

Analysis of the Social Impact of a Technological Training Project in Ciudad Bolívar

Cristian León-Ospina¹, Cristian Rosas-Aldana¹, Cesar Hernández^{1*}, Juan Sanchez²

¹ Universidad Distrital Francisco José de Caldas, Technological Faculty, Bogotá, Colombia.

² Universidad Distrital Francisco José de Caldas, Faculty of Engineering, Bogotá, Colombia.

*Corresponding author, ¹*Orcid: 0000-0001-9409-8341

Abstract

The locality of Ciudad Bolívar in the city of Bogotá has been characterized by difficulties in social and cultural integration. In the search for sociocultural improvement, a program was developed to increase the presence of information and communication technologies called Ciudad Bolívar Digital. This article has the purpose to assess the social impact of the training project based on socio-economic factors. To achieve this task, information was extracted from polls which discussed said factors for the analysis of the social impact in the community. The analysis determined that the largest participation share is represented by women and elderly people. In general, people who received training showed an improvement on their quality of life in social, cultural, working, emotional and health aspects.

Keywords: Community, ICTs, Impact, Indicators, Poll, Social, Training.

INTRODUCCIÓN

Ciudad Bolívar is considered one of the most problematic localities in Bogotá. A wide range of social and economic hardships can be evidence in the area. It has the largest population of unemployed inhabitants in the capital. Most of the residents are classified in the socio-economic strata 1 and 2 (with the lowest income) or even below 1 meaning that they live in precarious situations (Universidad del Rosario, 2009). Furthermore, their school coverage is very low which leads to an educational deficit and less opportunities for achieving higher-quality lifestyles.

Ciudad Bolívar is a project whose vision is to benefit more than 630.000 inhabitants of the locality, offering access to new technologies. It seeks to guarantee the access and social appropriation of ICTs (Information and Communication Technologies) managed by ETB (which in Spanish stands for Telecommunication Company of Bogotá). Thirteen interactive portals are distributed in the area so that the population can acquire information on different computer tools regardless of age or level of academic studies (Ministerio de TIC, 2011). Currently, this project is recognized as one of the most important digital strategies in the country, since it plans to widen the social and economic opportunities of this community.

Given the previous statement, it was necessary to analyze the real social impact of this project by analyzing its weaknesses and strengths before it can be implemented in other districts or regions in the country. In order to train people's skills and open the door to job offers, it is paramount to consider that "everyday organizations rely more and more on ICTs to function and it is an element that is gaining popularity and becoming an essential component" (IEEE - Conferences and Events, 2014). This also allows to show results on the efficiency and quality of the services that are being offered, revealing the actual effect that they have and grasping the opinions of the participants of the course. To measure the impact of ICTs in a local environment, it is important to identify the capabilities and needs of the population in order to perform the selection process, design polls and establish a methodology (Cruz, Macías, & Gaona, 2015). The notion of social impact has to be clear "and the ways in which those affected perceive and experience it" (Serje, 2017).

In (Blanca & Liberta Bonilla, 2007), the definitions of social impact are approached from the point of view of different authors and taking as a reference the definition given by the Spanish Language Academy. The assessment of the impact is stated in terms of the assessed results of applying an action over one group. All types of effects are investigated, both planned and unexpected, according to the purposes of the action. The concept of social impact includes not only the results foreseen but also those unforeseen. Additionally, both the positive and negative effects are contemplated when a specific program has been implemented within a social group or community (Blanca & Liberta Bonilla, 2007).

This document details the analysis of the social impact regarding the Ciudad Bolívar Digital project, while considering that social impact as a part of research, has to think on the targeted audience, how to interact with them and how to improve their quality of life (Kate Travis, 2010). This analysis is made with the purpose of contemplating the effectiveness of said project in the strengthening of knowledge in ICTs following the idea that "the technology available to people greatly influences what their lives are like" (NSES, 2016) and hence motivate the development of new projects that can improve the way of life in sectors with similar conditions. Furthermore, some social indicators were established which generated recent statistic data on the current state of the project.

This was all carried out in several interactive portals where 50 people were chosen to participate in a poll. An Excel database was created to facilitate the analysis with graphical and percentage-based representations. To observe the impact that the strategy had in the participants, their knowledge before and after the ICT course was compared.

RELATED WORKS

In (Cruz et al., 2015), the analysis of the phenomenon produced by a lack of resources in vulnerable populations called 'technological marginality', which implies that there is social separation or exclusion regarding the use of tools and services that grant scientific and technological skills. The study tackles the research from 2012 to 2015, on the influence of ICTs in the life of the residents of Ciudad Bolívar in the city of Bogotá where the Technological Faculty of the Universidad Distrital Francisco José de Caldas is located. Some of the factored indicators include: digital breach, technological marginality and inclusion. The impact of technology is quantified through statistical tools such as polls, so that they can be replicated in subsequent studies where information is required and identify local baselines in terms of technology and needs that can be supplied and/or improved through ICTs.

In (Palza, 2017), a statistical study was made to achieve the following objectives: quantify the people that signed in the interactive portals in the month of February 2017, give a vision of the type of population that was benefitted by taking data such as gender, age, strata, economic occupation, etc. A satisfaction analysis was also carried out on the people who signed in. This led to determine the trained people's perspective on the quality of the service and evidence the impact of the course regarding the improvement of their electronic communication skills and the access to information.

In (Fernández, 2001), the main objective is to obtain the information and tools that can enrich concepts and strategies to improve the measurement of different types of social impact led by science and technology. This was achieved through several studies performed on research from authors that have worked on similar topics and contributed with a classification of the existing types of impact. The reader is contextualized to offer a straight-forward vision of the concept and introduce him to the theoretical notions of gauging science and technology.

In (Gómez González, Durlan, Cáceres, & Aleixandre, 2017), the work focuses mainly on the assessment of the social impact of technology, where it was described within an international context to present a wider perspective on the concept and analyze the state of some countries regarding the study of such impact. Then, the situation in Spain is further explained, by identifying which are the most advanced studies and which have the most potential of future development. It is concluded that there a scarce level of development on the study of social impact, but that the assessment of technology's impact keeps gaining relevance in the field.

