ICT ADOPTION FOR WOMEN´S DEVELOPMENT IN MEXICO

A Doctoral Thesis to be submitted to the Doctoral Program in Information and Knowledge Society to fulfill the requirements for the degree of Doctor of Philosophy

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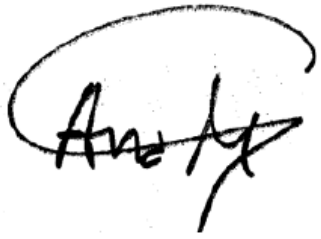

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Acknowledgments

This research took place between 2015 to 2020 and was possible thanks to the support of five strategic partners: (1) the National Digital Strategy Coordination in the Office of the President, under the responsibility of Alejandra Lagunes Soto Ruíz during the period of 2015-2017 and my leadership during 2018. (2) PROSPERA, the Federal Cash Transfer Program of the Federal Government in Mexico, under the Ministry of Social Development during the period of 2015-2018, under the responsibility of Paula Angélica Hernández Olmos, Technical Advisor Angelica Castañeda. (3) the Deputy Ministry of Telecommunications during the period of 2015-2018 under the responsibility of Monica Aspe Bernal from 2015-2017 and Edgar Olvera during 2018, the Coordination for Knowledge Society and Information under the responsibility of Javier Lizárraga Galindo during the period of 2015-2018. The Coordinator of Puntos México Conectado, Daniela Rivera during the period of 2015-2018, The Director of the PMC in Ecatepec Fernando Barrios and the Course Facilitator Claudia Alcántara. (4) the Digital Government Unit in the Ministry of Public Administration during the 2015-2017 under my leadership and; (5) ENOVA, a Social Enterprise that manages a network of 70 Digital Centers in the State of Mexico and collaborates with Puntos Mexico Conectado (PMCs) digital inclusion centers in content and curricular design during the period of 2015-2018, under the leadership of Raúl Maldonado, Mois Cherem, Jorge Camil, and ENOVA´s pedagogue Belen Carranza.

Due to the importance of ICT research to digital inclusion efforts in Mexico and the global community, these institutions agreed to facilitate the necessary support to develop the study. This inter-institutional collaboration allowed the use of PMC at Ecatepec in the State of Mexico, enabling the invitation of women from PROSPERA Federal Program to participate in the study; the adaptation of learning curricula at the PMC in order to meet research objectives; and the provision of invaluable feedback from different professionals whose areas of expertise aligned with the objectives of this research project.

ENOVA is part of the *maker culture*, characterized by its pursuit of capabilities development and knowledge that helps understand how information technology works. For this purpose, this movement relies on a wide range of activities that combine curiosity, innovation, and creativity, such as programming, design and 3D printing, animation, multimedia editing, music mixing and editing, video games, robotics, app creation, photo editing, stop-motion, sensor use, and microcontrollers (Cobo, 2016). ENOVA provides educational courses in these areas in its broad network of telecenters under the name *Red de Innovación y Aprendizaje* or RIA (ENOVA, 2016).

ENOVA has shared its expertise on how Information and Communication Technology (ICT) capabilities are more effectively taught. At the same time, it has provided detailed information

regarding its course content, its methodology for the development of curricula, and impact on learners. In respect to the latter, a set of interviews was held with one of ENOVA's most experienced educators and facilitators, Belen Carranza, who provided valuable insights for the design development of this research.

The Ministry of Communication and Transport (SCT) provided access to Punto México Conectado facilities and evaluation scores for each participant in this research. Whole-day visits to the Punto México Conectado allowed me to have first-hand experience of digital inclusion activities and learning experiences.

PROSPERA assisted with the selection of potential beneficiaries living in the Punto México Conectado area, where the research was undertaken. This process identified 2,500 potential beneficiaries. At the same time, PROSPERA advised on how to invite people of specific socioeconomic characteristics to a free public program such as PMC.

The Ministry of Public Administration (SFP) and the National Digital Strategy Coordination facilitated the necessary collaboration space among public entities related to this study, as well as relevant regulatory frameworks that encourage the development of evidence-based policy to enhance the implementation of the National Digital Strategy.

This research report was completed under the conditions of the COVID-19 pandemic, where months of social restrictions and confinement had resulted in a global economic recession. The only way for millions of people to continue working, communicating with friends and family, and attending school was through digital technologies and the Internet. In this context this research will provide evidence of people's adoption of ICT in their daily lives and the positive impact of this on self-confidence, entrepreneurship, personal finance, and personal development.

Special recognition

My sincere gratitude to Dr. Ana María González Ramos, my thesis director, for her support, continuous guidance and follow up, which made it possible for me to complete this body of research. I would also like to thank PhD. Carlos Ivan Moreno Arellano – second thesis director - and Dr. Maximo Matus Ruiz member of my thesis committee for all their guidance and direction. My gratitude to Jorge Sánchez and Ricardo Uriegas, digital inclusion analyst from 2015 to 2018. To my family, thank you so much for providing me with a sense of collective action for the well-being of people and for always encouraging me to pursue what I enjoy in life.

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Summary

The objective of this research is to explore and describe if and how the acquisition of digital capabilities enhances development opportunities for women living in impoverished communities. Using mixed methods of descriptive and qualitative tools, the research included a case study involving 64 randomly selected women to participate in a set of five digital inclusion courses at the digital inclusion center “Punto México Conectado” (PMC) of Ecatepec, Estado de Mexico. The objective was to identify women's motivation to participate in a digital inclusion experience, their process of ICT skills acquisition, whether they applied ICT into their daily life, and whether this application translated into better development opportunities for them.

Findings can be summarized as follows: Firstly, Internet and ICT usage among vulnerable women tends to focus on covering family needs, like helping children with homework or monitoring teen activities online, rather than covering their own needs. Secondly, motivation to participate in the courses was associated with reaching independence in usage, since most participants depended on others to explain to them how to use their computing devices, which were mostly mobile. Thirdly, the support of family and close friends was key for these women in agreeing to participate in the Digital Inclusion Courses.

Fourthly, although motivation was high, dropouts occurred with an average of three women missing each course. Reasons shared by the participants were mostly related to gender roles, such as having to leave the course to take care of their children and elders, health issues, and a macho culture that explicitly prohibited participants to attend the courses. Another reason, not related to gender stereotypes, was job opportunities and/or having to take care of their entrepreneurial activities.

Fifthly, women who finished the program accomplished independence and autonomy in usage of ICT for their own interests and needs, not only those of their families. Learning experiences increased self-confidence and self-esteem, empowering women to accomplish relevant ICT usage according to their own priorities, such as enhancing their entrepreneurial activities. Key success factors in the experiment were the PMC Learning Model that comprised the quality content and premium facilities, and a professional facilitator leading the course according to the group context and participants’ educational background.

A final set of policy recommendations included: Firstly, to implement digital skills acquisition as part of the social program’s conditionality factors. Secondly, to integrate as part of the Social Protection Program content associated with gender stereotypes. Thirdly, to widen access to PMC curricula through different learning channels, like MOOC courses, TV tips, micro-videos and text messaging campaigns with tips on digital skills and personal finance. Fourthly, to launch a permanent communications campaign to promote usage of free Wi-Fi spots. Fifthly, to design

on-site dissemination of PMC curricula through facilitators' participation at different Social Protection Program facilities in order to increase women's participation in digital inclusion activities.

Sixthly, to incorporate a financing and insurance mechanism as part of the Social Protection Program to cover for personal computer devices to support participants in accessing learning content. Seventhly, to design a multi-stakeholder financing mechanism to maintain investment in highly qualified human capital and quality infrastructure in the PMCs. Eighthly, in a COVID 19 context, to accelerate the acquisition of digital capabilities by women, children and elders. Ninthly, to scale bootcamps with successful learning models and job placement strategies like "Laboratoria" which trains women from impoverished communities on entry level programming skills; and tenthly, continuously evaluate and redesign public policy related to digital inclusion strategies.

Although government programs studied in the research process changed their names and scope, recommendations apply to current and future ICT for Women's development programs.

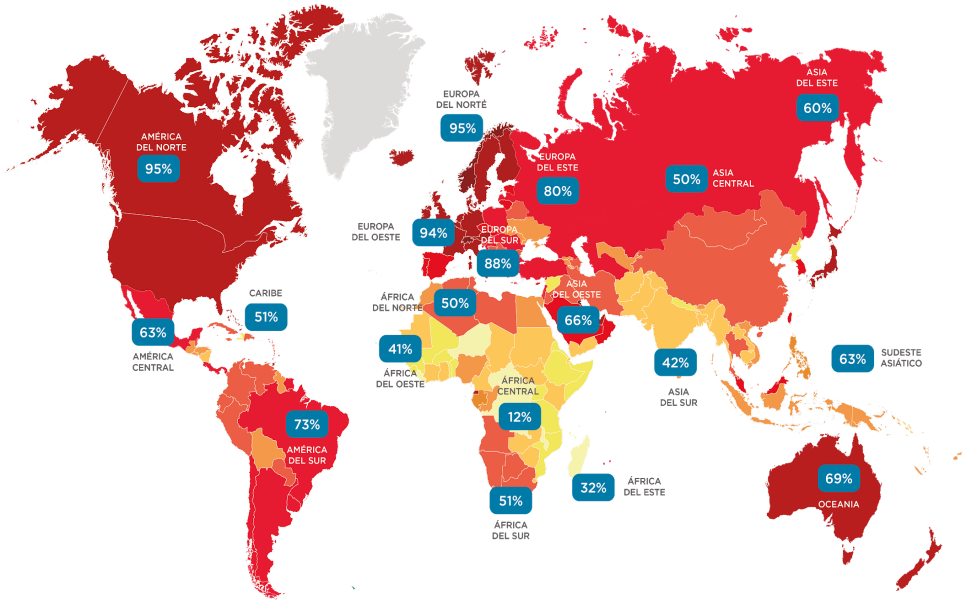
Chapter I. Introduction

1.1 Digital inclusion as driver of women's development

Digital technologies have changed the way people live, work, learn and interact. The new global order, based on the broadening of Information and Communication Technologies (ICT), has generated new development opportunities for some, while also fostering new types of exclusion and disparity among people and countries (Hewitt, 2001).

According to a recent "We Are Social Report", there were 4.38 billion internet users in 2019, representing 57% of the world's population; 3.4 billion people (45% of world's population) were active social media users, and 5.1 billion (67% of world's population) had at least one cellular phone (IMF, 2019). Internet access is not equal among countries and geographic regions. Figure 1 represents in color scale the Gross Domestic Product (GDP) per capita per country, indicating in the lighter tone the lowest levels of GDP/Capita, and in the darker tone, countries with the highest GDP/Capita. Blue boxes show the percentage of internet coverage per region. As Figure 1 shows, internet coverage in Latin American and the Caribbean is asymmetrical: coverage in southern countries stands at 73%, while in Central America and the Caribbean it stands at 63% and 51% respectively.

Figure 1. Internet coverage and GDP/Capita



Note: IDB. (2020). IDB Map on Internet Coverage and Economic Growth, 2020.

This visualization suggests greater investment in connectivity in countries where GDP per capita is higher. Many studies have proven the correlation between access to ICT and economic growth

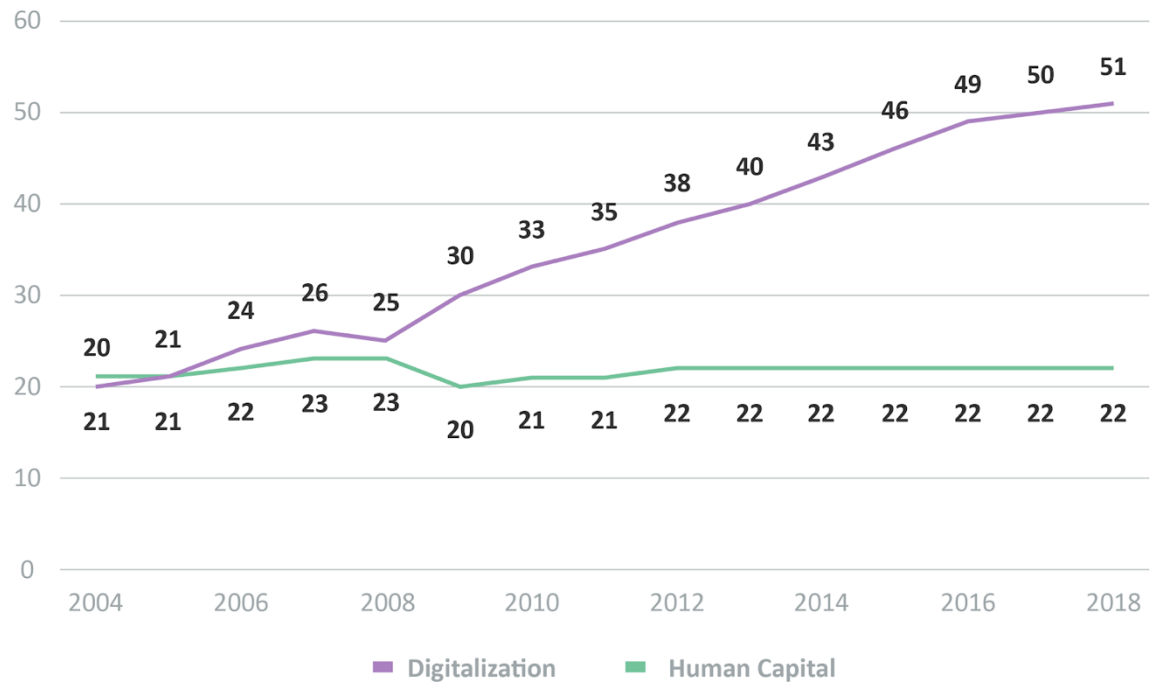
(May, Waema & Bjåstad, 2014). According to economic theory, an abundance of information industry yields more competitive economic markets. Advanced ICT infrastructure enhances the number of digital participants in all sectors of a country's economic, social, and political system (Meso, Datta & Mbarika, 2006).

Although ICT drives socioeconomic progress in developing countries, access to ICTs cannot be a solution to poverty in itself, but a set of instruments oriented to reach global development and poverty reduction goals (UNRISD, 2010)[1]. As Zheng (2009, p. 79) states: "rather than maximizing access to technology, ICT for development should take into account the effective use of ICTs to enhance both well-being and agency freedom of individuals." To this end, countries aiming at poverty reduction through ICT need to conceive new applications and digital inclusion models using the increase of ICT channels, such as mobiles and telecenters (Hewitt, 2001; Heeks, 2008).

However, Latin American countries have consistently under invested in the acquisition of digital competencies – human capital – compared to their level of investment in ICT infrastructure. According to the Economic Commission for Latin America and the Caribbean (ECLAC) and the Development Bank of Latin America (CAF), the region's digitization index has grown 155% in the last 14 years, while its human capital index has risen just 1% as shown in Figure 2 (ECLAC & CAF, 2020).

[1] According to the United Nations Research Institute for Social Development "a fundamental precondition for poverty reduction is a pattern of growth and structural change that generates productive employment, improves earnings and contributes to the general welfare of the population…Poverty and inequality must thus be considered as interconnected parts of the same problem. Poverty is closely related to various dimensions of inequality, including income status, gender, ethnicity and location. And inequalities are manifest across several dimensions, such as employment, earnings and access to social services" (UNRISD, 2010, p. 4).

Figure 2. Digitalization/Human Capital Index 2004–2018, Latin America and the Caribbean



Note: ECLAC. (2020). Las oportunidades de la digitalización en América Latina frente al Covid-19. [eBook] (1st ed.). United Nations. Retrieved from: https://repositorio.cepal.org/bitstream/handle/11362/45360/4/OportDigitalizaCovid-19_es.pdf

The so-called digital divide[2] (Warschauer, 2002) is a matter of not only the unavailability of ICT but also the social, political, institutional, and cultural contexts that shape people's inability to value and use them effectively (Madon et al., 2009).

When I started this research project in 2015, only 57.4% of the population in Mexico were Internet users and 44.9% had a computer at home, according to the National Survey on the Availability and Use of Information Technologies in Homes (ENDUTIH, 2019)[3]. Of those with a computer at home, 67.2% did not have Internet service because of lack of economic resources to pay for the service. According to an OECD report from 2015, Mexico was among the most expensive countries in broadband prices per megabit per second.

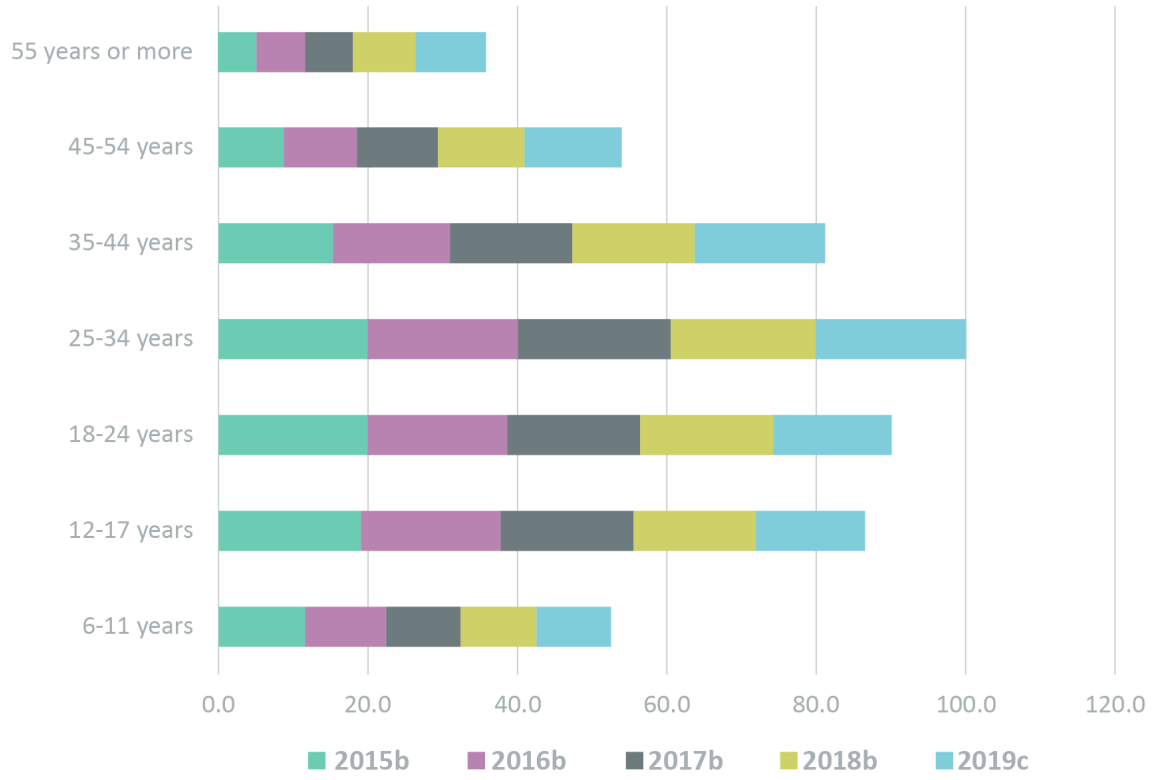
By 2019, 70.1% of the Mexican population were Internet users (ENDUTIH, 2019). The three main means of connecting to the Internet were: smartphone, with 95.3% connected; laptop, with 33.2%,

[2] According to Warschauer "The digital divide refers to social stratification due to unequal ability to access, adapt and create knowledge via the use of information and communication technologies" (2011, p.1). In addition the concept of digital divide unhelpfully "attaches overriding importance to the physical availability of computers and connectivity, rather than to issues of content, language, education, literacy, or community and social resources" (Warschauer, 2002, p. 5).

