

INFORMATION AND COMMUNICATION TECHNOLOGIES FOR SCHOOL MANAGEMENT IN CÔTE D'IVOIRE

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ABSTRACT: *Côte d'Ivoire devotes a significant part of its budget to the construction of many educational infrastructures. However, these schools that are traditionally run need current ICTs for their efficient management. This paper highlights the impact of ICT in the school's management in Côte d'Ivoire, precisely in Abidjan, Grand Bassam, Bonoua and Bingerville. The results of the survey carried out in urban and semi-urban areas show that 90% of establishments have an Internet connection. It has more or less a place among institutions in Abidjan and those of the interior in terms of use of management software. Nevertheless, less than 50% of managers are trained in the use of ICT. In addition, only 37% of functional email addresses.*

KEYWORDS: ICT, Management, Schools and Managers, Education, Côte d'Ivoire

INTRODUCTION

Education is one of the priorities in the training of children and young people in all countries. In Africa, many efforts have been made by governments to realize the political will expressed by the charter of education adopted by Addis Ababa Conference at 1961, followed by the Jomtien declaration on education for all in 1990 and reaffirmed by the Dakar framework for action in 2000 (Abdelrahman, 2013; UNESCO, 2015). Following these recommendations, Côte d'Ivoire decided to make education and training the pillars of its development. Moreover, since independence, Côte d'Ivoire has devoted more than 45% of its national budget to education by building many school infrastructures in both rural and urban areas in order to provide quality education for all children of school age. However, these institutions have always been managed by directors or principals in a traditional way. This has resulted administrative delays, managerial errors in students' numbers, grades and financial resources (Oluyemisi, 2015).

Since the advent of Information and Communication Technologies (ICT), several institutions have been equipped with its tools. Several schools are being provided with computers with or without internet connection (Pelgrum & Law, 2003). Generally, the motivations for directors to integrate ICT in their schools are exploring new horizons, using new educational opportunities, tackling service gaps such as the lack of libraries and above all improvement of school management (Touré *et al.*, 2008; UNESCO, 2011). As far as the management of schools by ICT is concerned, not all schools are housed in the same category. While in some institutions all academic and pedagogical activities are managed by a computer network, in most other schools this is not yet the example. Thus, several questions can arise:

- What can explain this situation?
- Why this delay in the use of ICT in the management of institutions?

- Where these technologies are available, how are they used in the management of institutions?
- What the school managers and all other administrative managers actually do with the ICTs within the institutions?
- What are ICTs increasingly bringing to the level of results of different services?
- Are the challenges the same in urban and semi-urban settings?
- As new information and communication technologies increase dramatically and are truly integrated into all sectors of activity, institutional managers can do without these tools?

The main objective of this work is to study the impact of ICT on the management of schools in Côte d'Ivoire.

- Describe the different uses of ICT by school managers;
- Show the influence of ICT in the management of institutions;
- Identify incentives for the use of ICT by managers and other school managers;
- Identify the obstacles related to the effective use of ICT by managers in the management of schools;
- Meeting the challenges for better use of ICT in the management of institutions.

THEORETICAL UNDERPINNING

The current evolution of the school environment seems to be characterized by a not inconsiderable phenomenon: The growing importance of ICTs in society, which obliges the school to take into account new training requirements, new tools, new work strategies and new roles to be an emerging knowledge society (Djédjé, 2007a,b). These changes mean that technological tools and the creative application of technology can improve the quality of life by making education and learning more effective, increasing the productivity of businesses and governments and increasing the well-being of nations (ETS, 2002). To this must be added that globalization seems largely determined by the effective use of ICT in all areas of economic and social life in general and education in particular. Indeed, education is seen as the appropriate framework to prepare citizens for the new technological, information and communication. For the last twenty years, the education sector has been an ICT location, which is why ICT in education are increasingly being debated in international fore, and the majority of countries are increasingly being considered in their educational policies. This situation requires schools to review their method of operation in order to take account of new management tools and new working strategies in view of the benefits that ICT brings to schools. For example, the Organization for Economic Cooperation and Development shows, on the basis of one study, that in schools in the 21 countries of this international body, the use of ICT by teachers and by school administrators encourages the updating of educational files and the rationalization of administrative tasks. ICT also frees up time for teaching or professional development. They also help reduce isolation through the use of e-mail and the Internet to communicate and collaborate with colleagues, parents and the outside world. Finally, the use of ICT has contributed to the growth of professional development activities

(online self-training) and the opening of the school to the outside world (Uys, 1998; Oluyemisi, 2015). In addition, this study highlighted the arguments in favor of the introduction of ICT in schools. These reasons relate to three logics i.e. economic, social and pedagogical development. ICT can simplify and modernize administrative tasks and management, facilitate and improve the teacher's preparation and lessons, make communication between parents, pupils, teachers, schools, school authorities and organizations faster and more efficient and fine-tuning assessment procedures through electronic testing and evaluation. On the other hand, the use of ICT can transform education by adapting teaching and learning to projects, making them flexible, focused on skills, problems, the individual and the environment child. It could be the driving force and the adjunct to a radical change in school curricula (UNESCO, 2002; Adomi & Kpangba, 2010). ICT help students become self-motivated, self-motivated learners, strengthen interaction and collaboration, foster a deeper understanding, offer information-rich learning environments, and focus on mentoring, supporting and mentoring teachers. Than the dispenser of knowledge.

