Using an Information Ecology Approach to Identify Research Areas

Findings from Chile

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GLOBAL
IMPACT STUDY

THE GLOBAL IMPACT STUDY

This research was conducted as part of the *Global Impact Study of Public Access to Information & Communication Technologies*, a five-year (2007-2012) project to generate evidence about the scale, character, and impacts of public access to information and communication technologies. Looking at libraries, telecenters, and cybercafes, the study investigates impact in a number of areas, including communication and leisure, culture and language, education, employment and income, governance, and health. The Global Impact Study is implemented by the Technology & Social Change Group at the University of Washington Information School with support from Canada's International Development Research Centre (IDRC) and a grant to IDRC from the Bill & Melinda Gates Foundation. Learn more at **globalimpactstudy.org**.

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Using an Information Ecology Approach to Identify Research Areas: Findings from Chile

INTRODUCTION

This report presents the main conclusions of the case study about Public Access to ICT (PAI) venues that was developed as part of the first stage of the project entitled *The Global Impact Study of Public Access to Information and Communication Technologies.* The study was developed between June and September 2008 in Chile.

The objective of this study was to characterize the infrastructure, of the public access venues, their users, their main activities and their role in the community in which they are immersed. Based on these results, the aim was to generate plausible hypothesis about the impact of the public access to ICT and design feasible research projects to test these hypothesis during the second stage of the project.

The following sections of the report present the method used in the study, and then it presents the results. Based on them, it describes possible research projects and finally discusses its implementation.

METHOD

The research questions of the study were defined as:

What are the main characteristics of public access venues?

Who are the main groups of users of public access venues?

What are the main activities carried on in public access venues?

What is the role of the public access venues in the community in which they are immersed?

In order to answer these questions, the study used qualitative techniques to collect and analyze the data. The data collection instruments were:

Instruments	Information Collected
Questionnaire (Operator)	Background information about the venues (hardware, connectivity, software, etc.) Information related to the users and activities carried out in the place with Internet access. Photographic registry of the venue.
Non participant Observation	Observation of the infrastructure of the venue. Observation of the activities in different periods of the day (including normal and high demand periods)
Individual (operators and users) and groups interviews (users)	Description of the activities carried out by the users. Perception of the changes experienced by the community and/or the individuals due to the venue.
Ecology Mapping	Identification of the most relevant agents and organizations present in the community. Perception of the changes experienced by the community and/or the individuals due to the venue.

All the instruments were designed so as to be able to address the topics addressed in the research questions (i.e. characteristics, users, activities, role in the community).

These instruments were used in nine public access venues, intentionally selected across the country to represent the heterogeneity of the public access initiatives in Chile[1]. The venues selected were the following:

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[1] The main public accesses to ICT initiatives in Chile are: community telecenters; schools (participants from the Governmental Program "Open Schools to the Community"); libraries (participants from the Governmental Program "Biblioredes"); and cybercafes.

Table 1 Description of the public access venues

Image	Venue	Characteristic
	Biblioredes Villa Austral	This library is part of the National Library Program that provides free Internet access and is located in a low income area of the city of Temuco, which is the capital city of the Araucanía region and has approximately 300 thousand inhabitants.
	Biblioteca de Puerto Saavedra	This library is part of the National Library Program that provides free Internet access and is located in Puerto Saavedra, a small size town in the Araucania region that has less than 15 thousand inhabitants.
	CyberCafé Montt	Public internet access place, that provides paid access to ICT. This private venue is located in downtown of the city of Temuco, which is the capital city of the Araucanía region and has approximately 300 thousand inhabitants.
	CiberCafé Lobos (Purén)	Public internet access place, that provides paid Internet access. This private place is located in Purén, a small town in the Araucania region that has less than 12 thousand inhabitants.
	Telecentro Lautaro	Community telecenter owned by the municipality (local authority) that provides free access to ICT and is located in Lautaro, a medium size town in the Araucania region that has less than 35 thousand inhabitants.

	Telecentro Gorbea	Community telecenter owned by the municipality (local authority) that provides free access to ICT and is located in a small size town in the Araucania region that has less than 15 thousand inhabitants.
	Telecentro El Encuentro de Peñalolen	Community telecenter owned by the municipality (local authority) that provides free ICT access and is located in a poor but populated area of Santiago that has approximately 250 thousand inhabitants, Chile's capital city.
	Cibernarium de Mauleactiva	Telecenter owned by an NGO that provides free access to ICT and is located in Talca, a medium size city in the Maule region (regional capital) that has approximately 200 thousand inhabitants.
	Liceo Araucania de Villarrica	School that provides access to ICT to the community in certain periods of the week. It is located in Villarrica, a medium city in the Araucania region that has less than 50 thousand inhabitants.

