper time management: topics covered in the beginning were given too much time and while the latter ones had to be rushed through
- Teachers should be given more guidance on when and where to use activities in the laptop.
- Trainings in the school should be longer, spanning many days.
- Trainings should be more focused on digital learning activities rather than on theory
- More breaks between sessions in the training
- Training should be done during holidays
- Unnecessary discussions should be reduced

One of the teachers recommended that the training book be written in simpler Nepali. He suggested that it would be better to use simpler words in the book instead of academic Nepali since teachers might use the training material when explaining the project to community members and parents.

When the teachers were asked whether the residential training was necessary at all, 14 (out of 16) teachers thought it was absolutely necessary. When the same question was asked about in-school training, all 16 teachers said that it was absolutely necessary. Taking into consideration the fact that the teachers have highly appreciated the both components of the training we recommend that future trainings also follow this modality. For logistics and may be financial reasons, it might have been tempting to provide only residential training in future phases. However, the teachers in these two schools strongly recommend having separate components.

3.2 Orientation program for parents and other stakeholders

A 3-hour orientation program for parents/guardians and other stakeholders was held on April 17th, 2008 at Bashuki and on April 21th, 2008 at Bishwamitra. In addition to teachers and head teachers, school management committee members, Parent Teacher Association members,

ward representatives, district resource persons and parents of grade two and six students participated in the program. These programs lasted for about three hours. They were conducted by the teachers themselves because as highly respected members of the local community, it was felt that they would be able to garner more community support for this new idea than outside “experts”. Furthermore, this approach would drive home the message that the ownership of the initiative lies with the local community, so the community would be more receptive to the idea.

The objective of these programs was to give the parents and other stakeholders in these test schools an overview of the project and discuss the importance of their role in making it a success. Since many community members had not seen computers before, it was also essential to show how these laptops work and how to protect the laptops especially when the students are away from school. Parents and the broader community need to be aware that the computer should be kept away from, say, water, sharp objects, etc. The orientation program also dwelt on how the laptops are used in the classrooms. A session was also devoted to how the laptop could be properly used by other family members. This program was also held to drive home the message that the laptop should be viewed as a family asset and maintained accordingly.

The teachers and head teacher thought that this program went smoothly and was largely successful in its goal. In subsequent phases, they recommend that at least one program be held before the program and convince them that their support would be vital for the successful implementation of the program. The next meeting, which could be held after the laptop is provided, could discuss the program in further detail.

3.3 Refresher training

OLE Nepal held a refresher training on July 28th and August 4th, 2008 at Bashuki. The training at Bashuki was held on July 29th and July 30th. The training in both the schools were conducted by curriculum experts from OLE Nepal and largely focused on how to integrate laptop in classroom teaching. The teachers also observed the classes conducted by the experts. In Bashuki, there were fewer teachers who participated in the training the first day. The second day of the refresher training went smoothly and had more teachers participating. The case in Bishwamitra was also similar. In one of the days, the training got affected because that training coincided with a visit by DoE officials. Since the teachers had to divide time, the training that day could not be as effective.

The teachers found the refresher training to be relevant to their needs and wanted these kinds of refresher trainings to be held on a regular basis. The teachers believed that they would be able to translate the knowledge gained during the class observation to their own lessons.

4. Classroom teaching learning process

4.1 Teaching learning digital materials

As has been repeatedly mentioned in earlier chapters, digital materials for grade 2 and 6 math and English have been loaded in the laptops given to students. In order to have any notable impact on teaching and learning, however, the materials in the laptops must be relevant and adequate. As learning materials are grade and subject specific, only those teachers teaching grade 2 and 6 Math and English and the students in those classes were asked the questions about the digital materials.

We wanted to know whether the materials in the laptops were, in general, consistent with the interests of the students in their classes. When asked that question, all the teachers teaching math or English in grades 2 and 6 answered in the affirmative.

Table 4.1: Whether the digital materials were consistent with students' interests?

School	Class2		Class 6	
	Yes	No	Yes	No
Bishwamitra	3	0	2	0
Bashuki	2	0	3	0

Surprisingly, however, when asked whether the materials in the laptops were consistent with the level or capacity of the students, the answer was rather mixed as shown in Table 4.2.

Table 4.2: Whether digital materials were consistent with students' capacity?

School	Class2		Class 6	
	Yes	No	Yes	No
Biswamitra	3	0	1	1
Bashuki	1	1	1	2

In general, teachers were satisfied with the materials developed for grade 2, but had differing views on grade 6 digital content. The teachers found many initially uploaded activities for grade 6 either too easy or too difficult. For the materials that the teachers deemed easy, it could be because those materials were mostly of review type. The teachers had earlier said that they reviewed materials during the first couple of weeks and OLE Nepal had taken that into consideration while preparing digital materials. The teachers however agreed that digital materials for grade 6 prepared after incorporating the feedback from teachers were more in line with the capacity and the level of the students. The response to whether the materials in the laptops are able to meet the aims and objectives of the relevant class as prescribed in the curriculum are identical to the ones for whether the materials are consistent with student level or capacity. Just like the responses there, the teachers felt that the recent digital contents were more relevant in this front.