Some recent works takes all the activities taking place in a school as an anchor to reflect on the educational uses of ICT (Ahmed *et al.*, 2013; Oluyemisi, 2015). For example, groups them into three main categories: uses for administration (budget, inventory, student records, etc.), uses for action research (storage of data, statistical analyzes), teaching and learning (Forcier, 1999). Similarly, "a computerized school, a systemic and adaptable vision of the multiple possible uses of ICT in the process of a typical school" were showed (Basque *et al.*, 1998; Ahmed *et al.*, 2013). The model identifies the four fundamental processes of a school (Teach, Learn, Manage School and Operate a Multimedia Resource Center). After a review on the computer technology use in the cinematographic schools served by the educational services center ended up adding an element on institutional coordination to make it more attractive. This involved the sharing of information and the coordination of ICT departments within an institution or between institutions. In addition, Aylwin (1984) lists nine types of activities in a school. In fact, the share of general administration in computer education, followed by educational documentation, supervision of teaching, apprenticeship, and so on. Furthermore, it is identified for each of them, the benefits obtained by the use of computers. For many authors, two broad categories of computer use in education were distinguished. There are, on the one hand, activities aimed at the study of computers by (1) the development of a computer awareness (knowledge of history, the impact of computers on society, Software) and (2) computer skills (programming and use of hardware). On the other hand, the authors group together applications of the computer as vehicles: (1) teaching (exercisers, tutorials, simulations and problem-solving software), (2) data management such as (Program objectives, planning, etc.) and (3) the storage and retrieval of information (such as of documentary banks). However, many constraints remain to be overcome if ICT is to improve the management of schools in both developed and southern hemispheres apart from questions related to the equipment of computers, Internet access and others, particular emphasis is placed on the role of the school head for the effective use of ICT in schools. According to Atkins and Vasu (2000), teachers themselves argue that principals play a key role in stimulating the use of ICT in schools but this support seems to be lacking. This can be explained by the fact that administrators lack training in this area. Already, in the early 1990s, Kearsley & Lynch (1994) reported that school leadership training was one of the most often neglected aspects of the pedagogical appropriation of ICT. Roberts *et al.* (1998), in their research on professional development and learning technologies (needs, problems, trends and

activities), report that in the study of documentation specifically addressing the needs of school administrators regarding professional development and technology has not been found. Thus, according to the school principals' various problems limit the integration of ICT in their schools (Roecks, 1981): The time allotted for professional development, subsidies, the need to reach all teachers, easy and equitable access to technological means, the perception that the faculties of education are lagging behind and do not follow what is happening in the schools.

CSE (2000) consider technological resources and accessibility in schools as necessary elements to support the implementation of ICT in the schools. Apart from the weaknesses observed at the level of head teachers, some authors believe that the low use of ICT in the management of schools is linked to a general problem of access to ICT infrastructures. For example, the main obstacles encountered by African schools and particularly tertiary institutions for accessing the Internet include: lack of infrastructure in general and network infrastructure in particular; The high costs of telephone service and Internet access; Limited expertise and skill levels with respect to ICT, and the absence of a supportive policy framework (Isaacs, 2002). Similarly, Bridges.org (2000) provides access to ICT access problems. For him, actual access refers to material access, appropriate technology, affordability, capacity, relevant content, integration with everyday tasks, sociocultural factors, trust, legal and regulatory frameworks, The local economic context, macroeconomic conditions and political will. While several Western countries have begun to implement ICT in schools, most African countries are lagging behind for a variety of reasons. Despite this fact, Côte d'Ivoire motivated by the desire to improve the profitability and performance of its education system as well as its determination to adapt to globalization and globalization, did not remain marginal of this awareness of the importance of ICT in the international societal as well as educational movement. Therefore, the set of challenges listed should not be an obstacle to the integration of ICT in the management of institutions. On the contrary, each State must look for ways to overcome them, with a point of inception, the head of school, who has an essential role to play in the effective use of ICT in academic and pedagogical activities. For this reason, the training of school leaders appears to be a necessary step towards a successful integration of ICT in schools (Isabelle *et al.*, 2002).

Although different strategies can be used by school principals to promote efficient pedagogical integration of ICT in schools, general leadership qualities are not enough: technological knowledge is also needed. According to Sharratt (1999), it is essential that principals have knowledge of technology in order to provide the necessary support to teachers. This knowledge allows them, among other things, to communicate with staff in the language of technology and pedagogy. Sharratt (1999) argues also that successful integration of information and communication technologies in schools largely depends on the leadership and technological skills of principals. Any-Gbayéré (2000) emphasizes that the school principal in Côte d'Ivoire must promote creativity and creativity, encourage, reward and stimulate teachers.