The data collected consisted of:

- 9 Questionnaires

- 9 Observations

- 18 Individual interviews

- 14 Focus groups (group interviews)

After the application of the instruments the data was reviewed and a summary of the answers given by the participants relative to each topic was transcribed. These transcriptions were analyzed using the qualitative software NVivo. Since all the actors referred to the same topics, the different answers were grouped to develop categories for each topic.

Each topic was analyzed by at least two members of the research team and the resulting categories were negotiated to represent a consensus.

FINDINGS

Results are presented in four sections:

- Access points characterization

- Users characterization

- Activities in public access venues

- Public access to ICT use impact

ACCESS POINTS CHARACTERIZATION

In general terms, results indicated that there are two broad types of public access: Community oriented venues and Commercially oriented venues. Each type has the following characteristics:

Table 2 Characteristics of the venues

Characteristic	Community oriented	Commercially oriented
Access value	Access to ICT is free of charge, despite of other services that in some cases could be paid (printing, CD burning.	Access to ICT is paid.
Management	The venue is managed by an operator. In general terms (s)he acts as a facilitator in the use of ICT, including the delivery of ICT skill courses. Additionally they also build social bounds with the users.	The venue is managed by an administrator that provides a number of "services" for the users, such as printing documents, burning CDs, etc. In general terms, they do not engage in socially with the users, keeping their role as administrators only.
Hardware allocation	Computers are allocated in a way in which the operator can easily see what users do with the computer.	Computers are allocated in a way in which users have an important degree of privacy while using ICT.
Privacy	Privacy in the use of computers is not essential	Privacy in the use of computers is very important.
Opening time	The opening hours are similar to the ones of the public sector offices (i.e. from 9 to 13 and 15 to 18).	Opening hours run from 12 AM to 12 PM.

Characteristic	Community oriented	Commercially oriented
Time of use of the PCs	In average, users use the computers during more than one hour.	In average users use the computers during 30 minutes, despite the fact that there are some exceptions that spend several hours.
Complementary services	Additional community oriented activities and services are provided, such as ICT skills training, ICT courses for special groups of users, etc.	Additional commercially oriented services are provided, such as documents printouts, music download to a CD, phone calls.
Purposes	They declared that their purpose is to help to overcome the digital gap by introducing people to the use of ICT.	They declared that their purpose is to provide ICT access as a service and that the sell privacy.
Location of venues	Located in identifiable "communities" that have clear geographical and socio-demographic boundaries. People living in these communities have shared feeling of belonging and therefore, venues also are perceived as part of this community (users refer to the venue as "our" venue).	Located in areas without defined socio-demographic boundaries, for example "downtown of the city", even if they are immersed in a community, they declare themselves as providing a service (users refer to the venue as "the" venue).

Results did not show consistent differences in relation to the type and number of computers, software installed or other equipment available in the public access venues.

USERS CHARACTERIZATION

Results showed that a large variety of users attend to the public access venues, including children, primary and secondary students, young unemployed workers, housewives, elderly people, and people that are part of the active work force. However, based on the types of venues described in the previous section, results showed that commercially oriented venues are predominantly used by young people and teenagers. On the other hand, community oriented venues are used by all types of users, and that there is a tendency to see homogenous groups of users at given daytimes.

For example, in the library and school based venues, generally in the morning are only students using the computers or in Municipality based public access venues, it is usual to see "mothers" (typically middle-aged women) using the computers just before noon. Also, in the morning in these venues it is possible to see mainly adults (employed and unemployed).

Based on the data describing users, it is possible to identify four non-exclusive groups of users (see Figure 1):

Students: Users attending to primary and secondary schools that use public access venues.

Youngsters: Young users that generally go in groups to the public access venues.

Community members: Generally adults living in the community in which the public access venue is installed. They regularly go to the venue and recognize themselves as part of the "community of users".

Adults: Generally individual grownup users that go to public access venues occasionally, among them are un-employed, workers, activists, etc.

