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Research paper

The impact of the genie program on the integration of ICTs in Moroccan education and its effect on teachers

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Abstract

This research focuses on the use and integration of ICTs (Information and Communication Technologies for Education) in Moroccan public schools, through a survey. A GENIE program was developed in September 2005 to improve the quality of teaching and learning. The main objectives of the GENIE strategy are: effective and rapid integration of ICTs into the education system; integration of ICTs at the heart of the learning process as a fundamental tool; positive interaction with educational programs; increase the quality of education through effective use of information technology by teachers and students; integration of multimedia and internet tools into educational methodologies and the learning process; qualification of future generations. Currently, we can say that we can't really notice the effects and the traces of this program. This study aims to describe the national project GENIE and its impact on the different educational actors.

Keywords: *Morocco; GENIE; Integration; Education; ICT.*

1. Introduction

European countries are racing for successful ICT integration, the national reports of 15 countries "Austria, Belgium (Flanders), Spain, Estonia, France, Greece, Hungary, Italy, Lithuania, Norway, Netherlands, Portugal, Czech Republic, United Kingdom, Switzerland", carried out within the framework of European Schoolnet, referring various aspects: the context of education, ICT policy, the place of ICT in programs, digital resources for learning, training of teachers. In Belgium, the WTA (Walloon Telecommunications Agency) advocates for transversal integration of ICT in the educational project of schools, around 4 axes: school equipment, ICT training of the actors of the education system, technical support and logistics in schools, integration and use of ICT [1].

Although education systems have invested heavily in new technologies since the early 1980s, there are no international indicators to measure the adoption and use of ICT. The national reports from 15 countries are based on information provided by ministries of education through an annual questionnaire. This initiative led by European Schoolnet makes it possible to compare information from different countries [2].

As part of its 2016 ICT Barometer in Wallonia [3], the WTA measured the level of ICT use and equipment of citizens, businesses (SMEs "Startup World Expo" and GES" Global Exhibition on Services"), municipalities, actor's local tourism and primary and secondary schools to meet the challenges, the WTA offers various recommendations. Addressing different targets, however, these recommendations are based on a common foundation: education and training. This race led by various European countries makes it possible to compare information in different fields related to ICTs [3].

Morocco, like most countries in the world, is following the path towards the diffusion of new technologies, in all public schools, in order to improve the quality of the educational offer. The National Charter of Education has supported the need for the integration of ICT for the first time in October 1999. (The National Charter of Education and Training, Lever 10) [4].

The launch of a national program on September 15, 2005 by His Majesty King Mohammed VI has given the first step towards the generalization of information and communication technologies within the Moroccan school system. This program called GENIE was very expensive; its total budget exceeds 1172 MDH (towards the end of 2013). The new strategy was therefore to integrate information and communication technologies in all educational institutions (schools, colleges and high schools), which is why schools and universities were equipped with multimedia rooms (computers, video projectors, printers, digital cases, etc.), and an internet connection.

Training was offered to the various educational actors (directors, inspectors and teachers) to ensure a better pedagogical integration of ICT [5].

Multiple pitfalls in its realization are reported before installing the pillars of this program given the fragile infrastructure of the country, the resistance to change of some teachers and the huge number of targeted institutions [5].

2. Problem

To better understand the GENIE program, this work contains two parts; the first is a bibliographic analysis of the impact, obstacles and state of the moratorium of GENIE program, to answer the following question: What impact has it left on the Moroccan edu-

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cation system? The second part deals with the study of the effect of GENIE training on the teachers who followed it.
The first consists of the creation of digital laboratory resources whose mission is the acquisition of digital resources through private providers in international and national level.
The second encourages teachers to the production of digital content in the various disciplines and the best projects are awarded each year through a national competition called "Innovatice" [6].

3. Theoretical framework

The new information and communication technologies are known, at an international level, as being a tool for teachers and students. The UNESCO report (information and communication technologies, an educational program and a frame for teacher's training, 2004) reveals that ICTs, in a short time, have become one of the pillars of modern society. Today, many countries consider understanding these technologies and mastering their key concepts as an integral part of the basic education, as well as reading, writing and counting. A report by the united nations organization for education, science and culture (ICT UNOESCO, a referential of skills for teachers, 2011) gives possible causes to account for the difficulty/challenge of integrating the ICTs in schools (recognizing the urgent challenges facing countries around the world in these technologies, the financial investments they involve and the need for clear vision of the role that teachers have to play in harnessing the power of ICTs, either as well or out of class. It is not an exclusive problem of Morocco: other foreign countries have observed the same phenomenon and advanced multiple causes as well. Likewise, in a recent study [7], between rural and urban places, they are still lacks of integration of ICTs in Moroccan high school.

4. Methodology

Our study focused on the analysis of data collected from 200 teachers, 11 school directors and 9 pedagogical inspectors (from 12 institutions - middle and high schools), questionnaires and direct interviews were done in different delegations of the Regional Academy of Casablanca-Settat, for more data, that observations can provide.