The teachers mentioned that they generally spend one period to go over one activity. If one expects the teachers to use laptops for three days, then there should be about three activities prepared for each week. The teachers recommend that OLE Nepal should increase the number of activities in the laptop accordingly. However, they also mentioned that a number of activities have enough materials and variations in them to make them viable for use in multiple periods.

The teachers also mentioned that there were not sufficient exercises, especially for grade 6 students to work on. OLE Nepal is aware of this problem and has been working hard to provide more activities in the next update. Since the teachers are so used to following the chapters in the regular textbooks, they suggested that the teaching materials in the laptops be sequenced according to the chapters in the textbooks. This way, they will not have to spend a lot of time figuring out which activity corresponds to which chapter in the book. Currently, the materials developed by OLE Nepal primarily follow the national curriculum rather than the text books per se. However, OLE Nepal has now also prepared documentation that explains clearly which digital activities correspond to which textbook chapters.

The teachers also suggested that there be multiple choice question answers and practice questions. Some teachers proposed having different levels in the activities so that students develop a competitive spirit and try harder to go to a higher level. This could motivate them to study harder. The latest set of learning materials developed by OLE Nepal has incorporated these suggestions from the teachers.

When the students were asked what they found difficult in the math and English digital contents being used, only six of them indicated that they found something difficult in these activities. Of these six students, five said they had difficulty with division while one said that she had problems with multiplication. Furthermore, when the grade 6 students were asked how effectively they are able to use digital activities in the laptop, most of them said they can use it well. 83% in Bishwamitra said that they can use it well while 17% said they can use it somewhat well. In Bashuki, the corresponding figures were 75 % and 25 % respectively. No one said they cannot use the digital materials even though it was one of the options that was given. Taking these two responses together, this result most likely means that these students generally have problems with division and multiplication, rather than indicating weaknesses in the design of the digital materials.

4.2 Classroom teaching learning

It is important to understand how classroom teaching learning has been affected by laptop use in classrooms. All 17 teachers in the two schools feel that the use of computers has helped their teaching! All grade 2 and 6 teachers teaching math and English feel that their lectures are now more organized and that it is easier to teach students new concepts. They also believe that the use of laptop-based instruction has enabled students to learn concepts more easily. They are also of the opinion that laptop based instruction has made it easier to give students more practice exercises. In addition, they feel that the use of laptop based instruction has made the classes more interactive. All the teachers were unanimous in saying that the use of laptop-based instruction has increased the students' interest in their studies.

At Bishwamitra, teachers said that they generally use laptops 2 to 3 days a week. The teachers at Bashuki said that they conduct laptop-based classes at least three days a week. OLE Nepal trainers had advised the teachers to integrate laptop-based teaching with other teaching approaches during each period the laptops are used. Accordingly, during the periods when laptops are used, the teachers in both schools have been allocating between $\frac{1}{4}$ and $\frac{1}{2}$ of the class period for laptop based instruction. The remaining time is used for teaching concepts using the blackboard, physical learning materials and standard paper-and-pencil approaches. Thus there is evidence that the teachers are viewing the laptop as one of the many tools for teaching and are indeed integrating laptop-based instruction in the regular classroom process. The grade 6 student survey, which was taken independently, also largely confirms the teachers' statements about how the laptops are being used in class.

Students in grade 6 said that teachers mostly used laptops during the middle of the class period. They also said that when some of the students forget to bring their laptops, the teachers ask those students to look at the laptop of the student who is sitting next to her. This laptop-sharing approach is also used in situations where a student's laptop does not function properly or when a student, for some reason, falls behind the rest of the class. It is an effective way to not only prevent class disruption but also encourage peer-learning, and it was emphasized strongly by the OLE trainers during the teacher training program.

Many students said that they sometimes use their laptops for subjects other than math and English—subjects like geography and science. They also mentioned that when some of the teachers are absent, they make good use of the laptops during the teacher's absence and explore the various programs and learning materials independently.

The teachers in both schools felt that the introduction of the laptops has had a beneficial impact on student attendance. Most teachers said that the students are attending school more regularly. Furthermore, most of the teachers at Bashuki mentioned that the use of laptop based instruction has discouraged students from leaving school in the middle of the day. Since the problem of students leaving school before the end of the school day has never been a serious problem at Bishwamitra, the teachers there felt that this issue was not relevant to them.

