

Swaddling Ivorian Pupils in Internet: Evidence and Implications

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Abstract: Internet has conquered the world and strongly modified people's habits. Every single individual is somehow affected by this communication and information channel. In Cote d'Ivoire, its development is still slow and will be difficult to achieve if efforts are not multiplied through sustainable information, learning and training programs. Indeed we conducted a study to assess the familiarity of Ivorian high schools' students with the innovation tool. We discovered that Ivorian pupils' use of internet is acceptable but their understanding and knowledge of it are highly questionable because they hide profound cases of ignorance and prejudices that appear to be significant impediments for an efficient leverage. Our paper then invites actors of education to create a favorable environment for internet development and promotion through education and sensitizing. But this also is only possible if infrastructures and equipments' costs are adequately revised downward.

Keywords: Infrastructures Development, Internet Education, Internet Knowledge, Ivorian Pupils

I. Introduction

Africa is amongst less privileged regions of the world in terms of internet connectivity and usage and this is not a secret. However, from a sustainable development perspective, one of the most important keys of the global connectivity system is Internet. Its exponential growth and the transformative changes it enables in all aspects of human life make countries that don't master it the most vulnerable in the global village. Many studies indeed have shown the behind lagging of the black continent regarding the liberalization of the network. Besides, according to the Internet World Stats (IWS) [1] report of 2012, African region lies at the fifth place with a usage rate of 7.0 percent, compared to the Asian region leading the world with 44.8 percent of internet users. Therefore, efforts must be multiplied to remove hindrances and increase the appropriation by African people of this revolutionary tool necessary for all development in the twenty first century. The only question is where to start. To find an answer, we decided to look at the education side. Thus, we conducted a study in high schools of Cote d'Ivoire to understand students' approach to the network issue. This study is one section of a three parts research. The first, dealing with the acceptance of sciences by pupils, has already been published in IJER Journal in September 2013 [2]. The ongoing paper is the second part that is trying to depict the internet environment in Africa in general and singularly in Cote d'Ivoire. The third and last step of our work will attempt to draw a map of the way our respondents see their future, by taking into account the data and analyses of the two other studies. The present paper will be organized around four main points. It will firstly give the global landscape of internet in some African countries. Then it will explore and analyze data collected from our survey, to finally propose some ways to valorize the social network in that westafrican country.

II. Overview Of Internet Environment On African Continent

2.1 Africa in World Internet Statistics

This section will be based on Internet World Stats reports of 30 June 2012. IWS is an International website that provides useful updated information on world Internet Usage, Population Statistics, Travel Stats, Internet Market Research Data, Telecommunications Information Reports and Facebook Stats by country.

Table 2.1: World Internet Usage and Population Statistics of June 30, 2012

World Regions	Populations (2012 Est.)	Internet Users Dec. 31, 2000	Internet Users Latest Data	Penetration % Population	Growth 2000-2012	Users % ofTable
Africa	1,073,3809,25	4,514,400	167,335,676	15.60%	3.61%	7.00%
Asia	3,922,066,987	114,304,000	1,076,681,059	27.70%	841.90%	44.80%
Europe	820,918,446	105,096,093	518,512,109	63.2%	393.40%	21.50%
Middle East	223,608,203	3,284,800	90,000,455	40.20%	2639.90%	3.70%
North America	348,280,154	108,096,800	273,785,413	78.60%	153.30%	11.40%
Latin America/ Caribbean	593,688,638	18,068,919	254,915,745	42.90%	1310.80%	10.60%
Oceania / Australia	35,903,569	7,620,480	24,287,919	67.60%	218.70%	1.00%
WORLD TOTAL	7,017,846,922	360,985,492	2,405,518,376	34.30%	566.40%	100%

Adapted from IWS. Source: <http://www.internetworldstats.com/stats.htm>

This table has been adapted from a report given by the statistics website. Our analysis will only focus on the penetration and growth issues. The set of data produces a general view as shown by the following Fig. 2.1 and 2.2.