[3] The National Institute of Statistics and Geography (INEGI) is in charge of the ENDUTIH survey.

and desktop, with 28.9%. The main activities of internet users corresponded to entertainment (91.5%), obtaining information (90.7%), and communication (90.6%). The most common network connection problems were identified as slow information transfer (50.1%), service interruptions (38.6%), and excess of unwanted information (25.5%). Just over half (50.7%) of internet users cited lack of economic resources for the absence of Internet services at home. In four years, this percentage had decreased by five percentage points. In terms of internet users, the four-year increase was 12.7%; however, user distribution among the population concentrates in young adults 25–34 year-olds (100%), leaving behind the older population. 50% of 45–54 year-olds are internet users, compared with less than 40% of those 55 years and older, as shown in Figure 3.

Figure 3. Internet users by age group 2015–2019 in Mexico



Note: ENDUTIH. (2015). Retrieved from: http://goo.gl/hd0A9N, and INEGI. (2019). Retrieved from: https://www.inegi.org.mx/programas/cntaippdpe/2019/#:~:text=Presentación,Censo%20Nacional%20de%20Transparencia%2C%20Acceso%20a%20la%20informacion%20Pública%20y,el%20INEGI%20en%20dichas%20materias.

To tackle the digital divide in Mexico, the federal government under the President Enrique Peña created the National Digital Strategy Coordination. The office coordinated with relevant agencies and entities in the preparation, monitoring and periodic evaluation of the implementation of the National Digital Strategy; it also promotes the adoption and development of information and

communication technologies, digital government, innovation, openness, transparency, collaboration and citizen participation to evolve Mexico into the knowledge society (DOF, 2013).

On December 2nd, 2012, all political parties signed a major political agreement called *"Pacto por México"*, a Pact for Mexico[4]. The main agreement of the Pact was to deepen the democratic process based on three guiding pillars: 1. The strengthening of the Mexican State; 2. The democratization of the economy and politics, as well as the extension and effective application of social rights; and 3. The participation of citizens as fundamental actors in the design, execution and evaluation of public policies (Pacto por Mexico, 2012).

Major structural reforms were passed in congress within each of the pillars. One was the telecommunications reform approved in 2013, with significant changes in terms of competition rules and institutionalism by giving autonomy to the regulatory body, and the tender of more open national television networks. The reform also mandated the revision of telecommunications sector legislation into a single law, and the adoption of measures to promote competition in television, radio, telephony and data services. Recognition of the Internet as a fundamental right is stated in Article 6 of the constitution, as well as the obligation of the state to deploy broadband in public places, and to design, implement and evaluate a "Digital Inclusion Policy"[5] to make the benefits of an information and knowledge society available to all (*Ley Federal de Telecomunicaciones y Radiodifusión*, 2014).

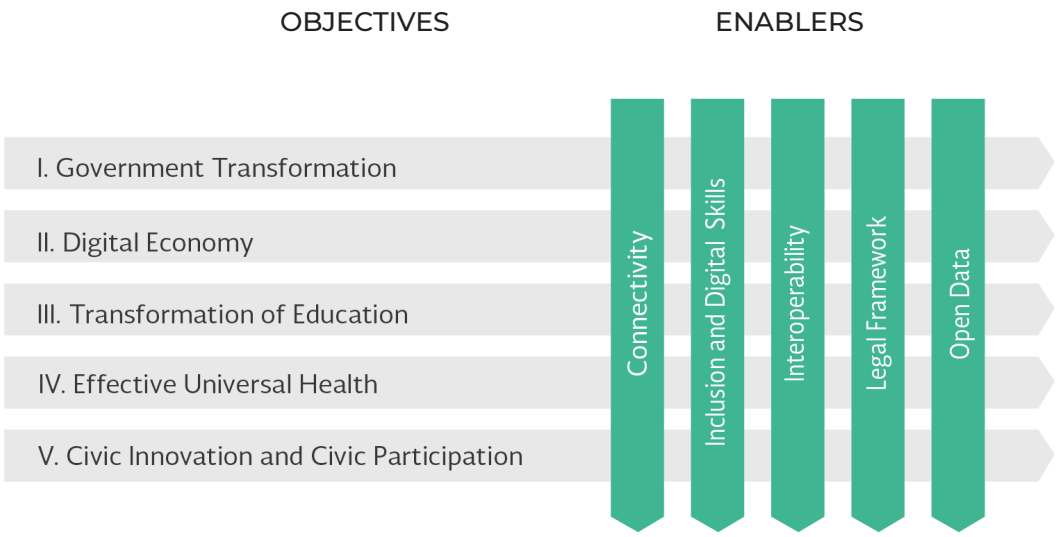
To comply with this mandate, the president launched on November 25th, 2015, the National Digital Strategy (NDS).[6] The objective of the National Digital Strategy was to facilitate ICT access and promote its use in the daily life of society and government to the economic and social benefit and development of the country. The strategy was designed according to five objectives and five enablers and 69 action lines to be executed during 2012–2018. It was also part of the National Development Plan, the major policy instrument to conduct government priorities during every presidential period. The NDS was published as part of the "Program for a Close and Modern Government 2013–2018" in the national official gazette on August 30th, 2013, making it a transversal mandate to all government entities (DOF, 2013).

[4] The Pact for Mexico is a political agreement signed by: Enrique Peña Nieto, President of the United Mexican States 2012-2018; Jesús Zambrano Grijalva, National President of the Party of the Democratic Revolution; María Cristina Díaz Salazar, President of the Executive Committee of the Institutional Revolutionary Party and Gustavo Madero Muñoz, National President of the National Action Party.

[5] The complete text of the law is available at Cámara de Diputados del H. Congreso de la Unión. Ley Federal de Telecomunicaciones y Radiodifusión (2014). Retrieved from: http://www.diputados.gob.mx/LeyesBiblio/pdf/LFTR_240120.pd

[6] The main enabler to achieve this objective is the expansion of connectivity by the action plan called México Conectado, which seeks to guarantee the constitutional right of access to broadband Internet service (the 6th article of the Constitution).

Figure 4. Mexico's National Digital Strategy Objectives and Enablers



Note: DOF. (2013) Program for a Close and Modern Government 2013-2018. Retrieved from: http://www.dof.gob.mx/nota_detalle.php?codigo=5312420&fecha=30/08/2013

The objective of government transformation was to build a new relationship between society and government, focused on the citizen's experience as a user of public services, and adopting the use of ICT to transform how government delivers digital services. Objective number two was to develop a digital economy ecosystem that contributes to national prosperity through assimilation of ICT in economic processes, to enhance productivity, economic growth and creation of formal jobs. Objective number three looked to integrate ICT into educational processes in management and the training of teachers, and in the dissemination and preservation of culture and art, to allow full population inclusion in both the information and knowledge society.

Objective number four looked to generate a comprehensive digital health policy that took advantage of opportunities offered by ICT. The objective had two priorities: on the one hand, increase coverage, effective access and quality of health services, and, on the other, achieve greater efficiency in the use of current healthcare infrastructure and resources. The fifth objective considered harnessing ICT to promote citizens participation through public consultations, surveys, and discussion forums.

The first enabler, connectivity, focused on network development and expansion of a better infrastructure in the national territory; expanding the capacity of existing networks, and the development of competition in the ICT sector to stimulate the reduction of prices. The second enabler, digital inclusion and skills, refers to the equitable development of skills to operate digital technologies and services (taking account of both social and gender equity). The third enabler,

interoperability, refers to technical, organizational, governance and semantics necessary in technological systems to share information and transactions. The fourth enabler, legal framework, refers to the harmonization of regulations with the purpose of fostering an environment of favorable certainty and trust for the adoption and promotion of ICT. The fifth enabler, open data, refers to the availability of government information in useful and reusable formats by the general population, to foster civic entrepreneurship and drive transparency, improve public services, and ensure greater accountability.

Under the enabler of connectivity and digital inclusion, one of the first actions saw the development of a network of 32 digital inclusion centers, or telecenters, called *Punto México Conectado* (PMC)[7], in the surroundings of the capital cities of each of the 32 federal states. The purpose of the Centers was to train people of all ages, including seniors, in the use of digital technologies and technological innovations. The project consisted in the design, planning and operation of technology access points through the PMC with the aim of bringing digital skills training closer to impoverished urban communities. The PMC provided users with services, courses and training that allow them to integrate into the digital age and thereby acquire capacities and skills that facilitate opportunities within various institutions of the public and private sectors (SCT, 2018, p.8).

To accomplish its objective, the PMC program was based on four pillars:

a) Training and digital education: training is offered throughout life, focused on community management, knowledge reinforcement and necessary skills for the population.

b) Science, innovation and technology: the centers have spaces created for exploring problems, gathering information, developing ideas and creativity.

c) Children: there are interactive spaces for children to play, experiment, solve problems and develop skills.

d) Culture: space is set up for cultural exhibitions and activities from the community, government entities, and the site operator.

According to the program´s guidelines, all PMC buildings follow a set of standards in terms of required length for construction, interior design and layout, in order to promote the same digital inclusion and learning experience in all locations, while at the same time contributing to the enhancement of the urban landscape. The PMC program was launched in March 2015 with the PMC of Tlaxcala. The PMC program was recognized by the World Summit on Information Society as one of the best global digital inclusion programs in 2017 (Secretaría de Comunicaciones y Transportes, 2020). A set of photos of the PMC selected for this research are available in ANNEX B.

[7] *Punto México Conectado* is an initiative from the Mexican National Digital Strategy that aims to tackle digital divide in Mexico by the provision of ICT access and learning and education curricula (such as digital literacy, innovation and entrepreneurship programs) to enhance the productivity and effective use of ICTs.

Figure 5. Mexico´s PMC Users - Photo winner of the 2017 WSIS Prizes

Note: ITU. (2017). Photo Contest | WSIS Forum 2017. [Figure] Retrieved September 12, 2020, from https://www.itu.int/net4/wsis/forum/2017/PhotoContest

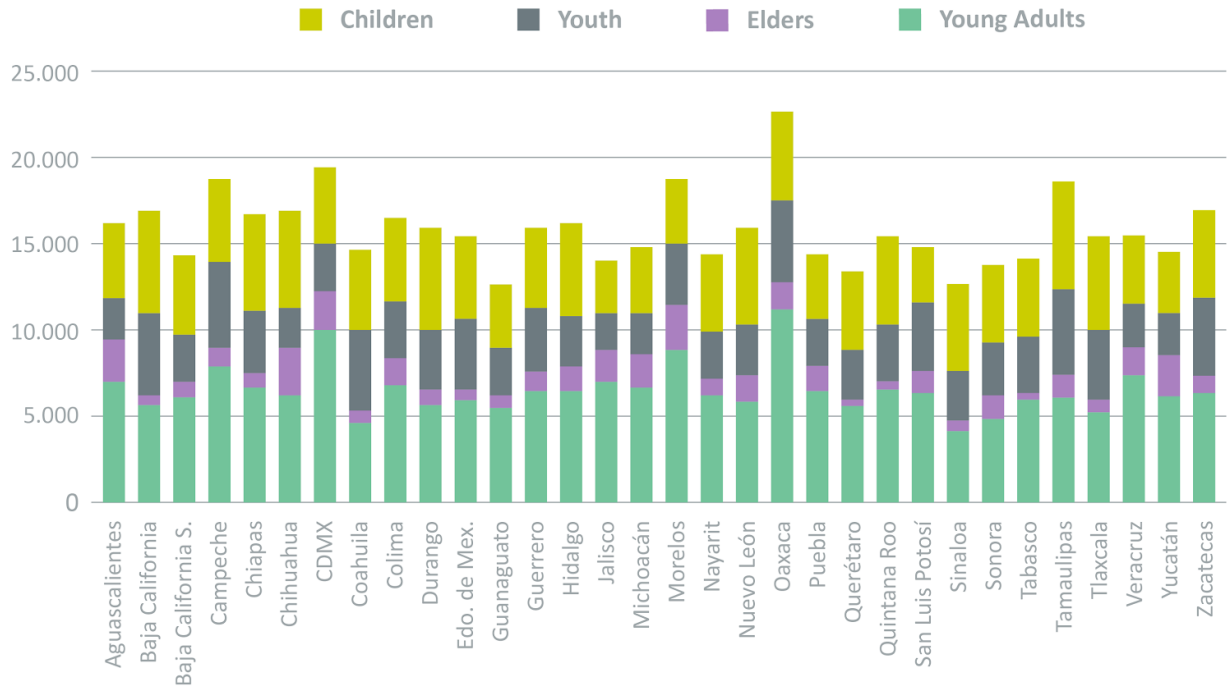
As part of the digital inclusion initiatives of the Mexican NDS, an exploratory policy consideration was the integration of digital skills development as part of the most important social program in Mexico, "PROSPERA", so-called due to the Program's focus on women as recipients of conditional monetary transfers. Different pilot projects took place during the 2012–2018 government period, such as providing a tablet to women to access different learning content specially related to personal finance (RetoDiario, 2020), and a mobile medical chatbot to follow up pregnancy development in women living far from medical services (Secretaría de Salud, 2020).

An important aim of this research is to describe and explain how and to what extent the acquisition of informational digital capabilities impacts the development of women living in urban impoverished communities. Considering the PMC purpose and their strategic location nationwide, I designed this study with the consideration of the opportunity to link the PMC program with women beneficiaries of PROSPERA. The PROSPERA program was a conditional monetary transfer that required beneficiaries to take children to school and comply with an age and gender specific health protocol.

Educational services for youngsters were subsidized with an additional transfer based on the gender and grade level of this group of population attending school (Levy, 2008). In 2015, beneficiaries totaled 6.1 million people (PROSPERA).

Following changes in government in December 2018, the PROSPERA program was restructured in 2019 into a set of different programs. According to a recent analysis published by ITESO University in Mexico, the current program still focuses on people by geography (rural, urban), economic status (poor or extreme poverty), school enrolment, and age (in the case of older people under the universal pension program). The new program is named "BIENESTAR" and has structured cash transfers in the form of scholarships, "*Beca Bienestar Benito Juarez*", per child enrolled at school. The health component has been replaced with the Program of universal access to health and medicines, and the nutrition supplement with a higher amount of cash transfer within the *"BIENESTAR*" scholarship (Jaramillo, 2020). The PMC program was renamed in 2019 under the new government administration to "Digital Inclusion Centers (DIC)", with adjustment to curricula and budget, but the Centers continue their operations. Throughout the operation of both PMC and DIC activities combined 38,500 courses have been delivered to different groups with the objective of reducing the digital inclusion gap in the country (SCT, 2019). Although I am writing this report in 2020, I refer within the text to the PROSPERA program as it existed at the time of the fieldwork, from 2015 to 2018.

Figure 6. People enrolled in the Digital Inclusion Centers in Mexico by age group and State



Note: SCT. (2019). Deputy Ministry of Telecommunications [Figure]. *Marco de Habilidades Digitales* [Ebook]. Ciudad de México. Retrieved from: https://www.gob.mx/cms/uploads/attachment/file/444450/Marco_de_habilidades_digitales_vf.pdf

As Figure 6 shows, the DIC content covers all group ages with children and working age adults as primary users. As part of the 2019 adjustments to the Program, a "Digital Skills Framework" was

implemented as part of the updates to the curricula at the DIC (SCT, 2019)[8]. In a TV report from Zacatecas in November 2019, the DIC Administrator referred to a 40% cut in the budget for the operation of the Mexico Conectado Program, which covers part of the operation of the 32 DIC nationwide. In Zacatecas, this cut implied a necessary reduction in staff operating the DIC, from nine to five people, and elimination of the English course as part of the curricula (24 Zacatecas TV, 2019).

As I mentioned before, this thesis report refers to the Punto Mexico Conectado Program and the operational conditions that were current between 2015 and 2018. One of the 32 PMC was located in Ecatepec, State of Mexico, an impoverished urban community in the surrounding areas of Mexico City with significant presence of beneficiaries of the PROSPERA program. That is one of the reasons I selected this location for the case study presented in this research. Socioeconomic characteristics of people living on Ecatepec can be consulted on page 38.

I used Amartya Sen's (1999) Capability Approach[9] as a theoretical and analytical framework to explore and describe to what extent digital capability enhances women's development. According to Sen´s approach, freedom of choice is both the primary and the means for development. Through this research I explore the contribution of digital capability to make choices by vulnerable people to improve their lives' conditions, and how the access, and use of the Internet may become a tool to expand the freedom of choices of Mexican women in impoverished communities to enhance their personal development. A further comprehension of this process provides evidence and scientific knowledge to enhance digital inclusion policies.

1.2 Purpose and importance of this study

To seek a deeper and more nuanced understanding about the process of acquisition of digital capabilities, adoption of ICT and its impact on women´s development, my research incorporated a case study of policy intervention. It uses a mixed qualitative and descriptive methodology involving a target population composed of women beneficiaries of the PROSPERA Program, all from impoverished urban locations and with only basic ICT knowledge. According to PROSPERA, only 0.08% of its 6.1 million beneficiaries owned a computer and 0.04% had Internet in their household (PROSPERA, 2015).

The importance of this study relies on the understanding of the process of acquisition of informational capabilities, how these informational capabilities are incorporated in women's daily life, and whether this adoption prompts new behaviors at the individual and community level that enhance women's development[10]. While some work has been developed aiming at understanding

[8] New Program orientation can be found in "*Gobierno de México. Centros de Inclusión Digital*''. Retrieved from: https://cid.gob.mx

[9] The Capability Approach proposes development as the enlargement of people's choices that can enable them to lead the life they want to (Sen, 1999). In Sen's approach the choices are termed "capabilities" a, thus development is given by the enhancement of the set of choices or capabilities, i.e., the expansion of human capabilities that enables a person to realize "the various things he or she values doing or being" in all dimensions of her life (Krishnakumar 2007). According to Sen (1999) human capabilities are agents of change.

[10] According to the Oxford Dictionary, 'acquisition' is defined as "The learning or developing a skill, habit, or quality". On this basis, for the purposes of this research, acquisition of digital capabilities will be understood as the process through which individuals learn and

the impact of telecenters (Hudson, 2001; Huerta & Sandoval-Almazán, 2007; Madon et al. 2009; Gollakota, Pick & Sathyapriya, 2012; Matus & Ramírez, 2012) more empirical research is needed to better understand how ICT policies enhance digital capabilities for ICT adoption.

As previously stated, PMC is an initiative derived from the NDS to provide access and education curricula for digital learning and effective use of ICTs in people's lives (employment, social relationships, cultural identity) (Gurstein, 2003). Unlike other projects in the world that have established these type of digital inclusion policies in rural areas, the PMC program started its implementation in impoverished urban communities in order to reach a great number of potential users who could benefit from access to the telecommunications infrastructure (Mookherjee, 2006, p. 234)[11].