The students in Bishwamitra generally said that the teachers give them homework every time the laptop is used in the classroom while those in Bashuki said that they are given homework only sometimes. According to the teachers in both the schools, they give laptop-based homework on a regular basis. These are mostly review type questions. The teachers ask students to repeat at home activities that were gone over in the class that day. At times, the teachers look at the user logs in the students' computers to see whether the student has at least opened that activity at home or not.

When the grade 6 students were asked whether they were able to finish all the homework assignments given in laptops on time, we got the following responses:

Table 4.3: Whether students complete homework given in laptops on time?

School	Yes	No	Total
Bishwamitra	24 (100%)	0 (0%)	24
Bashuki	13 (68%)	6 (32%)	19

All the students in Bishwamitra said they were able to complete their assignments in a timely manner. At Bashuki, about one-third of the students said they had difficulty completing their assignments. There is a possibility that the inability of these students to complete their homework on time might be at least partly related to the fact that they have limited free time at home after helping their families with household chores.

When the students were asked how learning has been affected with the introduction of laptops in their classrooms, almost all grade 6 students mentioned that it easier to learn new materials using the laptop (see Table 4.4 below). These responses are consistent with the teachers' views that laptop based exercises have helped the students to learn concepts more easily.

Table 4.4: Whether it is easier to learn new materials using laptops?

School	Yes	No	Total
Bishwamitra	24 (100%)	0 (0%)	24
Bashuki	17 (89%)	2 (11%)	19

As to why it is easier to learn concepts using the laptop, the most common student response was that it was possible to do each exercise or activity as many times as necessary. The next most common reason was that these computer based activities were fun and very enjoyable. The students also appreciated the fact that they could do these activities at their own pace. All these reasons were cited by more than 50% of the students.

When the students were asked about how they learn materials in the laptop almost all the students (42 out of 44) said with teacher's help. The students were allowed to mention as many options as they liked. There were also a significant percentage of students (77%) who said that they learnt to use the laptop based materials from their peers. Slightly less than fifty percent said that they learn themselves either at home or in school. The data above underscores the need to emphasize peer-learning among students as well. Conscious attention should be given in this front.

Since the influence of the laptops can go beyond the classroom and the students assigned the laptops, it is important to find out the extent of this practice. OLE Nepal has been encouraging expanding the use of the laptops at home and among friends. When the students were asked whether other family members also use the laptops, the overwhelming majority said yes. The exact responses are given below:

Table 4.5: Whether other family members use laptops at home?

School	Yes	No	Total
Bishwamitra	17 (77%)	5 (23%)	22
Bashuki	13 (87%)	2 (13%)	15

Siblings are the ones who use the laptop the most, followed by father and mother. This information is also confirmed with data from household survey where many siblings of students who have been assigned laptops said that they use the laptop regularly.

In an effort to understand how extensively the laptop is used by others outside student's family, students were asked whether their friends who are not in grade 2 or 6 also used their laptop. Their responses are shown in Table 4.6.

Table 4.6: Whether friends in classes other than 2 and 6 use their laptops?

School	Yes	No	Total
Bishwamitra	10 (42%)	14 (58%)	24
Bashuki	3 (15%)	17 (85%)	20

In total, less than one-third of the students said that their friends in classes that are not provided with laptops use their laptop. At Bishwamitra, however, a relatively large percentage (42%) of respondents indicated that they let their friends use their laptops. Since this survey was done about two months after the laptops was distributed, the sharing of laptops will probably increase in subsequent months.

One question designed to obtain information on how the students are using the laptop asked what the students did the most with the laptop. They were asked to select one answer from a choice of 6 options: playing with learning activities (the E-Paath activities developed by OLE Nepal), taking pictures using the camera in the laptop, chatting with friends, surfing the internet, reading books online, and others that needed to be specified. At Bishwamitra, 68% of the students (15) said they mostly used the laptop for playing with the digital learning activities, while 23% (5) said they mostly used the laptop to take pictures. The corresponding number for Bashuki was 32% for learning activities and 42% for taking pictures.

One of the concerns people might have is whether the students are able to use their laptops as much as they like at home. One could argue that the students might not have been able to use laptop fully because they had no chargers at home. It is also conceivable that other family members might be excessively using the laptop at home. If there are many family members who use the computer or that some of them spend a lot of time using laptop, this limits the time student can spend in front of her laptop at home. If they have to do a lot of household chores, they would also not be able to use their laptops much at home. So, what the students say is of special interest. The response is given below:

Table 4.7: Whether students are able to use their laptop as much as they like?

School	Yes	No	Total
Bishwamitra	20 (83%)	4 (17%)	24
Bashuki	19 (95%)	1 (5%)	20

Reasons cited by the students who said they are not able to use the laptop as much as they like were that they had to take sheep for grazing, had to stay in the shop, and had too many things to do at home.