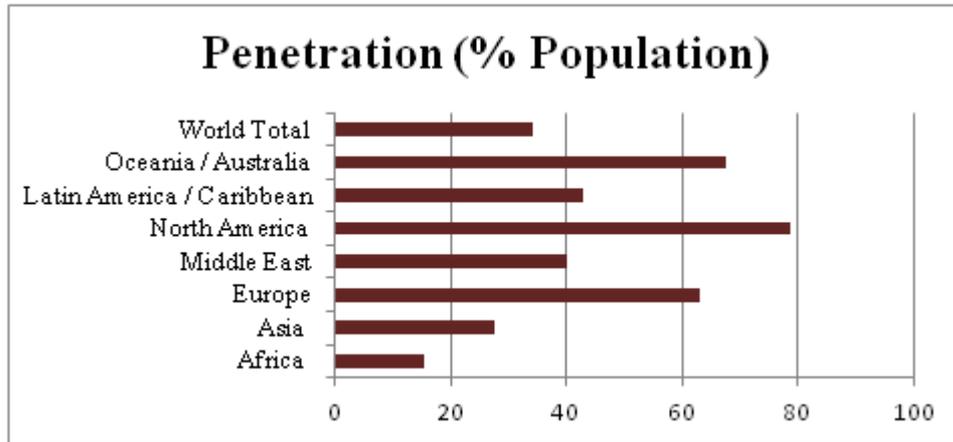


figure 2.1 world internet penetration

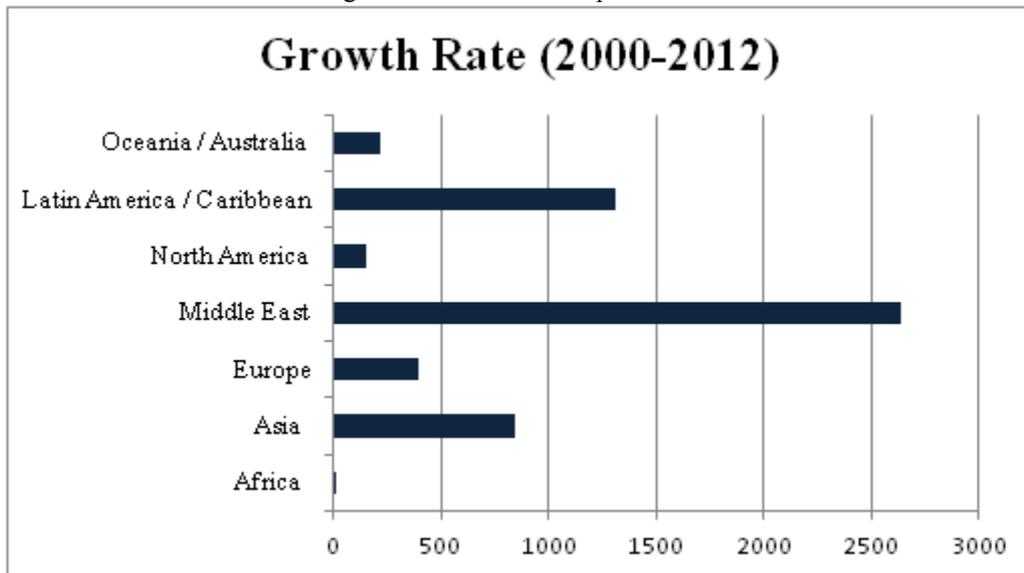


figure 2.2 world internet growth

Both internet penetration and growth rates of Africa are the lowest of the world even though the amount of internet users on the continent is higher than those of Middle East and Oceania / Australia due to the huge difference in population size. Many reasons can be evoked to explain the internet situation in Africa.

2.2 Difficult Internet Environment

Africa has been for years connected to Internet through only one submarine cable named South Atlantic 3 (SAT-3) that linked Portugal in the south of Europe to South Africa [3]. To solve this situation of insufficiency, many projects have been launched by African decision makers and international partners in the aim of increasing connectivity capacity and traffic speed to users. New submarine cables will help the continent facilitating access to broadband Internet in more than twenty countries in 2014. Fig. 2.3 offers a general view of African Undersea Cables.