5. Results

5.1. Infrastructure and equipment

87% of schools are now equipped with a basic multimedia environment, with a budget of 635 MDH: 2,823 establishments are equipped with multimedia room (MMR) and multimedia suitcase (MMS) with Internet connection. "With filtering," says program director Ilham Laaziz El Malti. « This filtering is necessary to prevent students from surfing prohibited sites. » [8]

5.2. The multimedia rooms

Each multimedia room (MMR) must contain essential equipment for a quality teaching practice, namely:

- Computers
- Internet connection
- Connectors
- Distributor
- Printers [3].

5.3. Weekly computer access volume

Indeed, all schools are equipped with at least one multimedia room, connected to the Internet. The goal is to guarantee a minimum weekly computer access time for each student, depending on grade level. This hourly volume can be summarized as follows:

Table 1: Minimum Weekly Volume of ICTs Usage for Each Student [9]

Level	Primary	Middle school	High school
Minimum weekly hours	1 HOUR	2 HOURS	3HOURS

5.4. Broadcast program

The equipment is spread over the five years (by now) as follows:

Table 2: Equipment Project [4]

Total	Primary school		Middle school		High school	
Establishments	Primary school	%	Middle school	%	High school	%
2823	1613	25%	761	75%	499	75%

5.5. The training

The Ministry of the national education is trying to encourage teachers to use the ICTs in order to achieve the following goals:

- The numeric alphabet.
- Have pedagogical and technological skills to integrate informatics into classroom practice.
- Follow the basics of content development. [3]

5.6. Quantitative level

5.6.1. Beneficiaries of GENIE program equipment

Here are some significant figures:

Table 3: The Different Beneficiaries of the GENIE Program [3]

Significant figures	
The duration	3years
Number of students	6,2 Million
Number of professors and administrators	230.000
Number of establishments	8604

The key is to train all teachers and administrators; here is a table that shows the different types of training and the number of beneficiaries:

Table 4: The Number of Beneficiaries for Each Type of Training [3]

Type of training	Number of beneficiaries
Computer training	230.000
Development of ICT tools for educational programs	10.400
Repair	710 technicians in each provincial direction

5.6.2. Approach

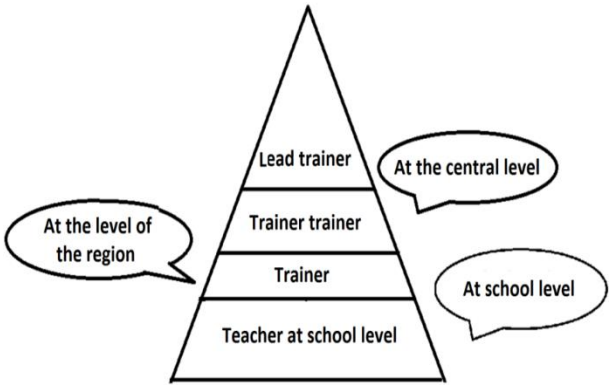


Fig. 1: Pedagogical Approach of Training.

By now, the total number of multimedia rooms is over 9,260 rooms. According to the first phase of implementation of the program, a challenge was made to assess the progress of the program towards the objectives especially in terms of equipment multimedia rooms. New material has been adopted. Mrs. ILaham Laaziz,

the project director, said "before, we launched tenders for the acquisition of computers and Internet connection. The method currently practiced is the purchase of services from telecom operators. From now on, it is the operator who deals with the equipment of the room in computers and Internet connection and provides the service of follow-up and maintenance" [10].

6. Development of use of content

6.1. Development of use

All the teaching actors are in agreement with the importance of the use of ICT, for multiple reasons: Speed, ease, efficiency ... The Ministry of Education and Teaching always encourages the new practices of ICT technologies, information and communication in the teaching-learning process, for this several resources are made available to teachers to exploit, develop and adapt to their pedagogical teaching methods.

6.2. Content development

In order to develop an educational content adapted to the curricula, several objectives are set. With regard to this strategic axis, the ministry has opted for the parallel development of several components:

- Create a national laboratory to monitor the development of appropriate educational content: The National Laboratory for Digital Learning Resources;
- Establish a national portal for education and training open to all institutions attached to the Internet: The Education Portal [3].

6.2.1. Electronic educational programs

- Development of educational content on the basis of the curriculum;
- Reinforcement of learning (languages, mathematics, ...);
- Integrate and simplify science;
- Computer training.

6.2.2. Suggested content by level

Table 5: Suggestions for Curriculum Content by Level [3]

Primary school	Middle school	High school
• Educational games • Learning to use the internet • Use of the educational programs	• Module to learn computer science • Support of school courses with ICT-based activities • Use of the educational programs	• Teach computer science • Support of school courses with ICT-based activities • Use of the educational programs

6.2.3. The national laboratory

- Authentication of the completed content.
- Preparation of specifications and technical specifications of digital content.
- Opening to properties to complete the content.