Some teachers felt that the introduction of laptop has made managing the classes more difficult. Many teachers felt that the noise level has substantially increased. This had to do with the fact that students had difficulty controlling their excitements. The teachers hope that the noise level will subside once the students get used to using laptops. The teachers also admitted that they were, at times, having difficulty managing time because they are not used to integrating laptop use in classrooms.

In general, teachers were very satisfied with the way students are benefiting from the OLPC project, especially in Math and English. The teachers feel that the English vocabulary, pronunciation and speaking skills of the students have improved. For example, previously students would only know the names of different objects but had no idea what they looked like. Since the learning activities in the laptops make maximum use of images and multimedia in general, the students now have a much better grasp of English words. Learning Math has also been easier. These digital materials have also encouraged students to study independently. They can now read, write and learn themselves with the help of the computer. This way, it is easier for the teachers to teach in the class. Students also find studying fun and audio visual has raised their enthusiasm level.

4.2.1 Impact on subjects other than math and English

During the current test phase, the OLPC project has been focusing on English and Mathematics for grades 2 and 6. It is also of interest to look at whether this would affect the learning on other subjects. Since the project has just started, to what extent this concern is supported by the evidence, is hard to tell. However, based on conversations with teachers and family members, there are reasons to believe that the effect might be positive, or at least non-negative.

At times, teachers have used materials in the laptop while teaching other subjects as well. For example, the science teachers mentioned that they have utilized pictures of animals available in the laptops in their classes. Similarly, one of the geography teachers mentioned that he has made use of the atlas in the computer. However, it is clear that because of lack of adequate digital educational materials at this point, the use of laptops in subjects other than English and math is quite limited. It is expected that the e-library will play a major role in making the laptop more relevant for other subjects in the future.

4.2.2 Effect on other grades (besides grades 2 and 6)

Though the laptops have been given to grade 2 and 6 students and materials are largely relevant to these grades, some teachers have utilized the materials for other classes as well. Since the teachers in these schools are each given a laptop, they can use their laptops in other classes as well. One English teacher said that he uses the materials in the laptop to teach students from

other grades proper pronunciation. Similarly, the geography teacher mentioned earlier indicated that he sometimes uses the built-in atlas in grades other than 2 and 6.

If OLE Nepal could provide information on the materials in the e-library and the activities that might be relevant to other grades, use of those materials in those classrooms could substantially increase. Since students in other grades are not given laptops, the teachers will probably have to use their laptops in those classes. There has been a talk in one of the test schools (Bishwamitra) to have a separate room where teachers will include their laptops during day-time to give a feel of the computer lab. As a result, students from other classes could take advantage of the materials in the laptops.

4.2.3 Playing games vs. learning

During interviews and conversations with parents, teachers and students, it was evident that many of them did not consider playing games in the laptop as a learning experience. This included some of the interactive activities developed by OLE Nepal. Since many of the games are educational in nature, it might be a good idea to discuss this in length with concerned parties. For example, some parents we talked to were very worried that the students were spending a lot of time playing games in the laptops. In their opinion, playing games that were there, after a point, was a waste of time. They were not aware that many educational materials developed by OLE Nepal were prepared in a game form, so that students would be more interested in using them. The parents should be informed about the educational nature of the games so that, they might, for instance, look at things from a new angle.

4.2.4 Effect of laptop provision on school enrollment

There is at least one instance where a student studying in a private school moved to one of the pilot schools. When that family was asked why they moved their child to that school, they said they saw the potential of ICT use in education.

Though it is difficult to pinpoint the exact increase in student enrollment because of laptop provision, the teachers estimate this number to be around 25 in Bashuki. The increase is more significant in grade 1 and 5. The schools attempted to freeze the enrollment of new students in grade 2 and 6 after the registration deadline taking into account the total number of laptops assigned for this test phase. However, they were more liberal with other classes. So, there could have been some students who came to these schools in grade 1 and 5 hoping that this initiative will be continued for at least another year in these schools.

It needs to be noted here that, it is likely the increase in enrollment in these schools might caused a decrease in nearby schools. But we do not have the required data to verify this assumption.

4.3 Class preparation

One would also be interested in knowing how class preparation has been affected by the introduction of laptops in grades 2 and 6. One question related to class preparation is whether the teachers now have to put in more hours to prepare for such classes. If their workload has increased in this manner, this might have negative consequences later on as the teachers might decide to limit the use of laptops in their classes. Teachers were therefore asked the question: “Compared to the effort you had to put in the teaching learning process before receiving the laptops, how much effort do you put in now?.” The responses are summarized below:

Table 4.8: How much effort teachers put in after laptop introduction?