According to Peraya & Viens (2005), the actor involved in managing the implementation of ICT as an innovation must drive innovation in a proactive rather than reactive way and manage it in a flexible and evolutionary way by integrating Adjustment. In the same vein, Gbongué (2000) considers that the school principal in Côte d'Ivoire must be a source of motivation for the teacher involved in the management and implementation of ICT. For Schoales (1998), TECE training should be mandatory for all school personnel, including

administrators, and training objectives should be linked to wider educational goals and other change initiatives. Finally, the process of integrating ICT must therefore take place in an organizational, structural and cultural context. According to Sandholtz *et al.* (1997), the introduction of ICT into unprepared school environments has little effect on both teachers' pedagogical practices and academic achievement. In this regard, research emphasizes the important role of school leaders in the proper preparation of the school, both in terms of material resources and human resources (Otto & Albion, 2002). Similarly, Byrom (1998) states that leadership is one of the most important factors affecting the use of computer technologies in schools.

METHODOLOGY

Type of research

This research combines both the quantitative and qualitative approaches generally used in this type of work. As regards the qualitative component, the search for information made it possible to meet resource persons to obtain relevant information on the subject (Savoie-Zajc, 2000; Gomm *et al.*, 2000). Since little research in Côte d'Ivoire has emphasized the role of ICT in the management of schools, this research is intended to be empirical and exploratory. Thus, the quantitative component made it possible to collect data from different actors of the school. Field research was carried out according to protocol of Yin (1994). This protocol consists of the following elements: type of research; (1) choice of sites and schools; (2) sampling and selection of respondents; (3) instruments and data collection; (4) data processing and analysis; (5) strengths and limitations of the study. This qualitative and quantitative research was carried out at four sites and in ten primary, secondary and higher education school.

Selection of Sites and Schools

The study was conducted in urban and semi-urban areas. Abidjan, the economic capital of Côte d'Ivoire, has been chosen as the main data collection site because it is home to more than 70% of schools in Côte d'Ivoire. Then, the town of Bingerville, located about twenty kilometers east of Abidjan is the site that hosts the oldest schools of the Country. Finally, the cities of Grand-Bassam and Bonoua located respectively 30 and 60 kilometers south of Abidjan in semi-urban zone. The schools are composed of a mixed primary school, eight mixed and non-mixed secondary schools and a higher teacher-training college. The different structures have been chosen based on selection criteria, among which the presence of a minimum of ICT infrastructure is highlighted. They can be presented in three groups:

- Group 1: International School of the Corniche and the Anne Marie Raggi Institute: These institutions offer computer courses to students and integrate ICT into teaching. They are schools that practice the Ivorian and French system. They have equipment and infrastructure for ICT education.
- Group 2: Nid de Cocody, Lycée Technique d'Abidjan (LTA), Cours Secondaire Méthodiste, Ecole Normale Supérieure (ENS), Lycée Sainte Marie (LSM) and Groupe Scolaire Emmanuel de Bonoua (GSE): These structures practice the Ivorian educational system. They teach computers to students but do not yet integrate ICT

into teaching. They do not have enough computer hardware and software and infrastructure. For the most part (LTA, ENS, GSE, CSM and LSM), the computer course remains very theoretical.

- Group 3: Modern High School of Treichville and the School Boys of Bingerville. These School with an Ivorian educational system do not teach computers to students. These institutions have cybered within them enabling teachers and students to make use of ICT. At the Lycée Moderne of Treichville, for example, the teachers succeeded in opening a cyber computer with 30 computers with connection (of which 20 are functional) for the students. In addition, the teaching unit in mathematics has a computer with Internet connection. That of physical science also has a computer without connection which allows it to improve the quality of the teachings and evaluations.

Sampling and Selection of Respondents

The chosen sampling technique is the reasoned method which makes it possible to interrogate in each school the managers who have some knowledge of the subject (N'da, 2002). This method implies the choice of the persons participating in the study according to criteria of relevance to the question and the objective of the research. Steps have been taken with each manager to get approval for the project by signing a consent form before proceeding with the data collection. Thus, on the basis of volunteerism, the managers agreed to answer alone or with the help of their closest collaborators, to all the questions asked about the place of ICT in the management of schools.

Instruments and Data Collection

Three questionnaires were developed for data collection in each of the participating institutions. An "Institution" questionnaire comprised of 30 questions, including closed and open questions administered to school administrators. Another "Manager" questionnaire composed of 32 questions and respecting the same configuration as the first one was administered to heads of departments, school principals, managers and other administrative staff. Finally, a final questionnaire "Managers in Teacher Training Institutions", composed of 17 questions presented under the same register, supplemented the regular manager questionnaire at the level of the Training of Trainers Institution. Data collection was done by a team of investigators under the supervision of the principal Investigator and Associate Researcher. The teams traveled all the institutions to administer the questionnaires and to check the quality of the data collected before validating them in the presence of the principal investigators.

Data Processing and Analysis

The data obtained from the questionnaires were processed manually for closed questions due to the small number of questions.

Strengths and Limitations of the Study

The methodological limitations of this study would undoubtedly be those imputed to the geographic space of the study and the low sampling. Indeed, the small number of educational institutions and respondents can have an impact on the generalization of the results of this

research. However, the approach used to collect the data respects the scientific approach and allows to guarantee the quality of the results and to study the impact of the ICT on the management of the establishments in a restricted environment.