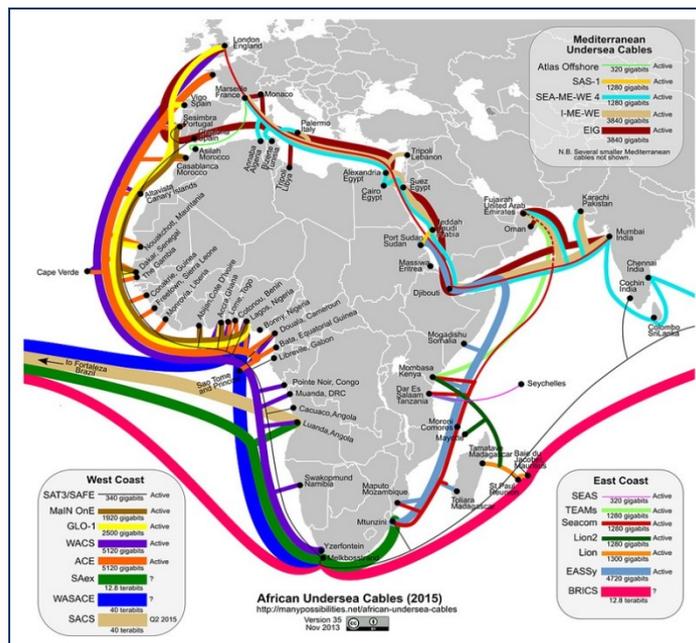


figure 2.3 map of African undersea cables
 (Source: <http://manypossibilities.net/african-undersea-cables/>)

With these infrastructures, many African countries will be able to better connect to high-speed internet, privilege formerly reserved to only 0.7 per cent of the continent by the end of 2008 according to France Telecom. In May 2011, some West African countries such as Togo, Benin and Cote d'Ivoire could not access the network for several days because the SAT-3 cable connecting the region to the global network was cut off by a boat [4]. This example is among reasons why ongoing undersea projects are good alternatives to overcome such kinds of accidents. Since 2009, the internet capacity of Africa has been multiplied many times. By 2015, there will be 14 undersea cables running around the continent and covering all the shores, from the Atlantic to the Indian Ocean, covering the Gulf of Aden and the Mediterranean. By mid-2012, the total capacity was planned to reach 15.7 Terabits per second according to the International Telecommunication Union - ITU. With SAT3/SAFE, Africa had a capacity of 340 Gigabytes per second. In 2012, the current bandwidth capacity was 440 Gigabytes per second [5].

But the market of submarine cables has bloomed without removing all obstacles surrounding the internet issue. The most important of those hinders is the autonomy and democratization of the network. Here, we want to point out what marketing managers call market power. The person who has that power controls the market. The democratization of internet in Africa poses the question of submarine cables ownership. Do African governments have the capacity to influence the cost of internet when owners and key players are multinationals and international financial institutions?

2.3 Internet Connection Price Challenge

Africa has become the new destination for ICT businesses. Many companies are building more fiber optic lines to connect Africa to the rest of the world. Many others are providing e-businesses, making the continent one of the most rapidly expanding IT sectors in the world. Besides, some computer manufacturers are settling their companies on the continent. The number of African countries capable of making computers as well as companies producing software and other applications for mobiles is increasing. At a national level and in terms of education, policy makers are working to connect all African schools to the network. The first barrier to their action is the connection cost and the situation seems to stay for long.

Internet connection is still very expensive in sub-Saharan Africa. The World Bank and the ITU estimate that the average cost of a broadband connection is about 100 USD for 110 kilobits/second. In Europe and Central Asia, the same connection capacity is 20 USD while it's 7 USD in Latin America and the Caribbean. Countries of the Middle East and North Africa pay less than 30 USD [6]. In September 2008, the price of an STM-1 on SAT-3 was USD 200 000 per month, or USD 1290 per Mbits/s. Despite the arrival of new submarine cables in the country, Cote d'Ivoire's connectivity price is still very high because of monopoly on the international gateway [7].