Figure 1. Different types of users of the public access Venues

Students using a Cybercafe in Purén

Youngsters using a telecenter in Peñalolen

Adults using a telecenter in Talca

Community members using a telecenter in Lautaro

From a different perspective, users' perception of the role of each type of venue is different. While the community oriented venues are perceived so as to be in contact with the community, local mass media, churches, adults and youngsters associations, serving their needs of information, communication and leisure; the commercially oriented venues are perceived as a service provider, without building bridges with the communities.

ACTIVITIES IN PUBLIC ACCESS VENUES

The analysis showed that users described activities belonging to two dimensions. On the one hand they described activities that they did while directly interacting with the computer and on the other, they described activities that took place in the venue.

Regarding the activities belonging to the first dimension (use of ICT), claims were classified as belonging to one of the following types:

1. **Production or work related activities**

These are claims describing activities that helped users to perform productivity related tasks. The activities classified here were the ones in which users described tasks that resembled what would be normally done with a personal computer available at the user's desk. The type of activities that were classified in this category were:

- **Online transactions**, such as managing personal bank account, paying taxes, etc.

- **Trading goods and products**, such as buying or selling goods for work.

- **Job applications and search**, such as looking for job opportunities in dedicated web sites, sending own curriculum vitae, etc.

- **Product development**, such as preparing a presentation or a report for a client, writing a homework, etc.

2. **Communication**

These are claims in which users described activities that were focused on sending or receiving messages to/from individuals or groups. The type of activities that were classified in this category were the following:

- **Group chat**, such as participating in public communication forums or groups using instant message (IM) tools like Messenger or the like.

- **Dialogues**, such as sending or receiving messages, typically from relatives and/or friends.

- **Participating in social networks**, such as using social network websites to upload and/or download materials (photos, videos, etc.), comments or news. In this case the emphasis is on the "social" aspect of the communication.

- **Diffusion or marketing**, *such as sending pamphlets or presentations to groups that are not necessarily known*. In these descriptions, users did not mention the production of the materials,

just that they use the venues to "send" these materials to other users.

3. Information

These are claims in which users described activities that focused on searching and downloading information. In this case users did not mention further processing of the information, just accessing it. The type of activities that were classified in this category were searches to retrieve the following information:

- **Online catalogues**, *such as looking at goods or materials for personal use, like furniture, electronic equipment, etc.* Generally the interest in this case is to check and compare prices of specific items that users are planning to buy for them or their homes.

- **Academic material**, *such as information about specific topics that is downloaded and printed or copied to a memory stick to be used elsewhere*. Interestingly many of the users that described this type of activities were "mothers" that went to the public access to collect materials for their children's homework.

- **Health related material**, such as searching for information about diseases, their symptoms and treatment. In some cases they use this sort of information to confront the diagnosis of the physician and in others to auto-diagnose them.

- **General interest**, search for contents that are related to the users' general interests, such as regional, national or international news, magazines, etc.

4. Recreation

These are claims in which users described activities that have a ludicrous intentionality (playful activities) and did not have a particular context such as social networking, publicity, etc. This type of activities were classified as:

- **Playing games**, such as playing on-line or off-line games.

- **Downloading audiovisuals**, such as Youtube videos, funny pictures and images.

- **General interest contents**, such as horoscope, gossip websites and tabloid, sports, weather information, etc.

- **Create and up-loading contents**, such as videos or pictures in Youtube or Flickr.

Regarding the activities belonging to the second dimension (i.e. activities that took place in the venue), these were reported by users of community oriented venues only and their claims were classified as belonging to one of the following four types:

5. Training

Users that attended to ICT related training sessions that took place in the venue.

- **Academic assistance**: Users that go to the venue to receive help or support in their academic activities.

- **Social interaction**: Users that go to the venue to interact with other users.

- **ICT habilitation**: Users that go to the venue to be helped in the use of ICT. Generally users claimed that the received support in the use of ICT from the venue operator and in some cases form other users.

PUBLIC ACCESS TO ICT USE EFFECTS

Finally, users and operators were asked about the effect or impact of the public access venues. Their answers where classified as belonging to one of the following categories:

Social networking: Some users said that the public access venue helped them to build social relations, while others said that the public access isolates people, particularly youngsters.

Economic improvements: Comments in this regard mentioned that due to the Internet access, they were able to buy cheaper. Also, some users mentioned that the possibility of doing online transactions saved them time and therefore money. Finally other few users mentioned that they increased their income due to the public access, either because they found a job or due to the ICT skills acquired their salaries increased.

