ORIGINAL ARTICLE

A SURVEY OF TEACHING OF SCIENTIFIC AWAKENING IN MOROCCAN RURAL PRIMARY SCHOOLS

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ABSTRACT

Background: Here we present the analysis of an exploratory research on teachers' practices as a partial image of these scientific moments at school in rural primary school. **Objectives**: This work seeks to describe how scientific awakening activities are currently practiced in rural primary schools in Morocco, we chose to study their functioning, and that is to say, on the one hand, the relationships that exist between the components involved in such a system, on the other hand, teachers' practices. **Methods**: To do this, we have chosen to conduct our study, by means of two questionnaires, with primary school teachers and their students from three provincial delegations of national education, Settat, Berrechid and Khouribga (Morocco). **Results:** Our first results show very contrasting ways that the teaching of science awakening in rural primary schools is very far from what is desired and this is due to several factors (time allocated to awakenings, lack of rooms for experiments, in sufficient continuing education on approaches and methods of teaching awakening and other less apparent problems). **Conclusions** In view of this, all stakeholders in the education sector are asked to face up to and find adequate solutions to the problems cited by the teachers to improve the quality of science education in general and the scientific awakening in particular.
Keywords: *Scientific awakening, Rural primary school, Teaching practices, Information and Communication Technology, Morocco.*

1. INTRODUCTION

In recent years, there has been a new interest in science in basic education and in educational renewal. In implementing these changes, one of the major problems is the sometimes considerable distance between the skills that one would like to develop in the students and the scientific background effectively mobilized by the teachers [1, 2]. Both in terms of knowledge and feeling, the major fields of science, such as biology, physics, astronomy, chemistry, to name a few, frighten and discourage a large number of teachers of the fundamental as soon as one departs from the few contents traditionally approached in the classes [3, 4].

The teaching of things or by things is then incontestable because it makes it possible to approach the facts and to distract the beliefs, to grasp the phenomena and to silence the opinions. Today, while astrology and clairvoyance represent, paradoxically, an important part of the economy of the most developed countries, the demand for science education is based on this same ambition.

Scientific and technical progress also support the existence of this teaching. Advances in the fields of health, communication or energy, which prolong life, extend the conquest of nature and relieve work, justify an understanding of the irreversibly scientific and technological world. At a time when scientific and technical progress can also produce doubt and confusion, school science and technology are contributing to the new citizenship, associated with advanced forms of participatory democracy.

Over time, the arguments for scientific and technological education, starting at school, always rest on benevolent interests for "man, worker and citizen", these three components of integral education, such as it was thought of at the end of the 19th century. The complexity of the world also accredits this part of the program for all children and from an early age [4, 5, 6].

The development of scientific awareness in basic education, therefore, necessarily involves the adaptation of initial and in-service teacher training. In the current context, it is not only an awareness of new official directives [7, 8, 9], but also and above all a questioning of often outdated representations of scientific education, and of the development of science skills both in terms of content and procedures [9, 10]. In addition, it is difficult for teachers to discuss a subject in which they are not specialists in the classroom. In a lively approach to science, everyone is confronted eventually with their own limits: the knowledge acquired is changing, constantly developing, calling into question. The approaches adopted must be put in the practice in varied contexts. The result is an increase in teacher insecurity, especially if he chooses an active

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methodology in which students are encouraged to formulate their own research questions and hypotheses [11]. When the teacher emphasizes the ideas, suggestions, projects with the learners, his teaching objectives tend to be more vague, and strongly linked to the environment which he will use as a resource to reach the interests of the pupils [12, 13, 14].

How does wakefulness work? By what practices do primary school teachers think they can achieve the objectives of awakening? But what is awakening? The objective of this study was to describe some forms of teacher practice in teaching early childhood education in Morocco as it is currently encountered. From a methodological point of view, it was a question of grasping the "functioning" of this type of teaching, that is to say, of identifying the components that intervene and the nature of their interactions taken as a whole. We will develop the methodological conceptions and the environment of the teaching of scientific awakening, on the basis of this study, before recalling what the official texts say on awakening activities.

