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DIGITAL KNOWLEDGE CENTERS: A WAY TO REDUCE THE DIGITAL
DIVIDE IN SOUTH AMERICA'S POOR HINTERLAND: A PROPOSAL FOR THE
CITY OF SANTA FE, ARGENTINA

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Digital Knowledge Centers: A Way to Reduce the Digital Divide in South America's Poor Hinterland: A Proposal for the City of Santa Fe, Argentina

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Abstract—The aim of this work is to study the utilization of Digital Knowledge Centers as a way to reduce the digital divide that hits the hinterland of most south american countries. Argentina was chosen because of the knowledge that the proponent has about the country and because its state of development is such that it could assure the “survivability” of the project. Argentina is the 8th biggest country of the world by territory area, therefore it was necessary to pick also one city. After a careful evaluation the city of Santa Fe was chosen, because due to its location, composition of the population, and resources in terms of non profit organizations and voluntarism are sufficient to assure the sustainability of the project. Having a knowledge center such as the one that is being proposed here, other than shorten the digital divide in that specific place; could eventually, due to the potentiality of Argentina, start a series of developments that can propagate to the neighbor provinces creating a virtuous circle that could contribute greatly to the e-literacy of the population thus increasing the e-readiness of the whole area and finally the overall country.

Index Terms—ICT4SD, sustainable development, knowledge center, Argentina, digital divide.

I. MOTIVATION

THE idea of “*Digital Knowledge Information Centers*” (DKC) is not at all new and has been applied with certain success in some Asian countries such as India [2]. There are some publications that described the work done there and the results achieved, which are positive although not always sustainable. The main aim of this proposal is to describe a project to keep young children out of the streets of the city of Santa Fe. The problem of children on the streets [1] is well known in Latin-America and affects the societies of many countries and Argentina is not the exception. Particularly in the city of Santa Fe (See Figs 1 and 2), hundreds of young children hit the streets of the city every day to beg for food; to

do the squeegee merchant cleaning the windshield of the cars at the traffic lights; to steal; to scavenge on rubbish dumps; etc. It is a problem that is connected directly with the poor economical condition of the country that has been enormously exacerbated after the crisis of 2001 and reached dangerous levels over the recent years. The amount of children on the streets is that high, that, for example, when one stops at the traffic lights they run altogether like a human wave and hit the cars with their water squeegees. Since there are so many, usually they fight among them to get a piece of the windshield to clean. That situation aside from being awkward for the driver is very dangerous for the children themselves because of the accidents that they can suffer when the drivers start to move at green light. The problem is that one can keep an eye on them if they were only one or two, but if there are many around and coming and going in between the cars, even the more attentive driver can cause an accident; and that is actually what happens and many children suffer bad injuries or even die in the case s/he is hit by a heavy truck for example.

The system is so rotten, that a disable kid victim of such an accident, far from becoming a problem for their parents becomes a desirable thing because in this way his/her family can claim the social benefit that the government provide for disables, that is, the kid that suffers an accident and remains disable becomes a source of extra income for the family. This is a vicious circle because that money comes from the taxes and aware of this, the tax payers search to evade the payments whenever they can in order not to support this kind of behavior.

This is just an example of the many problems that having children on the streets can cause. There are many others, such as the proliferation of drugs that afflicts a growing number of children that are continuously younger; the security on the streets, because of the increase in pick pocketing; etc. Further enumeration of the problems is not necessary to convince the readers of the serious problems caused by having the streets with children that do not go to school, do not stay with their family decently, and do not go back home at night.

Having depicted the situation any idea that can remove even a small percentage of the children that today live on the streets of Santa Fe can definitely greatly improve the situation, and, as it will be shown later, create a virtuous circle that could encourage also other people (not necessarily children) to abandon the streets.