Another study of the ITU gives us additional useful evidence of internet situation in sub-Saharan sphere [8]. According to that study, the ten lowest tariffs for Internet access range from USD 26.31 in South Africa to USD 58.16 in Mali for a broadband of 256 kbit/s and the ten highest from USD 170 in Uganda to over

USD 1 000 in Burkina Faso. The monthly subscription of the same broadband is charged to subscribers for USD 46.53 in Cote d'Ivoire. The IT organization also showed that the world rank for South Africa, sub-Saharan country with the best tariff for wired 256 kbit/s connection, is 50th and Senegal the second country lies at the 60th place.

In short, we can assume that the hands of the continent's governments are mostly tied because only cable owners have power. Intermediary companies buy and sell and the end user pays a lot of money for approximate services. A few companies, south-African MTN and French Orange for instance, are still controlling the sector in a quasi-monopolistic state in many countries. So everybody is applauding the arrival of new submarine cables as most of visited sites in Africa are still hosted out of the continent, making the traffic extremely low. But from our point of view, it's not evident that this will decrease connectivity prices as countries don't own those cables.

III. Data Exploration

148 pupils in Cote d'Ivoire responded to our survey from February to March 2013. Their answers gave us valuable information to find best ways for internet promotion. For data analysis, we used both SPSS 17.0 and Microsoft Excel 2007.

3.1 Internet Usage

In order to assess the importance of internet for Ivorian pupils, we tried to make a link between their understanding of the network and the usage they made of it. That exercise gave the results as presented in the following pie chart.

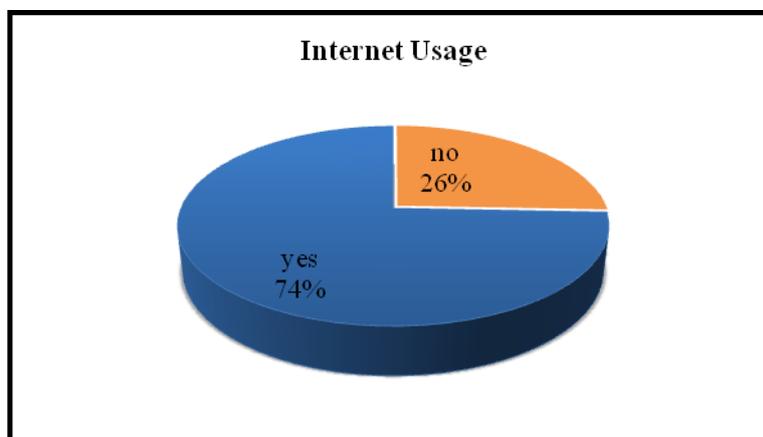


figure 3.4 pie chart of internet usage

From Fig. 3.4, we can easily conclude that Ivorian pupils are really connected to the whole world. But for this kind of study, negatives values are of very high importance because they help highlighting certain hidden situations or realities. If we put the 26 percent of non-users together with those ignoring what internet could stand for (Fig. 3.6), then we can understand that negative values are extremely meaningful.

Another significant value is the level of internet usage. Drawing a picture of the frequency to which young school boys and girls approach the social network allows us to propose some ways susceptible to solve the issue addressed by our study. The usage level gave information as stated in Fig. 3.5:

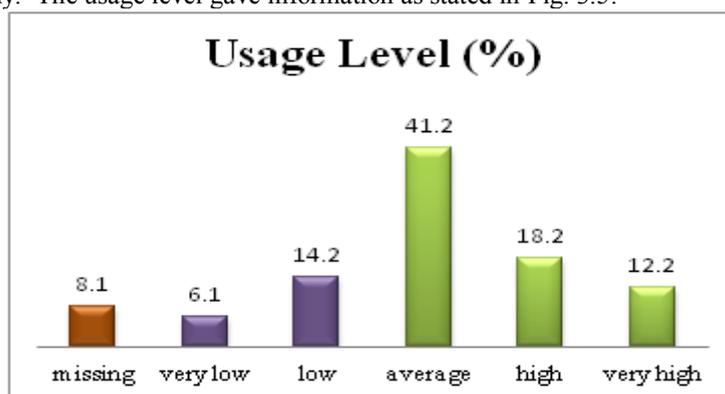


figure 3.5 bar chart of internet usage level

Here too, there is no doubt that internet has become one the best companions of Ivorian pupils. Indeed, only 8.1 percent of values are missing. The sum of below-average responses gives a percentage of 20.3, which will be determinant in the final analysis.