RESULTS AND DISCUSSION

The processing of the data makes it possible to carry out an analysis in three main articulations: the first gives to present the existing one, that is to say the state of the premises, the second emphasizes the induced effects on the management of Institutions and lastly identify the challenges to be overcome for a genuine use of ICTs in the management of institutions.

State of play of the institutions in terms of ICT: Equipment, Connectivity, Accessibility and Availability of Management Software

The computer is now part of the equipment available to all schools in Côte d'Ivoire given its applications which make the management of these structures much easier. Indeed, making ICTs an essential tool for the management of schools requires that a minimum of equipment be available for carrying out daily activities. However, not all establishments are housed in the same category of ICT equipment. The number of computers per institution varies from 14 to 85 in the structures visited during the survey and private schools are significantly better equipped than in public schools. If acquiring a sufficient number of computers is a good thing for the training of learners and the management of institutions, having access to the Internet is even better to facilitate and speed up this process. Thus, the majority of institutions, despite the difficult economic environment, have access to the Internet (Figure 1).

Approximately, 90% of school has an internet connection. This not only allows learners to do research but especially managers to use ICT to carry out the day-to-day activities of the institutions. Beyond the usual uses, the websites are for the school a showcase to make them known and to improve their image with the parents of learners and the whole educational community. These sites are regularly animated by ICT specialists who also have the mission of informing the net surfers about all the activities carried out within these schools. Their role is therefore not limited to the training of learners and educators, the maintenance of equipment and the management of computer rooms. In all schools visited there are at least one ICT specialist whose minimum qualification is the Breeder of Higher Technician (BHT) in Computer Science. Internet is no longer a "luxury" or a fashion effect, but a genuine tool for managing educational and educational institutions. Apart from the connection to the Internet, the availability of software for the management of the establishments is another element of motivation which leads the managers to use the ICT. Currently in Côte d'Ivoire, the NkraGestEtab software, designed by teachers, is a model of success in this field. Already, for the first year of commercialization of this software, more than a hundred establishments have acquired it as well in Abidjan (58.33%) as in province (41.67%) of Côte d'Ivoire. The purchasers include public (28.33%) and private (71.66%) schools in the following proportions (Figure 2).

These data are certainly not representative of all the schools in Côte d'Ivoire, but they make it possible to say that the dynamics of the use of ICT in the management of the establishments is initiated both in urban environment and in environment. Managers who have understood

the usefulness of ICT have made efforts to acquire management software for their schools. Even when the resources of the school do not allow it, some managers involve the parents by raising contributions, with the agreement of the management committees (COGES), to equip the institutions with computer tools. This is much easier, since some regional directors of the Ministry of National Education encourage exchanges between the central administration and schools using ICT. Overall, the state of play shows that the minimum exists at school level to make ICTs a management tool. The questions that need to be asked, however, are what do these ICT institutions really do? What do computers do in these schools? What is the impact on the day-to-day management of schools?

Impact of ICT on the management of institutions: management of practices, educational programs, educational programs, continuing education

All the managers interviewed are unanimous on one fact: ICT have considerably improved the management of schools in Côte d'Ivoire at all levels. In terms of administrative management, the impact of computer use can be seen in the automatic edition of registration forms and receipts, the schools of badges, the making of photographs, the schools of register in the same way, all administrative activities concerning personnel are dealt with the ICT tool: ration lists, etc. Similarly, all administrative activities of the staff are treated with computers: Editing of administrative lists and management of information on all staff. This saves time and efficiency by avoiding errors as recognized by this manager of school. "Today, the use of computers has allowed us to master the numbers of learners in the different cycles of teaching, to identify our students from the badges made by our services, all of which changed qualitatively the management of the institution by considerably reducing fraud". The testimony of this manager is edifying as to the induced effects of the ICT on the administrative activities of the schools. This view is also shared by many managers who believe that in addition to these aspects, ICTs also contribute to improving communication within institutions. This is internal communication and external communication. Through the intranet network, it is easier to exchange between the different departments and other services of the institution. Similarly, the Internet facilitates contact with parents of learners because they can regularly monitor the performance of their children without moving around the school. Indeed, ICTs offer many advantages in terms of communication, because managers can exchange information more easily with the parents of learners and with all the players in the school. This is a remarkable step forward in the integration of ICT in education and it is with good reason that Karsenti *et al.* (2008) maintain that the pedagogical integration of ICT now seems inevitable in order to promote the educational success of students, to increase the professionalism of the teaching staff, to encourage managers' leadership and even to encourage collaboration between school, family and community.

School is no longer a closed system in which managers, educators and learners are cut off from the rest of the world. Rather, it is a place where citizens are educated in permanent contact with the family, the community and the community at large. From a pedagogical point of view, the use of ICT enabled the editing of educational lists: Pupils by grade and level of study, distribution according to gender and age groups, etc. This new approach ensures reliable listing and up-to-date data at all times to better manage the numbers of learners and educators. The use of the computer has improved the management of academic results by considerably reducing the possibility of fraud. From a precise code, each educator takes his notes and validates them according to an application created for this purpose. This prevents school officials from falsifying notes and also gives parents of learners the

opportunity to regularly consult the work of students wherever they are. At the level of educational practices, some advances are observed in some institutions. Many managers put at the disposal of educators the necessary tools for the pedagogical integration of ICT by equipping institutions with video projectors, retro projectors and computers with Internet connection. Thus, educators and learners are invited to research, update their knowledge and improve their competence in all disciplines taught in the institution. Lastly, in terms of financial management, ICTs have promoted transparency in operations, as the head of the school recognizes: "Before the computerization of my establishment, I did not master all the operations my agents carried out in terms of registration fees, learner education, and vehicle fuel management and so on. Every time we did the accounts, there were missing. Since the establishment of the ICT-assisted management system, all these problems have disappeared because from my workplace, I have the daily situation of all the financial movements.

