In Search of
ICT in Education
Practices

One Computer in Multi-grade Classroom
Case of Buan Elementary School, Philippines

Case Studies from the Asia-Pacific Region
One Computer in Multi-grade Classroom
Case of Buan Elementary School, Philippines

Julito Aligaen
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Preface

A wise person once said, “If students do not learn the way we teach, then let us teach the way they learn.”

That is what educators have been trying to do through the use of information and communication technologies (ICT).

UNESCO believes that integrating ICT into education can help to bring quality education to everyone, everywhere – a key goal of the Education for All initiative. The citizens of the future must be equipped with sufficient knowledge to keep up with technological advances and demands of the 21st Century.

UNESCO also believes that recognizing innovative ICT in education practices can encourage and enhance even more educational innovations. With the support of the Japanese Funds-in-Trust, the Asia-Pacific Programme of Educational Innovation for Development (APEID) of UNESCO Bangkok implemented a project on Innovative Practices in ICT in Education to identify, document, share and multiply ICT in education innovations.

As part of the project, the UNESCO ICT in Education Innovation Awards was launched in 2007 to recognize outstanding work by (i) teacher and teacher educators, (ii) educational planners and administrators, and (iii) non-formal educators. Another component of the project was the documentation of innovative practices to increase the awareness and knowledge of teachers, educators, principals, administrators and policy makers to the potential of ICT in helping them achieve their educational goals.

Our search for excellence, showcased in this series of case studies, is a testament to the innovative spirit of educators. The case study in this booklet presents the One Computer in Multi-grade Classroom project in the Philippines by Mr. Julito Aligaen. Mr. Aligaen won the top prize under the Education Planner and Administrator category in the 2007-2008 UNESCO ICT in Education Innovation Awards for his efforts.

Without doubt, these innovators will be very pleased that their projects are recognized and appreciated. Still, we believe that they will feel more gratified when their efforts are adopted and put to good use by others. That is the ultimate reward they, and UNESCO, seek.

Molly Lee
Coordinator
APEID, UNESCO Bangkok
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ALS</td>
<td>Alternative learning system</td>
</tr>
<tr>
<td>APEID</td>
<td>Asia-Pacific Programme of Educational Innovation for Development</td>
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<tr>
<td>BALS</td>
<td>Bureau of Alternative Learning System</td>
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<tr>
<td>CICT</td>
<td>Commission on Information and Communication Technology</td>
</tr>
<tr>
<td>DepEd</td>
<td>Department of Education</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and communication technology</td>
</tr>
<tr>
<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organization</td>
</tr>
</tbody>
</table>
**Introduction**

The education system in the Philippines has gone through many stages of development. It has been influenced by the rulers of the time – the Spanish, American and Japanese. The most recent change was institutionalized in August 2001 by the Governance of Basic Education Act (Republic Act 9155), establishing the Department of Education (DepEd) as the main agency responsible for formulating educational policies and managing elementary and secondary education in the country.¹

The overall mission of elementary education is to prepare students to be enlightened, disciplined, self-reliant, God-loving, creative, versatile and productive citizens. Specifically, the main objectives of elementary education are to:²

- provide knowledge and develop the skills, attitudes and values essential to children's personal development and necessary for living in and contributing to a developing and changing social milieu;
- provide learning experiences aimed at increasing children's awareness of and responsiveness to the demands of society, and to prepare them for constructive and effective involvement;
- promote and intensify children's knowledge of, identification with, and love for the nation and the people to which they belong; and
- promote work experiences aimed at developing and enhancing children's orientation to the world of work and creativity, and to prepare them for honest and gainful work.

Focusing on children aged seven to twelve, elementary education is a six year programme (in some cases, seven years) sub-divided into four years of primary grades and two years of intermediate grades. The core subjects include mathematics, sciences, English, Filipino and makabayan (social studies, livelihood education, values). English is the medium of teaching in most local schools. Filipino, considered as a second language, is used in the makabayan and Filipino subjects. Spanish made a return as a mandatory subject in all Filipino schools in 2008. Outside of Manila, other languages such as Cebuano, Bicolano and Waray are also used for teaching makabayan.³

The four years of secondary education catering to students aged 13-16 is a continuation of the elementary education programme and prepares students for higher education. The major subjects are science, mathematics, technology, Filipino, English and civics/national culture. However, not all elementary graduates continue their education within the formal education system.