3.2 Ivorian Pupils Knowledge of Internet

When asked for what they go on internet for, Ivorian high school boys and girls showed different interests. The frequency of terms stemming from their answers gave the bar chart as follows:

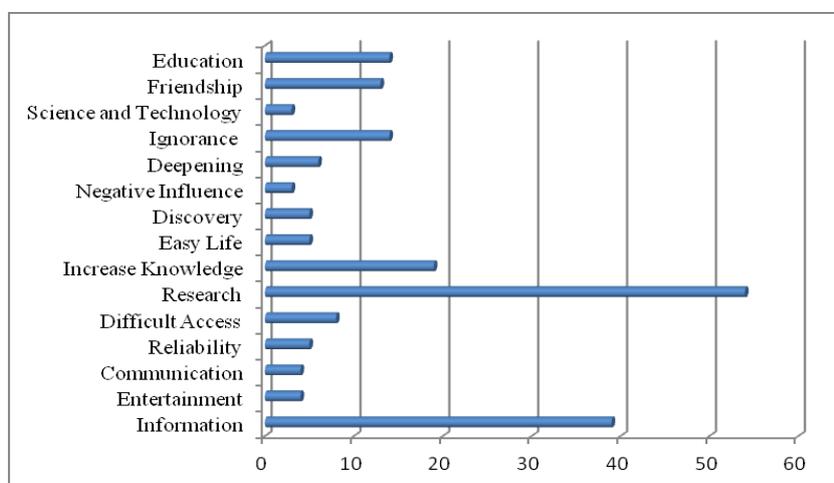


figure 3.6 bar chart of values frequency

From picture 3.6, we notice that the possibility of doing research and getting useful information on internet leads the understanding of Ivorian pupils on what internet has to offer. The third underlined element is that internet is a platform to increase knowledge. Education and Ignorance fall at an equal frequency. Here Ignorance means that a category of Ivorian high school students don't really know what internet is and this will be deeply discussed later. The perception of the social network as a tool to make friends throughout the world is shared by many pupils. For those young persons, these are best benefits of the World Wide Web. The data exploration furthermore pointed out the negative influence of internet mentioned by many respondents. Some others emphasized the difficulty to access it. All these responses will be profoundly developed in the coming lines.

IV. Data Analysis

4.1 Knowledge of Internet

According to Fig. 3.4, 74 percent of respondents use internet and 26 percent not. Naturally, missing values of Fig. 3.5 refer to those 26 percent non-users as far as usage and usage level are strongly related. When we look at the cumulated percentage of average and above average usage level (71.6 %), there is no doubt that internet has a great future in Cote d'Ivoire. This reality is reinforced by the mean report of Table 4.7.

Table 4.2: Internet Usage Level

Usage Level			
Internet Usage	Mean	N	Std. Deviation
yes	3.3361	122	.97583
no	1.7857	14	.69929
Total	3.1766	136	1.08027

A mean of 3.3361 over 5 is very interesting as its shows a relatively good behavior of students towards internet. However, the general observation is that none of our respondents sees internet as an asset, a tool to do real and legal business. Maybe many of them ignore that Facebook and many other huge companies in the world have made fortune and extended their empires by maximizing web opportunities. Ivorian pupils take everything from internet without knowing what they have to offer back. They don't know that they can gain from others pupils knowledge and experiences, share ideas and solutions and learn cultural diversities worldwide.