Acquiring ICT skills: Some users mentioned that learning how to use ICT was a big change in their life, feeling more empowered and increasing their sense of belonging to the society of the 21st century.

Increased motivation due to the access and use of ICT: Users mentioned that they could see an increased motivation among students using ICT.

Health conditions: Some few users mentioned that they were able to collect information about some illness and its treatment in the Internet and thereby their health has improved. Besides, some users commented that the use of computers was related to some health problems (back pain, tendinitis, etc)

Truancy: Some users commented that the public access venue was a magnet to youngsters that had nothing else to do and that these groups could be a threat for the community.

ANALYSIS

Results presented I the previous section can be represented using a network type schemata, as the one presented in the next figure.

Figure 2 Schemata of the results
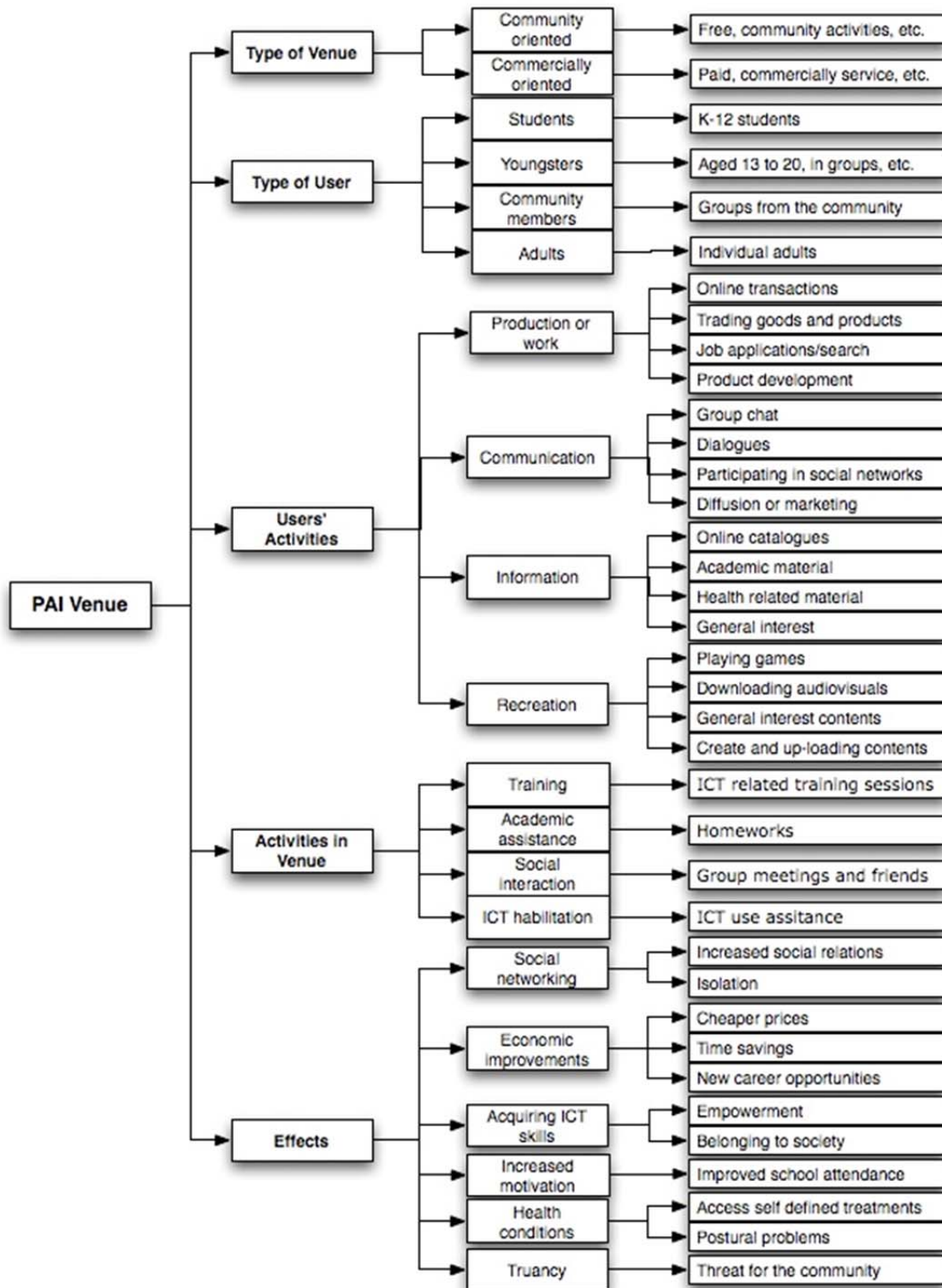
As it can be observed, the main topics of the analysis were the type of the venues, the type of user, the activities (users and venues) and impact. For each topic the categories resulting from the analysis are presented and, in turn, for each category, the particular code is presented (leaves of the tree).