2. THEORETICAL CONTEXT

2.1 Science education in primary school:

The inclusion of science in the primary education curriculum in Morocco [15, 16] brought about a major change to the primary school curriculum and reflected the importance of science and technology in many aspects of our lives daily, at work, at school and at home. Our dependence on science and technology requires that all students develop a high level of scientific knowledge. The primary science program provides schools with a full program from grades 1 to 6. It provides a very good basis for the study of scientific subjects (Maths, physics, chemistry, biology and geology) in primary schools. Most importantly, it cultivates a positive attitude towards science and offers students the opportunity to experience the enthusiasm of working as a scientist. Therefore, schools had to engage in comprehensive school planning in order to improve the teaching of science learning in primary rather than to meet the demands of education. The important takeaway message would be that science should not be a complicated and difficult subject for children. Science can be the subject that stimulates curiosity, creativity and critical thinking in children (learners). But more importantly, science is all around us and inside us and children should find out with the advice and help of their teacher

2.2 Science Awakening Program in primary school:

Science in primary education is included in the learning area "Understanding the world". The scientific awareness program allows teachers to familiarize themselves with the most recent sciences and to learn how to transfer scientific knowledge to school children. primary. It offers answers to the following questions: why is science important to everyone, what benefits do children gain by learning science early in life, how to teach science through fun and educational hands-on experiences, etc.

The science awareness program in primary schools in Morocco requires teachers to implement the science program for young children from 1st to 6th grade. It establishes a minimum weekly time allocation for each subject (two sessions per week, each one is 60min) [15]. The science program is structured to allow students to familiarize themselves with the biological, chemical and physical aspects in four parts: living things, energy and forces, materials and awareness and protection of the environment. However, the program now requires teachers with students to take a scientific approach. It now aims to develop scientific skills as well as understanding. Practical investigation is at the heart of the activity and the program emphasizes the importance of providing students with opportunities to test and develop their ideas [17].
The science program aims to develop two types of understanding among students: conceptual understanding and procedural understanding. Conceptual understanding refers to students' knowledge of the biological heritage and physical aspects of the world. Procedural understanding refers to students' understanding of the scientific procedure (approach). These two forms of understanding are not developed independently. In particular, a good understanding of scientific procedures is necessary for the continuous development of conceptual understandings [18]. As with other learning at the reception, your child is mainly introduced to science through play and play - for example, objects that float and evaporate during water games. Such activities will help your child develop important skills such as observation, prediction and critical thinking [19].

The content of teaching and learning science is defined in the national MEN program for primary schools in Morocco. In this context, certain subjects and areas are repeated across groups of years, which means that children can return to a particular subject each year of primary school, but with increasing difficulties and with a different objective each time. For example, the field of animals, including humans, is examined in each group of years, with a very clear progression of knowledge and understanding over the six years: in the 1st year, it is about : examine the human body, recognize groups of animals and classify them; animals. By the sixth year, this will have evolved towards knowledge of the internal structure of the human body in relation to circulation, by classifying living beings on the basis of more complex characteristics and by exploring scientific research in this classification. This is why teachers are required to complete the work of each component and each unit each year. The program is often described as having a continuous structure. This refers to the fact that, as students' progress from one class to another, they revisit the subject, this will develop and refine their understandings (another example: movement theme, the student will begin this course in 1st year and he will

study it until the 5th year). Therefore, students must master certain skills in each group of years and there is a very clear progression of these for each year.

3. RESEARCH QUESTIONS AND METHODOLOGY

3.1 Problem

Along with languages and mathematics, science remains one of the main subjects in primary school. It can be one of the most exciting and practical topics and, therefore, is a real joy for teachers and students. Children love to learn by being completely interactive and discovering things for themselves - the perfect way to understand the world around them. A positive primary science experience is also essential to encourage future generations to not only study this in high school, but also potentially to follow it as a career [20].

The fields of primary school "discovery of the world" and "experimental sciences and technology" are therefore school subjects which cannot be analyzed by projecting the disciplinary logic of middle or high school onto primary school. In this perspective, we must take into account both the "objects" discussed in these moments (very often directly related to everyday objects), activities (which may be linked to activities in other areas learning) but also the "worlds" in which these objects and activities can be situated. The school moments that interest us are therefore extremely complex.

To better understand the logic at work in these school moments, we chose to analyze, in a first phase of this exploratory research, the gaps between what had to be done and what is actually done and to propose solutions to overcome these obstacles. This research leads us to examine several questions:

- What is the main knowledge of teachers towards the methods of teaching scientific awakening?;
- What are the continuities and breaks that occur within these school moments and in the passages between these moments and other school or non-school moments?
- What are the proposals (solutions) proposed by the teachers to overcome the obstacles which enclose the smooth running of school moments during a session of scientific awakening?