School	More	About the same	Total
Biswamitra	8 (89%)	1 (11%)	9
Bashuki	5 (71%)	2 (29%)	7

As shown in Table 4.8, the overwhelming majority of the teachers feel that they put in more effort now. Though there was an option to choose ‘less effort than before,’ no one chose that alternative. This pattern is largely similar even when we consider only those teachers teaching grade 2 and 6 math and English.

Some of the reasons cited by the teachers on areas where the effort has increased:

- Making lesson plans
- Preparing how to incorporate laptop while teaching
- Selecting which activities matches the subject matter being taught.
- Extra effort to bring down the noise level
- Preparing for the security and management of the laptop in the classrooms.

The use of lesson plans by the teachers in both schools seems to have increased as a result of the project. All the teachers who teach Math and English in grades 2 and 6 say that they make lesson plans for all these classes. However, one-third of them said that they do not make lesson plans for other classes they currently teach. All the teachers, including those teaching classes that do not use laptops, feel lesson plans help them in the teaching process. This finding suggests that hands on practice in making plans should be given more emphasis during the teacher training program.

4.4 Laptop and network issues

Teachers teaching grades 2 and 6, and all the students in grades 2 and 6 have laptops. No new student has been admitted to those classes after the laptops were provided, so all the students there have laptops. With regards to the teachers, some of them, who are new to the school, do not yet have a laptop. There is a provision in the schools that if the teachers leave the

school, they should return the laptop to the school so that the new teacher will be able to get the laptop.

Almost all teachers (16 out of 17) found the laptop and its layout easy to use. They thought the operating system interface is very intuitive and felt that the students too have little difficulty using them. Most of the teachers said it takes about 1.5 hours to fully recharge the computer and that the charge lasts for about 3 hours when the computer is in use.

We had also asked the teachers, students and their family members whether they had any problem with different aspects of computer use. More than 50 % of the respondents mentioned that the biggest problem was the jumpy cursor. The dust, the humid climate and the student's sweaty hands as a result of running around might be contributing to the situation. The problem seems to be slightly more acute in Bashuki. One teacher had a computer that did not boot properly, but that was during the residential training session and it was taken care of immediately.

When the teachers were asked whether they had problems with sound in their computers, the response was:

Table 4.9: Whether teachers had problems with sound in their computers?

School	Yes	No	Total
Biswamitra	3 (30%)	7 (70%)	10
Bashuki	3 (43%)	4 (57%)	7

More than one-third of the teachers thought the sound quality needs to be improved. There either is some problem with sound quality or that some teachers might have difficulty adjusting the volume. Since earphones are not available, difficulties arise for students and teachers when using sound related activities in noisy conditions. For example, at Bishwamitra, it is difficult for the users to hear the audio when there is rain since the school has a tin roof.

All the teachers have said that there have been no instances of students losing or selling their laptops. This was one of the concerns people had earlier. There was a feeling that some students and their families would be tempted to sell their computers as the laptop is bound to fetch a good price. If they had done so in sufficient numbers, the dynamics in the classrooms would have shifted. The teacher would then have had difficulty in deciding whether to continue with computer based instruction or revert to traditional methods. However, none of the computers were stolen or lost. It might be because when the students and their family feel a sense of ownership, they protect the computer. In addition, since the members in the community know each other well and the information passes quickly, the reputation of families that tried to sell laptops would have tarnished unless there was a critical mass willing to sell computers. It might have also helped in this aspect that the students were not provided with chargers to be taken home. Without the chargers the laptop was of limited use.

On a related note, during the second school visit to Bishwamitra, the teachers said that one of the chargers had gone missing right before the two-week monsoon holiday. The teachers

suspect a student who has gone elsewhere to stay with his relatives for a longer period might have taken the charger. The student has taken laptop along with him to the new place. Though this might be an isolated case, the teachers might want to be more vigilant about charger use in the future.

The school, students and their family members in general are spending a lot of time protecting the laptop. At home the students keep the laptop away from fire and water. Those who have a closet at home keep the laptop there when not in use. The students keep the laptops securely in the bag. The family members are aware that the laptop should be stored securely. When at school, the laptop is in the charging rack when it is not being used in the classroom. At school, the students are required to strictly follow the rules developed by the schools regarding how and when to use laptops. For example, students are not allowed to use the laptop without the teachers' permission. On their way to school or back home, the students keep the laptop in the backpack given by OLE Nepal. They are encouraged to walk carefully and in groups.

4.5 Difference between the two test schools

Looking at some of the responses to critical questions that we discussed earlier in this chapter and the chapter on teacher training, it is apparent that the two schools are very different. The teachers and students in these schools have given vastly different answers to some of the questions that one would expect to be similar if the schools were similar. For example, the residential training component of the teacher training was given for both the schools together. So, their experiences should have been similar. Similarly, the same digital contents were uploaded in the laptops in both schools. There, again, their views on the different questions related to digital contents varied a lot. Even responses to some of the questions by students produced different results.