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system. Some may opt to join the alternative learning system (ALS). Those who cannot make it in either the formal or alternative system are likely to become unskilled labourers (see Figures 1 and 2).

**Figure 1: Pathways for Elementary School Graduates**

- Completed Elementary Education
  - Regular high school
  - Out-of-school youth (Alternative Learning System)
  - Out-of-school youth (child labour)

**Figure 2: Pathways for Secondary School Graduates**

- Completed Secondary Education
  - Only some can pursue higher education
  - Working students, if unskilled, have difficulties in accessing these opportunities (Distance learning/Online learning)
  - Out-of-school youth (unskilled labour)

The responsibility for developing the basic education curriculum – including subject offerings, credit points and time allotments for the different subject areas, and the guidelines for implementation - lies with the Central Office Bureau of Elementary and Secondary Education. However, at the local level, schools are permitted to modify the curriculum (e.g., content, sequence and teaching strategies) and teachers can decide how they will implement the curriculum, what resources they will use and how they will assess the students.4

The government is fully committed to meet the Education for All goals, but it also recognizes the problems and obstacles in its way, such as unqualified and poorly trained teachers, inadequate facilities and equipment, and the lack of instructional materials. The DepEd has adopted several strategies to address these issues, for instance reviewing elementary and secondary education, increasing universal access to education, improving the quality of education, offering alternative delivery schemes (e.g., multi-grade teaching, mobile teaching and instructional management by parents, community and teachers in disaster areas), providing management training for principals and school administrators, and conducting

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research, improving school libraries and teachers’ welfare. The DepEd has also identified the use of information and communication technology (ICT) as one way to enhance the skills of teachers and students to access, process and apply information, and to use educational software in solving problems and conducting experiments.\(^5\)

**The Use of ICT in the Classroom**

ICT is the educational tool of the 21st century. Increasingly, it is embedded seamlessly in all social and technical development processes, e.g., e-commerce, e-agriculture, e-health and other e-based business transactions. Similarly, it is important for e-education or ICT-enabled education systems to develop and prepare ICT-enabled workers to function professionally in ICT-enabled work places in our knowledge-driven society. Clearly, integrating ICT into the school systems is critical to equip students for 21st century learning and working environments.

Despite the growing attention on computer technology in education, its use in the classroom has not grown to the extent predicted. The DepEd introduced computers to schools as early as 1996 by deploying five to seven units of personal computers per secondary school. Targeting teachers as the key resource to optimize the use of computers in the classrooms, the responses to the teacher training programme were disappointing. In some cases the computers were unused because senior administrators about to retire could not understand the objective of the programme, and were reluctant to support and implement a life skills development curriculum at their level. Another reason for the slow progress was a shortage of equipment.

Yet, many teachers have shown that it is possible to accomplish great things with limited resources, as can be seen from the One Computer in Multi-grade Classroom project.

**One Computer in Multi-grade Classroom Project**

As noted earlier, not all elementary graduates can proceed to formal high school and not all secondary graduates can pursue higher education. Alternatives to continue education are available through non-formal education – onsite face-to-face with instructors or off-site learning through radios and other distance learning approaches. Nevertheless, insufficient ICT infrastructure combined with the ICT illiteracy of elementary school teachers and school heads, continues to increase the digital divide and under-development of basic life skills of the communities, including teachers and students in the rural areas.

Another disadvantage for isolated rural communities is the disparity in the delivery and quality of educational programmes and services. Efforts to increase the coverage of primary

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education throughout the country have met with some success, but many schools are still challenged by limited resources, shortages of teachers and overcrowded classrooms. In the Philippines, the number of students per classroom can range from 45 to 70 in both elementary and secondary schools. The government has created multi-grade schools where two or more grade levels are taught by one teacher in one classroom to address the problems.

The One Computer in Multi-grade Classroom project initiated by the Asuncion National High School targeted the combined class of Grades 5 and 6 in remote Buan Elementary School in Davao del Norte. The objective of the project was to support the learning of students to develop their life skills through ICT and to decrease the digital divide among the teachers, students and the community.

There were 30 Grade 5 students and 28 Grade 6 students in total. To ensure that they had sufficient hands-on experience to learn to use the computer, the students were divided into small groups. One student from Grade 5 was paired with one student from Grade 6, resulting in 28 pairs of mixed grade students and one pair of Grade 5 students.

The class was equipped with one computer loaded with software programs such as Microsoft Office and Microsoft Encarta, and a video card connected to a television set. The whole system was placed in a separate area inside the classroom to allow the paired students to work on their computer assignments while the other students carried on with their regular classes (Figures 3 and 4).