3.2 Methodology

Our sample for this research is made up of 100 primary teachers from rural areas and 300 students (learners), belonging to three delegations of Moroccan national education Settat and Berrechid (Casablanca - Settat region) and Youssoufia (Marrakech region), and who are distributed according to the table 1 below:

Table 1: The table showed the distribution of the target population of our study.

Membership	Teachers			Learners		
	Settat	**Berrechid**	**Youssoufia**	**Settat**	**Berrechid**	**Youssoufia**
	30	25	45	120	85	95
Teachers	<30 years	Between 30 and 45 years	>45 years			
	26%	59%	15%			
School	**Main**		**Annex**			
	40%		60%			
Gender	**Male**		**Female**			
	41%		59%			
School level	**Master**	**License**	**Baccalaureate**			
	17%	59%	24%			
Number of learners per class	<30		30<x<45		>45	
	44%		51%		5%	

Data collection was carried out by two anonymous questionnaires, one for teachers and the other for students. The questionnaire addressed to teachers (appendix 1) is composed of two sections of a total of 16 questions, aiming to collect data expressing their knowledge and the environment which surrounds the teaching of the activities of scientific awakenings towards the profession, their practices teachers and the elements deemed de-motivating their work.

The tests of the questionnaire and the scientific awakening test were done collectively during school hours during the 1st semester of the school year (2018-2019) between the months October 2018 and January 2019. Some questions should have been re-explained and reformulated for some students. The test concerns the first four school levels. The data thus collected is processed and analyzed by statistical software.

4. RESULTS

4.1 Time allocated to the teaching of scientific awakening in primary schools and presence of the laboratory

An analysis of Table 2 shows that the majority of teachers (95%) thinks that the time currently allocated to teaching scientific awakening in primary schools is insufficient. On the other hand, they confirmed that the majority of rural primary schools (95%) do not have a laboratory to do the experiments.

Table 2: Teachers' responses on the time allocated to the teaching of awakening and presence of the laboratory.

Time allocated to scientific awakening		Existence of a laboratory or room for experiment	
Sufficient	Insufficient	Yes	No
95%	5%	5%	95%

4.2 influence of seniority and initial training (specialty) of the professor on the teaching of scientific awakening

According to Figure 1, it has been found that the speciality (scientific or literary training) and the seniority of the teachers play a very important role in the competence of teaching scientific awakenings. 90% of teachers confirmed that initial training influences their performance well and others (75%) of them, added that with the time (the seniority), the teacher can acquire more competence in teaching awakening.

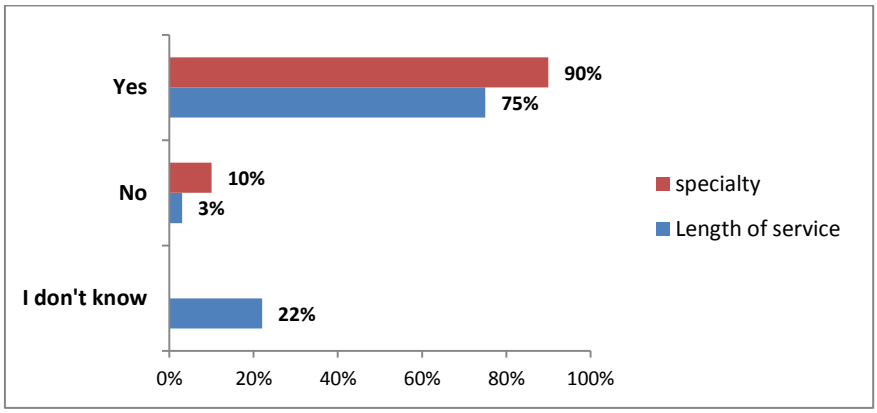

Figure 1: Effects of initial and pregnant training on the teaching of awakening.

4.3 Continuing training and the teaching of awakening

The result in Figure 2 show that the majority of teachers surveyed (35%) has not had continuing education in the pedagogy and didactics of teaching science awareness. On the other hand, 33% of them replied that they had training on the theme: teaching scientific awakening, but it is insufficient. For the rest of the teachers (32%), they have never had training in this area.