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Fig. 1. Location of the Province of Santa Fe in Argentina. It is located in the north of the country. Neighboring provinces are from the north clockwise Chaco, Corrientes, Entre Ríos, Buenos Aires, Córdoba and Santiago del Estero. Its more important cities are Rosario (population 908,000), the capital Santa Fe (369,000), Rafaela (83,000), Villa Gobernador Gálvez (74,000), Venado Tuerto (69,000), Reconquista (66,000) and Santo Tomé (58,000). The illiteracy rate of the province is 3.7%. [7]

The idea is to attract the children to the knowledge center with the excuse of the playing games on the computers. It is known that computer games generate a great deal of attraction and sometimes addiction over the player, which is generally greater among the younger. This is exactly the characteristic that a “replacement” must have to compete with the attraction that the streets generate. Aside for being a source of income the streets are a source of action and entertainment for the children, so if one likes to find something that can compete with the streets in terms of attraction, it is imperative to find something else that can provide the same level of action and generate the same adrenalin but without being so dangerous. One such thing could be computer games.

Playing computer games alone, in groups and/or among other Internet users around the world would be the lure to attract and keep the children out of the streets for some time. The process however is much more complex and would require the help of trained social assistants, psychologists and teachers to develop a plan of alphabetization and e-literacy that can gradually mix the gaming with other more educational activities.

Aside for attracting children out of the streets and develop their e-literacy, the idea brings about another desirable consequence which is to improve the write and reading skills of the children. It is a very important result to improve not just the e-literacy on computer systems but simple the general literacy of the children. The fact is that even though most kids frequent elementary school —and many times they do that not because they are eager to learn but because they receive lunch there, which is the only meal they may have during the whole day— they finish the school still without knowing or having severe difficulties to read and write fluently. By using the computer for gaming, e-mailing, chatting, and things alike



Fig. 2. Map of the Province of Santa Fe. The city of Santa Fe, is situated at 500 km from Buenos Aires, located on the border of a fabulous system of watercourses falling onto the Paraná, one of the most important rivers in the world. On the eastern margin of the Pampa, it is an important shipping point for the agricultural products of much of NW Argentina. The city also has some industry. Founded by the Spanish conquistador Juan de Garay (1573), Santa Fe was the site of the promulgation of the 1853 Argentine constitution. There are several notable churches and a national university. [7]

they will be somehow force to read, and write, and thus would ultimately help them to improve their abilities in this sense.

Another indirect consequence of the knowledge center is to provide, through the Internet, a kind of “window”, where the children can see that other world really exists. This is very important because what usually happens is that these kids grow up in an environment that does not give them choices, they cannot see what the different alternatives of their lives are. They born in a poor village, surrounded by poor people, generally lack of culture; they see their elder brothers, sisters or relatives doing the same thing, that is, living in the streets, begging, stealing, having drugs, etc.; and it is impossible for them to imagine that there is another reality feasible. Through the usage of Internet in the knowledge center, they could realize that there are other possibilities, see what other younger people are doing in other parts of the city, in other neighborhoods or even in other countries; and then come back home revitalized knowing that what surround them it is not the only choice, that maybe they can change their destiny. This psychological end product is not minor, because its continuous effect every day during the growing phase, leaves a seed in the mind of the children that could be beneficial in the future. One of the problems that the children of the streets have in their development is the lack of stimulus, because the environment is not motivating, their families do not provide motivation and the society does not take care of them. The Internet can fill this missing part providing the necessary stimulus enabling them to choose, which is what at the end

will make them free.

II. WEB-BASED LEARNING

After the first attraction phase through the usage of games to draw children's attention, and develop their e-literacy (how to use the keyboard, start and boot the system, navigate the operating system searching for the game, etc.); they should be smoothly introduced to another e-activities such as those offered by web-based learning methods. This term usually refer to all kinds of learning in which the educational materials are hypermedia documents which can be handled via web technologies. The network environment in this case will be the one set up in the knowledge center. Web-based learning offers a number of advantages:

- It is predominantly a personal way of learning; therefore the kids can complement the information received at school with images, multimedia, further information, etc; defining their own learning speed without pressure and exploiting only their curiosity, interest, and willingness to learn which is known to be high in the children.
- One-to-one interaction between the kids (i.e. students) and the virtual peer (i.e. teacher) which is an integral part of many web-based learning programs. Tutoring is provided via email or even via online chatting including voice and video. This can also cope with the reading and writing skills deficits that were described earlier.
- Eventually, with appropriated guidance, they kids can produce some content where they will be using the whole gamut of current multimedia technologies, thus further improving their e-literacy and ultimately giving them some tools to find a job in the new economy (specially for those that are reaching their working age)

Web-based learning programs are often delivered as live broadcasts over the Internet, which are frequently called 'webcasts' or 'webinars' (web-based seminars). The nature of participation is similar to the use of videoconferencing in a virtual classroom and the feedback is limited to asking questions using a Q/A window. The questions can then be answered by the lecturer online during the presentation or, in most cases, via email afterwards. Web-based learning systems often allow for other forms of online activities, such as participation in discussion groups, working on collaborative projects and the like. By these means the population of a poor and conflictive neighborhood on the outskirts of Santa Fe, can follow via web, a lecture or a seminar given in the more cultural enriching environment of the capital city of Buenos Aires, leveraging the technology to spread culture to the socially excluded.