In Côte d'Ivoire, the use of ICT has not only made it possible to modernize the management of schools, but has also and above all helped to reduce the embezzlement of funds facilitated by the manual management of operations. This situation is the cause of the inability of many managers to honor their commitments to learners and tax burdens. This leads to teacher strikes, failure to complete school programs and poor results at the end of the year. Today, computerization enables institutions to improve their financial management by carrying out daily or periodic balance sheets, controlling the details of student payments, making financial statements 2, 3 and 4, and so on. In the same way, summary sheets are produced at the level of schooling, canteen, and boarding school and transport costs. As soon as a payment is made to the school or to the boarding school, for example, the management of the establishment is informed in great detail so that the risks of fraud are low. There is also an improvement in the management of educators' vacations, which facilitates payments after the dispensation of lessons. On the basis of statistical tables of inputs and outputs, all activities related to accounting are monitored by managers, so that it is difficult to make false invoices, unjustified disbursements, in a word, falsifications which are of a nature compromise the performance of educational structures that play an important role in the development of African countries. In short, there is every reason to believe that, in the days to come, ICT have acquired their reputation in the management of schools in Côte d'Ivoire. While this is true in some situation, it is worth acknowledging that in the majority of schools much remains to be done. Indeed, many challenges exist and can considerably hamper the use of ICT as an essential tool for school management. What are these difficulties? How do they present themselves and what their consequences are at the administrative, pedagogical and financial levels?

Challenges posed by the Management of Institutions through ICT

Despite remarkable advances in the use of ICTs for the management of institutions, there are some challenges to be faced. In the case of computer equipment, more than 65% of establishments have a number of devices which are clearly insufficient in relation to their actual needs, so that essential services do not have them. In public institutions, the situation is more dramatic than in the private sector, given the weakness of the resources made available to managers by the state.

Worse, only one institution out of the ten visited (1/10) has an ICT integration plan with well-defined objectives and a strategy for renewing it equipment. For the vast majority, this is not yet the case so it is common to find several computers down with no means to replace them,

computer rooms under equipped as well as some services, devices of another generation. To this must be added that the connection in the establishments or schools is not always of good quality. Interruptions are noted and regularly disrupt the use of the Internet for pedagogical and administrative purposes. The managers encountered are fully aware of this situation, but evoke the lack of means to justify the under-equipment of their establishments in these terms: "We are aware that ICT can help us better manage our institutions, but we lack the means to equip ourselves appropriately. Moreover, being responsible for a public establishment in a semi-rural area, where the parents do not have significant financial resources, the means made available to us by the Ministry of National Education can't allow us to have the desired material". Apart from questions related to the equipment of the institutions in computer tools, another challenge relating to the integration of ICT in managerial practices remains the training of the actors. Indeed, less than 50% of managers are trained in the use of ICT. Trained women (70.52%) are more important than men (53.33%). Thus, there are fewer untrained women (29.48%) than men (46.67%) as shown in figure 3.

These data are certainly not representative of all the schools in Côte d'Ivoire, but they make it possible to say that the dynamics of the use of ICT in the management of the establishments is initiated both in urban environment and in environment rural. Managers who have understood the usefulness of ICT have made efforts to acquire management software for their schools. Even when the resources of the school do not allow it, some managers involve the parents by raising contributions, with the agreement of the management committees (COGES), to equip the institutions with computer tools. This is much easier, since some regional directors of the Ministry of National Education encourage exchanges between the central administration and schools using ICT. Overall, the state of play shows that the minimum exists at school level to make ICTs a management tool. The questions that need to be asked, however, are what do these ICT institutions really do? What do computers do in these schools? What is the impact on the day-to-day management of schools?

To this end, training is provided to strengthen skills in basic software and for the use of certain software used only in each institution. The situation is virtually identical with regard to the Internet. Apart from the fact that the type of connection chosen by the institutions is not often efficient, few managers encountered have an e-mail address. So, only 37.10% of managers have a functional email address (Figure 4). However, it should be pointed out that many of them do not use it often or when they do, it is done by intermediaries (to consult or send messages). Some managers even acknowledged that they lost their first e-mail addresses because they did not use them regularly. The challenges listed have important implications for the management of institutions. At the administrative, educational and financial level, the lack of knowledge of it tool by many managers is a serious handicap for the pedagogical use of ICT. For example, in many schools, managers do not have control over the workforce until the middle of the year. This situation is an obstacle to the planning of classrooms, working groups in different subjects. It is also not uncommon to find parallel entries made by agents without the managers being informed. There are falsifications of marks for the benefit of certain learners with the complicity of the agents of the school administration. The same is true of financial management, where the lack of computerization leads to mismanagement in the institutional funds (Bialobrzaska & Cohen, 2005). According to the managers, many examples of fraud have been committed by some agents due to a lack of computerization of the management of the establishments. This has led in most cases to the dismissal of persons convicted of such conduct. Faced with the concerns that managers encounter in order to

integrate ICT into the management of institutions, should we consider that the use of informatics is only reserved for a category of educational structures or is it necessary to carry out major actions to enable. To all managers to benefit from the benefits of ICT to improve the management of establishments? The second approach seems to be the most realistic, which is why the following recommendations are made to policy makers (state) and school managers.