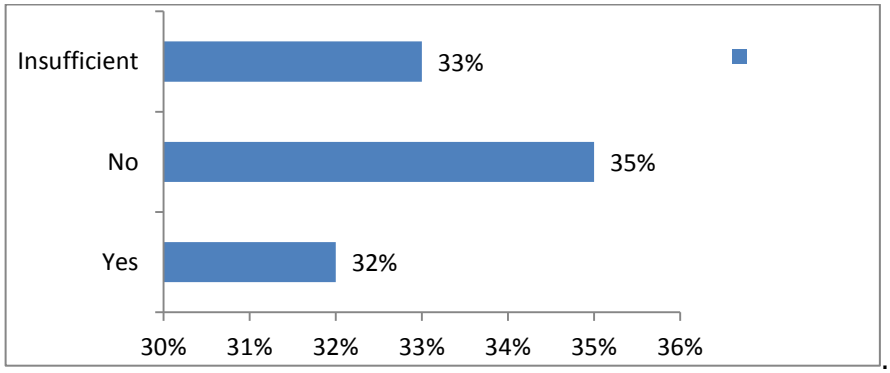

Figure 2: teachers' responses to continuing training in the teaching of scientific awakenings.

4.4 Information and Communication Technology (ICT) and methods of teaching scientific awakening

Figure 3 and Table 3 represent teachers' responses to the use of ICT in teaching science awareness. We note from the results that the majority of teachers (80%) knows the methods of teaching awakening with the following distribution of use: experimentation (20%), investigative approach (15%), research documentary (5%) and observation in mind (52%). On the other hand, it was possible to draw that 71% of the respondents integrate ICT in their lessons either by using the computer with a percentage of 82% or other techniques (DVD player etc.) with 18%. 68% of the teachers affirmed that

they work with their own means for the integration of the TIC (portable pc + usb). Since in their rural establishments, they do not have enough computer hardware for all the teachers in the same school.

Table 3: The table presents the Information and Communication Technology and school equipment.

Answers		Yes	No	Sometimes
Teachers	Integrate ICT	71%	20%	9%
	Know the methods of teaching awakening	80%	20%	
computer equipment in school		32%	68%	

ICT: Information and Communication Technology.

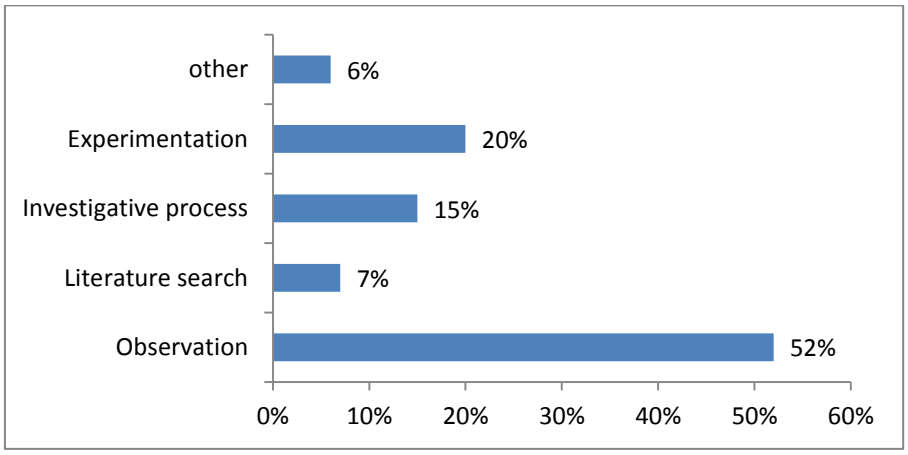

Figure 3: Methods used by the teachers interviewed in the teaching of scientific awakenings.

4.5 Obstacles that hamper the teaching of scientific awakening in primary schools

Concerning the obstacles which slow down the teaching of scientific awakening in primary schools, the teachers affirmed that they are different and vary according to their importance with the following percentages (figure 4):
- *Density (*overcrowding*) of learners* per classroom: 10%;
- Rooms not-equipped (lack of laboratory and insufficient IT equipment): 45%;
- Lack or insufficiency of continuing education: 30%;
- Insufficient supervision and visits by inspectors: 16%;
- Others: specialty and initial training (4%).