III. CONVENTION ON THE RIGHTS OF THE CHILD

The Convention on the Rights of the Child adopted by the United Nations by General Assembly resolution 44/25 of November 20th, 1989 and entered into force on September 2nd, 1990 [3], established among other things the right of the child to education. It is important then to notice that this proposal is

completely in accordance with the principles expressed in the Convention, in particular, the Article 28 part 3 mentions: "*States Parties shall promote and encourage international cooperation in matters relating to education, in particular with a view to contributing to the elimination of ignorance and illiteracy throughout the world and facilitating access to scientific and technical knowledge and modern teaching methods. In this regard, particular account shall be taken of the needs of developing countries.*" It is clear how this proposal is in line with this article especially with the final sentences because the knowledge center are in part an evolution of the town libraries which not only bring closer the culture to the neighborhood but it does it using the most modern method today which is the Internet. It is important to develop a little bit more the apparent resemblance that exists between the classic libraries and the Knowledge Center. A classic town Library can be converted into a Knowledge Center, or better said, can host it inside if it has enough room and if the appropriated infrastructure is installed. This is usually the situation in developing countries where there is no need of Knowledge Centers in the way depicted here, simply because, in general, each town has a Library that has been computerized in recent years becoming a Digital Knowledge Center by itself. However, it is not always possible to turn a Digital Knowledge Center into a Library. This is especially truth in third world or developing countries where the density of Libraries is very low, and the situation generally being that there is only one Library in the capital city of the district or the province. Therefore, the mission of the Digital Knowledge Center would be twofold: on one side it will provide access to computers and Internet and as a result it will shorten the digital divide. On the other side it will somehow alleviate the shortfall of town Libraries in poor neighborhoods, particularly taking into account the great amount of digital literature, encyclopedias, and newspapers that are available on-line, and even more important if in the near future there will a great deal of books digitized on-line, as projects like the one pursued by Google and others begin to reach their critical mass.

Article 29 continues stating that the education of a child shall be directed to: "*The development of the child's personality, talents and mental and physical abilities to their fullest potential*". This is another thing in which Digital Knowledge Centers such as the one depicted here would contribute greatly because by introducing the young kids to the Internet they could not only develop their talents (or at least discover what talents they have aside from being on the streets) but to acquire the abilities to find a job or perform tasks that belongs to the new economy paradigm, such as programming or take advantage of e-commerce. This will end up improving the e-readiness index of the whole society.

IV. MINIMIZING INTERNET SELF-EXCLUSION

Doherty *et al.* [5] discussed the role of informal support networks to reduce the digital divide. Their research reveals

that even if at the beginning economic difficulties may limit the adoption and extensive usage of ICTs, in the long run other factors such as the lack of training and support networks in which individuals can learn about the use and potential of a particular technology, can intensify their social exclusion and protract self-exclusion. In line with this view it is clear that Digital Knowledge Center aside of its main objective of acting as a contention place to take children out of the streets, will train those kids on how to use the technology and in this way will enable them to use the instruments of the information society thus reducing the probabilities of exclusion. As with many other things people do, training and support is not always sufficient to have a favorable and enjoyable Internet experience. In order to be effective, the training and support should be exercised in a context in which the children and young users can feel comfortable about using it. That is why this proposal starts with the idea of attracting children first with gaming to continue then with other more educational activities; because I believe that this is one of the best ways to offer a joyful usage of a computer to a kid that never heard about it before; let's don't forget that this was in fact the motivation that attracted many of today's most successful computers programmers and entrepreneurs.