Based on these results, the categories can also be organized using a Systemic Network[2] that enables to define the **unit of analysis (impact of public access to ICT)**, showing the categories and its expected relations. In this case, one possible network representing the unit of analysis "Impact of public access to ICT" is presented in the next figure.

Figure 3 Systemic Network for the Analysis of the Impact of Public Access to ICT Venues (PAI)
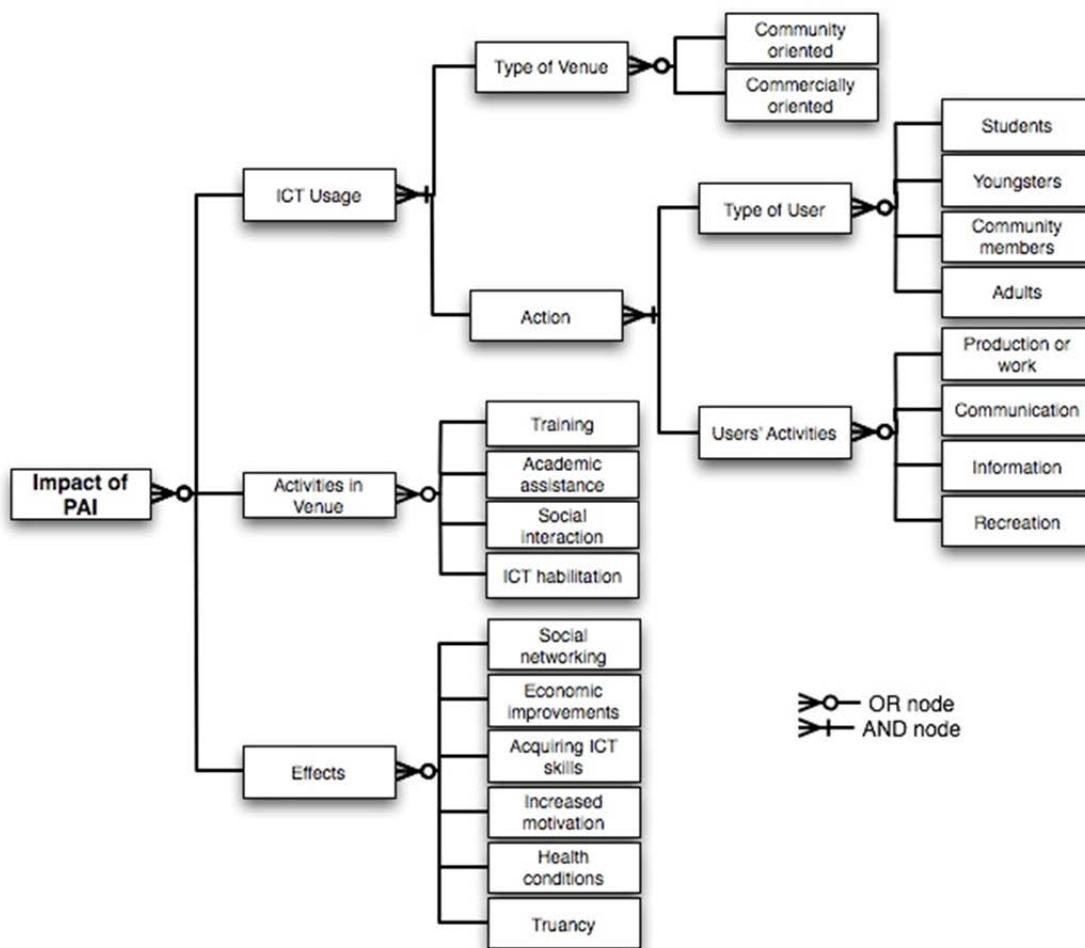
In the network three main branches are used, the first one, "ICT Usage", includes all the expressions describing different types of uses of ICT ("actions") happening in a given "Venue" (the "and" relation

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[2] Qualitative analysis tool, see (Bliss, Monk, & Ogborn, 1983) for expanded description.

expresses that all actions must have a specific venue). Also, each "Action" is described so as to be performed by one "user" that does a certain "activity". The second branch, "Venue Activities" includes all claims describing organized activities that are performed in the venues (the "or" relation expresses that some uses of ICT happen without having a relation with an activity organized in the venue). Finally, the third branch "effects" includes all the claims describing some effect of the public access venues.