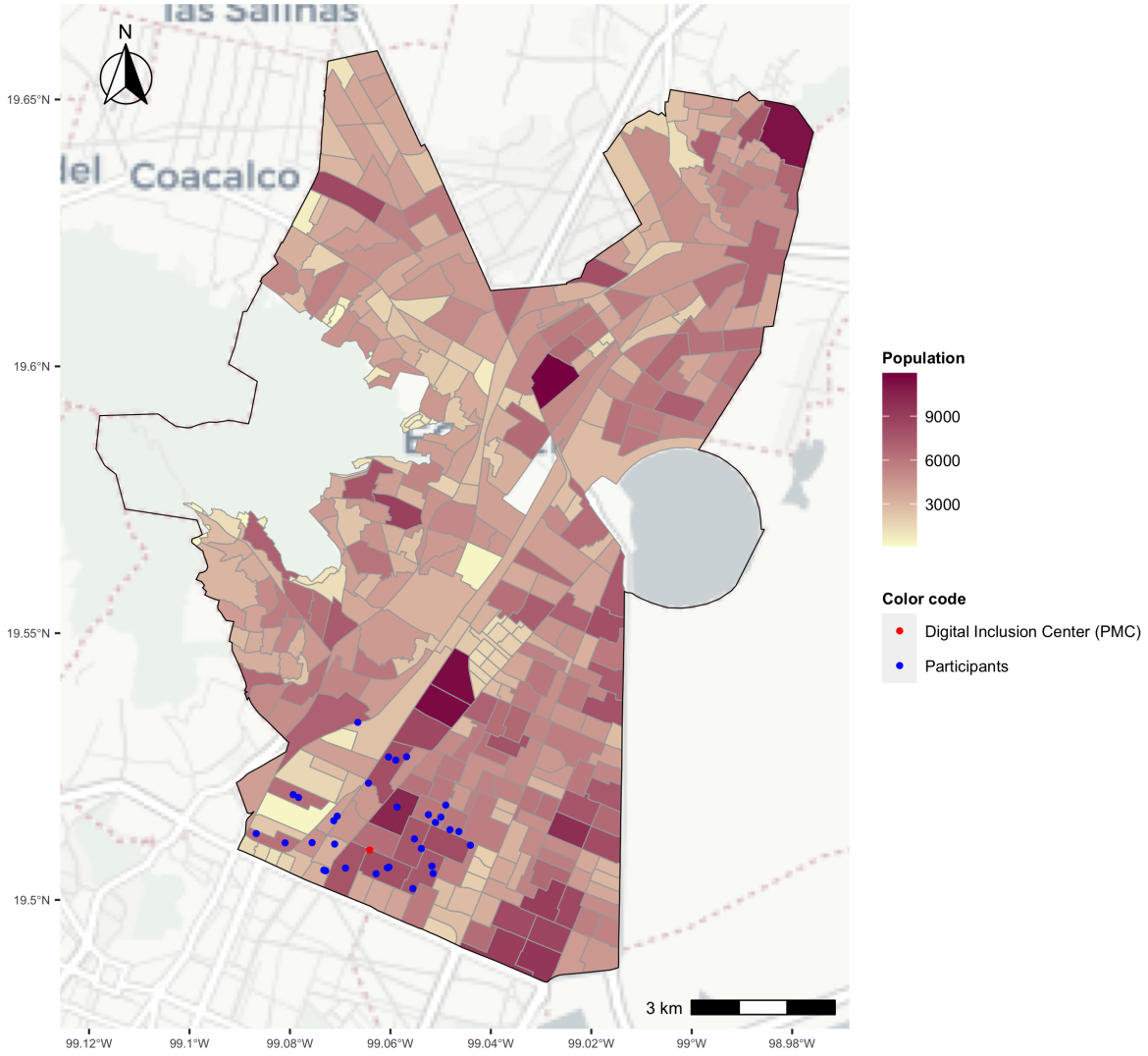
In Ecatepec, State of Mexico, population density is one of the highest in the country, making it a suitable location for a PMC. Figure 7 presents Ecatepec´s density map[12] in color scale; the red dot indicates the location of the PMC and blue dots the location of the PROSPERA beneficiaries who participated in this research.

develop digital skills, i.e., informational capabilities. In the same sense, the definition of 'adoption' is "Choose to take up or follow (an idea, method, or course of action)"; as such, the working definition for this research will understand digital adoption as the process by which people that have acquired digital capabilities begin to internalize them and employ them within their daily contexts. For this reason, this research will rely on the acquisition of digital capabilities as means for ICT adoption.

[11] "Economists have ignored a crucial dimension of poverty: its intrinsically dynamic characteristic of being locked into a low-level trap of asset (or capability) deprivation, resulting in exclusion from social and economic life on a par with the rest of society…Hence poverty alleviation in the long run must address incentives for the poor to acquire capabilities and assets that will enable them (or their children) to escape poverty in the future" (Mookherjee, 2006, p. 234).

[12]Average number of habitants by block. Data is from 2010 since is the latest available in shape files at block level.

Figure 7. Municipality of Ecatepec, in the State of Mexico - Population density map



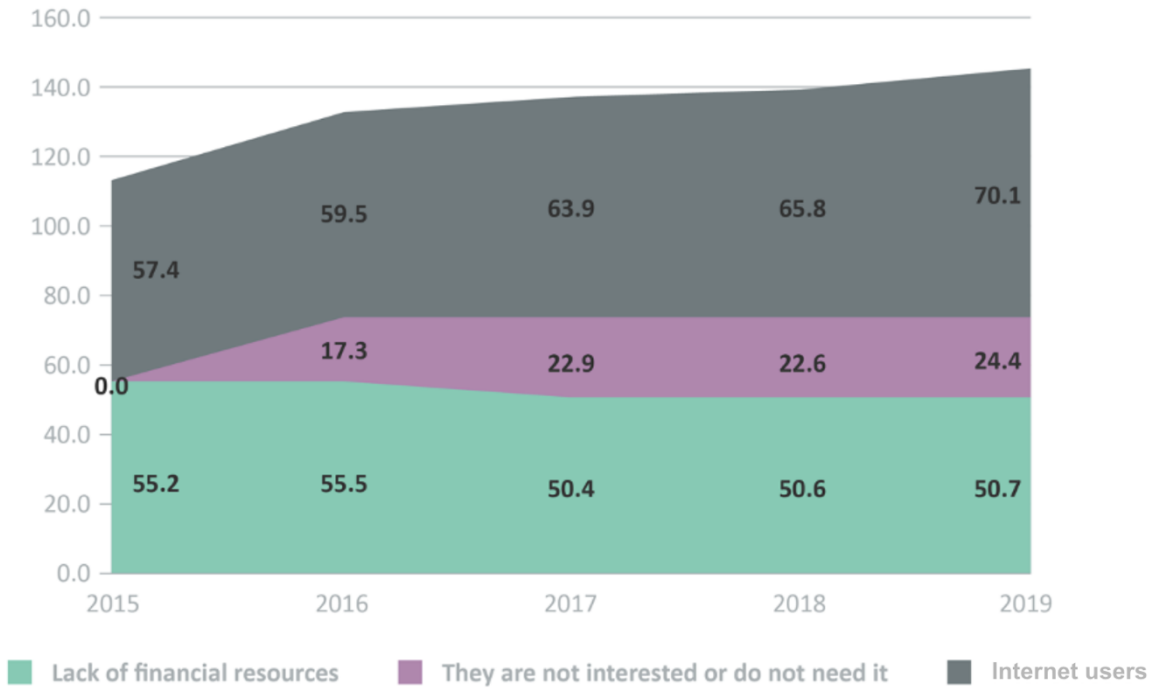
Note: Author's elaboration based on data from INEGI. (2010). Retrieved from: https: //www.inegi.org.mx/programas/ccpv/2010/

Proximity to the PMC was an important aspect of the study design as I looked for the intersection of digital inclusion programs and their relationship with development of people participating in poverty reduction programs like PROSPERA.

Additionally, evidence collected through this research allowed me to identify areas of strength and best practice for future policy design. Specially related to social, political, institutional, and cultural contexts that shape people's inability to value and use ICT effectively (Madon et al., 2009). As

Figure 8 shows, although Internet users increase significantly over the four-year period, there still remain two challenges to close the digital device. Firstly, the economic context, in terms of lack of economic resources as the primary reason cited for not having Internet services at home (even though it decreased from 55.2% to 50.7% over the course of 2015 to 2019). Secondly, the usage divide which is not related to the economic context but to the socio-cultural context in 2019, 24.4% of people reported not being interested in, or not seeing the need for, Internet services at home (UNESCO, 2008).

Figure 8. Reasons for not having Internet at home among Internet users in Mexico



Note: Author's elaboration based on data from EDUTIH, INEGI, 2015 - 2019. Data is expressed in percentages.

Taken together, this study contributes to an understanding of the social, economic, institutional, and cultural contexts that surround the processes by which women living in impoverished urban conditions acquire digital capabilities, how they incorporate ICTs in their daily lives, and whether this adoption fosters their own development. To close the digital divide, provision of telecommunications services is important, but it is also relevant that digital inclusion policies democratize access to technology innovation and digital skills acquisition with programs like the PMC. Results from the case study aim to contribute evidence of what works, as well as what can be improved in future digital inclusion policy design.

Chapter II. Theoretical framework

This section describes the theoretical framework I selected for the study and is divided into five sub-sections: (I) ICT for Development (ICT4D) 2.0; (II) Digital inclusion as a human right; (III) The Capability Approach in ICT4D; (IV) ICT as a tool for gender gap reduction; and (V) Digital poverty and exclusion. To define this framework, I reviewed and analyzed different sources of information on the multidimensional implications of ICT for development.

2.1 ICT for Development 2.0

In the 1990s, the Internet and the establishment of the Millennium Development Goals (MDGs) gave birth to what has been called Information and Communication Technologies for Development, or ICT4D. The digital technologies of the 1990s sparked a generalized upsurge of interest in how ICT might be applied in developing countries (Heeks, 2008).

The information communication technologies set the formation of a new global political economy and new organization of the international markets (Castells, 1999). If the evolving technologies are shaping a new "information society",[13] there is a chance that through exploiting new access to information, individuals and nations can escape the confines of poverty and underdevelopment (Hewitt, 2001). In this context, there is a possibility to use ICT in developing countries to adapt and adopt public policies to improve the living conditions of marginalized citizens.

If we assume that the availability and use of ICT are important drivers for economic and social development, then we must include strategies that can stimulate development for those who are excluded from them, those who live in extreme poverty (Castells, 1999). At the same time, ICT can create inclusiveness, but also, new inequalities worldwide, making the development of people living in poverty even harder (Mansell, 1999; May, Waema & Bjåstad 2014). The challenge is, on the one hand, to understand what people excluded from ICTs actually perceive of opportunities with digitalization within their socioeconomic context and, on the other hand, to understand how this information is considered a helpful tool for their daily lives (Slater & Tacchi, 2004).

Conceptual frameworks explore more comprehensive approaches related to access to ICTs and multidimensional factors influencing why people adopt them. This expansion in understanding of diverse motivations of people informs about successes digital inclusion programs have enjoyed since the consideration of holistic and integral approaches. Variables involving individual socioeconomic status or variables related to the process of acquisition of ICT skills have been found

[13]Castells' notion of an Information Age has been increasingly replaced by the term knowledge society, because it is not only information that has become commodified but also, knowledge itself (Kleine & Unwin, 2009).

very influential (Ferro, Helbig & Gil-Garcia, 2011). Furthermore, successful programs in developing countries have shown that the cultural background and community acceptance of digital learning processes are primary factors (Madon, et al. 2009; González-Zabala, Galvis & Sánchez, 2015).

Other researchers, like Heeks (2008), acknowledge the traditional notion of ICT4D (also referred to as ICT4D 1.0) characterizes poor people as largely passive consumers. However, following the "bottom of the pyramid" concept (Prahalad & Hart, 1999), this traditional notion has evolved into a new digital dividend approach that sees poor people as active producers and co-producers of innovations, now referred as ICT4D 2.0 (Heeks, 2008). Under this new approach, there are three overarching challenges that will frame the next digital development phase: first, giving poor people the tools to produce digital content and services; second, offering incentives for creating new income and employment opportunities through the use of ICT; and third, recognition of motivation and interest as valuable tools for progression.

Following an extensive work done by Scheerder, Van Deursen and van Dijk (2017), in a system-atic literature review of digital divide determinants. This new framing for digital development scholarly work recognizes, that as Internet access (first-level digital divide) increases in coverage, so does Internet skills and use (second-level digital divide) providing data and elements in recent years to focus research work into a third-level digital divide in which the tangible outcomes of Internet use are highlighted.

International organizations like UNESCO had also documented differentiated experiences, suggesting that effectiveness of digital inclusion policies depends on three progressive steps: the acquisition of ICT skills (basic and advanced skills); the ability to incorporate them into people's daily lives (because it hopes that such skills will, in turn, generate knowledge); and helpful utilization of ICT (for example, using them for start-up or learning purposes) (UNESCO 2008). Despite focusing on individuals, these approaches overlook other, even more important, problems, such as access, probability of use, security, which can be factors that drastically affect the level of use by disadvantaged people in Mexico, especially women.

According to Dijk and Hackers (2003), governments, civil societies and markets all have a role in the support of four kinds of access: 1) lack of any digital experience, caused by lack of interest, computer fear and unattractiveness of the new technology ('psychological access'); 2) no possession of computers and network connections ('material access'); 3) lack of digital skills, caused by insufficient user-friendliness and inadequate education or social support ('skills access'); and 4) lack of significant usage opportunities ('usage access'). This ecosystemic approach to digital inclusion is aligned to one of the conclusions of this study: that without motivation there is no overcoming of the usage divide.

2.2 Internet and digital inclusion as a human right

The design and implementation of public policies oriented to generate more and better access to ICTs have become crucial in order to reduce the digital divide. Access to the Internet has become a catalyst not only for wider freedom of speech but also to further other basic human rights, such as access to education, health and work (León & Franco, 2015). However, due to the rapid changes experienced by the technology sector, it is easy for people living in poverty to become excluded from ICT developments. González-Zabala, Galvis and Sánchez (2015) argue that factors such as cultural background, earlier availability to ICT, higher income, or even personal and social habits might influence accessibility to information and digital culture.

Digital inclusion is to be understood as "a set of public policies to democratize the access to ICT, promoting simultaneously: access to ICTs (connectivity and equipping), accessible content, and skill development for the proficiency of tools" (Matus, 2014). As the study and implementation of digital inclusion strategies advances, so does the conceptual framework used to analyze them. At first, digital inclusion strategies were based on the concept that the digital divide comprehended only the dichotomy of haves and have-nots (ECLAC, 2013). Digital exclusion referred only to people that had no access to ICTs (Madon et al., 2009). At first, this approach may have been sufficient, considering that accessibility to ICT had not reached sufficient coverage, and this problem was coined the first digital divide (Rogers, 2001; Van Dijk & Hacker, 2003). However, having this problem solved, the concept of digital divide became wider because it depends on the uses and finality of this utilization, the second digital divide.

While some work has been developed aiming at understanding the impact of telecenters (Hudson, 2001; Huerta & Sandoval-Almazán, 2007; Madon et al., 2009; Gollakota, Pick & Sathyapriya, 2012), more empirical research is needed to better understand how ICT policies could enhance digital capabilities for ICT adoption.

The relevance of digital inclusion has acquired importance at a global level, and in May 2011, *"The Report of the Special Rapporteur on the promotion and protection of the right to freedom of opinion and expression by the United Nations Human Rights Council"* included a set of recommendations to member states on access to the Internet as a priority for all states. Recommendations included Internet literacy skills in school curricula and support for similar learning modules outside of schools, like the PMC; also, the right to privacy and data protection, restriction of content on the Internet, and general principles on the right to freedom of opinion and expression through the Internet (HRC, 2011).

In Latin America, the Third Ministerial Conference on the Information Society in Latin America and the Caribbean, hosted by the Economic Commission for Latin America and the Caribbean, yielded

"*The action plan on knowledge and information society for Latin America and the Caribbean for the period 2015 to 2018 (ECLAC 2015–2018)*[14]". This action plan agreed by LAC countries states as first priority to enhance population access to broadband Internet in order to guarantee fundamental availability of services to citizens, ranging from social security to innovation and education (ECLAC, 2015). The adoption of regional priorities as national ones has been increasing, with major countries in the region creating national digital agendas. These include Mexico's National Digital Strategy (DOF, 2013), Chile's Digital Transformation Act (Biblioteca Nacional, 2020), Uruguay's Digital Agenda 2020 (Agenda Digital, 2019), Colombia's Digital Government Policy (Gobierno Digital, 2020), and Perú's Digital Agenda to the Bicentennial (PCM, 2020). Furthermore, according to the 2020 "Cybersecurity Report" published by the InterAmerican Development Bank (IADB) and The Organization of American States (OAS) 13 countries in LAC including Mexico have a National Cybersecurity Strategy (BID, 2020).

The Mexican case provides an interesting example regarding the need to implement digital strategies that enhance competition within the telecommunications sector. According to Mariscal (2005), the Mexican privatization process confirmed the theory that liberalization of the telecommunications sector yields more enterprise competition and, in turn, decreases prices of Internet access and increases levels of coverage of telecommunications services. But the "market solution" is insufficient to evenly distribute technological access, creating important disparities within the country.

Mariscal's analysis of 'tele density' showed that the benefits of ICT were not reaching the majority of the population. For example, while Mexico City averaged 37.6 landlines per 100 inhabitants, the southern state of Chiapas averaged 4.2 per 100 inhabitants. Economic forces generate a disproportionate digital divide, especially considering the wide range of income levels in Mexico. A comprehensive digital inclusion strategy in Mexico should aim to include marginalized sectors of the population, in both rural and urban areas, where digital inclusion would be an effective means of poverty reduction.

2.3 The Capability Approach in ICT4D

In the last decade, several approaches like those presented in subsections 2.1 and 2.2 of this research have been developed to analyze digital inclusion challenges, such as adoption and usage. In this section I will add to the theoretical framework the approach of digital inclusion as a driver for people's development. I decided to use Amartya Sen's "Capability Approach"[15] to offer a way of

[14]The Digital Agenda for Latin American and the Caribbean considers 23 goals to be achieved during the period 2015–2018. The Agenda is updated every 3 years. Agenda countries agreed 7 broad goals to be achieved during the period 2018–2020.

[15] "In Sen's approach, 'functionings' are the various things a person may value doing or being, such as being adequately nourished, being healthy and being able to take part in the life of a community. In Sen's terminology, a person's 'capability' refers to the alternative combinations of functionings that are feasible for her/him to achieve. The focus of development, thus, becomes increasing a person's capability set, or her/his substantive freedom, to lead the life she/he values. Functionings represent the 'outcome' component, while capabilities are the 'freedom' component in this approach" (Kleine, 2010).

thinking about development, not as economic-income growth but as enhancement of individual freedom (Sen, 1999). In this sense, development is seen as a process of expanding the real freedoms that people enjoy. In the context of this research, freedom and enjoyment may be enhanced when women learn how to use the Internet and ICT without having to depend on anyone else to do so, in this way they are able to self-educate themselves to satisfy personal and family needs.

Development, then, is understood as "freedom of choice" in the personal, social, economic, and political sphere (Hatakka & Lagsten, 2012). According to Sen's statement, human choice is both the aim, and the principal means of development; the primary development outcome is choice itself, and the secondary outcome depends on the individual's choice, such as what kind of lives they want to live (Kleine, 2010). Sen's idea of development is therefore the enrichment of individual capabilities, allowing individuals to be the agents of their own lives within the social groups they belong to (Diaz & Urquhart, 2012).

The Capability Approach assumes that "choice" is the primary development outcome and, at the same time, outcomes will vary from person to person depending on what kind of life each individual values; e.g., one in which ICT can increase their knowledge or income. ICTs are especially important because they can offer new possibilities for making choices (Zheng, 2009; Gigler, 2014). Thus, the possibility of choice-making becomes the primary source of development (Bailur & Gigler, 2014).

In the context of ICTs, people may value a life in which they are able to choose access to information for increasing their knowledge or to use ICT to be in contact with family and friends. According to this approach, the informational capabilities are a person's "capability" to transform ICT access into real opportunities to create meaningful uses and achieve goals that she or he values. As Björn-Sören Gigler (2015) states: "Access to information and enhanced informational capabilities act like improved literacy in increasing people's capabilities to make choices in their lives in various areas, including the economic, social and political spheres. Thus, as a result of expanded informational capabilities, individuals will be able to increase their control over life choice; in this sense, information and ICTs play a critical role in strengthening poor people's human capabilities" (Gigler, 2015, p. 34).

