Development of an ICT training model for in-service teachers in Nicaraguan schools.

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Abstract: The Integration of ICT in Education is becoming necessary for the future development of each country. However integrating ICT is not a simple task and requires commitment, collaboration and resources. Nicaragua, despite the important and difficult problems in its educational system, is in the process to integrate ICT in education with the hope to keep pace to the new knowledge based economy and to improve education quality. In order to succeed in Integrating ICT in Education, the creation of an ICT training model for in-service teachers in Nicaragua might be needed and beneficial in order to optimize time and resources.

Keywords
ICT integration in Education, ICT training model, in-service teachers, Improvement of teaching and learning skills.

1. Introduction
The need to integrate ICT fully into all aspects of teaching and learning is no longer a matter of choice for schools, but one of necessity (Dr Chris Comber) [1]. Knowledge is essential for adjustment of rapid changes in markets and technology as well as for innovation (Dieter Ernst) [2]. A great amount of knowledge is accessible through worldwide information networks implying that its access depends highly on ICT. The continuing and accelerated changes in technology and its effects in economy force developing countries to permanently restructure and upgrade.

ICT integration in Education is not only an economic requirement but also a necessity to improve communication, motivation, understanding, and the learning and teaching skills of both students and teachers.

2. ICT integration in Education
ICT integration in Education requires a national commitment and collaboration. As many researches had identified, the most frequently mentioned problem of integrating ICT in education is the insufficient number of computers (Cheung, 1997; Williams, Coles, Wilson, Richardson, & Tuson, 2000; Pelgrum, 2001). However there are other aspects that must be considered because integrating ICT in education is not only a matter of supplying schools with computers or other ICT resources but to enrich the learning environment; encourage creative thinking, lifelong learning and social responsibilities; and to promote administrative and management excellence in the educational system. (Singapore ICT Masterplan, 1997).

According to the 1997 ICT Masterplan of Singapore, in order to successfully integrate ICT in education, four key dimensions were identified as essential:

1) Curriculum and assessment,
2) Learning resources,
3) Teacher development, and
4) Physical and technological infrastructure.

3. Background
Nicaragua is located in Central America. The population by 2004 was estimated at 5,374,825 people and 2,028,445 of them were in school age (5-19 years), from the 2005 census.
3.1 The Nicaraguan Educational System

The Nicaraguan Educational System is divided into three subsystems. 1) The Basic and Middle Educational sub-system administered by the Ministry of Education (MINED), 2) The Technical Educational Sub-system administered by the National Institute of Technology (INATEC) and 3) Higher Educational System under The National Council Of Universities (CNU). All three subsystem work independently and only the CNU is independent from government administration.

All the 3 sub-systems have common and specific issues which are for the most part related to the lack of resources. The distribution of educational budget is considered unbalanced. The next figure shows the budget distribution according to the different programs:

![Chart 1: Educational inversion per capita](image)

<table>
<thead>
<tr>
<th>Program</th>
<th>Cost per student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-school</td>
<td>25</td>
</tr>
<tr>
<td>Primary</td>
<td>72</td>
</tr>
<tr>
<td>Secondary</td>
<td>55</td>
</tr>
<tr>
<td>Technical Education</td>
<td>99</td>
</tr>
<tr>
<td>University</td>
<td>900</td>
</tr>
</tbody>
</table>

The budget administration of the three sub-systems is done separately. Also plans, strategies and implementation are for the most part done independently.

Such educational structure and disproportioned inversion might have something to do with the disappointing results of entrance examinations in public universities. The next figure shows the examination results in one public university:

![Figure 2: Entrance Examination Results](image)

Although the budget destined to the Basic and Middle educational sub-subsystem represents 62% of the whole Educational Budget, the distribution is considered unbalanced due to the amount of students attended in each program. The Basic and Middle sub-system attends the most. The following chart shows the inversion per student in each program. Universities receive more inversion per student due to a constitutional law that designates them 6% of the national revenues.

The problematic in the Basic and Middle Educational Sub-system affects the whole educational system and deprives the country from the possibility to develop due to unqualified citizens.

The main educational issues in the Basic and Middle educational sub-system are as follow:

- Insufficient budget:
Insufficient coverage: 25.86% (530,745) of students in school age (3~18) are out of the system. (est. 2004) [4]

Inefficient Education Quality [5]
- Inappropriate Curriculum
- Insufficient cultural content in the curriculum
- Deficient and insufficient teaching materials.
- Repetitive and passive pedagogical practice.