In (Velásquez, 2017), the author takes the results from the research "Design of a methodological proposal for the monitoring and analysis of using information and communication technology in vulnerable communities", which

is based in the observation of the so-called 'Open Classrooms' and 'Library Parks', programs included in the 'Medellin Digital' program. It seeks to promote and facilitate the good use of ICTs in different communities. This analysis revolves around the uses given by students, teachers and parents, the contributions of teachers, the strategies used to attract the community and the obstacles detected during the development. This observation established some appropriation trends for TICs and offered some recommendations to potentiate its impact in several aspects of the life of these social groups.

METHODOLOGY

Based on the research made in the social impact of implementing similar projects, a brainstorming session was planned so to effectively implement a poll that could recollect the most relevant information for the subsequent analysis of the results.

The target population is a part of the locality of Ciudad Bolívar which is why it was necessary to study beforehand the location and concurrence of the portals present in the area in order to have a sampling of the quality at the time of execution of the polls.

The poll analyzes six socioeconomic factors: identification data, health, education, workforce, ICT and courses of the portal. It includes a total of 33 questions: 5 for personal identification data, 5 for healthcare information, 4 for education, 9 for workforce, 6 for information and communication technologies and 4 for the courses offered by the portal.

Polls were made personally and individually to gain more clarity on the questions asked and reduce the errors in recollecting the information. The participants were more frequent in the morning time so the polls were scheduled accordingly. The polls were implemented over several stages, one before training and one afterwards with the purpose of measuring the effectiveness of the program in the community as well as people's perception towards it.

Polls were made to a group of 50 people assisting to more than one interactive center, with a total of 33 women and 17 men as seen in Figure 1. In terms of ages, 12 of the participants were 61 to 70 years old, 8 participants had 20 years of age or less, 6 had between 31 and 40 years, 5 had between 41 and 50 years, 6 had between 51 and 60 years and 6 had between 71 and 80 years, as illustrated in figure 2.

After the data recollection process was finalized, the information was organized in Excel 2016. Then, the data was processed through statistic indicators applied to each proposed item in order to facilitate the study of percentage-based changes before and after the training program. After the social impact indicators were settled, an analysis was made on the behavior of each socio-economic factor and its corresponding questions, in a percentage-based representation.

Based on the results obtained, changes were seen for all analyzed factors and conclusions were stated while

emphasizing on the impact that the training program had in people's lives, in terms of intellectual and emotional growth.

RESULTS

The results obtained for each item of the poll are shown in this section.

Identification data

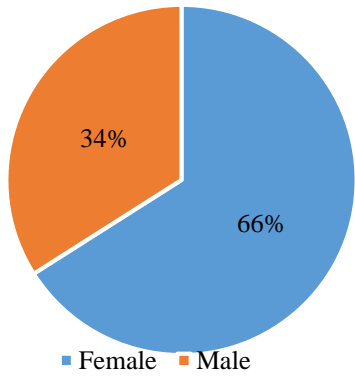


Figure 1. Participation chart in terms of gender

Figure 1 shows that the largest percentage corresponds to the female gender with a 66% share, while the male gender takes 34%.

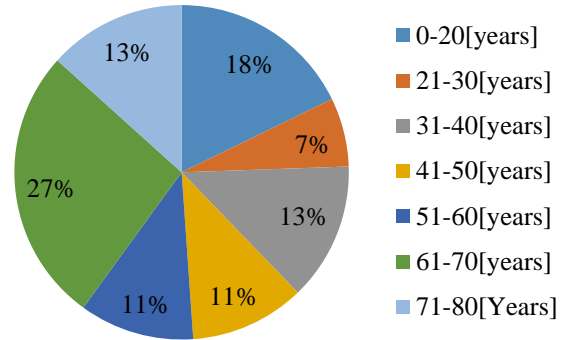


Figure 2. Participation chart in terms of age

Figure 2 shows that most of the assistants are adults between 60 and 70 years old, revealing an interest from elderly population in the offered course.

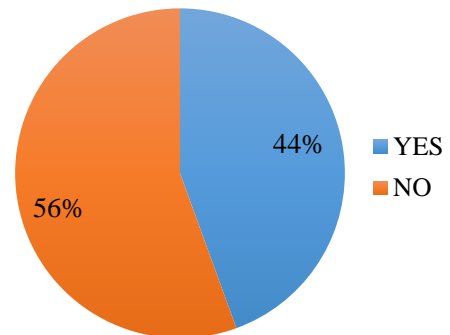


Figure 3. Participation chart for people who take

Figure 3 shows that 44% of the participants live with someone that depends economically on their income, while the remaining 56% do not have such responsibility. This can be explained by the fact that most of the participants are elderly people which already receive money from retirement and have children who work and live on their own.

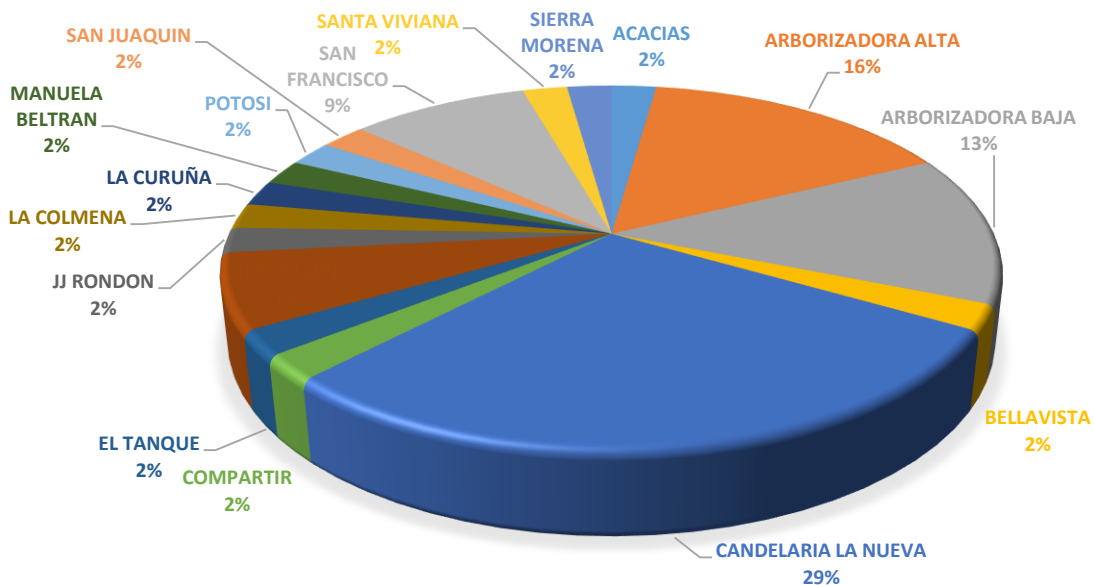


Figure 4. Participation chart in terms of neighborhood.