These capabilities include, for example, being able to use ICT to search information, analyze the relevance of the search results, and use the resulting information to one's own personal and professional progression; to expand capacity to communicate with family and peers in more efficient ways; to have the freedom to access information for the sake of public interest; and to express personal opinions. In other words, ICT for development should take into account the effective use of ICTs to enhance both well-being and agency freedom of individuals (Zheng, 2009).

As recent scholarly work focusing on the third digital divide has shown, when information and services are offered online, the number of potential outcomes the internet has to offer increases. However these outcomes are not equally distributed among Internet users, individuals with higher social status are taking greater offline advantage from digital engagement than their lower status counterparts (Van Deursen & Helsper, 2015). In this regard, although ICT may have disproportionate value to people living in low-income conditions offering unprecedented opportunities for their personal development and empowerment, digital inclusion policies are needed in order to tackle the fact that in the third digital divide offline inequalities could potentially be exacerbated among socioeconomic groups.

2.4 ICT as a tool to close gender gaps

Income inequalities, social restrictions, and urban-rural divide, especially in developing countries, compound gender differences. Women workers continue to be assigned to lower-skilled jobs in the lowest earnings categories, often in poor working conditions. At the same time, all women, but especially those living in impoverished communities, allocate more time and effort to care of the household. Therefore, they spend limited time and effort on their own development and learning, and creating work conditions to achieve economic autonomy and social independence. As Goyal (2011) states, loss of potential learning-by-doing leads to dynamic inefficiencies, which power relations, bargaining, perceptions and self-perceived limitations. ICT helps restore flexibility in female external labor supply since it facilitates distance work, flexi-time and location activity, making it easier to match skills to jobs and to maintain and upgrade skills; however, social structures and perceptions require intervention to become supportive (Goyal, 2011).

Development process affects women and men differently, since gender role division and subordination of women within patriarchal families increases female marginalization. In addition, gender identity is a social construction, with changing perceptions and embedded social norms requiring special policies. Supportive social and institutional change for gender equality and empowerment should promote the improvement and wellbeing of women and their families. This is important because women have been traditionally excluded from development discussions until recently. In the context of developing countries, it has been demonstrated that a small impulse to women - like making them the recipient of cash transfer programs - improves the life of their family nucleus (Sanford, 2016).

In this context, ICTs might provide opportunities for women to increase their income´s household, health condition, information access, and awareness relating to public and private rights (Huyer & Mitter, 2004). According to the XII Regional Conference on Women in Latin American and the Caribbean, “The gender digital divide and the second digital divide (which refers to skills, uses,

intensity, and advanced uses) compound other gaps. Age, educational and socioeconomic level, social class, ethnicity, and location are variables that have an impact on levels of access to ICTs —so much so that they mark the dividing line between the 'info-haves' and the 'info have-nots'. Here, too, gender operates as a cross-cutting dimension: for any of these variables it also means a lower level of access to and use of technology by women" (ECLAC, 2013, p. 13).

Women in Mexico continue to face important challenges on the road to equal opportunities. According to the 2015 Global Gender Gap Report by the World Economic Forum, Mexican women have achieved some equality rates regarding healthcare and education, where rates among women and men are practically equivalent (0.980 and 0.991, respectively). However, when it comes to economic participation, the equality index decreases to 0.545; in categories such as "estimated earned income", women's income represents less than half of men's (WEF, 2015). Furthermore, according to a report by the Ministry of Social Development, in 2013, female participation in the labor market was only 48%, compared to 83% of male participation (SEDESOL, 2014). This data demonstrates that an important gender gap in economic participation prevails in Mexico.

The gender digital gap in Mexico is statistically insignificant: in terms of access to ICTs it accounts for less than 2% (INEGI, 2014). Nevertheless, public policies must act as a tool for measuring and seizing the opportunities arising from the new ICT paradigm, especially those that may help tackle other gender inequalities in Mexico. ICT programs are not sufficiently gender-sensitive and might be the cause, unintentionally, of new marginalization of women, the gender digital divide. For example, it has been argued that failure to incorporate a gender focus into the ICT development process could expand the gender gap (Morgan, Heeks & Arun, 2004). ICT is a driver to deliver more personal freedom and control by raising skills and improving information options that can generate women's empowerment (Goyal, 2011; Scuro & Bercovich, 2014). Furthermore, digital inclusion programs targeting women in poverty conditions should also be seen as a mechanism for further family development, considering potential spillovers benefits to children.[16]

Moreover, the positive impact that digital inclusion policies can generate in peoples' lives comes from simple modifications in daily activities, like paying bills or obtaining official documents online, instead of doing so by visiting institutional facilities. This change represents substantial savings in women's time and money, considering that at least 90% of these activities involves at least a 30-minute walk from home, and any high-value financial transaction, like obtaining a loan or making a credit or installment payment, takes even more (Sanford, 2016).

Gender gaps are also present in professional development especially in the ICT Sector where a recent study´s results suggest that women are qualified to take over organizations' challenges.

[16] Research based on adoptees in the United States and the United Kingdom has shown that the family environment may be strongly influential on children's outcomes, in such areas as educational attainment, marriage age, college attendance or even college selection (Sacerdote, 2002, p. 347).

However, some leadership roles are not clearly identified by them as important (González & Lamolla, 2019). Therefore, women empowerment to take over leadership roles in their personal and professional life is needed regardless of socio economic and development conditions. To increase awareness on gender gaps and empower women in the tech field a boom of support networks in the tech community has emerged in recent years (González & Silva, 2018). Through this research I was able to gather relevant data to show how important group support is for women's empowerment and self-esteem to lead the life they value.

2.5 Digital Poverty and Exclusion

Poverty has multiple variables and complex causes (Deaton, 2006). Poverty is not just the lack of access to basic resources (household, employment, education), but also the lack of information that might otherwise contribute to personal empowerment and disrupt the reinforcing poverty cycle (Marker, McNamara & Wallace 2002; Barrantes, 2007). Overall, digital exclusion affects the political visibility of poorer communities and their ability to give voice to their needs and demands. Such people are marginalized from education, knowledge acquisition, and skills which are the lifeblood of economic and social interactions that can improve livelihoods (Marker, McNamara & Wallace, 2002).

Digital poverty is defined as a lack of ICT regarding access and use, featuring any population segment, whether or not economically poor (Barrantes, 2007). On the one hand, the adoption of ICT sources requires a complex and complete infrastructure to provide access; on the other hand, the usage of ICTs requires skills and literacy; generally poor people do not have these functionings and capabilities (Heeks, 1999). Some academics, such as Heeks (2008) and Chaudhuri (2012) have argued that even the provision of ICTs in communities with low incomes will be hampered by additional barriers, for example, lack of interest, survival needs, age, language, literacy levels, skills, and disability. In the case of Mexico, although literacy rate is 95.38% (World Bank, 2018), 4.62% of the illiterate population are concentrated in vulnerable impoverished communities, which represents a contextual barrier for ICT skills acquisition.

People with low digital skills are not only the ones who live in marginalized sectors with lack of ICT services (internet connectivity), but also the ones who lack the ability to use them (capacity and demand) (Barrantes, 2007). Therefore, inclusion is not just about gaining access to ICTs but using ICTs to achieve certain goals to improve personal and family wellbeing (searching job opportunities, skills to participate in e-governance, health and household economy, etc.). Without both active ICT participation and skill sets, ICTs cannot not offer the user opportunities to develop their own capabilities (Asiedu, 2012, 1199)

Digital inclusion policies have found an important opportunity to tackle prevailing social disparities in developing countries. Nonetheless, ICT is at once a factor of opportunity and a factor of risk

(González-Zabala, Galvis & Sánchez, 2015). A significant number of people remain excluded from ICT accessibility, which in turn excludes them from access to potential means for personal and social development. Madon et. al. (2009) have explored case studies in India, South Africa, and Brazil on successful digital inclusion programs that involve marginalized communities. The authors emphasize the importance of additional social processes (community acceptance of the project, for instance), which are contingent on long-term ICT involvement.

Furthermore as a recent study confirms the digital divide is a reality that is here to stay and has shifted from inequalities in physical access to inequalities in material access to devices and peripherals, device-related opportunities, and the ongoing expenses required to maintain the hardware, software, and subscriptions affect existing inequalities related to Internet skills, uses, and outcomes (Van Deursen & Van Dijk, 2019). In this context Digital Inclusion Centers like the PMC Program represent an opportunity to provide quality access to the Internet and up to date materials in urban impoverished communities in Mexico fostering the continuous creation of 'technological capital' as a means to put people's socio economic conditions of existence into relation with the different forms of accessing and using Information and Communication Technologies (ICT) (Calderon, 2019).

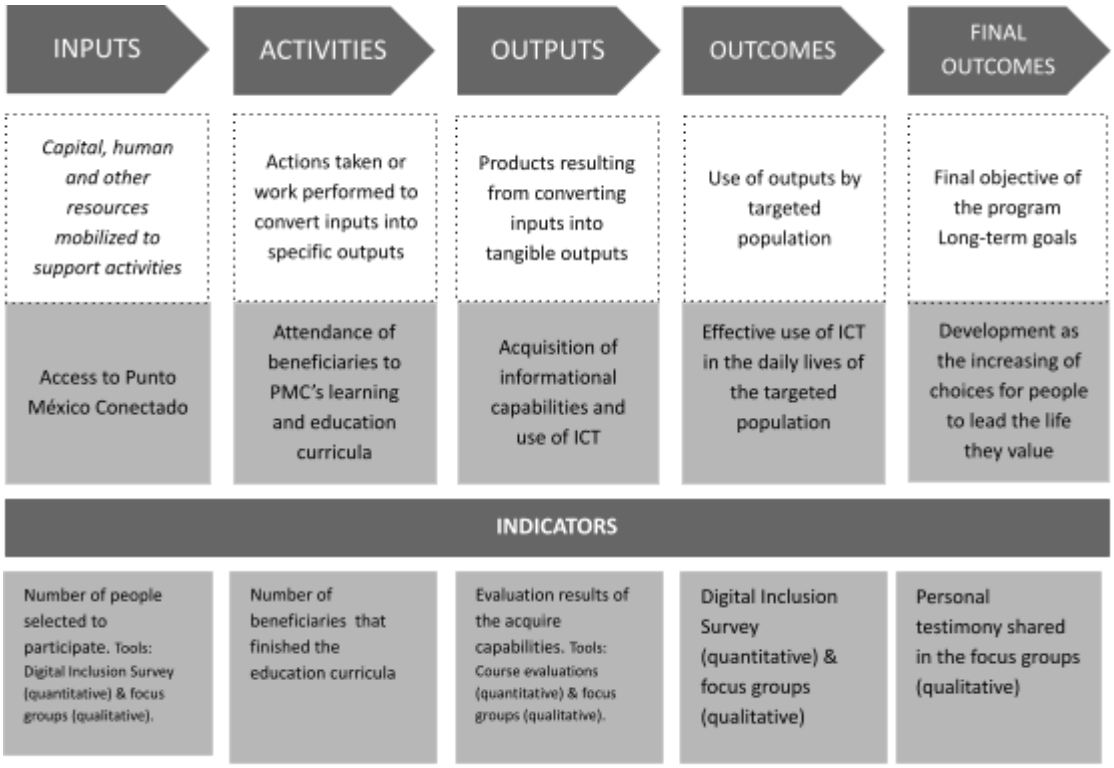
Through this research I aim to contribute to the literature on digital skills acquisition and its impact on the development of women from impoverished communities. The previously described theoretical approximations – (I) ICT for Development (ICT4D) 2.0, (II) Digital inclusion as human right, (III) The Capability Approach in ICT4D, (IV) ICT as a tool for gender gap reduction, and (V) Digital poverty and exclusion – provide an analytical framework for this case study. I am conscious there are other analytical perspectives; however, for the scope of this thesis and considering Mexico's current state of development, I considered these views the most appropriate. As the digital revolution continues to evolve, sustainable digital inclusion policies become a very relevant aspect for closing the digital divide

Chapter III. Research methodology[17]

3.1 Research objectives

The objective of this research is to explore and describe if and how the acquisition of digital capabilities enhances development opportunities for women living in impoverished communities. The theoretical framework suggests that the availability and relevant usage of ICT are important drivers for development. Therefore, access to information through ICTs and the provision of digital learning and education curricula should be geared towards increasing people's choices to lead the life they value (Zheng, 2009). Social change can be explained by a 'results chain model' that sets out a logical, plausible outline of how a sequence of inputs, activities, and outputs establishes a pathway through which the desired target is achieved (Gertler et al., 2011). It establishes the logical cause from the initiation of the project (access PMC) to the end (the acquisition of informational capabilities and use of ICT), looking at long-term goals; i.e., the adoption of ICT technologies in women's daily lives, as shown in Figure 9.

Figure 9. Results chain model



Note: Author's elaboration based on diagram of Results Chain from Impact Evaluation in Practice from World Bank

[17] This research will be conducted under the Open University of Catalonia general values, principles and commitments to society stated in the UOC Code of Ethics. For access the UOC Code of Ethics visit http://goo.gl/3blsjX

The research questions and sub-questions that guided this study and its analysis were as follows:

3.2 Research questions

1. To what extent does the acquisition of digital capabilities promote personal development in women living in impoverished urban communities?

    a. What were women's motivations for participating in the digital inclusion program (policy intervention)?

    b. How was their educational performance? Were there any barriers for educational performance? What were those barriers?

    c. Has the acquisition of informational capabilities enhanced the adoption of ICTs in women's daily lives? What type of usages have they adopted?

    d. Has daily adoption enhanced women's personal development? How has this enhanced it?

2. To what extent do digital inclusion centers, like Mexico Conectado, foster the acquisition of informational capabilities?

    a. How were the courses evaluated by participants of the program?

    b. How was the facilitator of the courses evaluated?

3. Under what conditions and policy designs can educational interventions focused on the adoption of ICTs promote development?

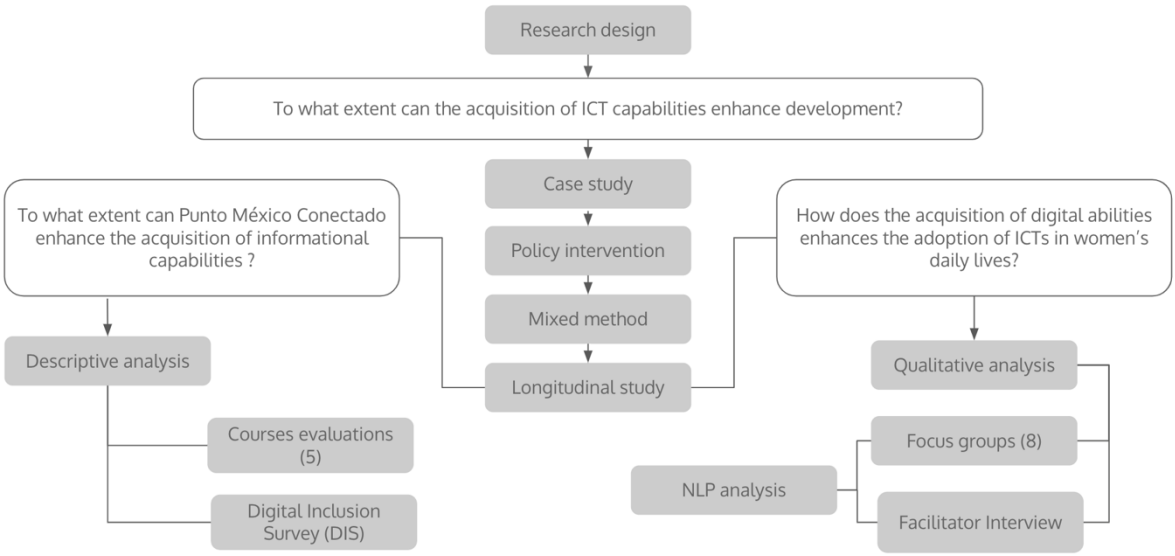
The following section describes in more detail the research designed to address these questions.

3.3 Research design

As stated previously, the objective of this research is to explore and explain if the provision of ICT access and the acquisition of informational capabilities through PMC (2012–2018) can enhance women's development. To address this objective and to answer the research questions, I decided to undertake a single-unit case study[18] with a policy intervention on digital learning and conducted mixed descriptive and qualitative techniques in order to analyze the results.

[18] Case studies are models designed to study a specific unit, whether a single person or a particular community. As such, the methodological path to its study is varied and can employ quantitative, qualitative or mixed analysis (Hernández, Fernández-Collado & Baptista, 2006).

Figure 10. Research design and methods



Note: Author's elaboration

The units of analysis for this case study were women between 18 and 55 years old, beneficiaries of the *PROSPERA* program living within the perimeter of the PMC Center in Ecatepec, Estado de México.[19] From a random selection process, 64 women were selected to be invited to participate in five free courses at the PMC with the objective of learning digital capabilities. The number was set at 64 due to PMC capacity and possible dropouts. The participants attended the courses from January to June 2017, and participated in three sets of focus groups: the first set was organized before entering the courses, the second set after finishing the courses and the third set seven months after finishing the courses. During this period mixed qualitative and descriptive methods were applied in order to understand changes in participants´ perceptions and uses of ICTs as a means for their personal development.

According to Hernández, Fernández-Collado & Baptista (2006), mixed methods research not only provides a stronger and integral analysis of the subject of inquiry, but also potentially contributes to deeper and more accurate understandings of the phenomena the study is focusing on. It is a design aimed to expand the scope to include the main strengths from each model-analysis.[20] In this way, the combination of descriptive and qualitative analysis methodologies seeks a more holistic exploration and description of specific phenomenon, reaching beyond individual segments within the research.

[19] A survey methodology was established because of the systematic method for gathering information from a sample with the purpose of constructing descriptive statics of the attributes of our target population (Groves, et al.,2009).

[20] In this regard, Bamberger et al. (2009) argue that "there is a strong case for using mixed methods both to help close this distance and to more accurately discern how outcomes (positive, negative, or indifferent) are obtained, and how any such outcomes vary over time and space (context)", as well as solve for other weaknesses of the models, such as the lack of generalizability from qualitative models, or how easily can quantitative models marginalize contextual factors. (Bamberger, Rao & Woolcock 2010)

The policy intervention was designed to achieve the digital inclusion of this group of women by the provision of two elements: (1) access to ICTs through a digital inclusion center (PMC) and, (2) the provision of learning and curricula[21] to enhance women's digital skills to meet their own digital needs (access to information, enhance their microbusiness), enhance women's ability to demand digital services' and increase their communications through ICTs. The five courses considered in the Program were selected from the PMC curricula, whose pedagogical methodology is described in more detail under the policy intervention subsection (p. 53).

For the purpose of this research, the attendance of, and close monitoring by, the facilitator and trainers at PCM allowed me to analyze the situation from two perspectives: 1) the perceptions of women beneficiaries of learning challenges, and 2) the experience and observation of the leaders of the learning process, as trainers of these women.

Research design developed along three phases: In the phase 1, before the training course, an initial test was applied to understand participants' Internet and ICT usage and preferences and a set of eight focus groups took place. During phase 2, the intervention, participants took five training courses, participated in a focus group, answered the digital inclusion survey; the facilitator was also interviewed. In phase 3, participants returned to the PMC, seven months after the intervention, to share their experience in two focus groups and answer the Digital Inclusion Survey (DIS).

The application of a longitudinal panel survey and course evaluations enabled me to gather descriptive measures as to what extent informational capabilities are acquired through the PMC digital inclusion program. Survey research is classified by Hernández, Fernández-Collado & Baptista (2006) as a non-experimental transversal design. Regarding surveys, longitudinal designs provide an appropriate tool since they analyze different changes with a temporal perspective. For the forthcoming analysis, this research employed a panel survey in order to monitor the behavior of our target variables in the study population. Panel observations through consecutive surveys also provided valuable insights not only about the group under study, but also about individual changes among participating women.