Infrastructure without minimum conditions: (61% of schools without water and sanitary services. Deficit of 160,000 chairs -2004- [5])

Teachers with inadequate preparation and low incomes; average salary for primary teachers in 2004 was $111 and $117 for secondary teachers.

Due to the importance of the Basic and Middle Education, this research is oriented to improve teachers’ knowledge and skills in order to mitigate the decaying quality in Nicaragua’s education.

The actual global demands and trends provide an inevitable way to go. The utilization of Information and Communication Technologies is now seen as a necessity due to their key role in the economic field. Therefore, in order to adjust to the now more knowledge based economy, ICT is not only a necessity but the best option to do it. They allow us to obtain, create, process, manage and transmit vast amount of knowledge and information.

Nowadays, ICT is also praised in the Education field. Global educational goals depend more and more on ICT to be achieved.

ICT can produce effective results when transmitting knowledge and information if used properly. However, in countries where access to such technologies is little, the challenges increase. ICT training programs even though necessary might not have effect if there is not an ICT integration plan put in place. Next are some of obstacles that might limit the success of ICT training programs in Nicaragua:

- Only 5.67% (570) of public schools have from 1 to 35 computers.
- 23% of urban schools and 81% of rural schools have no electricity service.
- The low salary of teachers makes possible to assume that very few own computers.
- Most teachers are senior with few or non experience on computer utilization or other kinds of ICT.
- The majority of teachers have to work two class periods (morning and afternoon), increasing their workload and reducing their time to get involved into self-learning activities.
- No actual support from the curriculum to implement ICT utilization in class.
- The Ministry of Education does not have the capacity to implement massive training courses.

However, the Nicaraguan Ministry of Education has set ICT as strategic to implement future improvements. An ICT in education policy proposal document (January 2008) created by National Commission of ICT in Education in the Basic and Middle Education expresses the expectance to achieve four main objectives:

1. School Administration
2. Teachers’ professional development
3. Support in the learning and teaching process
4. Development of student’s skills in the use of computational tools.

4. Research Objective

In accordance to the directions and measures to be taken by the Ministry of Education of Nicaragua in relation with ICT in education, the present research is intended to develop an ICT training model for in-service teachers in Nicaraguan schools. The model is expected to showcase the best training contents, activities and ICT to be used according to the different characteristics, environment, skills and interests of teachers.

In addition to the creation of a model, we will try to:
• Motivate in-service teachers to integrate ICT in their management and teaching activities.
• Foster lifelong learning responsibility.
• Reinforce values and principles and to introduce Information Education concept.
• Develop or reinforce social skills, self-confidence, team work spirit and expand social networks of teachers.

5. Methodology for developing the ICT training model.
The ADDIE Instructional Design model will be used as basic reference. The ADDIE model consists of 5 phases: Analysis, Design, Development, Implementation and Evaluation.

5.1 Analysis Phase
During the analysis phase, we will try to identify:
• Institutional goals that want to be achieved (Nicaraguan Ministry of Education)
• The materials that must be thought
• The learner’s current capabilities in general.

5.2 Design phase
Three steps will be basic during this phase:
• Plan the instructional strategy
• Select the course format
• Write the instructional design document

5.3 Development Phase
The following processes will be performed:
• Create a prototype
• Develop the course materials
• Conduct a tabletop review
• Run a pilot session

5.4 Implementation Phase
There are many things that need to be considered before the courses are lunched. For example:
• To establish the timetable for the course rollout.
• Schedule the courses, enroll learners, and reserve on-site and off-site classrooms.
• Manage travel and expenses for the trainers and or learners, etc.

5.5 Evaluation Phase
The four level of Kirkpatrick’s evaluation model will be taken as reference.
• Reaction of students
• Learning
• Behavior
• Results.

After the ADDIE process is successfully finished, the elaboration of the ICT training model will be elaborated.

6. Conclusion
The development of an ICT training model might be beneficial to Nicaragua because it will help optimize resources and time. The most difficult problem is not to get the ICT resources but to get real benefits from the investment ICT represents.

By encouraging and motivating teachers to utilize ICT for their own development and their classes, the chances to generate improvements in Education a greater. Not only teachers but students too will benefit and it will probably have an impact in the country’s future development.

References