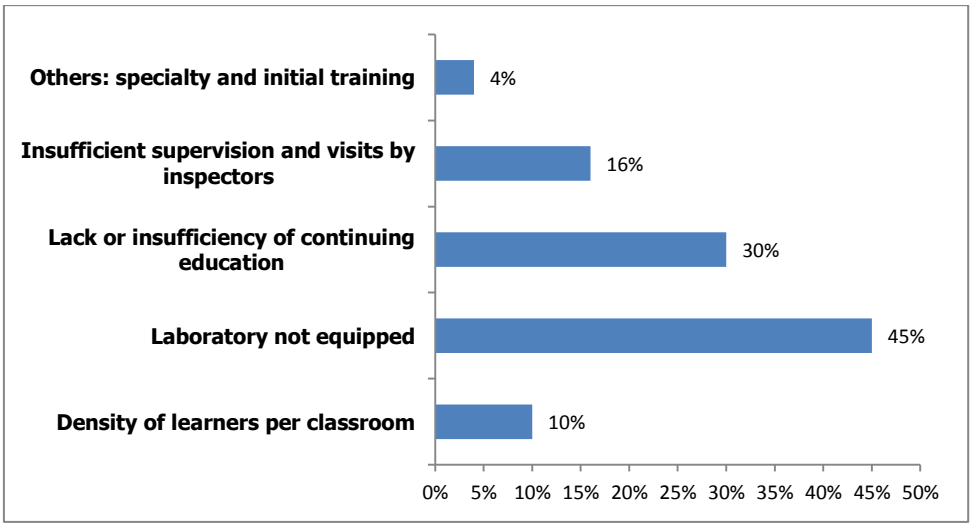

Figure 4: Obstacles that slowing the teaching of scientific awakening in primary schools

4.6 Proposals to improve the quality of teaching scientific awakening

To improve the quality of teaching scientific awakening in rural primary schools, teachers proposed the following solutions: equipment of the rooms for experiments (70%), more visits of inspectors for supervisors (22%) , less than 30 students per class (8%), continuous and periodic training on teaching approaches and methods (45%) and other didactic

and pedagogical solutions related to the teaching of awakening: review the teaching methods and the time allocated to scientific awakening (35%), review the activities of the scientific awareness textbook (20%) (Fig 5).

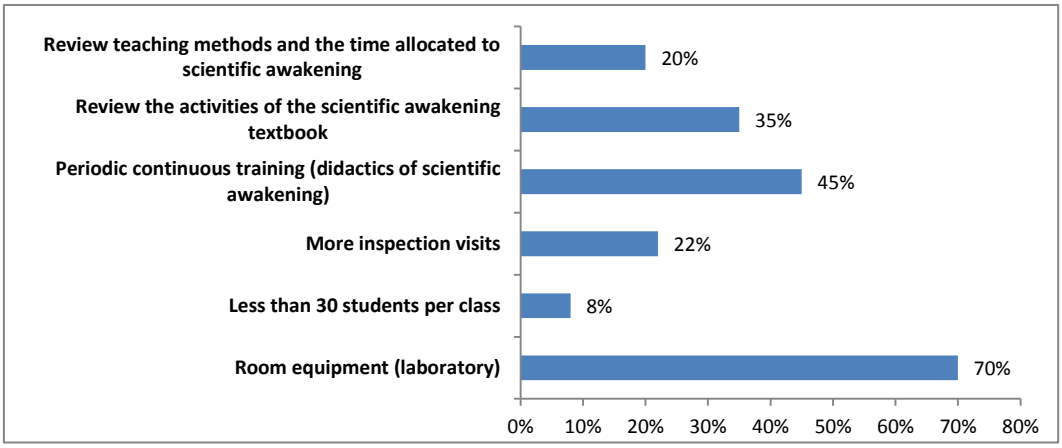

Figure 5: The figure presents the proposed solutions by teachers to improve the quality of teaching scientific awakening in primary schools.

4.7 Level of students towards scientific awakening

The results in Figure 6 show the level of students in scientific awakening and it varies according to the following percentage: excellent (7%), fair (35%), average (22%), below average (21%) and need educational support (15%).