The qualitative analysis consisted of three series of focus groups with women selected to participate in the study, and a one in-depth interview with the course facilitator. The facilitator has a key role in the PMC operating model and in the learning process of the participants, as further described in the results section of this research. This qualitative analysis was conducted in order to introduce in their learning experience and address the process of acquisition of informational capabilities that enhance the adoption of ICTs in women's daily lives.

[21] The curriculum was composed of courses offered at PMC. The first course "Getting to know the computer" is a 12-hour course designed to learn all basic information concerning the elements of the computer and its basic uses. The second course, "Getting to know Office" is a 24-hour course designed to teach basic operations of written documents, spreadsheets and slides. The third course, "Getting to know the Internet" is a 12-hour course where the students will learn basic tools to be functional online. "Exploring the Internet" is another 24-hour course directed to deepen the online tools and becoming more proactive and involved in Internet activities, such as searching and validating information or even looking for a job. The final course, not available at PMC, was "Personal finance", which was directed to teaching participating women basic financial management concepts.

Finally, it is important to point out that this research design demanded extensive field work, since participants were invited to participate individually after the preliminary randomization exercise. The PMC facilities in Ecatepec were adapted to use the multi-purpose room as an extra classroom for the PMC courses and the implementation of methodological research (survey application, focus group and interviews) for the purpose of this study.

The Digital Inclusion Survey (DIS) was configured as an online questionnaire, and application was made possible through the use of tablets. Focus groups required preparation of topic guidelines for each of the eight sessions, as well as the support of video recording, multiple scheduling alternatives, and transcript generation. Digital inclusion courses had a dedicated facilitator for the group, which was interviewed as part of the qualitative data gathering method. Such a complex set of activities was possible thanks to multi-stakeholder coordination among different areas of government supporting the execution of this study. The following Gantt chart represents the diverse activities undertaken during field work:

Table 1. Research Gantt chart

Activity	Sep 2016	Oct-Dec 2016	Jan-Jun 2017	Feb 2018	2019 - 2020
Project presentation to multi-stakeholder partners					
Site visits and final case study site selection					
Sample selection and one by one invitation to participate					
Survey design and online setting of the instrument					
First DIS & Focus Group sessions					
PMC Courses					
Second DIS & Focus Group sessions					
Third DIS & Focus Group sessions Graduation Ceremony					
Data analysis and report writing					

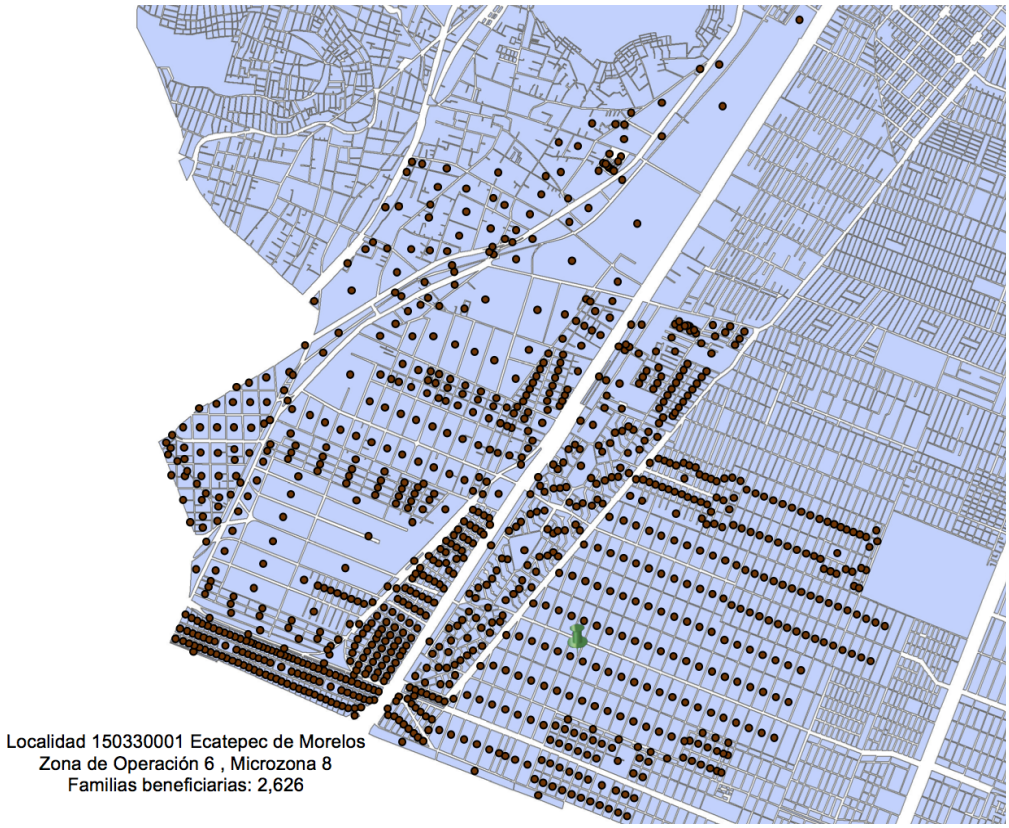
Note: Author's elaboration.

The following subsections further describe in more detail each of these aspects of the study design.

3.4 Case Study Location: Ecatepec, Estado de México

Program courses took place in the Punto México Conectado located in Ecatepec, a municipality within the State of Mexico[22]. The 64 women participating in the initial sample were selected from 2,626 families active in the PROSPERA program, around the micro zone 8 of PMC in Ecatepec (Figure 11).

Figure 11. Mexico´s PMC location map in Ecatepec, State of Mexico



Note: Author's elaboration. The map represents the beneficiary families in micro zone 8 of the PROSPERA Program, the green dot is where PMC is located.

PROSPERA geographical management was arranged according to the distribution of the beneficiaries' households. Each Mexican state has a program coordinator who arranges meeting points and physical presence of the program in the zones where beneficiaries live. The smallest

[22] Mexico is a Federation of 32 States with 2,445 Municipalities; the State of Mexico has 125 Municipalities.

geographical unit for the people living in this area is called a "micro zone", comprising a cluster of neighborhoods (Davila, 2016).

Officially named "Ecatepec de Morelos" is the most populous suburb of Mexico City, with 1,677,678 residents. It is placed only behind the capital's Iztapalapa (1,827,868 population), making it Mexico's second most populous municipality, and the 15th-most-populous suburb in the world (INEGI, 2015). Neighboring North of Mexico City[23], Ecatepec is located 25 km away from the capital downtown; it takes around an hour to drive from downtown to Ecatepec.

According to the 2014 poverty measurements of the National Council for the Evaluation of Social Development Policy (CONEVAL)[24], Ecatepec has 42.4% of its population living in moderate poverty ($2,542.13MX – $95.46 Euro Monthly)[25] and 7.2% in extreme poverty ($1,241.61MX – $46.62 Euro Monthly)[26]. CONEVAL ranked the State of Mexico 11th in percentage of population in poverty (Figure 12).

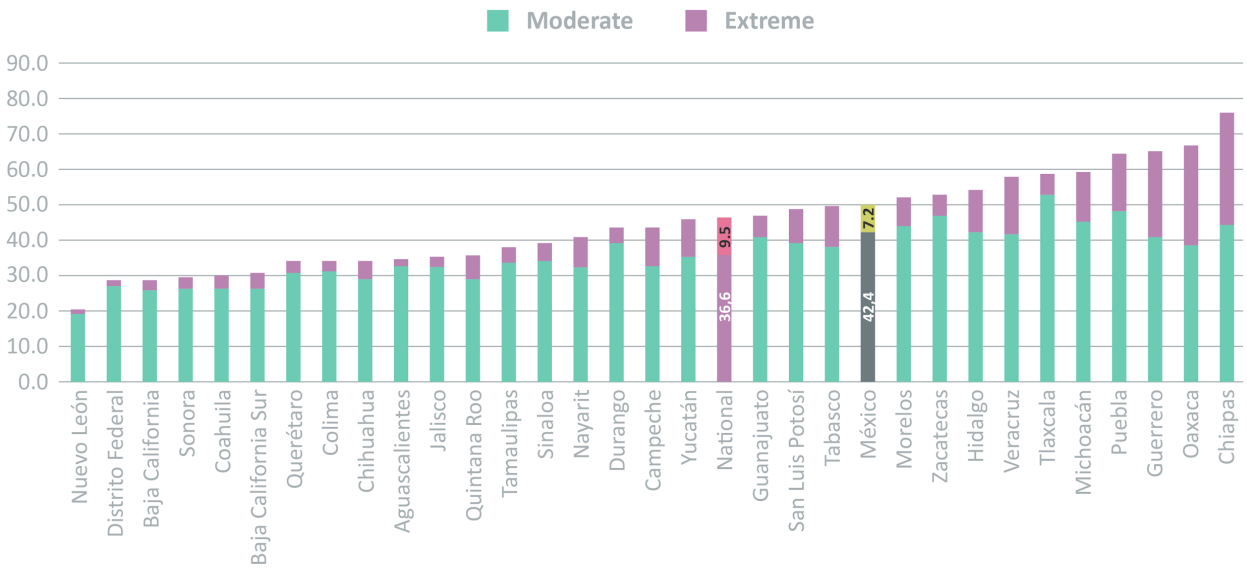
[23] Mexico City contributed 17.64% of national GDP in 2018.

[24] Created in 2005, The National Council for the Evaluation of Social Development Policy (CONEVAL) is a Mexican governmental body with autonomy and technical capacity to generate objective information on the situation of social policy and the measurement of poverty in Mexico, which allows for improved decision-making in the matter.

[25] Moderate poverty: It is that person who, being poor, is not extremely poor. The incidence of moderate poverty is obtained by calculating the difference between the incidence of the population in poverty less that of the population in extreme poverty.

[26] Extreme poverty: A person is in a situation of extreme poverty when he has three or more deficiencies, of six possible, within the Social Deprivation Index and that, in addition, is below the minimum welfare line. People in this situation have such a low income that, even if they dedicated it completely to the acquisition of food, they could not acquire the necessary nutrients to have a healthy life (CONEVAL, 2020).

Figure 12. Percentage of population living in poverty by State in Mexico



Note: Author´s elaboration. The graph presents the percentage of population living moderate and extreme poverty according to CONEVAL. (2020). Glossary. Retrieved 1 September 2020, from https://www.coneval.org.mx/Medicion/Pinas/Glosario.aspx

According to the "Financial Diaries Project", a multi stakeholder initiative[27], households belonging to the metropolitan area of Mexico City (Ecatepec included) operate on tightly constrained budgets (Sanford, 2016). This situation affects people living in Ecatepec in terms of limiting their capacity to plan financially for medium- and long-term projects. Income is composed of different sources and has a high risk of being affected due to health problems, household incidents, and other unplanned expenses.

According to the initiative per capita income was MXN$ 863 (US$ 66/$32.41 Euro), less than the CONEVAL poverty line for the basic food basket. On average, households spent 51 percent of their household budget on food, with only 49 percent of income available to cover all other needs […]. The median deposit into savings in the house was MXN$ 200 (US$ 15) and the median withdrawal was MXN$ 300 (US$ 23). Diaries respondents also kept important amounts of money on hand—30 percent of monthly per capita income in the average interview—to be spent imminently (Sanford, 2016).

[27] "Financial Diaries Project" is an International initiative of Bankable Frontier Associates, GESOC, A.C., the Metlife Foundation, the Bill and Melinda Gates Foundation and the World Bank. It consists in qualitative interviews across the world to gather information about the financial behavior and needs of low-income households in developing countries. This initiative was first developed by Daryl Collins and coauthors in the book "Portfolios of the Poor". Bankable Frontier Associates (BFA) has since used this research methodology to study the financial lives of the poor in South Africa, India, Bangladesh, Kenya, Rwanda, and Mexico as well as studies focusing on smallholder farmers in Mozambique, Tanzania, and Pakistan. The partner of this project in Mexico is the National Savings and Financial Services Bank (BANSEFI) and the study took place in a locality substantially similar to Ecatepec. For more information visit http://financialdiaries.com for more information.

It also finds that in Mexico City's metropolitan area, where there is substantially more economic activity, the most vulnerable population must rely on an average number of nine income sources to meet its necessary expenses (Sanford, 2016) (Table 2):

Table 2. Income sources of vulnerable groups in Mexico City's metropolitan areas

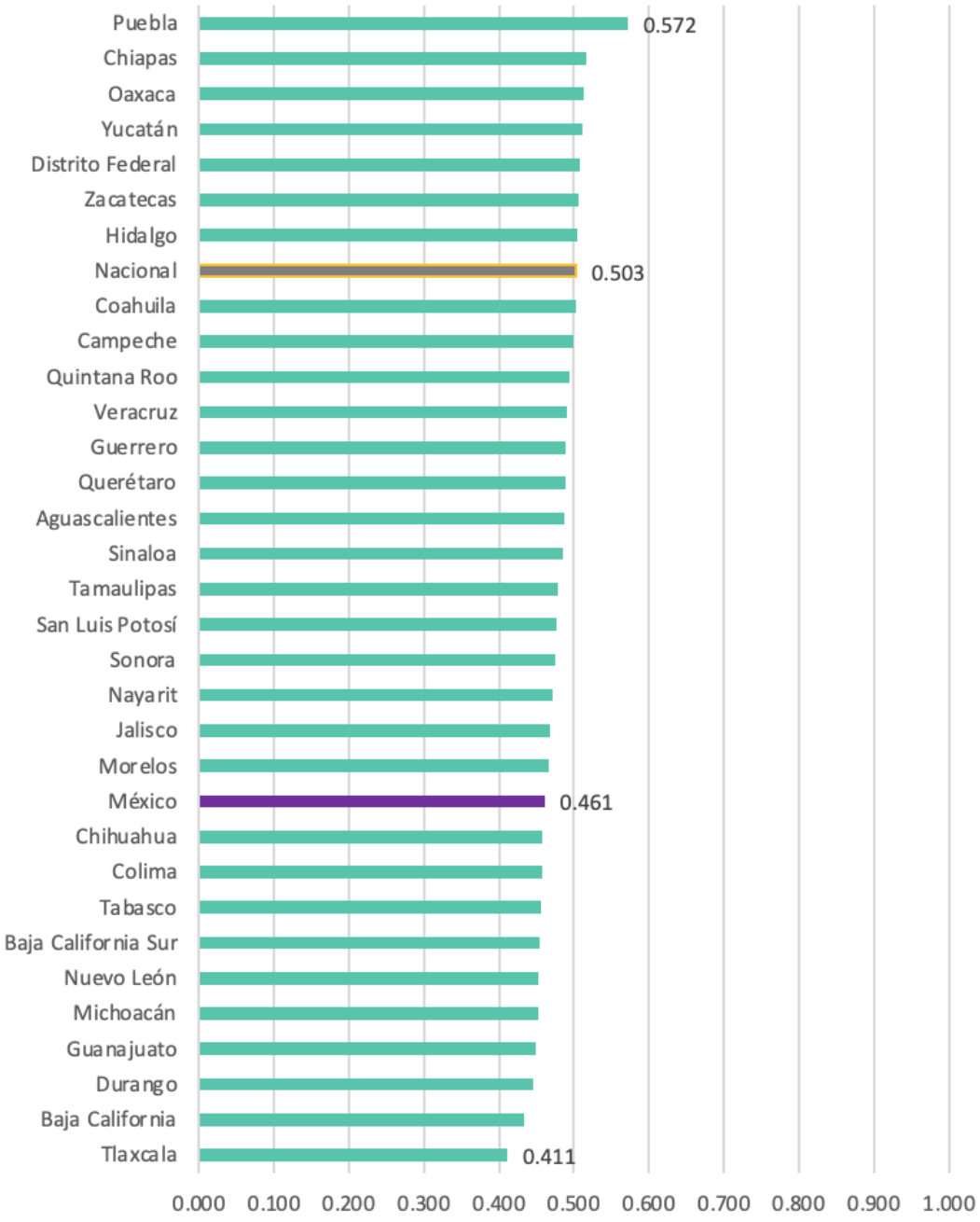
Income sources	Percentage
Rural employment income	53%
Casual income	15%
Self-employment	14%
Remittances	8%
PROSPERA	5%
Other income	1%

Note: Author´s elaboration with data from Sanford (2016). Estirando el gasto. Findings from the Mexico financial Diaries. Research publication, Somerville: Financial Diaries, Bankable Frontier Associates.

In addition, the population in Ecatepec relies on construction as economic investment (Sanford, 2016), given that this is the preferred savings mechanism of the most vulnerable of society (Banerjee, 2011).

Although vulnerability is a prevalent characteristic in Ecatepec, the aggregated indicators on economic activity at the state level locates the State of Mexico as the 2nd largest contributor to National GDP, at 8.93% (INEGI, 2018), a contrasting figure reflecting the inner inequalities of the State of Mexico. The national GINI rate reaches 0.503; comparison over the 32 states of the country reflects the inequality situation nationwide, not just in the State of Mexico (Figure 13).

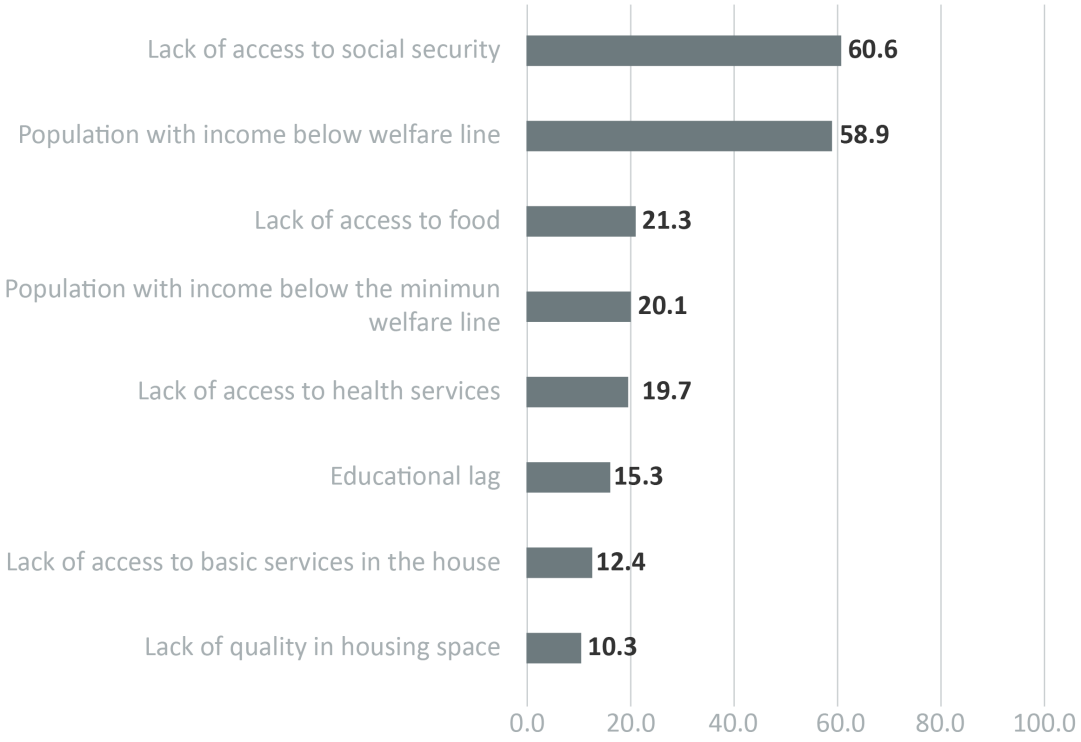
Figure 13. GINI Coefficient by each of the 32 States of Mexico



Note: Author´s elaboration with data retrieved from CONEVAL (2014). The graph presents the GINI coefficient for each State according to CONEVAL.