**Figure 3: Computer Unit**
The computer was used for ten hours each day from 7 am to 5 pm. A rotation schedule was devised giving each pair of students one hour per session. The paired students assigned to the first or last hour of the day were responsible for opening and closing the facilities respectively since the teacher’s work day started at 8 am and finished at 4 pm. At the end of the scheduled activity, the students used the audio-visual equipment to report their output to the rest of the class. In total, each pair of students was able to spend 1.7 hour per week at the computer, giving them sufficient time to complete one learning competency for both the academic and ICT skills (Table 1). Figure 5 is an example of a weekly schedule. A matrix was also developed to assess their achievements, particularly their presentation skills (Table 2).

Table 1: Hands-on Time Allotment for Paired Students

<table>
<thead>
<tr>
<th>Total hrs/week</th>
<th>Total pairs</th>
<th>Total hrs/pair/week</th>
</tr>
</thead>
<tbody>
<tr>
<td>45-50 hrs</td>
<td>29</td>
<td>1.55-1.70</td>
</tr>
<tr>
<td>1 Month</td>
<td>29</td>
<td>6.2-6.8</td>
</tr>
<tr>
<td>1 School Year</td>
<td>29</td>
<td>62-68</td>
</tr>
</tbody>
</table>
Buan Elementary School
Asuncion, Davao del Norte

ONE COMPUTER IN MULTI GRADE CLASSROOM
Teacher’s Journal

1 Week Program
Multi Grades V & VI
No of Students: 30 Grades VI & 28 Grades V
Mode of Pairing: 1 Grade V & 1 Grade VI

Day 1 – Monday

7:30-8:00 A.M.  Presentation of the overview
This is the time of presenting the students with their topics. Usually, it involves a short demonstration to guide the students on what to do, where to go & how to do their multimedia projects and to provide them idea of their expected outputs. This is also the proper time to review the rules and standards set in using the computer; furthermore, this period includes posting of schedule, pairing and assigning of computer assistants.

8:00-9:00 - 1st pair does their computer tasks while regular class is going on.
9:00-10:00  2nd pair
10:00-11:00  3rd pair
11:00-12:00  4th pair
12:00-1:00  Lunch & computer break
1:00-2:00  5th pair
2:00-3:00  6th pair
3:00-4:00  7th pair
4:00-5:00  8th pair
5:00-8:00 P.M.  Computer enhancement period (for students residing near the school only).
Parents consent is asked before allowing the students to do computer enhancement.
Students living afar from school are given priority to do their computer enhancement during regular class.

Day 2 Tuesday

7:00-8:00 A.M.  9th pair
8:00-9:00  10th pair
9:00-10:00  11th pair
10:00-11:00  12th pair
11:00-12:00  13th pair
12:00-1:00  Lunch & computer break
1:00-2:00  14th pair
2:00-3:00  15th pair
3:00-4:00  16th pair
4:00-5:00  17th pair
5:00-8:00 P.M.  Computer enhancement period (for students residing near the school only).

Day 3 Wednesday

7:00-8:00 A.M.  18th pair
8:00-9:00  19th pair
9:00-10:00  20th pair
10:00-11:00  21st pair
11:00-12:00  22nd pair
12:00-1:00  Lunch & computer break
1:00-2:00  23rd pair
Figure 5 contd.

Page 2 (Teacher’s Journal)...

2:00-3:00  24th pair
3:00-4:00  26th pair
4:00-5:00  27th pair
5:00-8:00 P.M.  Computer enhancement period (for students residing near the school only).

Day 4 Thursday
7:00-8:00 A.M.  28th pair
8:00-9:00  29th pair
9:00-12:00  Computer enhancement period for students living afar from school.
1:00-5:00  Computer enhancement period for students living afar from school.
5:00-8:00  Computer enhancement period (for students residing near the school only).

Day 5 Friday
7:00-8:00 A.M.  Computer enhancement period for students needing extended time to finish their tasks.
8:00-9:00
9:00-10:00
10:00-11:00
11:00-12:00
1:00-4:00 P.M.  Students multimedia presentation
Students output were evaluated using the multimedia presentation rubrics.

Note: Daily computer assistants are assigned to help needy students in performing their tasks.