These discrepancies underscore the need to identify the root causes behind these differences. One could argue that these differences are hinting at the fact that there might be certain enabling conditions that need to be in place to make sure that the program's objective are met. It could also mean that it might take time in some places to fully benefit from the initiative while we could see tangible results in some schools right away. For the pilot study, the OLE Nepal might want to seriously consider whether all the schools in the pilot phase need to be treated similarly or whether some activities, like sensitizing the community about the merits of ICT- in-education, need to be conducted in certain areas beforehand.

5. Suggestions and Recommendations

This chapter will mainly focus on what more needs to be done to make the Program even more effective. Even if the program is implemented the way it is currently being done, the initiative should improve the academic performance of many students in these schools. The teachers and family members of many of the students also agree to this assertion. However, since the program is relatively expensive, there might be people who would prefer even better results, preferably in many different dimensions to be convinced that this program is worth scaling up to include as many public schools in the country as possible. We identify below some of the suggestions we have to make the program even more effective. Please note that most of the suggestions we have highlighted in previous chapters are not included here.

5.1 Adding new Curriculum-based activities on time

During the evaluation period, we found that some of the activities that had already been prepared by OLE Nepal had not been uploaded to student laptops in the two test schools. OLE Nepal was working on the mechanism such that these activities could be automatically uploaded in the school servers automatically, i.e. without having to go to schools in person. Unfortunately, because of technical difficulties, this mechanism did not materialize on time. OLE Nepal has been working very hard to address this issue and should be successful (if not by the time this report is being written)¹¹. This delay resulted in not having relevant material on time. During the conversations, many teachers said they had reduced laptop use in classroom in recent days because they were done using the activities in the laptops. The teachers are teaching new topics/concepts and the materials relevant to those topics had not yet been uploaded in the computers. It is likely that the new materials that had not yet been uploaded to student's laptops covered many of those new topics. If they are uploaded later, it is likely that teachers won't use those materials later on as they will most likely have moved to newer topics. It is, therefore, very important that the materials that have been prepared be delivered to the intended targets on time.

There had been other challenges to regularly update educational materials. The prevailing political situation (e.g. strikes, *chakka jam*, etc.) was also delaying the delivery date. If possible, the deadline to upload materials could be set to an earlier date to account for situations beyond OLE Nepal's control.

5.2 E-library and internet access

We think OLE Nepal should try to upload all the books that are in its website (www.pustakalaya.org) to student laptops sooner rather than later. This serves at least two purposes. First, students who want to read those books could easily read them. Second, the users (teachers, students and their family members) might offer some suggestions that might help further improve the way e-library is accessed (e.g. layout of the books). Needless to say the parents and teachers are really looking forward to using the e-library.

¹¹ In fact, the students can now upload the activities by clicking on an icon in their computer.

Though we are aware of the work done to make internet access possible and should be fully in operation by the time this report is submitted, we wanted to mention this issue here largely because the teachers were very excited about this particular aspect (internet provision). It might be because they can use the laptop for personal benefit, like checking their e-mails and reading materials that might help them professionally. We came across some teachers who believed they were not personally benefiting from the laptop provision. When they feel this way, it is likely that some of them won't be as enthusiastic as others in adequately using laptop in the classrooms. This effect might be especially seen after a while (for example, after the novelty effect of using laptops in classroom wears off). One way to address this would be to make internet access possible from student's and teacher's residence as well. Other family members might also benefit as a result. For example, other family members can watch and listen news and programs related to health issues.

Though there was across the board support for internet provision, some teachers and family members were worried that students would spend too much time chatting online, like many urban private school students in Nepal. A pro-active role by teachers, like regularly checking log in the computers to see how students spend time in laptops would discourage students to spend a lot of time doing unproductive work.

Without internet access from home, convincing policymakers and others that one laptop for every child is preferred to, say, a well-planned computer laptop in the school might be harder, especially when the cost difference between these two alternatives could be substantial.

5.3 Work load on teachers

As has been repeatedly mentioned in this report, one of the main stakeholders that need to be persuaded to make the program effective is teachers. It is essential that teachers "buy-into" the project. Without their active support, this program will not reap the full benefit of the initiative. It is apparent that with the introduction of laptops in classrooms, the teachers have to and are adjusting their teaching methods. It is essential that we understand how they feel about the whole initiative and try to address any concern they have. Work load on teachers is one important factor to weigh in as it was repeatedly mentioned by the teachers.