According to CONEVAL data (2014), 60.6% of people in the State of Mexico lack access to social security, 21.3% lack daily food, 19.7% lack access to health, 15.3% have an educational lag, and 20.1% have an income below the minimum welfare line (Figure 14). This inequality gap affects the capacity of people to access basic living needs and creates an environment of uncertainty about the future.

Figure 14. Social deprivation in the State of Mexico



Note: Author´s elaboration based on CONEVAL (2014). The graph showed the percentage of population by indicators of social deprivation in the State of Mexico.

Other important aspects for the selection of Ecatepec as the research location are: 1) the macho culture or patriarchal society; 2) the subordination of women in family roles and household care; 3) female poverty and educational rates; and 4) security, gender violence and femicide.

Aspect number one, related to the presence of traditional gender roles of patriarchal society in Ecatepec, was confirmed by visiting ENOVA's telecenters, called RIAs[28], in Ecatepec. During the site visits and conversations with RIA facilitators, staff shared that husbands often impede their wives' access to RIA courses, recognizing that they function as a mechanism to attain personal growth[29].

[28]ENOVA provides educational courses in its broad network of telecenters under the name *Red de Innovación y Aprendizaje* or RIA (ENOVA, 2016).

[29]During fieldwork I had the opportunity to visit one of the RIAs in Ecatepec and chat with the facilitators about characteristics and context of women attending RIA courses, where these stereotype examples were common as reasons for drop out.

Regarding the subordination of women in family roles and household care – aspect number two – Sanford (2016) found during her research on financial diaries that although Mexican households struggled financially, some men still viewed it as unseemly for their spouses or partners to work. Additional questions on gender, when applied to the sample in Puebla and Mexico City, showed that 20% of women reported turning down a work opportunity due to their husband's objections.

Aspect number three relates to female poverty and educational rates. As Sanford's research indicates, the metropolitan area of Mexico's capital is marked by women "stuck in physically and emotionally abusive relationships. Economic constraints contribute to these women being unable to leave these situations" (Sanford, 2016). In this context, gender oppression happens to be contradictory, as women's personal and financial growth can benefit an entire household, including the men that belong to it. Putting in place digital inclusion policies, like the PMC, targeted to populations living in vulnerable contexts, aims to provide skills and tools to empower women to make the best decisions on their development. For example, women stuck in abusive relationships could decide to report violence situations, move to a shelter, or access government support in child custody and protection.

The fourth and final aspect for selecting Ecatepec is violence and homicide against women. According to the Mexican Commission on Human Rights Defense and Promotion[30] (CMDPDH, for its name in Spanish), 922 cases of homicides with feminicidal characteristics were registered in the State of Mexico from 2005 to 2010. On July 2015, the National System of Prevention, Attention, Sanction and Eradication of Violence against Women decided to emit a Gender Alert for eleven municipalities of the State of Mexico, with Ecatepec among them.

In general, Ecatepec Estado de México was selected as a case study location due to a combination of suitable socio-cultural and demographic reasons. Its proximity to Mexico City, which facilitated field work and my weekly observation of the participants in the learning program. The vulnerable conditions in terms of income, gender stereotypes and public safety presented the socio-cultural context where public policy intervention could provide the most benefit to participants of this research.

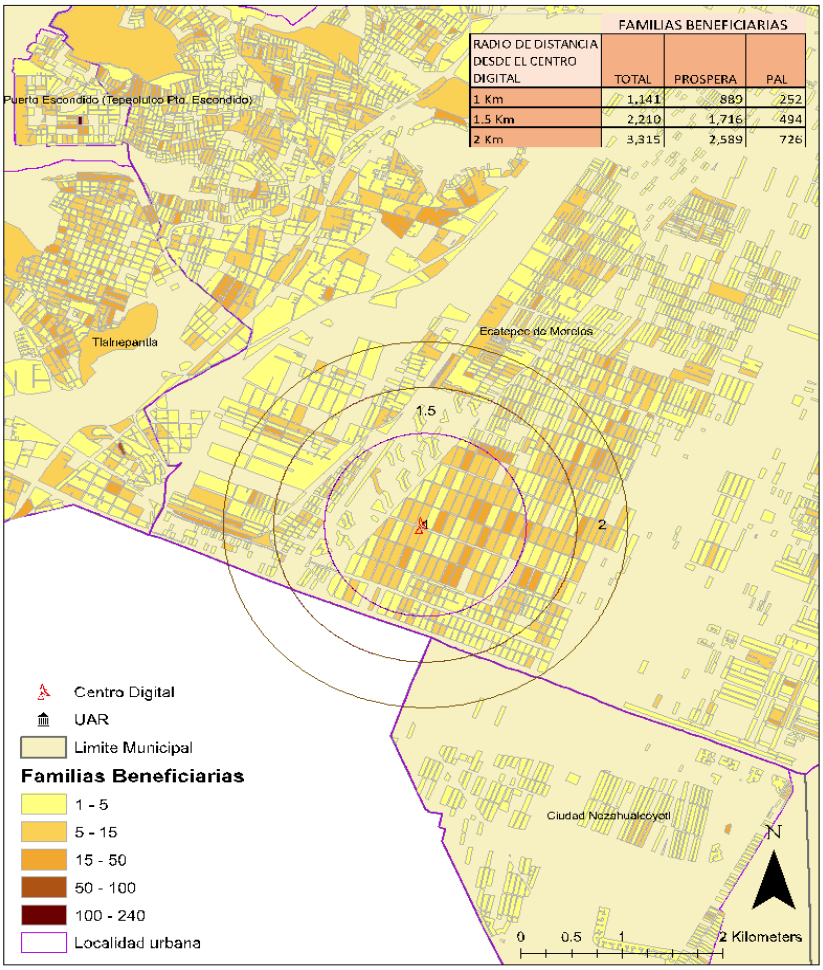
[30]CMDPDH is a civil, secular, autonomous and independent organization, founded in 1989. It has an advisory status to the Organization of American States and the United Nations Organization. It is a member of the International Federation of Human Rights. It belongs to several Human Rights protection networks, such the International Criminal Court Coalition, the National Citizen Femicide Observatory, the Justice System Citizen Observatory, the International Network for Economic, Social and Cultural Rights and the International Coalition of Human Rights Organization of the Americas. For more information go to http://cmdpdh.org/quienes-somos/

3.5 Data source and analysis

3.5.1 Population sampling [31]

As previously mentioned, the sample population was selected from a group of women between 18 and 55 years old who live in urban poverty conditions near the facilities of the PMC, and were beneficiaries of the main Mexican program of poverty alleviation, PROSPERA (2012–2018). In this program, the beneficiaries are organized in micro zones around the localities of the highest marginalization rates. The sampling starts with the selection of the micro zone nearest to the PMC digital center, as shown in Figure 15 and ANNEX A. With each micro zone comprising around 2,500 beneficiaries, a simple randomized sampling was taken to invite 64 beneficiaries to participate in five PMC courses during the spring semester of 2017.

Figure 15. Sampling map to select participants close to the PMC of Ecatepec, State of Mexico

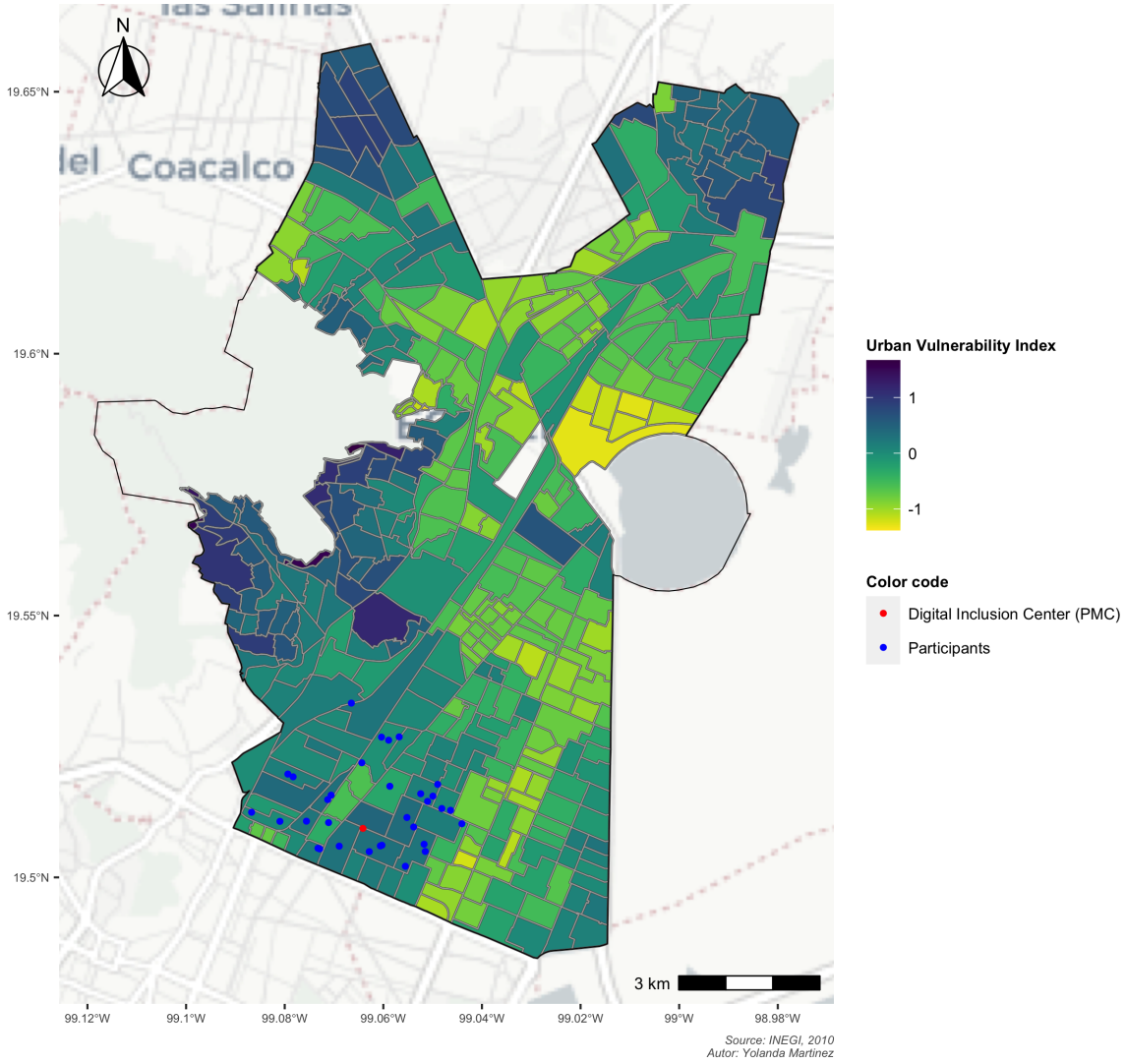


Note: Authors´ elaboration with data from PROSPERA Program 2012-2018.

[31] The statistical tests that determined the random invitation for participation and ethical implications were advised by Dr Alejandro Moreno, a prominent researcher, professional pollster and full-time scholar at the Technological Autonomous Institute of Mexico (ITAM, after its name in Spanish). At the same time, I received the technical guidance of Dr Alberto Simpser, Economist, Political Scientist and Engineer Scientist who specializes in field experiments. He is also a full-time scholar at ITAM.

Figure 16 shows Ecatepec's vulnerability map, pointing in red the location of the PMC and in blue the location of the participants of this research. In close proximity to Mexico City, Ecatepec has particularly high density since many people work in Mexico City but live in Ecatepec. It is also a municipality with a high rate of urban vulnerability, as shown in Figure 16. These characteristics indicated a suitable location for the PMC in terms of the number of potential beneficiaries of the digital inclusion courses.

Figure 16. Ecatepec´s vulnerability map



Note: Author's elaboration based on INEGI (2010). Censo de Población y Vivienda 2010. Retrieved 1 October 2020, from https://www.inegi.org.mx/programas/ccpv/2010/. Data is from 2010 since is the latest available in shape files at block level.

3. 5. 2 Descriptive Analysis

The descriptive analysis of this research relies on data collection through the Digital Inclusion Survey (DIS) – see ANNEX B – an instrument applied to study participants before the intervention, immediately after the intervention, and seven months after the intervention, in order to identify changes in Internet usage. The DIS was adapted from the 'National Survey on availability and usage of ICT in households' (ENDUTIH, for its Spanish acronym), which measures the level of use and availability of ICTs in Mexico[32], and the Gigler questionnaire (2015).[33] The survey consists of six modules that describe people's ability to access and use of ICTs: (I) Communication patterns; II) Information needs; (III) the availability and use of ICT; (IV) Informational capacities; (V) Applied ICT use with subsection on the use of computer, the Internet and cell phone; and (VI) ICT for development (social, economic, political and personal) (See ANNEX C for guiding questions).

The DIS, seeking to avoid a desirability bias or demand effects, focuses on objective or factual questions; for example, "how many times a week did you use the internet?" These types of questions provide concrete responses rather than perception responses (to a question such as, "Do you think this course will be helpful in the future?"). It does not follow, however, that perception should not be measured, because it influences conduct and behavior (adopting digital habits, for example), which is relevant for the analysis. Therefore, this survey measured three realms: preference, use, perception. Complementary to the measure of perception in the survey questions, the qualitative analysis section (p. 49) describes extensively how perception of the participants was measured through focus groups and text mining techniques. As part of the instrument design process, the DIS was tested prior to the launch of the PMC, piloting the instrument with people demographically similar to those who later took part in the study. Small adjustments were made to the DIS in order to facilitate the understanding of certain questions.

Through this survey data, a descriptive analysis was conducted to compare information on Internet usage by women participants in the PMC across time. This information provided important insights in terms of preferences and facilitated the understanding of how different factors (such as demographic, economic or social characteristics) affect ICT adoption in the target population[34].

Data from the survey allowed me to focus on particular aspects related to the subjects' views on what was being asked. As Gigler wrote: "survey results reveal detailed information about the

[32] ENDUTIH is an annual survey implemented by the Mexican National Institute of Statistics and Geography (INEGI 2015). It is a probabilistic instrument (it can be generalized for the whole Mexican population), designed to collect statistical data about the use and availability of ICT in Mexico. It was applied in the second trimester of 2015 to randomly selected individuals who live permanently in Mexican territory and who are older than 6 years of age. In broad terms, it enquires on personal experience in the use of ICT. (INEGI s.f.)

[33] With reference to Gigler (2015), his ICT survey applied in Bolivia was designed to study indigenous peoples' perceptions about the impact of the uses of ICTs on their well-being. As can be noted, Gigler instruments correctly differentiate the impartation of ICT capabilities from its acquisition and from the level of enhancement of individual and collective wealth. In other words, they are close to being exhaustive when it comes to distinguishing and measuring the different elements of the ICT for development pathways.

[34] Past studies (Ferro 2010; González-Zabala, Galvis & Sánchez, 2015) have shown that several variables influence the way in which ICTs are adopted and used by a population; such variables cover a wide range of characteristics, including socioeconomic status, gender roles, demographic characteristics such as civil status, race, ethnicity, religion, cultural context or even social acceptance within a society.

different factors such as socioeconomic status, gender, and literacy that influence people's uses of and capabilities to use ICT" (Gigler, 2015). The descriptive analysis was complemented with focus groups and a facilitator interview in order to analyze in a closer and more personalized way women's learning experiences. Finally, text mining techniques were applied to focus groups´ transcripts to assess relevant topics in the participants' contexts.

3. 5. 3 Qualitative Analysis

The qualitative analysis of this study relies on data provided through organized interactions with the participants through focus groups and an individual interview with the course facilitator, as well as a direct observation of women in the classroom.[35] Focus groups were conducted at three different times in the study. Five focus groups were conducted before courses started, one when they finished and two more seven months later (Table 3). Focus group sessions were recorded with the participants' permission. This facilitated active listening from the researcher and further analysis over time to compare the advancement and changes in perceptions of women during the different courses and activities of the PMC. Focus group sessions were led by me with the support of PMC personnel and the production team responsible for the recording of the sessions.

Literature suggests that focus groups should be composed of 5 to 15 members, depending on the theme of the study (Hernández, Fernández-Collado & Baptista, 2006). While commercial or non-controversial topics can be discussed in large groups, other sensitive, controversial or delicate topics should be only addressed to small groups. A closer and intimate environment will help encourage the discussion of such topics (Folch-Lyon & Trost, 1981; Morgan, 1996). Following this theoretical guideline, focus groups in this research consisted of six to ten members each. This number represents a midpoint between a heterogeneous and homogeneous composition of the group, allowing considerable diversity of opinions to be expressed.

Table 3 summarizes dates and numbers of participants in each focus group session, which took one and a half to two hours each. Each focus group followed a topic guideline to organize the conversation areas during the session and according to the research objectives. See ANNEX E for outlines of focus groups sessions.

[35] The purpose of combining focus groups with individual interviews is to fully exploit the strength of both methods and also to reduce the impact of their weaknesses. Focus groups may be intimidating to some members and, therefore, some opinions may not be divulged. However, group interaction may help less eloquent members to express their ideas more accurately or recognize previously unseen insights. Interviews, on the other hand, provide a more personal exploration with the possibility of achieving a deeper understanding of variables; however, it is also easier to arrive at a dead end (Hernández, Fernández-Collado & Baptista, 2006).

Table 3. Focus group sessions

Session Type	Date	Participants
Pre intervention - Before digital courses started		
Session 1	January 27th, 2017	8
Session 2	January 27th, 2017	6
Session 3	January 28th, 2017	6
Session 4	January 28th, 2017	4
Session 5	February 3rd, 2017	7
Post-intervention follows up and learning process		
Session 1	July 18th, 2017	6
Facilitator interview	July 18th, 2017	1
Seven months after intervention (self-learning and usage in daily life)		
Session 1	February 19th, 2018	11
Session 2	February 19th 2018	8

Note: Table presents the sequence of focus group sessions and the number of participants.

Focus groups comprise "a research technique that collects data through group interaction on a topic determined by the researcher" (Morgan, 1996). In social and behavioral research, it is important to consider focus groups, since they provide opportunities to explore character matrices and internalized factors commonly hidden to the members of the group and the researcher. Interaction among members is highly encouraged since it may help other participants to better explain their own experiences, and it can itself be a tool for empowerment through the development of social networks.

Moreover, Folch-Lyon and Trost (1981) outline that focus groups can be conducted for clinical, phenomenological or exploratory purposes. That is, in clinical arenas, focus groups are employed to explore subliminal feelings; in the phenomenological arena, they are employed to study emotional reactions; and in the exploratory field, this method is used to analyze a reaction to a stimulus (Folch-Lyon & Trost 1981, p.443). In the current research, since it is intended to understand participants´ reactions to ICT, I also have employed focus groups to study emotional reactions to the stimulus.

Despite the above-mentioned advantages, these interactions also allow for distortions, since false information can be exposed. In this regard, groups should be relatively homogeneous in their age, gender and educational levels. A varied group might not create useful results since it would not be representative of the studied group. Additionally, wide differences among participants may inhibit the free expression of ideas (Folch-Lyon & Trost, 1981, p.445). In the case of this research, participants in the focus groups were all PROSPERA beneficiaries, randomly selected to participate in the program.

A final stage of qualitative data gathering was the facilitator's interview, which took place after the termination of courses. An interview guide was prepared in order to structure the conversation (see Annex E). The facilitator's role was key in understanding participants' learning processes, as described in the results section of this research. The facilitator provided very important insights on three aspects of the program: challenges in the learning context of the participants; reasons for drop out; and course arrangements at the PMC. The facilitator assigned to this research project was a full-time staff member and a founding employee of this particular PMC, with a deep understanding of the PMC operating model and pedagogical methods.