Regarding a sector-based participation, it can be concluded that the most crowded places are those in Candelaria Nueva and Alborzadora Alta with a combined participation of 75% as seen in Figure 4.

Healthcare

Healthcare enrollment

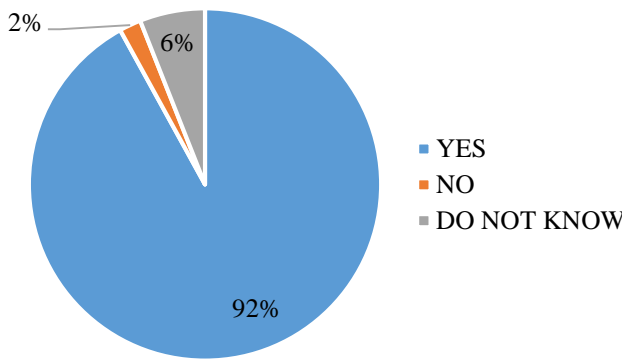


Figure 5. Participation chart for people enrolled in healthcare.

According to figure 5, 92% of the people surveyed have healthcare, 6% do not know their state since they are underage and the remaining 2% corresponds to immigrants from Venezuela.

Type of healthcare system

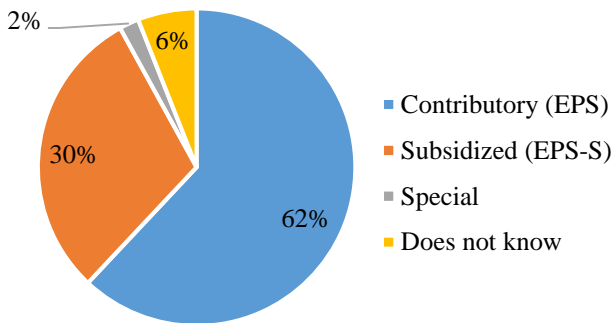


Figure 6. Healthcare system chart.

According to figure 6, 62% of the people surveyed belong to the contributive system (they have to pay for healthcare services) while the remaining share belongs to the subsidized and especial systems since they receive a retirement pension.

Use of digital platforms to schedule medical appointments.

Figures 7 and 8 reveal similar results before and after the training course since digital media can be hard to use or the order of the appointment can be ignored by the system.

The 10% share consisting of people that did manage to book medical appointments digitally took between 10 to 15 minutes.

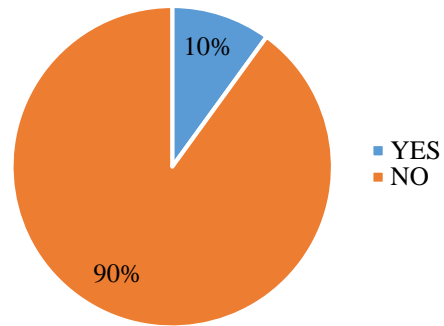


Figure 7. Chart for use of digital platforms to schedule medical appointments

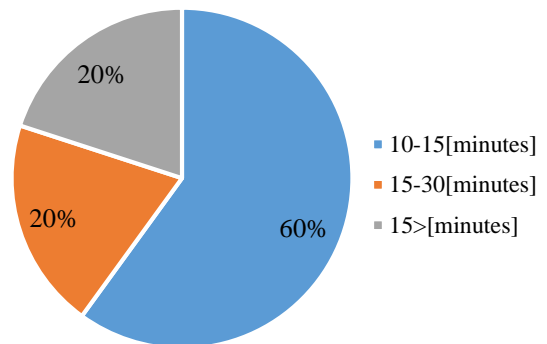


Figure 8. Chart for time taken in requesting medical appointments digitally.

Checking for symptoms and treatment online

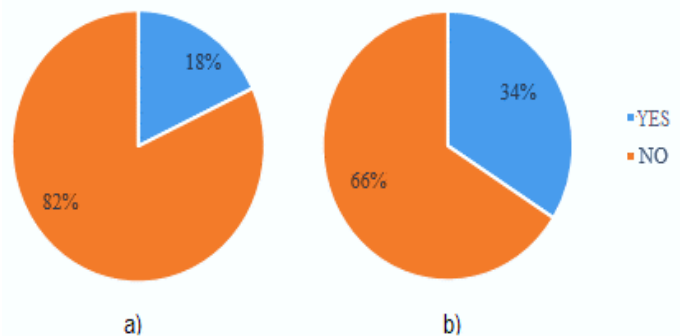


Figure 9. Trend chart for searches in health-related topics, a) Before the training course; b) After the training course.

As can be seen in Figure 9, the online consultations made regarding health symptoms had a growth of 16%. When asking the people who did not look for online information after the course, they answered that the diagnosis lacked the information to look for.

Applying training course for checking and assigning medical appointments

People who are able to search online were benefitted in terms of looking for disease-related symptoms. The percentage of queries increased due to the skills acquired in the courses for handling ICTs as shown in Figure 10.

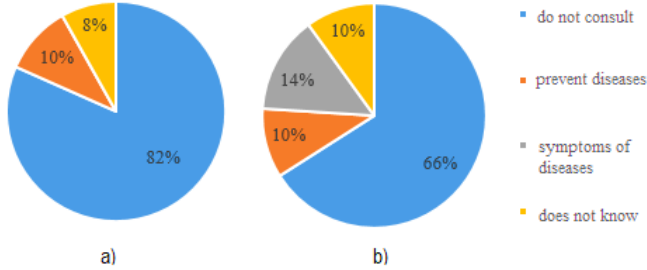


Figure 10. Chart for the application of the consultations in health environment: a) Before the training course; b) After the training course

Education

Trained people who are currently studying

Figure 11 evidences that people who are studying are mostly elderly who are culminating their elementary or high school studies and children attending high school who take advantage of the site to do research and finish their homework.