Most teachers in both the test schools feel that their workload has increased significantly. This is a serious concern. If this trend continues, it is likely that they will revert, to a large extent, to traditional ways of teaching and ignore the materials in the laptop. If this happens, the effect of laptops with educational content on student learning might be minimal. Steps to further reduce workload and encourage laptop use in classrooms need to be devised carefully.

Some ways to deal with this concern are:

1. Accept as reality that workload is bound to increase: Compensate teachers for the extra work they put in. If necessary, some performance indicators may be tied to compensation.

This, in theory, should motivate teachers to work hard. However, it might not be very feasible. One needs to agree on the format of the payment scale. The decision needs to be made on whether to compensate all the teachers in a given school or only the teachers teaching Math, English and the head teacher. The latter option will substantially reduce the cost, but might also create conflict among teachers.

This particular option might be doable in the test phase, but the cost will substantially increase in the next phase and beyond. Since the cost of this initiative is already pretty high, it might make more sense to explore other alternatives.

2. Look at ways to decrease teacher's workload

This option might be more feasible and OLE Nepal might want to seriously consider this. There are many ways to make teacher's life easier in classrooms. Some of them are given below:

- Better integration of textbook and digital materials in the laptop. This way, the teacher can use the laptop regularly and also closely follow the Nepalese curriculum. If the materials in laptop could be matched with the textbook sections, teachers would have to spend less time figuring that out. At present, the teachers in the two test schools like the educational materials included in the laptop, but they say they have difficulty figuring out which materials are relevant to what they are teaching that particular day or week. If additional information on where those materials can be included is provided, it would save some of teacher's time and potentially increase the use of those materials in the classroom.
 - Include 'sample' lesson plans for at least those lectures that use activities developed by OLE Nepal which teacher's can follow if they prefer. Though teachers are required to prepare lesson plans, most teachers in public schools in Nepal rarely follow this guideline. In addition, since ICT in education is a new concept for almost all the teachers, they might have difficulty figuring out when best to use digital materials. If they are provided with sample lesson plans and guidelines, they will have a better idea about how to integrate laptop use in the classrooms and proceed accordingly.
 - Refresher trainings to the teachers on a regular basis where different ways to use laptops/digital materials and the concerns teachers have are addressed. If teachers encounter some problems with laptop use that they are not able to solve immediately, a somewhat long gap between trainings might force some of them to reduce laptop use in classrooms. These problems could discourage them from regularly using laptops in classroom. During these refresher trainings, time should be set aside for teachers to share their experiences about using laptops. The challenges they encountered and the solutions they propose or came up with might prove instructive to others.
- ## 3. Hire additional teachers to compensate for the workload. This is also not very practical, the reasoning being similar to what was raised in the section on providing compensation for teachers.

As mentioned above, point 2 is particularly relevant. These steps could lessen the amount of time teachers' spend preparing for the class. It is apparent that teachers don't have much free

time in the two test schools. Most of them have to teach for six periods (out of seven) in Bashuki. The case is not much different in Bishwamitra. Worse still, when some teachers are absent, teachers who are free in the particular period substitute for the absent teacher. Moreover, for the teachers' at Bashuki, almost all the teachers there have to walk more than 2 hours a day to reach the school. Add to this the fact that many teachers help their families (household chores, farming, etc.), they don't have much spare time there.

In short, OLE should seriously look at ways to reduce workload for teachers so that they continue to teach using digital materials.

5.4 Chargers

We strongly feel that OLE Nepal should take steps in allowing students take chargers home so that the laptop can be used longer and that other family members or community members are more likely to use it. If the charging is only done at school, there is a risk that students might not be able to use the laptop adequately at home once more activities are uploaded in the laptops. The longer holidays complicates the matter. Since OLE Nepal encourages students and their family members to use the laptop for materials in the e-library, it makes more sense to allow students to take chargers home. Otherwise, there could be limited use of those e-library materials (e.g. only when the teachers set aside time to read those books in the classes).

As mentioned in the beginning of the chapter, since this initiative is relatively expensive, only concentrating on student's educational attainment (which definitely is a very important outcome) might not convince policymakers and others to heavily invest in this initiative. If it can be demonstrated that other family members and the community in general are also benefiting from this endeavor, arguments to expand this initiative to other parts of the country might be even more persuasive. With present provision on charging batteries, using laptop outside school is limited.

We recommend that OLE-Nepal go ahead with its plans on providing 2 chargers per student with laptops, so the students can keep one charger at home and the other one at School. This way, the students do not need to worry about carrying charger every day. The chances of losing or misplacing ones chargers are also minimized.

Though most teachers generally perceive this idea of allowing students to take chargers home as both necessary and desirable, they are well aware of the potentially negative consequences of this provision. One worry teachers in both the schools had was whether this would adversely affect the attendance rate of the students. The current provision requires the students to come to the school if they want to regularly use the laptop at home. If this is changed, the students might decide to stay at home. Another worry the teachers have is that the students might spend more time using computer and not give enough consideration to other subjects. Some teachers expressed further concern about the maintenance and protection of computers once many members of the family end up using the computer. For example, some of the family members might not follow security precautions.