The State must fully engage in the popularization of ICT by taking to de-tax all the computer tools in order to allow the establishments to dispose of the equipment in sufficient quantity and whose quality is recognized by all. In this same dynamic, the Ministry of Education can develop incentives to encourage institutions to acquire effective computerized tools for the training of learners and the management of schools. the popularization of ICT by taking. This measure also applies to the Internet connection because the cost of the subscription is still high in Côte d'Ivoire compared to other countries of the sub-region. The Internet must be able to cover the whole territory in order to give the same opportunities to all managers of establishments in the use of ICT, wherever they are. The role of the State is decisive because it defines national ICT policy and it is up to the State to ensure that it is not a privilege granted to a particular social class but rather Scope of all. The managers of private or public institutions must make the effort to equip their computer hardware structures and sensitize all their employees to the use of ICT. In addition, they must provide in-service training to strengthen their ICT skills. Each institution must have an ICT pedagogical integration plan as well as an equipment renewal strategy. Modern management requires predicting, planning at all levels, and ICT equipment does not escape this logic. This is why all managers are invited to develop strategies to have at all times high-performance computing equipment for the management of establishments.

Implication to Research and Practice

The impact of ICTs on the management of institutions is limited to a small number of educational structures, given that many schools are severely lacking in facilities. Similarly, access to the Internet is not always guaranteed for many establishments due to lack of financial means to pay for the connection or to maintain a website. Even cybercafé open in institutions are often not functional due to frequent computer breakdowns, the absence of a strategy to maintain and renew the computer park. The inadequate training of managers is also one of the major challenges because one cannot speak of pedagogical integration of ICT without a minimum of knowledge of the actors in computer science. The above-mentioned challenges represent obstacles to the pedagogical use of ICT in general and to the management of schools in particular. These challenges are important, but they are not likely to have the impact of information and communication technologies on school management. Thus, it is important to define a national policy for ICT development in Côte d'Ivoire and to put in place an incentive policy for managers, educators and learners.

CONCLUSION

Information and communication technologies (ICT) is certainly not a panacea for all the problems of school management in Côte d'Ivoire. However, the experiments carried out in a few establishments, both in urban and semi-rural areas showed the impact of information and

communication technologies on improving the management of these structures at the administrative, pedagogical and financial. The testimonies of the managers on the induced effects of the ICT on the functioning of their structures are edifying and show well that the computer revolution has made it possible to correct certain shortcomings observed in the practices of the agents.

Future Research

The digital revolution is becoming globalized, so it must not escape Africans. Indeed, it must serve as a basis for the national development consolidation. This is why all the actors of the school must play their full score to improve the management of schools and finally get best results at the end of the school year. That is why future research should focus on the techniques and means to be defined to popularize ICTs in all schools in Côte d'Ivoire, cover the Ivorian territory with an internet network and train trainers in the mastery of ICTs. The impact of ICTs on school results also needs to be investigated.

REFERENCES

- Abdelrahman, A. (2013). Managing Information and Communication Technology in Sudanese Secondary School. *Journal of Education and Practice*, 6 (32), 1-8.
- Adomi, E. & Kpangban, E. (2010). Application of ICTs in Nigerian secondary schools. *Library Philosophy and Practice*, 345, 1-8.
- Ahmed, A., Howie, S. & Osman, I. (2013). The Integration of ICT in Teaching Science and mathematics in Secondary Schools: with particular reference to Sudan. Proceedings of the 2nd e-learning Regional Conference - State of Kuwait, 25-27 March 2013. No.111 eRC-2013.
- Any-Gbayéré, S. (2000). Évolution du rôle du chef d'établissement secondaire dans le système éducatif de Côte d'Ivoire. Abidjan: Editions CEDA.
- Atkins, N.E. & Vasu, E.S. (2000). Measuring knowledge of technology usage and stages of concern about computing: A study of middle school teachers. *Journal of Technology and Teacher Education*, 8(4), 279-302.
- Aylwin, U. (1984). Les utilisations de l'informatique dans un établissement scolaire. *Prospectives*, février-avril-octobre, pp. 13-17.
- Basque, J., Rocheleau, J., Winer, L., Michaud, P., Bergeron, G., Paquette, G. & Paquin, C. (1998). Un modèle adaptable d'une école informatisée, Montréal, École informatisée clés en main du Québec Inc. http://www.grics.qc.ca/cles_en_main. Accessed on 15/05/2018.18.
- Bédard-Hô, F. (1995). Les facteurs qui facilitent l'intégration pédagogique des nouvelles technologies. *Vie Pédagogique*, 95, 40-44.3.
- Bialobrzaska, M. and Cohen, S. (2005). Managing ICTs in South African schools: A guide for school principals. Braamfontein: South African Institute for Distance Education.
- Edition Tessa Welch, 136p., Johannesburg, South Africa.
- Bridge.org. (2002). Spanning the Digital Divide. Understanding and Tackling the Issues, Cape Town, South Africa.
- Byrom, E. (1998). Factors influencing the effective use of technology for teaching and learning: Lessons learned from the SEIRTEC intensive site schools. Greenboro : Serve.
- CES (2000). Conseil Supérieur de l'Éducation (CES), Gouvernement du Québec. Éducation et nouvelles technologies. Pour une intégration réussie dans l'enseignement et