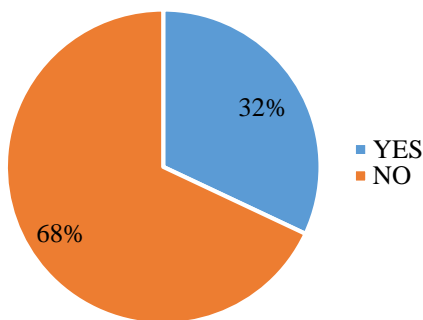


Figure 11. Chart of attendees who are currently studying

Highest educational level

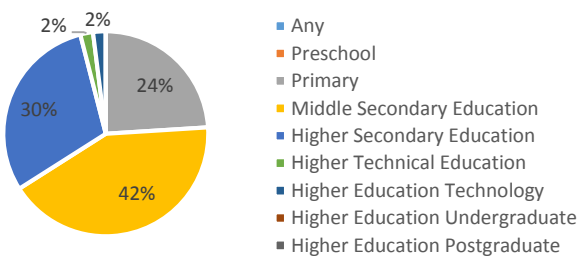


Figure 12. Chart for the educational level of the participants

According to Figure 12, there is tendency in educational levels towards elementary and high school studies since most adults

did not finish their school education when they were young. Therefore, they are culminating them now.

People who take online courses

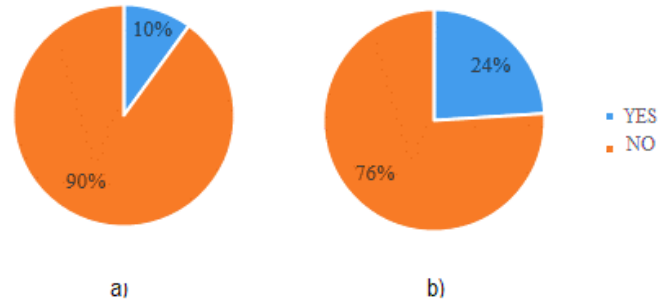


Figure 13. Chart for online courses: Before the training course; b) After the training course

Figure 13 shows that the percentage of people who take online courses is very low due to a lack of knowledge. This rate increased by 14% since people are more motivated because of the acquired skills.

Online training opportunities and allotted time

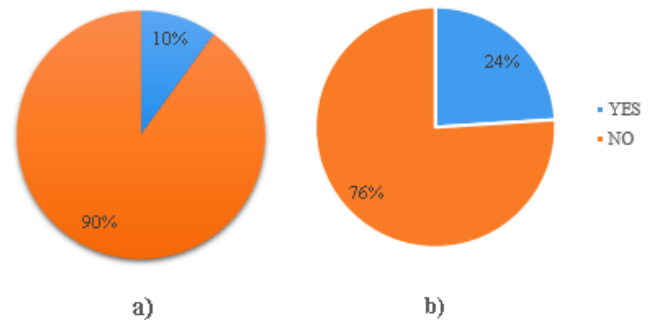


Figure 14. Chart for online training opportunity (a) Before the training course; b) After the training course

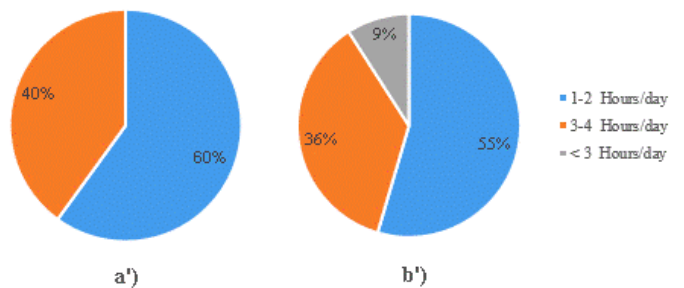


Figure 15. Chart for the time allotted to online training: a) Before the training course; b) After the training course

There was a considerable growth (14%) in the number of people that began to train themselves with digital media, since

the trainees found some sort of business venture according to the observations in figures 14 and 15.

Workforce

Allotted time for weekly activities

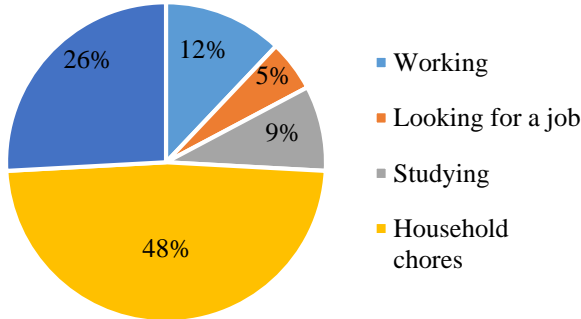


Figure 16. Chart for the allotted time to weekly activities

Figure 16 shows that the activities that take the longest time for the trained participants are related to house chores since most of the surveyed population consists of elderly who are no longer a part of the national working force.

People who are seeking a job for the first time

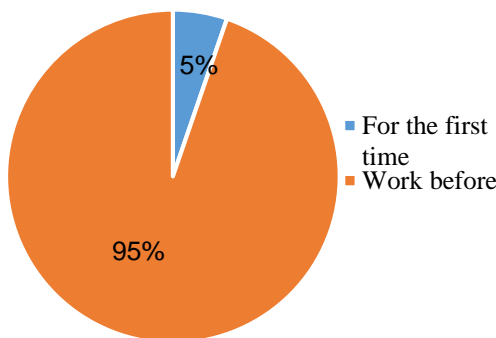


Figure 17. Chart for people who are seeking their first job

95% of trained people have worked at some point in their lives since they are older people (Figure 17).

Period in which participants were unemployed

Figure 18 reveals a reduction in unemployment percentages for over a year since most of the population that benefitted from the training course (elderly people) found jobs that better suited the abilities developed over said experience.

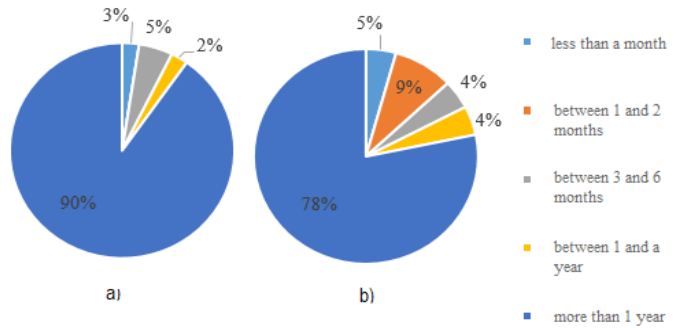


Figure 18. Chart for the duration of the last job: a) Before the training course; b) After the training course

Methods for seeking jobs

The method preferred by the surveyed population is through an acquaintance. In fact, both before and after the course, this is the most effective and safest method to get a job. However, there is considerable growth in looking for jobs online which went from 23% to 43% as indicated by Figure 19.