All focus group meetings, as well as the facilitator's interview, were video recorded to facilitate post-session observation and the integration of transcriptions. I then proceed to read, watch and analyze the sessions to codify and integrate themes and categories. Further, I applied a set of text-mining techniques to the transcripts that allowed me to compare and contrast manual coding with a more systematic text analytics approach. I considered this an innovation in my study design, since text mining techniques offer a variety of insights on social partners, sentiment analysis and preferences towards the phenomenon under study.

Text mining, or automated text analysis, is a series of research techniques that uses computational analysis to demonstrate patterns in sets of texts. Various philologists have used computer techniques for textual and corpus analysis of a text. In this area, there is a programming language R, which is an open source (and free) program for statistics, but which has been used by various philology studies for linguistics (Baayen, 2008; Gries 2013; Desagulier 2017; Levshina, 2015; Winter 2019) and literature (Jockers, 2014), and also from any other field within humanities (Arnold & Tilton, 2015). The following table describes the different text mining techniques applied to the focus group´s transcripts of this research.

Table 4. Algorithms and functions for text mining

Algorithm type	**Results**
Basic text manipulation: (string) these commands correspond to the basic manipulation of a text. Strings often contain unstructured or semi-structured data. The most important packages used were "tidyverse", which allows import of multiple packages that facilitate the analysis and manipulation of data, and "tidytext", which contains the tools to manipulate text. Regular expressions in neat and clean text allow me to analyze patterns in the text through concise language.	*Linguistic Corpus:* In the field of text mining or automated text analysis, a word is a sequence of characters, that is, any letter or any number and the underscore, located between two blank spaces, or between a blank space and a punctuation mark. This considers reading the texts, cleaning them of accents, empty words (those with little value for analysis, such as some prepositions or fillers) and spaces, then dividing them into paragraphs and words, generating the semantic database to be analyzed.
Frequency analysis: the algorithm counts each of the occurrences of each semantic word in the text.	*Word cloud:* graphing or mapping of the linguistic corpus, which allows visualization of the most frequent and important terms for the analysis of the text.
Sentiment analysis applied to literature: a set of computer techniques used to automatically classify a text with a positive or negative sentiment, from a semantic approach and with the knowledge of authorship. The frequency of the terms is examined for their positive or negative value within the analyzed text. This technique required me to review the dictionary of classification to make adjustments according to the context of this research. Sentiment analysis is a powerful tool in qualitative research, enabling better understanding of positive and negative perceptions of participants towards the particular topic of study.	*Sentiment Analysis Graph:* by means of a bar graph, allows visualization of how many words (sentiments/emotions) have a positive value and how many have a negative value in the corpus of the text.
Frequency of terms (TF) for sentiment analysis: it corresponds to the count of the times that each word or term appears in the text,	*Contribution to Sentiment:* graph of the linguistic corpus, where the most characteristic words of the text (or keywords) are found

according to the sentiment assigned.	according to the corresponding sentiment (positive and negative), thereby contributing to the sentiment analysis.
Inverse Document Frequency (IDF): algorithm used to evaluate the frequency of the word throughout the corpus and to evaluate how common or unusual a word is within a corpus. This metric is calculated by taking the total number of documents in the corpus, dividing it by the number of documents that contain the word and calculating the logarithm. Subsequently, the score was calculated by placing a multiplication of -1 on the negative words, so that the score for positive words would have positive values and the score for negative words have negative values.	*Score Table in the Linguistic Corpus:* metric obtained per paragraph of the corpus composed of each document. Each paragraph is assigned a positive or negative assessment to prepare to transform qualitative information into quantitative information and proceed to represent the sentimental evolution of the corpus.
Narrative trajectory: represents the sentimental evolution of each of the documents in the corpus, which allows observation of the line (curve) of the narrative trajectory (Archer & Jockers, 2016).	*The form of the History of the narrative:* graphics representing the sentimental evolution of the linguistic corpus for the documents analyzed.

Note: Table presents text mining techniques applied to the focus groups transcripts.

I applied text mining techniques at five different points in order to compare results as the intervention developed. Firstly, using all focus group transcripts from the pre intervention (diagnosis) phase; secondly, using transcript of the focus groups at the end of the courses; thirdly, using the transcript of the facilitator interview; fourthly, using the transcript of the focus groups taken seven months after the end of the courses and; fifthly, using an integrated transcript with all focus groups. The results sections explain in detail the outcomes of this analytical exercise. The text mining analysis complemented the coding analysis and theme categorization, achieved through various readings of the transcripts.

3.6 Policy intervention

The PMC curriculum designed by ENOVA was structured as introductory courses on how to use the Internet, a computer, office solutions, personal finance, robotics and English as a second language. Course content included, but it was not limited to, how to use social networks, cybersecurity tips,

digital design, digital innovation and entrepreneurship. As part of this research design, I selected a sequence of four introductory digital skills courses and added a personal finance course, given the vulnerability of participants and their socioeconomic context. The content of this last course was reviewed and adjusted to the average amounts of income and expenditures for this segment of the population.

These five courses ran from January to June 2017 as the learning intervention stimulus in this research design. The sequence of the courses was as follows:

Table 5. PMC course descriptions

Name of the course	Description
Getting to know the computer Feb 7th – Feb 23rd 2017	Trains for basic computer use that facilitates everyday life processes
Getting to know the Internet Feb 28th – March 16th 2017	Aims to discover some of the data and services that the Internet provides that meet several needs
Getting to know Office March 21st – April 27th 2017	Aims at developing initial skills for the use of Google office software, such as word processors, spreadsheets, presentations and drawing editors
Explore the Internet May 2nd – June 8th 2017	Aims at developing cyber cultural skills to communicate with others by creating and publishing multimedia content on social networks and blogs
Personal Finances June 27th – July 13th 2017	Aims at exploring personal financial goals by organizing income flows in a monthly budget

Note: Author´s elaboration.

Following ENOVA's content design methodology, each of the five courses was structured according to three considerations: 1) which competence was taught; 2) in which context, discipline or area it is taught; and 3) to what level it is taught. These three steps should be clear when the

competences are being imparted. Therefore, the courses' content in those regards is explicit. For each course, there is a clear description of the topics they deal with, as well as the competences, objectives, learning tasks, instructional techniques, didactic resources, evaluation indicators and time in minutes that comprise them. The Personal Finance course has a slightly different outline than the rest as it is a complex skill course.[36] Annex G presents in detail the content, competences and grades (evaluation rubric) of the different courses. As part of the instruction method, these matrices are regularly revised at the PMC since their standard application provides important elements for decision making in curriculum design.

Three evaluation instruments were used in order to learn about the students' progression: 1) a Product Grid to grade the practical use of the competences during each course; 2) a Competence Grid to identify which, and to what extent, competences were acquired after taking the course; and 3) a Final Evaluation. This selection observes ENOVA's evaluation logic, as well as that of Cobo (2016), which states that hybrid methodologies that combine different evaluation techniques to measure active learning in the form of critical thinking, motivation and metacognition are better than sole instruments because the combination of different measurements enriches the quality of information measured. More than combined instruments, he urges a battery of activities and evaluations that allow for a reliable range of results about the student's achievement and knowledge acquired. The evaluation of participants is detailed in the results section of this research (see section 4.2.1. in this document).

3.6.1. Digital Skills Acquisition Framework

The PMC curriculum was custom designed for the PMC by ENOVA. The blueprint of the courses followed ENOVA's Digital Skills Acquisition Framework, based on three theoretical bases: (A) the competencies approach, (B) the Merriënboer model, and (C) learning by projects.

(A) Learning by competences

A competency is a skill linked to a social practice of certain complexity that can also be successfully mobilized into another context (Perrenoud, 2006). "It involves the ability to meet the complex demands, by drawing on and mobilizing psychosocial resources (including skills and attitudes) in a particular context" (Salganik, 2003). In other words, a competency is the ability of putting knowledge, whether conceptual, procedural or aimed at problem solving, into action in any given situation. In summary, competency is the capacity of doing.

Learning by competences allows the use of knowledge to be flexible, expanding information boundaries to different disciplines or areas and generating new one in the process (UNESCO, 2008; OCDE, 2010). This broadening of limits allows us to conclude that, in line with Amartya Sen's definition of development, learning by competence is an agent of change in peoples' lives (Sen,

[36] The Personal Finance course is divided into: topics, objectives, teaching activities, learning tasks, learning objects with factual information, learning objects with procedural information and evaluation and time in minutes per content subject.

2009). Competency-based learning, according to John Dewey, is also understood as education based on learning through action and experimentation that is attentive to the social needs of the moment (Jover & Garcia, 2015). To this end, the PMC was conceived as a place for digital experimentation and community learning with courses open to all population groups.

(B) Merriënboer learning model

The five courses selected for this policy invention were designed by ENOVA according to the Merriënboer model (Merriënboer, 1997). ENOVA uses this model linking it with modern advances in learning methodology[37], and its ample recognition in education; for instance, it is quoted more than 24,500 times in the Google Scholar Academic database (Google n.d.).

Merriënboer gained scholastic respect after proposing that four elements are necessary to achieve effective learning of complex cognitive skills. Each of these elements has a crucial function in the learning process, and thus should not be ignored.

1. **Fact information**. There is a need to include concepts related to the subject treated and to help understand the utility of such concepts to achieve effective learning.

2. **Procedural information**. Handing out instructions to be followed to achieve specific tasks or goals proves to be crucial to effective learning.

3. **Simple tasks**. The practice of the above, with close follow up on the student, allows for the familiarization of knowledge and its utility in life circumstances.

4. **Complex tasks**. Further practices that convey more profound applications are the last piece of the long-effective learning puzzle.

(C) Methodology by projects

In addition, to exploit the potential of both learning by competencies and Merriënboer models, ENOVA designed courses based on a methodology by projects. In broad terms, the achievement of a set of individual or collective goals (projects) allows for substantial learning, as it demands exertion of traditional knowledge and competence exercise (Peñalosa, 2008).

In the terms of Perrenoud (2000), a project is a collective enterprise oriented towards a concrete production of a task, in which all students can get involved and play an active role. It also fosters conceptual and procedural knowledge and favors learning that can be mobilized to one or more disciplines. This kind of learning is what we have already referred to as transversal competences.

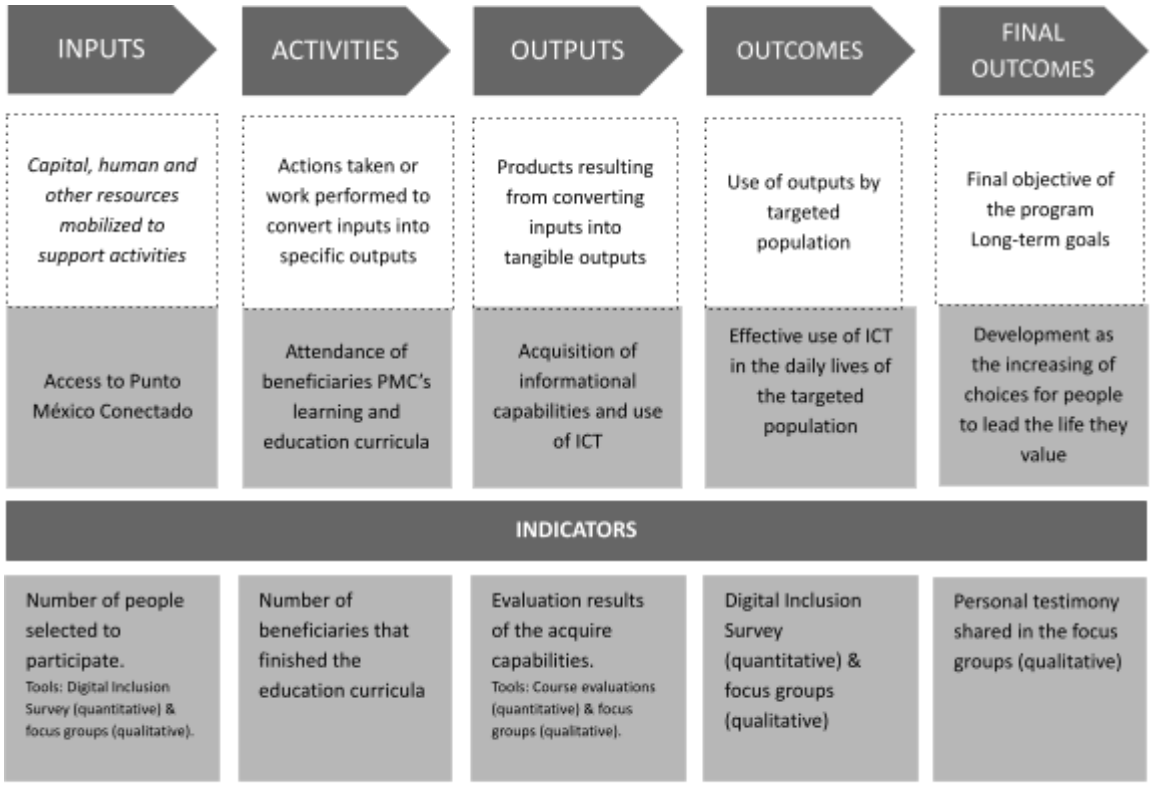
[37] Although the Merriënboer model was published in the 1990s, ENOVA considers it recent when compared to other broadly used instructional designs, such as ADDIE, which was created in the 1960s.

In this way, learning by projects forces the student to confront unprecedented challenges, unseen within ordinary schoolwork. Hence, the student has an opportunity to acquire greater awareness of his/her knowledge and his/her capacity to use it and to further grow it (Perrenoud, 2000). The PMC curriculum considered the learning framework designed by ENOVA based on the positive learning outcomes at the RIAs, where this learning model has been implemented since 2008.

Chapter IV. Research results

The results section presents women's response to the policy intervention/stimulus following the "*Results chain model",* described in the methodology section of this research (see section 3.1). In this model, the inputs considered the first DIS results, the types of women participating in the program, the findings from the focus groups, and the text mining analysis of the focus group transcripts. The chain model also contains the activities account for participants taking the courses and attendance of each course. The outputs considered learning performance of participants, results of the second DIS, the focus group after finishing the program, the facilitator's feedback on the policy learning experience, and the text mining analysis of the interview transcript. Final outcomes were captured by the third DIS, the focus groups testimonies seven months after finishing the program, and the text mining analysis of the focus group transcript.

Figure 17. Results chain model



Note: Author´s elaboration based on diagram of Results Chain from Impact Evaluation in Practice from the World Bank.

Each subsection of the results section has been grouped according to the main themes and categories that emerged from the coding exercise of the focus groups and facilitator interview transcripts. Table 6 shows the final set of themes and categories.

Table 6. Coding exercise

Subsection name	**Theme**	**Categories**
4.1 In search of autonomy in ICT usage	Motivations to participate in the program	a) Gain independence in usage b) Cover family and their own informational needs c) Improve microbusiness
4.2 Beyond digital skills: building confidence and self-esteem	Performance of the participants	a) Digital skills acquisition b) Self-esteem c) Self-confidence
4.3 Role of the facilitator in the learning experience	Learning experience	a) Facilities location b) Facilities design c) Learning curricula d) Course facilitators
4.4 The rise of a new generation of digitally empowered women	Consequences of ICT adoption	a) Empowerment b) Proactivity and motivation c) Active producer of content and innovation
4.5 Barriers to participate in the program Note: Author´s elaboration.	Barriers to participation in the program	a) Gender stereotype and macho culture b) Public safety c) Health d) Care of children and elders

Note: Author´s elaboration.

In section 4.1, I present the DIS results as a pretest of the policy intervention, the typology of participants that accepted to participate in the program and their motivations for doing so. In section 4.2, I present the learning performance of the participants in the program, and their learning experience and outcomes. In section 4.3, I address the role of the facilitator in the learning experience of participants in the courses, as well as the facilitator´s feedback on the policy intervention. In section 4.4, I review the development impact of digital learning experiences according to women typology. In the final section, 4.5, I address the cultural and social contexts that inhibit participation in the program.

4.1 In search of autonomy in ICT usage

The following section addresses participating women's initial usage of Internet and ICT measured through the DIS; it also presents the typology of participants, allowing a deeper understanding of participants' social, economic, and cultural contexts, that as Madon, et al. (2009) describe, shape people's inability to value and use ICT effectively. Finally, this section presents participants'

motivations to participate in the program, as extracted from the coding exercise and text mining techniques and is illustrated with women's testimonies that emerged during the focus group sessions. Understanding women's motivations is key under the theoretical framework, that choice making becomes the primary source of development (Bailur & Gigler, 2014). The complementary usage of descriptive, testimonial and text mining analysis allowed a more holistic approach in the understanding of women's learning experiences.

4.1.1 Women's ICT usage before entering the program

Participants completed the Digital Inclusion Survey (DIS) three times over the duration of the program: before the courses started, when courses finished, and 7 months after the courses ended. As mentioned in the methodology section, the DIS was adapted from the 'National Survey on availability and usage of ICT in households' (ENDUTIH, for its Spanish acronym), which measures the level of use and availability of ICT in Mexico, and the Gigler questionnaire (2015). The number of people answering the questionnaire depended on the drop out effect during the PMC program from 64 invited to participate, 27 answered the DIS questionnaire, 19 the second wave of the survey, and 7 in the final round and phase of the courses.

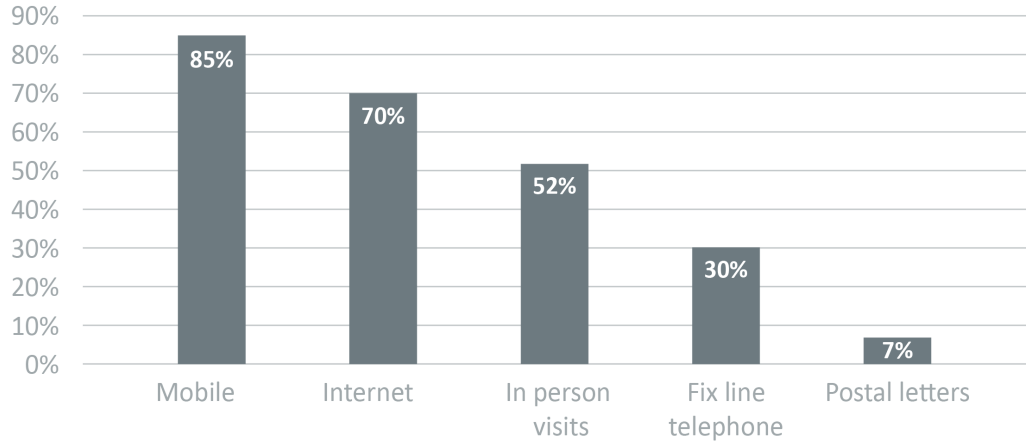
The survey consists of six modules that allow the gathering of information related to personal usage: Module 1 – Communication patterns; Module 2 – Information needs; Module 3 – Availability of ICT; Module 4 – Informational Capabilities; Module 5 – Personal usage; Module 6 – ICT for Development.

Next results from this first wave of data allow us to better explore digital ex/inclusion and describe the women's personal usage of ICT before taking any PMC courses.

Module 1. Communication patterns

The most frequent (in order of preference) means of communication with friends and family reported by participants were mobile, the Internet, in-person visits, fixed-line telephone and postal letters. These responses demonstrated that even though the participants in this study live in impoverished conditions, telecom services are within reach and widely used for communication purposes. Furthermore, mobile communication surpassed fixed lines significantly. Also, although postal services appeared to have low relevance as a means of communication, further research could evaluate its use for the delivery of products purchased online.