In line with these ideas, the Digital Knowledge Center proposed here fulfill most of the items listed in [5] aiming to minimize Internet self-exclusion, because it provides equipment (i.e. up-to-date computers and software) and resources (i.e. broadband access) to avoid feelings of being "second class" even for the people living in the poorest neighborhoods of the city. It provides access to knowledge, skills and support, through the help of trained support and flexible and inclusive politics of usage. It changes the "not for me" paradigm, by bringing the latest technology to the more impoverished areas of the city so that their inhabitants can feel that they are being taking into account now and will not be excluded from the society of the future.

V. KNOWLEDGE CENTERS AND COMMUNITY NETWORKS

According to Wikipedia, even if there is no absolute agreement on the term "Community Network", it is generally accepted that: "...a community network is a computer-based system that is intended to help support geographical communities by supporting, augmenting, and extending already existing social networks. Community networks often provide free web space, e-mail and other services for free without advertising. Community network organizations often engage in training and other services and sometimes are involved in policy work as well." [7]

Since this definition is somewhat broad, maybe is more interesting to find out what are the characteristic of community networks that could be in line with this proposal. The literature provides certain characteristics such as:

- Supply of information and Services. For example through a web site offering information for local people which may include local events, weather forecast, news,

governmental offices, and in general any information that can be of particular interest for the local community. The website can use new emerging technologies wiki-like to allow people post personal advertisements. Regarding ownership, the web site can be owned by a local government but managed involving local people from the social community.

- Management and Main Objectives. The community network can be managed and used by many different groups with different objectives. In particular the people in charge of planning and operating the project may be: a local government office such as the Provincial Direction of Informatics; a local non-profit organization or a volunteer group. On the other hand, the main objectives of community networks which are described in the literature are much like the ones of the knowledge centers envisioned here, for example: shortening of the digital divide; offering easier access to information and services for local people (i.e. information that is probably already existing); promotion of local economic development and employment; increase the sense of local identity and reinforce the affection to the living place; renewal, encouragement and/or maintenance of local communal interrelationship.
- Area coverage: In general community networks are associated with a metropolitan area, or smaller place. The geographical area associated with a community network can be a town, city, county, and in some cases a region including parts of several provinces. For the sake of the knowledge center the community network generated by them would have its primitive cell in the neighborhood.

According to the definition and the characteristics given above the Digital knowledge Center describe could become a building block of these community network contributing the node that will generate the content that then will be distributed among the community. Therefore the implementation of the knowledge centers can be viewed as the first or foundational step towards the future development of a full scale community networks that will eventually connect all the poorest neighborhoods of the city, enabling them to fully participate of the information society. After that is achieved, that is, once the community networks are operative, the whole gamut of ideas described in [4] can be applied.

VI. IMPLEMENTATION USING CAF

CAF is the acronym of Centers for Family Action that stands for "*Centros de Acción Familiar*" in Spanish. The CAF are institutional premises depending of the municipal government, which offers a physical space in economically poor urban areas, hardly served by public services, that collaborate with the complete and integral development of children, teenagers and their respective family groups [8]. They were created long ago by the Argentinean Ministry of Social Welfare, so they are now established institutions that are widely recognized for their positive contributions for the

society well being. The main objectives of CAF are:

- Provide integral daytime care to children between 45 days old to 4 years old.
- Offer educational, recreational and sportive activities outside school hours to children between 5 and 12 years old.
- Propose community activities for teenagers and adults.

The CAF services are different and specific according to the following age ranges: 45 days old to 2 y.o.; 3 to 4 y.o.; 5 to 12 y.o. and 13 to 18 y.o.; and in terms of care, nutrition, educational inclusion, access to healthcare services, theoretical and/or occupational training. Also, they work jointly with other governmental and non-governmental entities to achieve insertion in the neighborhood and involve local social networks to optimize the available resources. In particular the services that are common in all centers are: infant assistance, nutritional assistance and scholar follow-up. The activities that are performed depending on the capabilities of each center are:

- Daytime nursing for babies and young children.
- Scholar support outside scholastic hours, library, alphabetization, and instruction.
- Cultural and self-expression workshops
- Reflectional programs.
- Recreational and sportive activities.
- Breakfast, lunch and afternoon snacks.
- Sanitary control and legal advice.