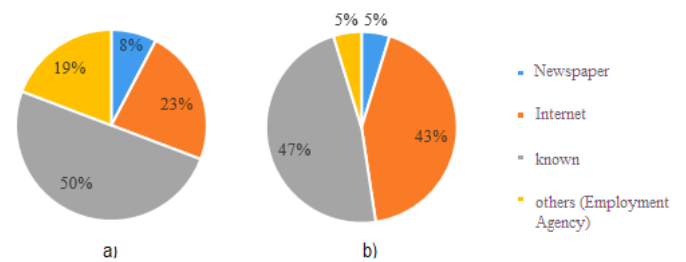


Figure 19. Chart for job-seeking methods: a) Before the training course; b) After the training course

Opinion on how easy it is to look for jobs online

Before attending the course, more than half the people considered that it was hard to look for jobs online. This trend was reverted after the training session since they gained some skills to handle virtual tools according to Figure 20.

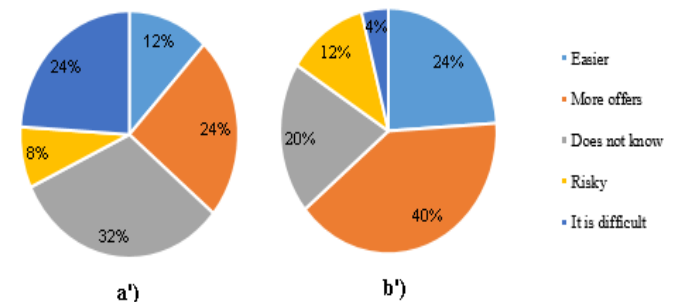


Figure 20. Chart of the opinion on how easy it is to look for jobs online: a) Before the training course; b) After the training course

Preference between being an employee or an independent worker

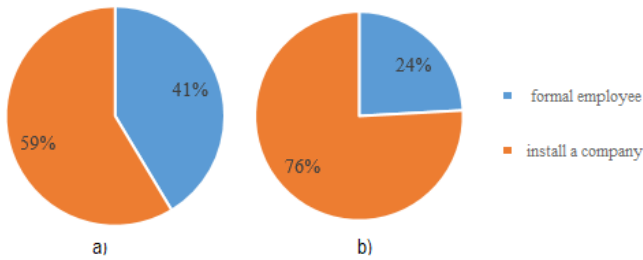


Figure 21. Chart for working status preference: a) Before the training course; b) After the training course

According to Figure 21, more than half the population prefers to be an independent worker which grew by 17% after the training course since this line of work offers many advantages.

Monthly income of the person's last job

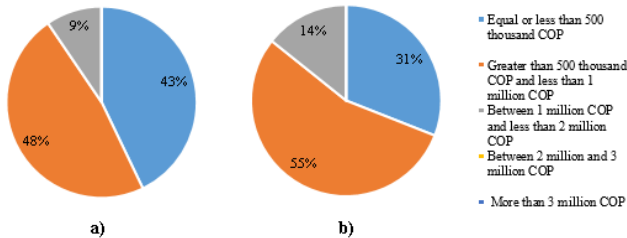


Figure 22. Chart for monthly income: a) Before the training course; b) After the training course

People earned between 500.000 and 1 million pesos (COP) in their last jobs which is very close to a minimum salary in Colombia. Additionally, 43% had income lower than 500.000 pesos so their economic situation was quite precarious. After receiving the training course, the percentages for monthly income increased significantly since the training course allowed them to use new tools in their jobs thereby increasing their earnings as seen in Figure 22.

Communication and Information Technologies

Frequency of using a desktop computer, laptop or tablet

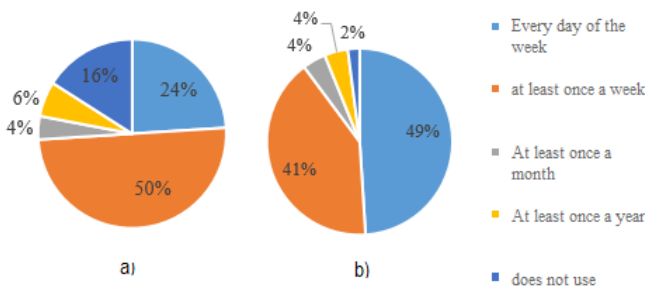


Figure 23. Chart for using technological devices: a) Before the training course; b) After the training course

The frequency of using technological devices grew by 25% after the course. The non-use of such devices was reduced by 2% as revealed in Figure 23.

Frequency of using the internet

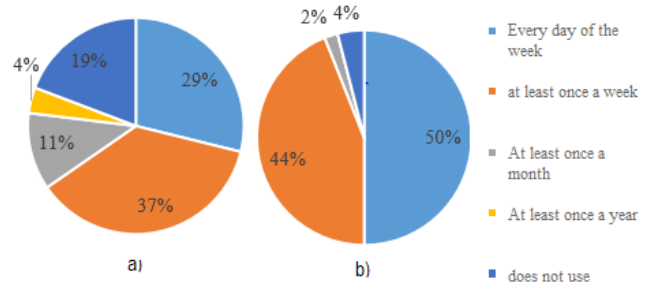


Figure 24. Chart for internet use: a) Before the training course; b) After the training course

Figure 24 indicates that the frequency in internet use grew by 21% and the non-use was reduced by 4%

Places where the internet is used more often

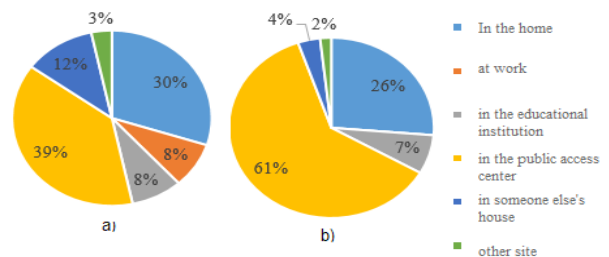


Figure 25. Chart for places to use internet: a) Before the training course; b) After the training course

The growth related to the use of internet in public places was considerable according to Figure 25.