They are mere consumers who undergo market rules, unable to influence them. Their reaction gave the impression that the network is a tool for initiated people. The case of below average respondents is more serious. Can an intellectual keep updated without internet? How could a learner be well educated and good informed on the world if internet knowledge and appropriation are not among of his/her highest objectives? Is it a question of time, a lack of means or a merely case of unwillingness? The time, they can naturally find some. The means could necessitate tremendous internal as well as external efforts and sacrifices. This aspect will be another section of this study. As far as unwillingness is concerned, we think that sometimes some high school learners are really not aware of what Internet and Communication Technologies are, in general, and they do nothing to get informed. The case of that category of students is not different from the one of those forming the 8.1 percent of missing values. Nevertheless missing values can be justified by many reasons and we'll give some of them. Respondents could have simply forgotten to answer. They could have even decided, for personal interests, not to fill in that section of the questionnaire. It could have also been the consequence of the non-usage of internet.

As stated earlier, internet usage and usage level raise two main problems for young boys and girls in Ivorian high schools according to our research. The first is internal and organizational. It relates to the time and time, the internet knowledge and the willingness. The second problem, external and structural, stems from a general policy. It poses the question of infrastructures. To address these issues, it's important to understand their depth.

4.2 Obstacles to Internet Appropriation

4.2.1 Internal and Organizational Issues

Time and Means

In schools, there are often very few and even no computer tools. Students then have to walk long distance to get the closest cyber cafe. If many students, in many cases, give up going on internet, it is precisely to avoid such kind of journey which would be expressed in terms of waste of time while homework and lessons are waiting to be understood, done and learnt. For most of them, parents did not have enough money to meet all their needs. Initiation to computer, in that case, is clearly not among their priorities because private courses are sometimes too expensive. Furthermore, when they don't have class, some pupils have to help their parents in any activities that could financially support the family. And all this does not give them enough time to pay attention to internet. Another important issue is the severe lack of infrastructures and computer equipments that often impede any development of internet.

Internet Knowledge

A big part of respondents pointed out the fact that they don't know too much about internet. This ignorance is revelator of the general situation of the education sector in the country. How is knowledge transmitted in Ivorian schools in this twenty first century? A common answer would say that books, movies, documentaries and all other communication channels overflowing the world are available everywhere to keep up to date. But we must understand that young people need more guidance than other persons. When a learner expresses out his/her ignorance, it's a sign that he/she want to know. According to Fig. 3.5, 10.4 percent of pupils showed a low frequency of internet usage simply because they have maybe not enough been taught on its real benefits. Therefore, it's the responsibility of decision makers and school actors to inform students on strengths, weaknesses, opportunities and threats carried by the revolutionary tool. Such an action would facilitate its efficient use. This ignorance could have maybe favored swindle cases, phishing mails and all kinds of cybercrimes that the country is actually accused of.

Willingness

Willingness is a relevant even crucial component to attain a goal. For many learners, success is a privilege of some gifted and skillful persons. But this is not true for most of those who get a lot of success. Success is the consequence of a sustainable improvement. The time a student spends in learning will determinate his/her success rate. Some extremely talented people do not get the success their status predestinates them to just because they do not increase their desire to develop their abilities. Outstanding success comes from a steady learning. Unfortunately, our study found that some respondents have a superficial knowledge and understanding of internet. They are not curious and even don't want to learn more. For example, many of those who pointed out negative aspects of the network simply justified its rejection by those reasons. This perception is not totally wrong as every person of all ages can obtain or do anything, sometimes by breaking regulations, from internet: cyberbullying, pornography, racism, violent actions, etc. Some pupils even asserted that they are merely not interested. If we assume that all those students are future leaders of the Ivorian nation, then something must rapidly be done for sure. The lack of desire to learn and to make a good use impedes the internet expansion in Ivorian high schools.