So according to the above description the CAF seem to be the right place to host the Digital Knowledge Centers (DKC) envisioned here. The usage of CAF would solve many of logistic and organizational problems regard the establishment of the Centers. The fact that the premises for the CAF are already in place and operative with electricity, alleviate a lot of problems concerning the initial set-up of the DKC and let us concentrate specifically in the installation of the computers, the provision of broadband access, internal networks, application set-up, and which is most important: the development of the strategic plans aimed at attract, keep and them e-educate the children object of these proposal.

There is though one aspect that still needs to be considered, which is, the provision of adequate security for the premises. Economists know very well that the ideas that obtained good results in some countries cannot always be “transplanted” to other countries “as is” expecting similar performances. No matter how good the idea is, it cannot be used as a recipe to implement the same project in another environment no matter how similar those environments seem to be there is always a degree of adjustment that needs to be done in order to let it work. The adjustments and adaptations will depend on many factors, each of them contributing in a greater or lesser degree. Probably the most important among all factors are the cultural differences. Marketing people, especially those from multinational companies, know very well how important is to study the cultural differences before introducing the same product into different countries. Maybe constituents of the product are the same but its presentation must be tailored

according to the tastes and necessities of the people of each country's society. And the same is expected to happen with an ICT idea for sustainable development such as the one described here. Moreover, since the Asian and the Latin American society are so different in so many aspects the number of adaptations will be certainly high. For example, one aspect that must be addressed is criminality. In India the index of criminality by size of the population among the poorest areas is low compared with Argentina. That means that the probabilities that the devices (i.e. computers, routers, printers, cables, etc.) that belong to the center are stolen are much higher in Argentina than in India. Just to mention an example, in Argentina the telephone companies has to fight against theft of their phone lines that are buried in the streets which are stolen, melt, reprocessed and then sold as raw cooper in the black market with substantial earnings for the thieves who are usually poor people, unemployed, that use the profits to maintain their families, or, what is even worse and it is becoming more common nowadays, to buy drugs or alcohol for personal use. Therefore, one cannot think simply in setting up a knowledge center full of computers in the middle of a poor but at the same time “hot” neighborhood, without the necessary security measures to prevent theft, because the risk is that nothing will be there the day after. To be effective and sustainable in the long run, the security measures have to be twofold, from one side they have to include the traditional deterrents such as alarms, bars on the windows, and things alike, but on the other side, which is more important is to involve the potential thefts into to process of the security assurance by providing services that may be of their interest, not in the sense of their “profession” as thefts but in the sense of their social in-group. Based on this author's experience, some examples could be: latest news about their favorite local soccer team; information about economical help of the government; information about the state of the rivers and where it is good to find fish for the day; etc. However to obtain a more accurate list of topics that can be of interest for these special kind of people, it is necessary to consult with the social assistants that work on these neighborhoods and are the ones that better know them. By including content that they can use one hopes to create on them a sense of ownership of the centre and the equipment inside a mean to obtain information that are useful for themselves and thus reduce the risk of suffering robberies. It important to notice that only by including them in the plan, for example, through content that can be of their interest, the project can have sustainability in terms of security.

VII. CONCLUSION

The benefits of having Digital Knowledge Centers equipped with the latest ICT technology was demonstrated to be a successful experience in countries like India. I believe that this experience could be, with the right adaptations, successful too in Latin American countries. In order to shrink the spectrum of possibilities and restrict the domain of

application, one country was proposed: Argentina. This country is interesting to start testing those ideas because it is not an extremely poor country, therefore the probabilities of success of the project are quite high. Argentina is also important in the context of the South-American region because is the one of the leading countries, second only to Brasil, but ahead in many aspects such as social inclusion. That means that if a project succeed in Argentina, the experience will probably be tested in other neighbor countries like Paraguay, Bolivia or Peru which are certainly much poorer, and therefore the gains in terms of social contention are greater

Finally, throughout this proposal it was analyzed the benefits of using preexistent structures called "Centers for Family Action" (CAF), to host the Digital Knowledge Center. In fact, the DKC can be seen in some way as the evolution of the CAF into the information society. This is a very important aspect because it almost guaranteed the success of the project at the lower possible cost.

The author believes that through the correct implementation of DKC and their association with CAF, multiple objectives can be accomplished at the same time to shorten the digital divide of the poorest neighborhoods and at the same time will reduce significantly the number of children on the streets in order to mitigate a problem that is afflicting of the vast majority of the third world.

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