People who have a smartphone

Figure 26 shows that smartphone use grew by 14% after the training session. This evidences that the knowledge gained in said session helped to promote the use of these technologies.

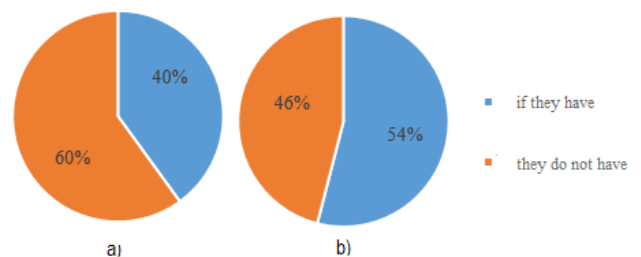


Figure 26. Chart for people who own a smartphone: a) Before the training course; b) After the training course

Frequency of using smartphones

The frequency of using smartphones was increased by 19%. This trend is proportional to the increase of people that started using this type of technology due to the knowledge acquired during the training session as Figure 27 shows.

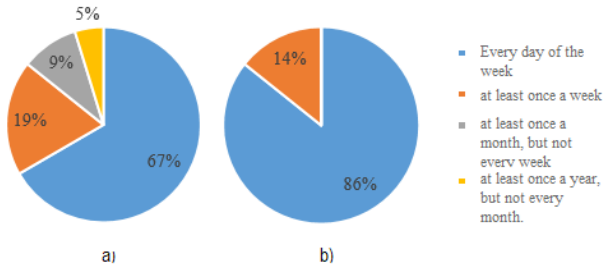


Figure 27. Chart for using smartphones: a) Before the training course; b) After the training course

Most frequent type of smartphone use

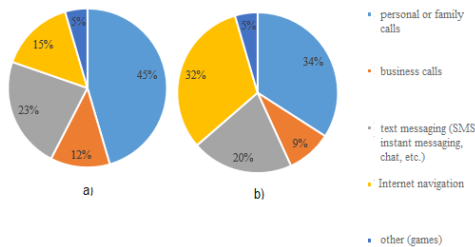


Figure 28. Chart for type of smartphone use:

The use of smartphones for online browsing grew by 17% after the course. This reveals an increased use in digital tools during the everyday life of the attendees evidenced in Figure 28.

Offered courses.

For this item, each area of study and promotion included in the website was considered such as the preference in the use of certain tools and the changes in the individuals after they were trained.

Courses taken by the trainees

The most popular courses were Basic Word, Basic Windows, Social networks and WEB tools, showing a great interest in the basic 101-type courses offered in the website. The more complex courses showed less interest as shown in Figure 29.

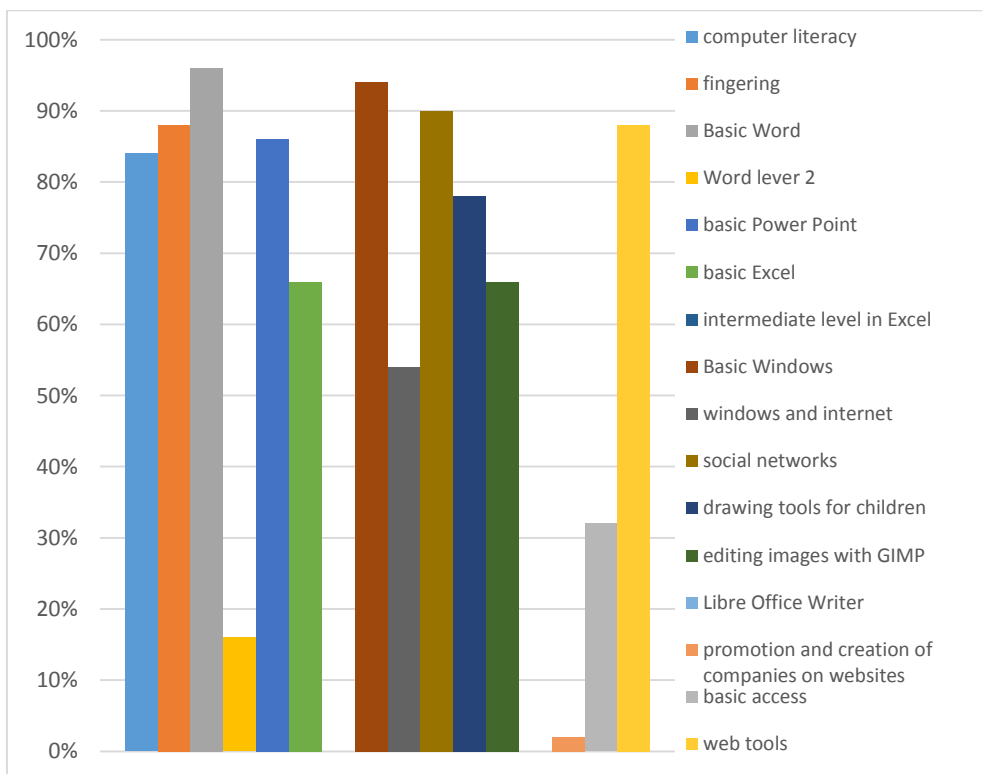


Figure 29. Chart for courses taken by the attendees in the website

Activities learned and performed during training

Figure 30 illustrates the activities from which the participants learnt the most and used afterwards were related to the movement of files and folders in the computer through the copying and pasting functions with a 100% achievement rate of these tasks. A considerable percentage was also seen in the transmission of different files through electronic media. The inclusion of elements into a computing system had low learning percentage.

According to the data thrown in Figure 31, most people showed more interest in learning how to use the internet after the course in order to find information on different matters both for educational and entertainment purposes. This contrasted with the use of internet for searching information on law services and finding jobs.

Figure 32 showed an improvement in personal aspects including the emotional, physical and educational areas as well as a slight improvement referring to social and economic welfare.