Prepared by:

OPHELIA P. AVILA
Class Adviser
<table>
<thead>
<tr>
<th>Rating/Criteria</th>
<th>Content</th>
<th>Design</th>
<th>Effects and Sounds</th>
<th>Presentation /Time Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent (5)</td>
<td>The topics given were well-defined. The student was able to give accurate details/information of the topic.</td>
<td>The student was able to make 5 slides with at least 2 pictures. The pictures suited the topic.</td>
<td>The student was able to apply a beginning and ending effect and sound and the slide colors were completely modified using the format placeholder for the overall slides.</td>
<td>The student was well-prepared and knew and understood the topic perfectly. The student read with clarity and pronounced the words correctly. The presentation was completed within 5 minutes or less.</td>
</tr>
<tr>
<td>Very Good (4)</td>
<td>The topics were properly defined. The topics given by the student lacked two details/information.</td>
<td>The student was able to make 4 slides and two pictures. The pictures suited the topic.</td>
<td>The student was able to apply a beginning effect and sound and the slide colors were completely modified using the format placeholder for the overall slides.</td>
<td>The student was prepared and knew and understood the topic. The student read with less clarity and pronounced the words with some corrections. The presentation was completed within 5 minutes or less.</td>
</tr>
<tr>
<td>Good (3)</td>
<td>The topics were defined acceptably and the detail/information given was not complete (lacked more than 2 details).</td>
<td>The student was able to make 3 slides and 1 picture. The picture suited the topic.</td>
<td>The student was able to apply effects and sounds but the slide color were not modified.</td>
<td>The student was not prepared and lacked knowledge and understanding about his topic. The student reads distractedly and was not able to pronounce almost 50% of the words. The presentation was done in more than 5 minutes.</td>
</tr>
<tr>
<td>Grade</td>
<td>Description</td>
<td>Details</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
<td>---------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate (2)</td>
<td>The definition and details/information given by the student are inaccurate.</td>
<td>The student was able to make 2 slides with pictures but the latter does not complement the topic.</td>
<td>The student was only able to apply effects and no sounds as well as color modification done.</td>
<td>The student was not yet prepared; moreover he does not have knowledge and understanding about his topic. The student reads distractedly and was not able to pronounce almost 75% of the words. The presentation was done in more than 5 minutes.</td>
</tr>
<tr>
<td>Poor (1)</td>
<td>The student was not able to define and give details/information about the topic.</td>
<td>The student was able to make only 1 slide and no picture at all.</td>
<td>The student was not able to apply effects and sounds and color modification.</td>
<td>The student was not able to present his topic.</td>
</tr>
</tbody>
</table>

**Results of the Project**

As a result of the project, the students’ performance and their ICT skills for this age group showed a marked improvement. The students also demonstrated a keen interest to explore, discover and experience, and their self-confidence grew through reporting and presentation to their teacher and peers. The project has significantly reduced absenteeism and dropout rates and at the same time improved class participation. The teachers’ personal ICT skills also improved since they had to master the skills themselves to be able to teach their students.

Another positive outcome of the project was the mentorship and peer teaching among the students. Pairing Grade 6 students with Grade 5 students enabled the older students to mentor their juniors. When the current Grade 5 students move on to Grade 6, they will be able to tutor the new Grade 5 students with confidence.

**Conclusions**

Introducing new projects to schools might have met with some resistance from school heads and teachers. However, in this case, there was none since there were no costs to be borne by the school. The investment cost was minimal and the annual cost per student was reasonable (see Table 3). Despite the remote location of the school, electricity supply was not a problem.

The success of the project can be attributed to the commitment and support of the school head and teachers. The parents’ support to the project is another significant factor. The skills gained by the elementary school graduates will be useful whether they continue their formal education or choose other paths.
Table 3: Summary of the Cost of Investment

<table>
<thead>
<tr>
<th>Project Cost</th>
<th>Depreciation Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year 1</td>
</tr>
<tr>
<td>Total Cost (Peso)</td>
<td>43,000.00</td>
</tr>
<tr>
<td>(US$)</td>
<td>(1,023.81)</td>
</tr>
<tr>
<td>Investment cost/student/year (Peso)</td>
<td>330.46</td>
</tr>
<tr>
<td>(US$)</td>
<td>(7.87)</td>
</tr>
</tbody>
</table>

Even with such a small budget, the sustainability of the project remains an issue for the school and community because they have no resources. Replication of the project in other schools will not be feasible without support from the government or other donors.
One Computer in Multi-grade Classroom Case of Buan Elementary School, Philippines

Case Studies from the Asia-Pacific Region