Considering all these factors, once (and if) the OLE Nepal decides to provide two chargers, it would be better to have an orientation meeting with family members before students are allowed to take the chargers home. That meeting should include topics like appropriate way to connect the charger in the socket, monitoring of student's laptop use by the parents so that they don't end up spending more time than necessary in front of the computer, and basic precautions family members need to take while using laptop. It must be made clear that the family members are encouraged to use laptop safely.

5.5 Cursor problem

The cursor problem is one of the issues OLE Nepal is seriously looking into. This is well documented in OLE Nepal's blog pages as well. This issue has been explored in Chapter 4 of this report as well. Alternatives like providing mouse are being explored. However, during the field visits, it did not occur to us that the teachers were updated on this issue. It might be a good idea to brief them about the issue on one of the interactions OLE has with the teachers. It might help in public relations matter that they know what is being done to address this issue.

5.6 Books by Janak Shikshya Samagri Kendra (the center that distributes textbooks to public schools in Nepal) in the laptop

One concern that was raised by teachers and family members in Bishwamitra School was that the load the students carry is huge. It is particularly dangerous during the monsoon season. There are students who have to walk 30-45 minutes each way and the path is especially slippery during the monsoon season. Many suggested having soft copies of the books to be used in the school included in the laptops. This way, students would not need to carry the books to school every day and would render hard copies of the textbooks non-essential. This would also be an immediate and tangible result of the laptop provision. Disruptions related to late delivery of books, which occurred this academic year especially in Bashuki, would also be minimized. Had the books been included in the laptops, the students would have been able to use them since day one. Consultations with DoE and other governmental agencies should be initiated to address how this can be done. To what extent this is feasible should be debated extensively.

5.7 Allowance and recognition for teachers

Though we consider providing compensation for extra work resulting from laptop use as highly impractical, we however think some arrangements should be made to compensate teachers when they attend programs like teacher trainings, not least because that is the norm in many trainings organized in Nepal. In addition, OLE Nepal might also want to provide teachers some recognition (e.g. letters) that, for example, could be used when they apply elsewhere.

5.8 Log of activities

If the log of the activities could be created, that would also be beneficial. The OLE Nepal could use it to study what the students particularly liked and develop programs accordingly. If OLE Nepal prefers, it could pass the information on student laptop use to the teachers who could then alert students to spend their time 'more productively' if they are not doing so.

5.9 Interaction between two schools

Regular interaction between the two pilot schools could benefit both the schools. They could both learn from each other's experiences. The best practices between schools could be adopted by the other schools. This could be done once a month or so. Since the schools are not that far away, it is feasible. Considering teachers in both the schools floated this idea, we can assume that they also believe that this interaction will benefit the program.

6. Conclusion

The test phase in the two schools in the outskirts of Kathmandu Valley is running very well. The students regularly use their laptops for various activities that are in the laptop. The head teachers, teachers, family members and the SMC members all see great promise in this initiative to improve student learning and reduce the disparity in educational quality between private and public schools.

Almost all the teachers and parents surveyed think that there is positive relationship between laptop provision and student learning. Though it is hard to quantify, most teachers and parents also feel that the students who have been provided laptops have become cleverer. They sense that this student-centered approach has resulted in students interacting with each other more often. It has also increased students' curiosity level. They are eager to learn new things. It has also helped in developing co-operative spirit among students as they are willing to help each other learn this new technology.

There is a general feeling that teaching and learning has been easier as a result of laptop provision. Almost everyone we have talked to in these two schools and the respective localities have a very positive opinion about the work OLE Nepal is doing and recommend this to be implemented in other areas of the country.

Since this is the first time this kind of initiative has been implemented in Nepal, there are bound to be some problems. These problems are documented in the preceding chapters. We have provided some of our recommendations there. The teachers are also aware of the challenges they are facing. They are trying hard to make this initiative a success. However, one needs to keep in mind the underlying constraints the teachers are facing (for example, their hectic schedule). Their concerns need to be addressed immediately in order to have maximum impact of the initiative.

Based on the interactions with teachers, students and their family members, and other community members, there are plenty of reasons to be hopeful that One Laptop per Child initiative with focus on educational content in a worthy endeavor. To understand fully how this program affects different subgroups (gender, ethnicity, economic status, geographical variation, etc.), a systematic study with larger sample is required which should be possible in pilot and subsequent phases. In addition to benefiting the students in the two test schools and the community there, the experiences gained from implementing the program in these test phase schools should be beneficial while implementing the program in future phase schools.