4.2.2 Structural and Infrastructural Challenges

From a general point of view, Africa is developing fast in terms of internet accessibility and connectivity. Investments are huge and the continent has become the new destination as stated earlier in the first part of this paper. Even if African countries are struggling to create favorable conditions for their people, their efforts are still compromised. Their national budgets cannot cover the costs of infrastructures. From this point, they can't provide all the schools with computer equipments. That work is entrusted to private organizations or companies whose prices are unaffordable for schools with very low functioning budgets. Generally, in Cote d'Ivoire there is no real internet development policy in education sector. If there is, it's sometimes approximately implemented. Teachers and students have to find a solution by themselves. And this is another big challenge. In Cote d'Ivoire, computer training courses in certain schools are still a luxury. The integration of ICTs in national education is still debated and despite vague promises, young people try to learn basic office software such as Microsoft Word, Excel, or Internet in small private centers.

Nevertheless some efforts have to be encouraged. Indeed Microsoft dedicates a new and special webpage to promote internet on the continent. In that aim, the corporate launched an action known as Initiative 4Africa on February 2013 to create many employment opportunities for African youth. Through a program named "one family, one computer", Microsoft is working together with Ivorian government to provide every Ivorian single family with an access to computer and internet. Microsoft also works in partnership with schools to implement a digital school program and training programs for teacher that will improve the quality and effectiveness of teaching [9].

V. Recommendations

5.1 Information and Education

Cote d'Ivoire is experiencing a fast digital development manifested by the integration of Internet based systems within organizations, communities, institutions, businesses and institutions. Companies more and more recruit employees who are able to use Internet to communicate, sell and make profits. With the Internet and innovative technologies, new works have emerged on the socio professional arena. Young students should be informed that those internet jobs generate substantial income and through them they can be financially independent. In fact, the ignorance of that reality makes many Ivorian teenagers engage in frauds and scams on the web that has seriously soiled the image of the country. It's school actors' responsibility to teach pupils how to properly earn money via Internet. Works such as Webmaster, Web Developer or Web Programmer, Community Manager, Web Designer, Web Project Manager are well paid and need to be discovered. In addition, they should be taught the importance of working hard and how to efficiently use internet. The reason is that many young pupils go online just for entertainment and friendship. This is not bad, but internet has more to offer. In that education, parents also have a role to play by controlling what they children do on the web. In addition, learning English or other things from interactive courses can make parents be more involved in their children's education. Connecting schools with homes, libraries or other access ports can be a strong springboard for all bodies and individuals engaged in education affairs to work as a team for a better supervision of children. Unfortunately a large part of Ivorian parents are illiterate or have even never seen a computer. Those who have knowledge don't have time. Even if they have time, it's impossible to control everything their children do outside or online.

5.2 Internet Accessibility

In terms of infrastructures, Ivorian authorities must privilege partnerships whose incidents on the connection price will be the lowest. Indeed, the monthly connection is still very expensive as indicated earlier. So, a well negotiated contract will reduce infrastructures costs and consequently their expansion. If all the schools of the country can benefit from one computer room, pupils will not need to go outside for internet as they have it at school. Besides, teachers can better adapt and improve different learning styles and skills. They can also enhance their personal teaching techniques and learn from others teachers. Through Internet, not only they can be linked to teachers and students in different places, but also they can gain more time to spend with learners. Internet also shortens administration and recordkeeping time. Furthermore, initiatives as those of Microsoft should be encouraged. Schools could also benefits from donations of parents as well as some private individuals or organizations.

VI. Conclusion

Innovation and technology lead the world and those who don't make profits of them remain far behind. School is supposed to be the place par excellence of learning. But if its actors are "out-of-date", how could they keep disciples up-to-date? Internet is an essential communication channel and an undeniable source of businesses today. It offers myriads of opportunities, some extremely good and some fundamentally negative. But users need to know where their interests are. Ivorian high school students should benefit from real computer

science teaching programs allowing them maximizing their knowledge of the social network. This will allow them selecting positive and fruitful programs. Giving to young people a good education to internet is an important way to promote it and to considerably reduce, if not eradicate, cybercrimes. Teachers and parents have very useful contribution to make. All this however is only possible if low costs installations and equipments in sufficient quantity and quality are available.

Acknowledgements

We are grateful to all schools' headers and pupils in Cote d'Ivoire who allowed us accomplishing this research. Our gratitude goes especially to Mrs. N'Ni Josephine, whose tactfulness facilitated the cooperation of students.

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