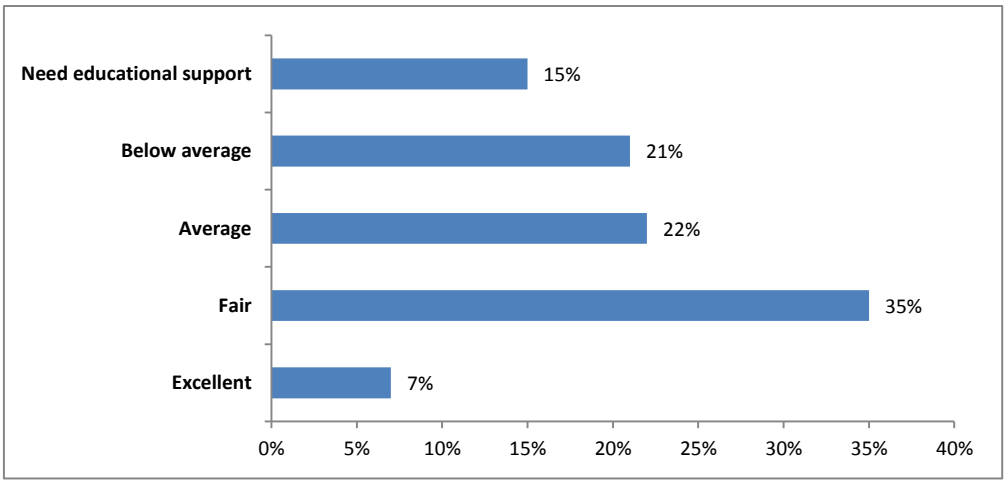

Figure 6: The figure presents the result of the scientific awareness test and level of students

5. DISCUSSION

How does wakefulness work? By what practices do teachers think they can achieve the objectives of awakening? But what is awakening? The objective of this survey was to describe some forms of awakening practices as they are encountered today. From a methodological point of view, it was a question of grasping the "functioning" of this type of teaching, that is to say, of identifying the components that intervene and the nature of their interactions taken as a whole. The results of this study showed that most teachers think that the time allocated to scientific awakening activities in elementary school is not enough (2 hours per week at the rate of one hour per session for the first 4 years), in addition to a few sequences of activities in the textbooks that are not clear and motivating for the students and the absence of a room for experiments, can affect the quality of teaching scientific awakening in rural primary schools. This can be seen clearly and clearly that the notional objectives sometimes cover several concepts and therefore the teachers lead to will have to specify and make these concepts intelligible to students. First of all, it is important to start the activity through a sensitive approach (see, touch, feel, possibly listen) of the objects on which the students will work because imagining or representing a "real" object is difficult for a child. Children work most of the time in workshops and learn, during scientific activities, names (tree, stem, flower, magnet, mirror, sugar, salt ...), adjectives (long, wide, high, sweet, salty, rough, smooth ...) and verbs (sort, fall, move, transfer, water, grow, float ...) [21, 22, 23].

The study also showed that the in-service training of teachers on the teaching methods of scientific awakening, in addition to the support and supervision of inspectors (sessions of educational scenarios and integration of ICT) can also affect the smooth running of these awakening activities, since most of them do not know the various methods of teaching science in elementary schools and especially the application of the investigative approach and do not integrate ICT in their practices during awakening sessions. Investigative teaching is now recommended internationally and many

countries are beginning to implement it [24]. In this connection, let us quote this Chinese proverb "I hear and I forget, I see and I remember, I do and I understand". It is based on the work of Piaget [25] (in particular the idea that every human being intervenes actively in the construction of his understanding), of Bachelard [26] ("To produce new knowledge is to overcome 'obstacles epistemological '"), by Vygotski and Bruner (with the idea that the construction of knowledge, although personal, takes place in a social context) [27, 28]. Finally, note that this pedagogy recommended by Hands on learning 'la main à la pâte" is borrowed from different trends [29]. Most research has shown the importance of integrating ICT in education in general and especially in science, since the integration of these teaching materials can lead the learner to understand and interpret everything well. What the teacher wants to apply and achieve as operational objectives to reach the intermediate objectives in order to achieve the overall objectives. ICT is ubiquitous in today's world. They are everywhere around us, occupants, in recent programs, an important place as didactic support, especially in primary schools which require the establishment of attractive means having direct links with the world in which the pupils evolve, so that these means arouse in them interest and motivation [30]. Among other supports existing within the school, the image and its exploitation in understanding among pupils of the 5th and 6th grade, since the image at their age plays an essential role, since they are still young. Attractive and above all motivating, ICT is proving to be an excellent medium which stimulates communication and stimulates the expression of pupils in primary schools [31, 22, 33].

6. CONCLUSION

The domain of science is undoubtedly one of the most extensive that education must face. The themes to be addressed in class are multiple and, even with reference to the skills bases; the possibilities of choice remain impressive. Despite the insufficient samples of this study, it was able to give recommendations to overcome the problems experienced by teachers, of an infrastructure order such as lack of rooms for experiments, congestion of students in the same class and " pedagogical and didactic order to know: insufficiency of continuous training on the methods of teaching the awakenings, increase of visits of supervision of the inspectors, revision of the activities of the school books and the time allocated the teaching of scientific awakenings. Overcoming these problems can improve the quality of learners' learning

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