The network itself is a result from the analysis and based on this, further analyses can be done, including analysis such as the frequency of each category and/or correlations between two or more categories.

Finally, for the "AND" nodes, the intersection of the categories is represented using a double entry table in which the specific content is described (using the leaves of the schemata presented in figure 2).

Table 3 Example of the characterization of the results based on the systemic network

Activity	Community oriented venues	Commercially oriented venues
Production or work	Adults trading goods and products and performing online transactions	Students developing products
Communication	Adults sending diffusion or marketing messages	Youngsters participating in social networks
Information	Community members searching for health related material	Adults, Students searching for general interest materials
Recreation	Youngsters creating and up-loading contents	Youngsters playing games and downloading audiovisuals

This type of analysis could shed light to the understanding of context, activity and potential effect of the use of public access venues venues.

DISCUSSION

Results of this study answer the four research questions and, in summary, show that there are clear differences between community and commercially oriented venues, that there are four types of users (students, youngsters, community members and adults) and perform different types of activities (production, communication, information and recreation). Additionally some overarching activities in the community oriented venues (training, social interaction and ICT habilitation) were also identified as well as some potential impact areas including positive and negative effects.

Although the systemic network presented needs to be refined and further exploited (no statistical analysis was performed yet), it already shows some results that enable us to focus the search for impact, looking for the effects of specific activities on particular users that use one type of venues. For example,

look at the impact of the "Communication" activities that Youngsters do in commercially oriented public access venues and its relation with the emergence of groups belonging to the net-generation, or look at the impact of the "Information" related activities that community members do in community oriented public access venues, etc. Therefore, next steps of this research should give evidence of the social, cultural and economic impact of the public access to ICT venues on users (including specific activities).

To be included in a next version:

- Discuss the categories with findings presented by (Bailey, 2009), (DeBoer, 2009),

- Look for evidence of similar behaviors as the one described by (Vasalou, Joinson, Bänziger, Goldie, & Pitt, 2008) , (Ito, et al., 2008) and (Peter & Valkenburk, 2006)

- Discuss general findings using the framework presented by (Young, 2008)

- Analyze the relation between the systemic network and categories presented by (Selwyn & Facer, 2007).

REFERENCES

Bailey, A. (2009). Issues affecting the social sustainability of telecentres in developing contexts: A field study of sixteen telecentres in Jamaica. *The Electronic Journal on Information Systems in Developing Countries, 36*(4), 1-18.

Bliss, J., Monk, M., & Ogborn, J. (1983). Qualitative data analysis for educational research: a guide to users of systemic networks. London: Croom Helm.

DeBoer, J. (2009). The relationship between environmental factors and usage behaviors at 'Hole-in-the-wall' computers. *International Journal of Educational Development, 29*, 91-98.

Ito, M., Horst, H., Bittanti, M., boyd, d., Herr-Stephenson, B., Lange, P. G., et al. (2008). *Living and Learning with New Media: Summary of Findings from the Digital Youth Project*. Cambridge: John D. and Catherine T. MacArthur Foundation.

Peter, J., & Valkenburk, P. M. (2006). Adolescents' internet use: Testing the ''disappearing digital divide'' versus the ''emerging digital differentiation'' approach. *POETICS, 34*, 293-305.

Selwyn, N., & Facer, K. (2007). Beyond the digital divide: Rethinking digital inclusion for the 21st century. Bristol: Futurelab.

Vasalou, A., Joinson, A., Bänziger, T., Goldie, P., & Pitt, J. (2008). Avatars in social media: Balancing accuracy, playfulness and embodied messages. *International Journal of Human-Computer Studies, 66*, 801–811.

Young, K. (2008). Toward a model for the study of children's informal Internet use. *Computers in Human Behavior, 24*, 173–184.