- l'apprentissage. Rapport annuel 1999-2000 sur les besoins de l'éducation. Sainte Foy : Bibliothèque du Canada.
- Djédjé, V. (2007a). Implantation Technologique par des Directrices et Enseignants de deux écoles secondaires : éléments de support, Université du Québec, Montréal, Canada.
- Djédjé, V. (2007b). Apport d'une communauté virtuelle à l'intégration des TIC dans une école élémentaire au Sénégal. CRDI-Bureau de Dakar: Policy Brief Research. <http://www.ore.uqam.ca/parutions.asp>.
- ETS, (2002). Educational Testing Service, Digital transformation: a framework for ICT literacy, Princeton, NJ.
- Forcier, R.C. (1999). The computer as an educational tool: Productivity and problem solving, Upper Saddle River, Prentice-Hall, 1999, 2^e edition.
- Gbongué, B. (2000). La supervision pédagogique dans les écoles secondaires techniques et professionnelles de Côte d'Ivoire : une expérience de modélisation. Thèse de doctorat, Université du Québec à Montréal, Canada.
- Gomm, R., Hammersley, M., Foster, P. (2000). Case study method: key issues, key texts. London: Sage Publications.
- Isaacs, S. (2002). ICTs in African Schools: A multi-media Approach for Enhancing Learning and Teaching. *TechknowLogia*, 4 (1),32-34.
- Isabelle, C., Lapointe, C. & Chiasson, M. (2002). Pour une intégration réussie des TIC à l'école. De la formation des maîtres. *Revue des Sciences de l'Education*, 28 (2), 325-343.
- Karsenti, T., Villeneuve, S., Raby, C., Lambrou, W. & Meunier, H. (2008). Conditions d'efficacité de l'intégration des TIC en pédagogie universitaire pour favoriser la persévérance et la réussite aux études. <https://depot.erudit.org/bitstream/003362dd/1/RAP-karsenti-37-2008.pdf>. Accessed on 20/07/2018.
- Kearsley, G. & Lynch, W. (1994). Educational technology: Leadership perspectives. Englewood Cliffs, NJ: Educational Technology Publications.
- N'da, P. (2002), Méthodologie de Méthodologie de la recherche: de la problématique à la discussion des résultats. EDUCI, Abidjan, Côte d'Ivoire.
- Oluyemisi, A.O. (2015). ICT and Effective School Management: Administrators' Perspective. Proceedings of the World Congress on Engineering 2015 Vol I WCE 2015, July 1 - 3, 2015, London, U.K.
- Otto, T.L. & Albion, P.R. (2002). Understanding the role of school leaders in realizing the potential of ICTs in education. Communication présentée au 13^e congrès international de la Society for Information Technology and Teacher Education. SITE. Nashville, TE.
- Pelgrum, W.J. and Law, N. (2003). ICT in Education around the World: Trends, Problems and Prospects. UNESCO-International Institute for Educational Planning.
- Peraya, D. & Viens, J. (2005). Culture des acteurs et modèles d'intervention dans l'innovation technopédagogique. *Revue internationale de pédagogie universitaire* 2 (1). http://www.profetic.org/revue/IMG/pdf/ritpu020peraya_viens-2pdf. Accessed on 12/06/2018.
- Roberts, J., Richmond, M., Howard, J., Lecoupe, F. & Flanagan, F. (1998). Le perfectionnement professionnel et les technologies d'apprentissage. Besoins, problèmes, tendances et activités. (Rapport de recherche préparé pour l'Alliance canadienne des organismes d'éducation et de formation et le Bureau des technologies d'apprentissage). Ottawa. <http://olt-bta.hrdc-drhc.gc.ca/francais/download/ProfessionalF.pdf>.