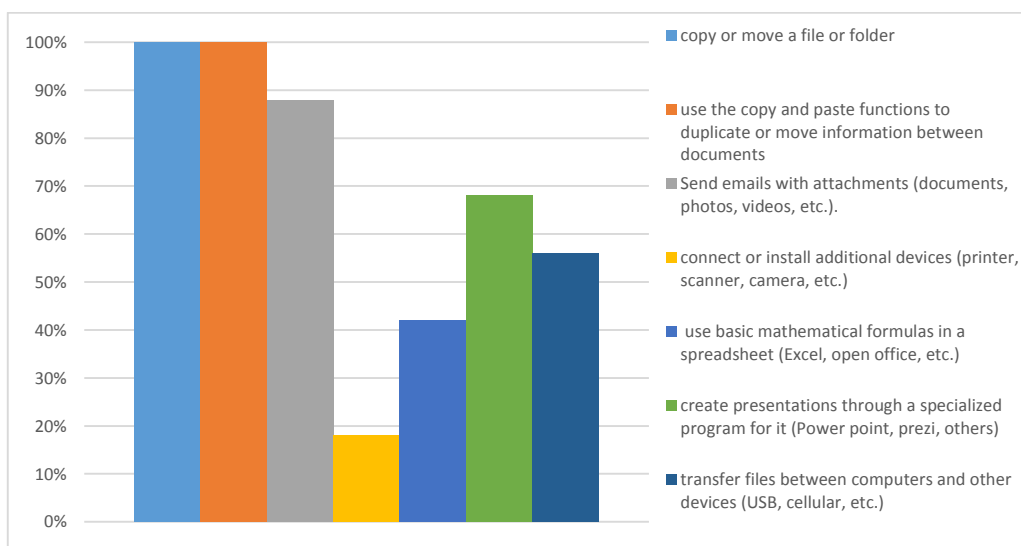


Figure 30. Chart for activities learnt by attendees

Services and activities learnt by using the internet after the training session

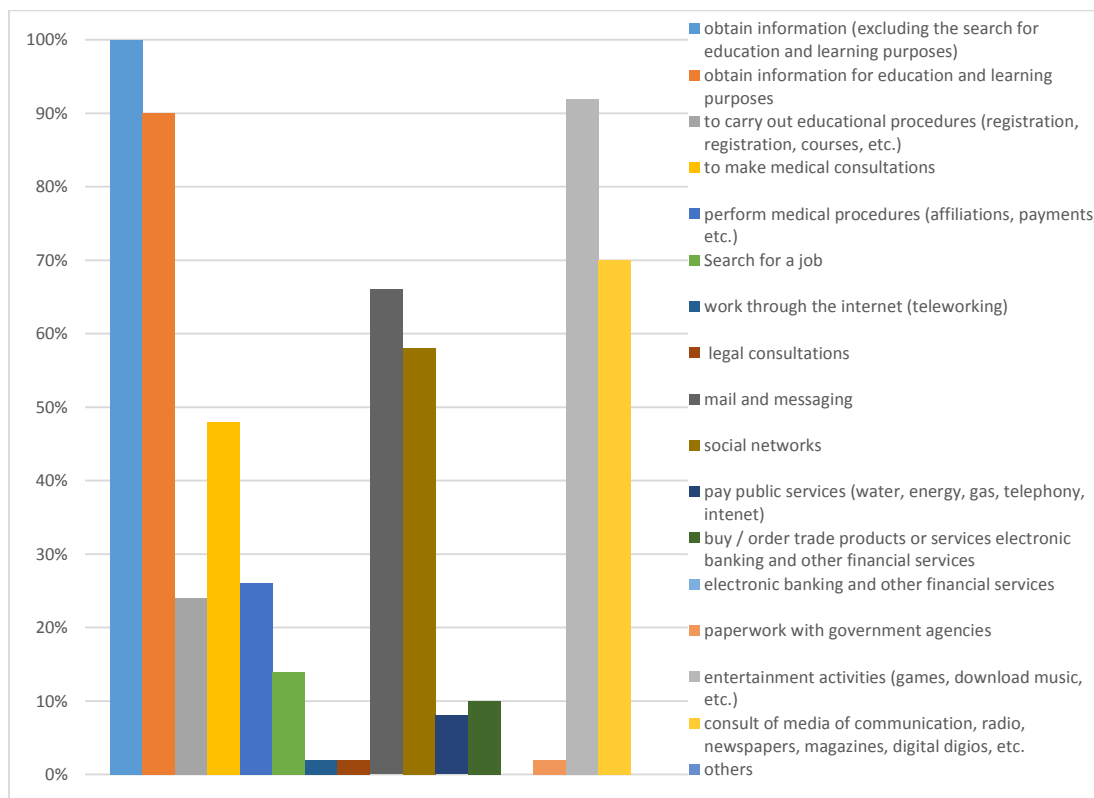


Figure 31. Chart for activities and services learnt by using the internet

Perception of the improvement of the quality of life of the participants

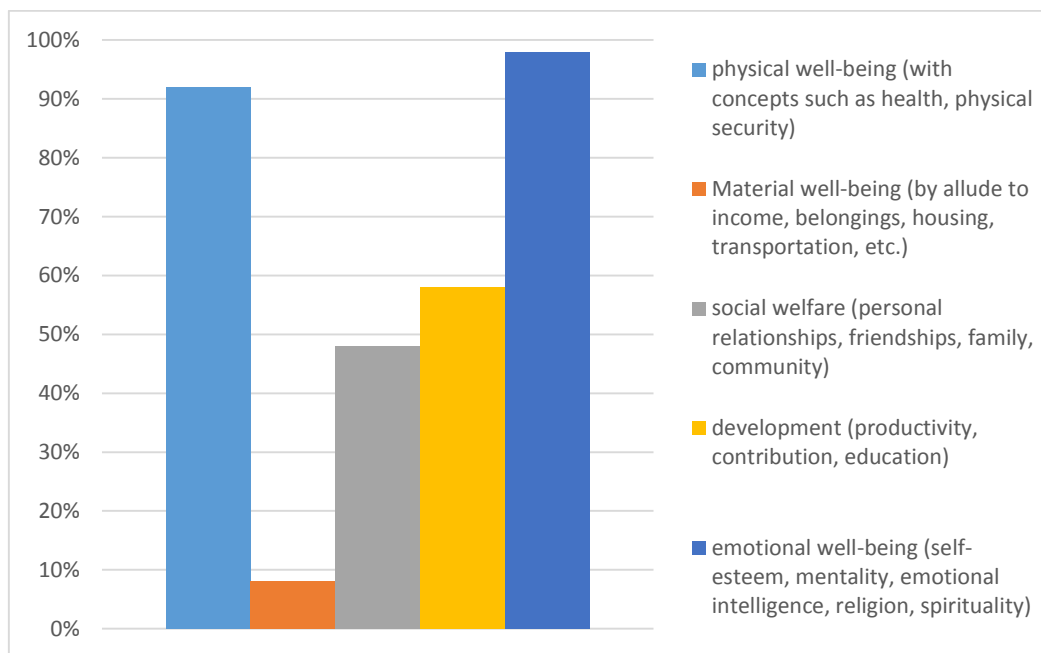


Figure 32. Chart for the improvement of the quality of life of the participants

DISCUSSION OF RESULTS

This type of websites serves as an integration method focused on the community in subjects related to information and communication technologies which leads to improve not only the educational aspect of using digital tools but also the contribution to welfare that would not have been possible in low-income populations.