6.2.4. The national portal of education and training

- Cooperative space: teacher and student
- Electronic Courier for each teacher
- Computer application of administrative management
- (E-note, E-inscription)
- E-learning or virtual learning
- Access to educational resources approved by the national education sector;
- Search Engines, Educational Approval and Training - Knowledge Circuits - Contributions of Educational Activities [3].

Similarly, a portal (http://www.taalimtice.ma) is available to teachers for the use of digital media and for sharing experiences. For this purpose, a code has been assigned for each establishment for access to the contents of the site [9].

7. Discussion

From the analysis of the questionnaires and the observation and interviews conducted in the field, several observations are noted:

7.1. Duration of teacher's training

We noted a lack of confidence in GENIE training offered by the Ministry of Education, in fact 80% of the teachers questioned said that the duration of training is a few hours therefore it is insufficient and it relates only to the Office "Word - Excel - Power point".
Inspectors surveyed also suggested extending the training period for new teachers.

7.2. Obstacles to integration of ICTs in classroom

The barriers to integrating ICTs in the classroom, as identified by teachers, can be grouped as follows:
75% of our population say they have no desire to use ICTs, for multiple reasons:

- Lack of confidence in computer hardware;
- Lack of self-confidence
- Resistance to change.
- Only 60% of establishments visited (middle schools) are equipped with multimedia rooms (MMR) or digital suitcases (DSC), yet no confirmation of its use is obtained.
- The lack of follow-up after the training: it is necessary to accompany the teachers trained in ICTs and to organize repetitive meetings to update the state of progress or rather the improvement of the competences in ICTs.
- All establishments' directors and inspectors surveyed congratulated the Ministry for all these initiatives but mentioned that its support is still missing during the integration of ICTs.

According to the data, the impact of the program is not remarkable enough, the effect of introducing a huge amount of computer tools without any complete training left a curious, confusing and disturbing effect on teachers.
According to the results of a study made in Abdelmalek Essaadi University 2017 [10], almost 55% of students affirmed that they do not have a laptop and almost 81% reported that they do not have a desktop computer, which brings us to the issue of inequality in terms of computer ownership
To give answers about the problems' questions, we must admit that we can't really notice the effects and the traces of this program. Here some suggestions to go beyond the barriers/ obstacles.

7.3. Levers

ICT promote more in-depth learning among students, as well as its integration has a positive impact on learning and metacognition [11].
Thanks to the dissemination and introduction of new information and communication technologies, today we can see a kind of classroom application among teachers and students. Thanks to the new training strategy for new contract teachers.

Note: This idea of training during the holidays was introduced to new contract staff in 2017 (The first class of contract teachers). Why not apply it for all teachers?
Finally, we can't neglect the fact that the GENIE program has opened a portal to ICT, allowing the whole community to wonder, with curiosity: What is it?
But without support, equipment and training are not enough. Diagnosing the impact and obstacles will help find solutions.

8. Conclusion

The Moroccan GENIE program (Generalization of information and communication technologies in education), part of a national strategy to generalize ICTs, has provided 70% of Moroccan schools with Internet access. 40% of them in rural areas and train more than 260,000 teachers for ICT use, through more than 200 symposia but also distance learning courses.
The program was awarded on March 7, 2017 in Paris the UNESCO King Hamad Bin Isa Al-Khalifa Prize 2017 for the use of information and communication technologies in education [12].
However, the various attempts of the state towards a successful integration of the ICTs are still modest. The GENIE program has put the foundation stone of a better pedagogical use of new technologies for the benefit of education. For this, the ministry has equipped several institutions, trained several teachers and made available several digital resources.
The integration of ICTs would consist, first, in understanding the importance and impact of ICT in the teaching-learning situation, in overcoming obstacles, in exploiting and creating new teaching resources, in order to ensure better integration of ICT in the teaching-learning situation.
It would now be better to think of a local strategy, the evaluation of achievements by the councils and authorities concerned. To this end, the commitment of the various educational actors as well as its appropriation by the educational establishments remains unquestionably the real guarantee for the successful pedagogical integration of ICT [13].
The results of a study made in morocco by [14] in 2017 reveals that personal initiatives can always make a difference and increase the number of potential adopters. However, initiatives need to be institutionalised for a more possible widespread consideration of ICT in the Moroccan school [14].
All Educational actors must work together to provide more solutions against the previously reported obstacles. It is necessary to:

- Increase the time of the training and specify the ICT training, while varying the courses: Computer Assisted Experiment (CAEx), Word, Simulation, photo (video) -maker.
- Plan the time of the training, to take place (if it is possible) during the summer, and it would be preferable that it be remunerated and certified, in order to motivate some traditional teachers" resistant to change".

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Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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