- Roecks, A.L. (1981). How many ways can the computer be used in education? A baker's dozen. *Educational Technology*, 21(9), 16-26.
- Sandholtz, J.H., Ringstaff, C. & Dwyer, D.C. (1997). *La classe branchée. Enseigner à l'ère des technologies*. Montréal : Chenelière/McGraw-Hill.
- Savoie-Zajc, L. (2000). La recherche qualitative/ interprétative en éducation. In T. Karsenti & L. Savoie-Zajc (Eds.). *Introduction à la recherche en éducation*. Sherbrooke, Canada: CRP. pp. 171-198.
- Schoales, D. (1998). First things first: Training the teachers. In Z.L. Berge et M. Collins (dir.), *Wired together: The online classroom in K-12. Teacher education and professional development* (Volume 3, pp. 129-138). Cresskill, NJ: Hampton Press.
- Sharratt, L. (1999). Technology implementation: Lesson for school and district leaders. *Orbit*, 30, 36-39.
- Touré, K., Diarra, M.L., Karsenti, T. & Tchamèni-Ngamo, S. (2008). Réflexion sur l'impérialisme culturel et les possibilités pédagogiques, émergentes des rencontres des jeunes en Afrique avec Internet, in *ICT and changing Mindsets in Education, ROCARE*.
- UNESCO (2002). *Information and communication technology in education a curriculum for schools and programme of teacher development*. Edition Division of Higher Education, Unesco, 150 p, Paris, France.
- UNESCO (2011). *Transforming Education: The Power of ICT Policies*. Paris: UNESCO.
- UNESCO (2015). *Information and communication technology (ICT) in education in Sub-Saharan Africa a comparative analysis of basic e-readiness in schools*.
<http://unesdoc.unesco.org/images/0023002342/234279e.pdf>
- Uys, P. (1998). *Managing tertiary education in a global virtual environment, Networked educational management*. www.globe-online.com.phillip.uys.cape.2000.htm. Accessed on
- Yin, R.K. (1994). *Case study research: design and methods*. 2nd edition. Thousand Oaks, CA: Sage.

APPENDIX

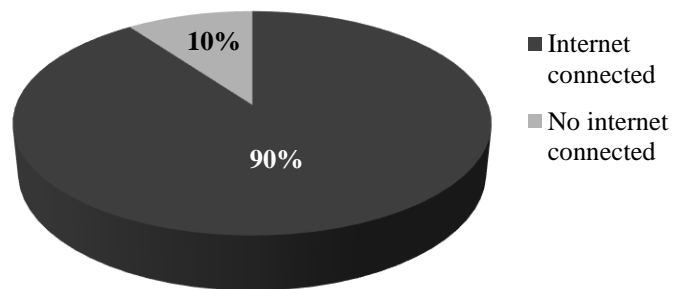


Figure 1. Percentage of schools with an Internet connection

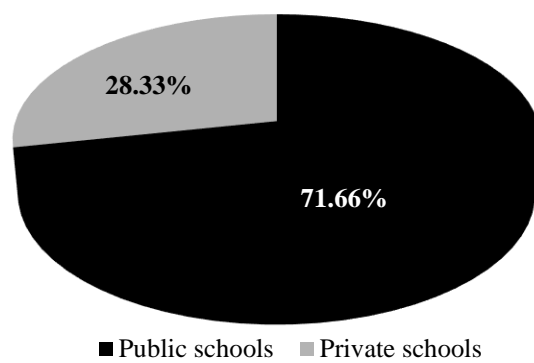


Figure 2. Percentage of schools with NkraGestEtab software in Côte d'Ivoire

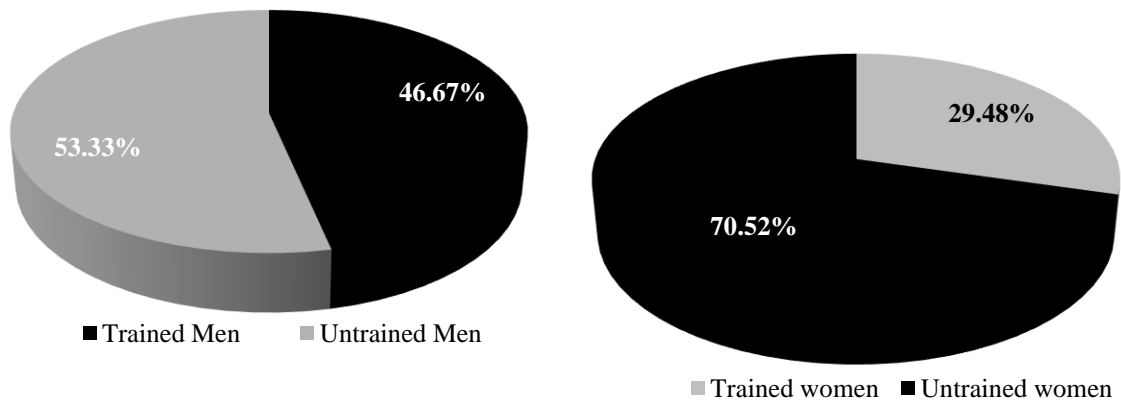


Figure 3. Percentage of managers trained in ICT use by gender

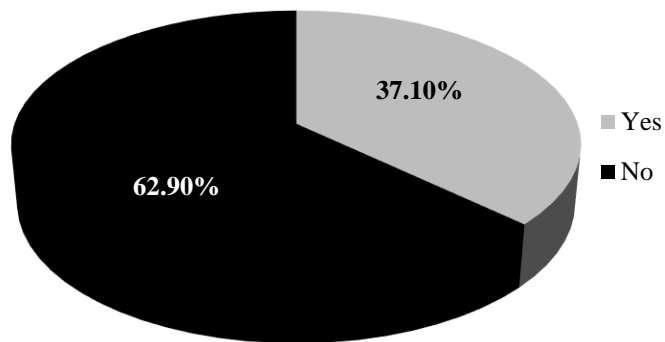


Figure 4. Pourcentage de managers possédant une adresse électronique