Most of the people participating in these websites are elderly so the methods adopted for teaching were a bit out of focus since some users had many doubts over previously discussed topics. This type of people finds it harder to learn and a specific methodology should be considered to teach to the elderly. However, there was a positive impact from specific family-related scenarios (Federación Española de Sociología., 2015) since elderly participants managed to communicate better with their relatives which led them to feel better emotionally since the communication became more dynamic. This confirms that, according to the research, participating in activities related to computing causes individual changes at a cognitive level and self-awareness matters such as self-esteem, independence, interest and prospects for the future. It also opens the possibility to social opportunities and communication with family (Prado, 2013).

To increase the participation of younger people, some courses should focus more on their interests as well as training sessions for advanced uses of ICTs. Additionally, these sessions should be aimed at population under the age of 14 which could replicate such experiences with their families, in particular with their grandparents with patience and love.

For the implementation of digital projects directed towards similar localities, some studies should be carried out beforehand that consider cultural aspects of the community,

which generates programs that attract even more the attention of the users and would make these projects even more successful.

People who could still perform some type of job and were unemployed at the moment showed significant improvement in the ability to look for jobs. This was evidenced in considerable increase in their income after the training session. Furthermore, people were interested in gaining new knowledge by showing that online browsing can help them take virtual courses related to their interests.

One of the aspects to point out is that each center where the courses were given are well located which eased the mobility of the local inhabitants to said centers. This shows a good planning strategy made by the project executors in terms of choosing adequate and functional locations.

CONCLUSIONS

The viability of similar websites in areas that resemble the locality of Ciudad Bolívar is an educational and social improvement option that can lead to changes in such communities. Nonetheless, it is necessary to keep in mind different strategies that improve the participation of children and teenagers as well as the elderly. Hence, a study must be made in the punctual interests of these groups to increase their participation in these types of programs.

There was an increase in the learning of different topics of interest for the attendees based on the skills gained on online browsing, stating an element of continuous learning in these portals and improving quality of life. Another important aspect that showed growth was the communication of the elderly with their youngest relatives since the newly obtained skills

motivated the use of technological devices, lifted their self-esteem and strengthened their family bonds.

REFERENCES

- [1] Blanca, M., & Liberta Bonilla, E. (2007). Impacto, impacto social y evaluación del impacto. *Acimed*, 15(3). Retrieved from http://bvs.sld.cu/revistas/aci/vol15_3_07/aci08307.htm
- [2] Ciudad Bolívar Localidad Digital abre las puertas nuevamente para ofrecer conocimiento a los habitantes de esa localidad de Bogotá. (2011). Retrieved from <http://www.mintic.gov.co/portal/604/w3-article-2420.html>
- [3] Cruz, P. A., Macías, M. A., & Gaona, G. M. (2015). Impacto del uso y apropiación de tic en poblaciones marginadas. *Visión Electrónica*, 9(2), 215–227. <https://doi.org/10.14483/22484728.11030>
- [4] Federación Española de Sociología., L. (2015). *El impacto de las TIC en el cambio familiar en España. Revista Española de Sociología* (Vol. 0). Retrieved from <https://recyt.fecyt.es/index.php/res/article/view/65370>
- [5] Gómez González, J., Durlan, C., Cáceres, S., & Aleixandre, G. (2017). La Evaluación del Impacto Social de la Tecnología en España. Retrieved from http://bdigital.uncu.edu.ar/objetos_digitales/6293/gomezgonzalezponmesa27.pdf
- [6] IEEE (2014). Conferencias y Eventos. Retrieved July 23, 2018, from <http://www.ieee.org.co/evento.php?id=40>
- [7] Kate Travis. (2010). Algunos consejos sobre el impacto | Blog de carreras científicas. Retrieved July 10, 2018, from <http://blogs.sciencemag.org/sciencecareers/2010/05/some-advice-abo.html>
- [8] Universidad del Rosario. (2009). Localidad de Ciudad Bolívar. Retrieved July 9, 2018, from <http://www.urosario.edu.co/Universidad-Ciencia-Desarrollo/ur/Fasciculos-Anteriores/Tomo-IV-2009/Fasciculo-3/ur/Localidad-de-Ciudad-Bolivar/>
- [9] Fernández Polcuch, E. (2001). La medición del impacto social de la ciencia y tecnología. Retrieved from http://www.ricyt.org/manuales/doc_view/62-la-medicion-del-impacto-social-de-la-ciencia-y-tecnologia
- [10] NSES - La tecnología influye ... (2016). Retrieved July 10, 2018, from http://www.project2061.org/publications/rsl/online/COMPARE/NRC/NRC2BSL/5_8/NSES184.HTM
- [11] Palza (2106). Informe de gestion.
- [12] Prado, S. A. (2013). Impact of ICT in the elderly in asturias: satisfaction and self concept improvement. Retrieved from <http://www.edutec.es/revista/index.php/edutec-e/article/viewFile/325/63>
- [13] Serje, M. (2017). Social relations: A critical reflection on the notion of social impacts as change. *Environmental Impact Assessment Review*, 65, 139–146. <https://doi.org/10.1016/J.EIAR.2017.04.006>
- [14] Velásquez, A. M. V. (2017). Aproximación al uso de las TIC en población vulnerable. Observación de Aulas Abiertas y Parques Biblioteca. *Revista Q*, 3(6). Retrieved from https://revistas.upb.edu.co/index.php/revista_Q/article/view/7816