Figure 18. Participants' means of communications with friends and family

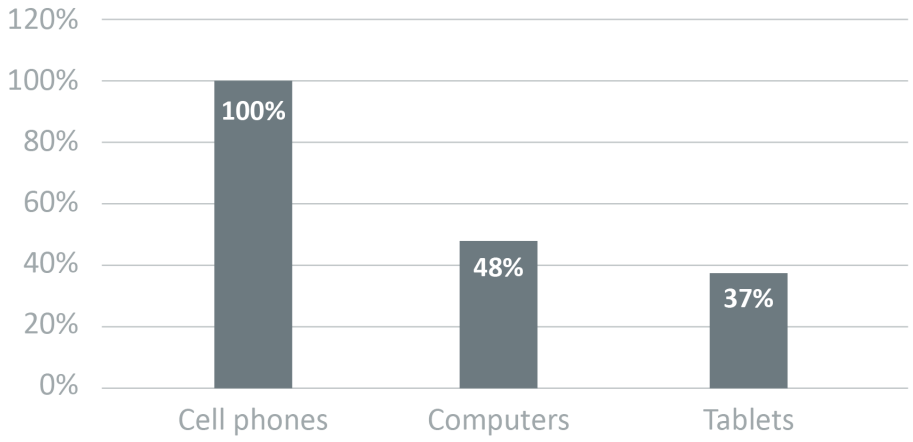


Note:

Author's elaboration based on data from the DIS. (2017).

In terms of devices used during the six months prior to the survey, all women (100%) confirmed cell phone use, followed by computers (48%) and tablets (37%), as shown in Figure 19. Economic constraints are one of the reasons for the concentration in cell phones, as further questions explored. However, the fact that cell phones are widely used provides valuable information regarding educational content and service delivery channels for these population segments.

Figure 19. Devices used by participants in the last six months

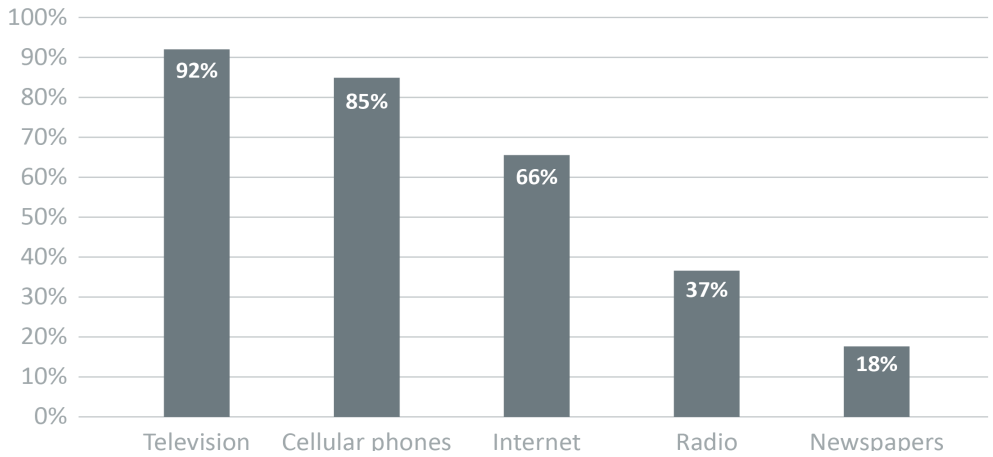


Note: Author's elaboration based on data from the DIS (2017).

Another important aspect of the pre intervention questions was the means preferred by women to access information. To my surprise, television was the most used, followed by cell phones, then the Internet, followed by radio and newspapers (Figure 20). Although TV is widely used, other traditional mass media were reaching far fewer people. As with findings on digital device use,

these responses are very valuable to policy design as they provide insights regarding communication channels with vulnerable groups.

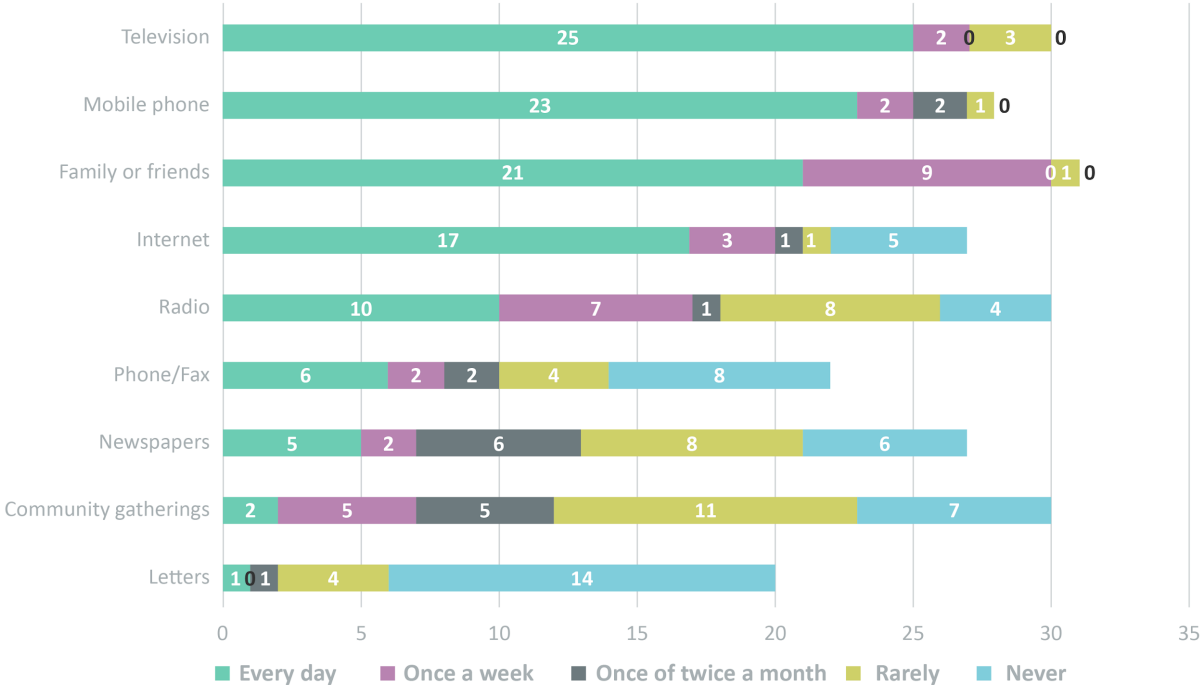
Figure 20. Means to access information



Note: Author´s elaboration with data from the DIS (2017).

As for the frequency of information received through different means, television, cell phone, and family and friends were cited as everyday sources of information. Radio and community gatherings were mentioned once a week.

Figure 21. How often do you receive information through:



Note: Author's elaboration based on data from DIS. (2017).

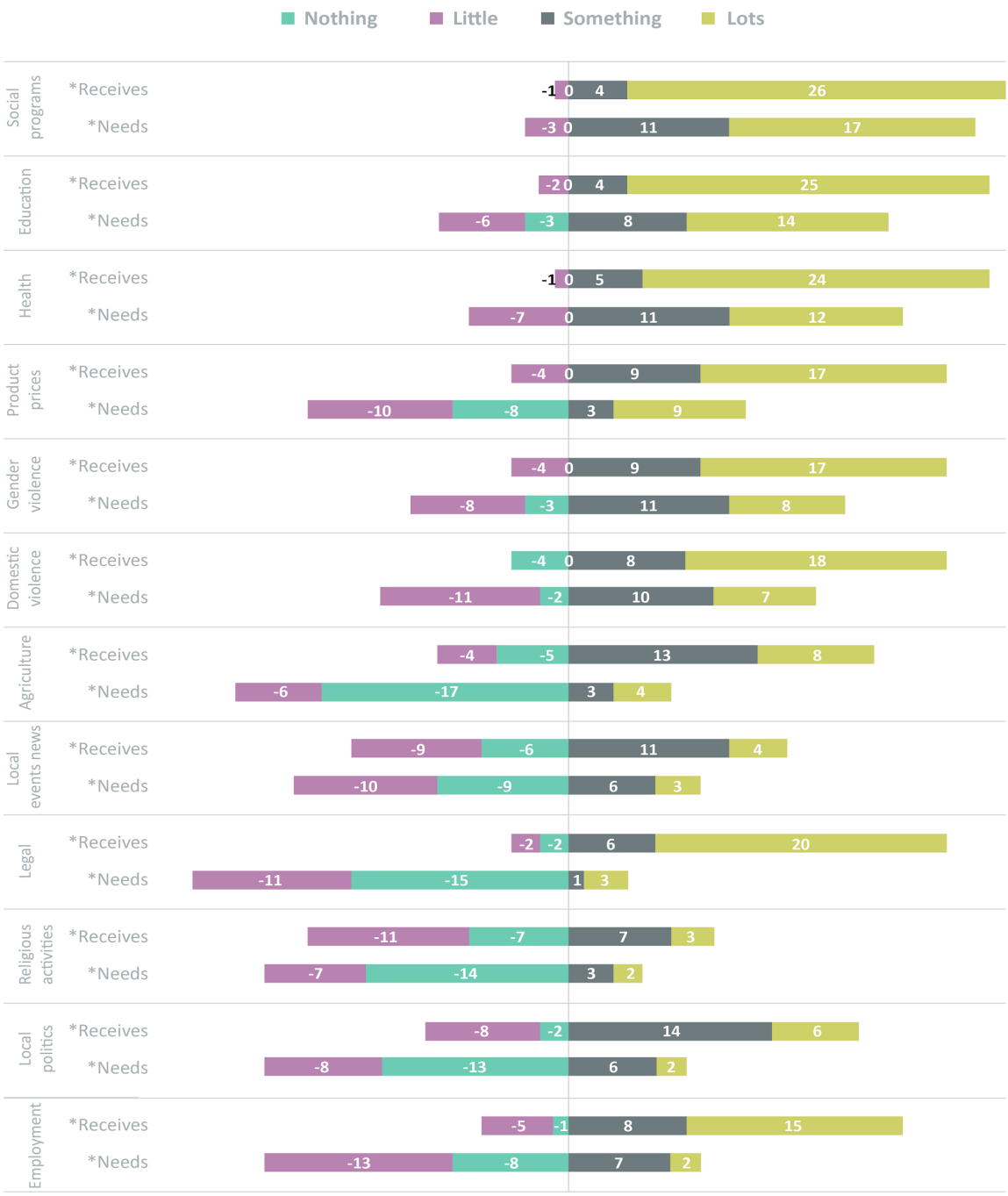
It is important to note a limitation in how the *Being informed* question was asked in the survey, since it did not capture whether, or how often, radio or TV programs were accessed through mobile apps. The structure of the questions in the DIS was kept the same in order to be able to compare responses with those obtained at the national level in future research.

To summarize the findings of this communication patterns module, the cell phone appears to be the preferred and most used channel of communication by women within this segment of the population. Cell phone usage is significantly higher than that of computers or tablets, and very close to television in terms of a means to receive information. This pattern is mostly related to the cost of the device, which is linked to the economic constraints of participants in this research (as will be further discussed in the following sections). In terms of digital inclusion and learning experience, the primary use of cell phones demands the design of digital services that are mobile first in terms of digital experience, although content should correctly display for multiple devices. For the PMC learning environment, understanding participants' most used devices allows them to adjust learning content for the mobile experience and to prioritize introductory courses on how to use mobile devices.

Module 2. Information needs

Also of important relevance to digital usage is the type of information that participants affirm they need, versus what they actually know. Their responses confirm that the information on social programs is balanced and they receive the information considered necessary. This is consistent with the fact that all respondents were beneficiaries of the PROSPERA program and regular beneficiaries of Mexican public policies (as members of a vulnerable group). The category information about employment in Figure 22 appears as unbalanced because the participants responded that they received information but had not a significant need.

Figure 22. Information gap - What type of information do you * on the following topics?

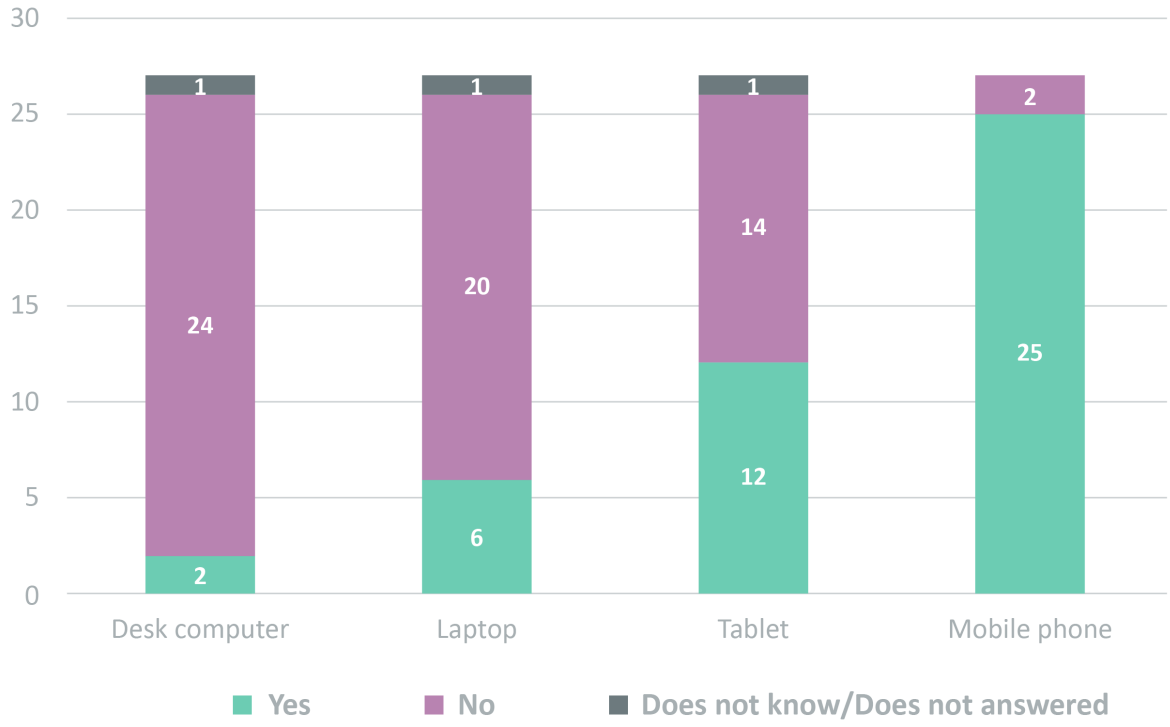


Note: Author's elaboration with data from DIS. (2017) Questions 2.1, 2.2. Graph presents answers to the question What type of information do you * on the following topics?

Module 3. Availability of ICT

Although households in Ecatepec have low access to ICT – only 49% of the municipality's households have access to a computer (INEGI, 2015) – 92% of respondents reported having a cell phone, with 60% of them having a smartphone (Figure 23).

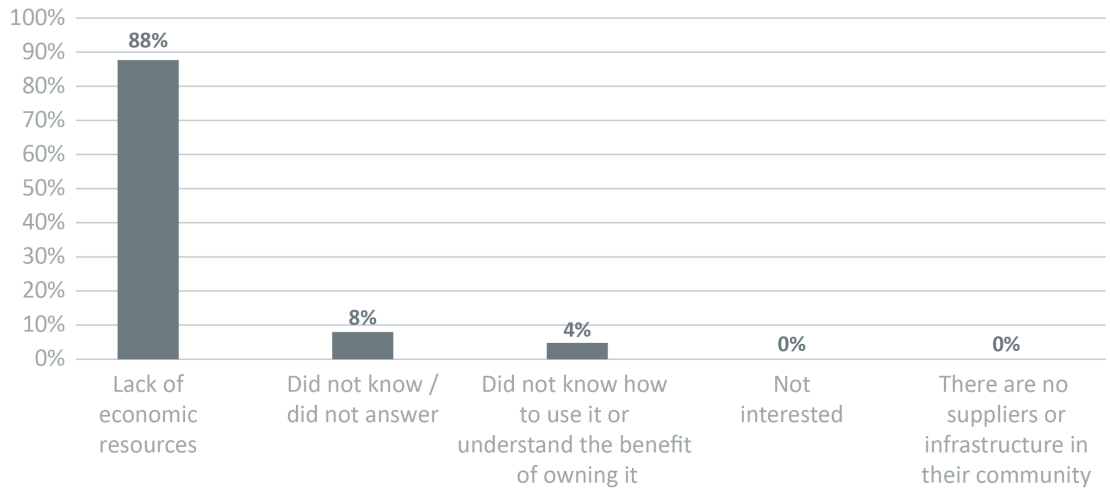
Figure 23. Ownership of devices among respondents



Note: Author's elaboration with data from DIS. (2017). Question 3.3. Graph presents answers to the indication of ownership.

The cell phone as the primary communication device owned by participants makes it the main channel for delivering online educational content, and government and private digital services. Tablet comes in second place of ownership. Therefore, *Mobile First* is a design principle that should guide content and service design. In terms of reasons for not owning a communication device, lack of economic resources was reported as the primary cause (Figure 24).

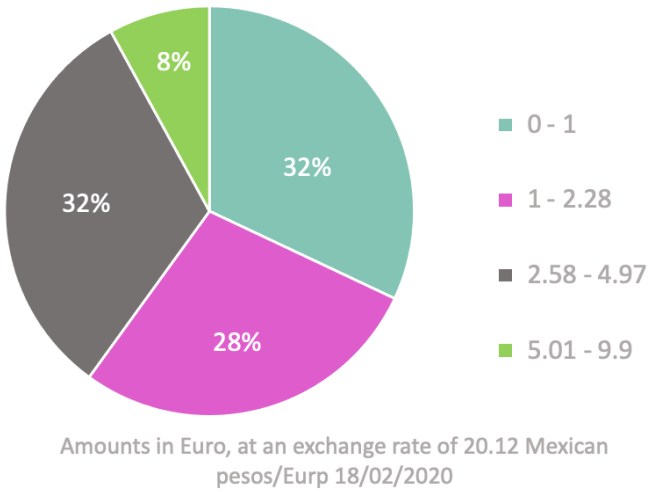
Figure 24. Participants' reasons for not owning a device



Note: Author´s elaboration based on data from DIS. (2017).

Economic constraint, then, is an important factor that determines how women access telecom services. Prepayment for services is the most common form of payment (80% of respondents, according to Q5.22, DIS), with an average monthly expenditure of three to five euro (Figure 25).

Figure 25. Average monthly spending on cell phone services by women respondents participating in this research



Note: Author's elaboration with data from DIS. (2017). Question 5.23.

According to the OECD (2017) report on Telecommunications in Mexico in 2014, the average monthly expenditure of the poorest 10% of households on fixed and mobile communications represented 10% and 6.2% of their monthly income respectively. The same expenditure represented only 1.8% and 1.2% of the monthly income of the wealthiest 10% of households in Mexico. Competition in the telecom sector represents an important policy measure to reduce service cost.

Returning to the results of the DIS in terms of Internet technologies, 72% of women reported using their smartphones to connect to the Internet (Q5.24 DIS); 62% use Wi-Fi and 24% use a cellular network (Q5.25 DIS). Results showed that 52% of women have an Internet service at home; most (73%) of those who do not have it claimed a lack of economic resources as the main reason. Consistent with the recent boom of coverage in telecom services (described in previous subsections), nearly two thirds (65%) of women had been using the Internet for less than 2 years, of which 83% used it between once a week and every day, mainly at work (67%).

Surprisingly, only two participants claimed to have used the Internet at a public place at no cost. This is an important finding, since there are more than 108,000 Wi-Fi areas (schools, medical clinics and government buildings) in the country that provide free Internet access. This reveals an opportunity to better target the promotion of these services, and as such, a policy recommendation has been made on this opportunity in this research.

Module 4. Knowledge of ICT usage

To understand the baseline prior to the intervention in this research, the DIS included questions on ICT awareness among participants in the topics of the curricula, such as different usages of the Internet, office tasks, basic computer concepts, and personal finance. Of women answering the DIS, 85.15% indicated that they knew what the Internet is, and 66.66% knew about social networks. However, even basic knowledge of ICT was lacking among many: only 29% claimed to know what a web page is, and just 18% knew what a text processor is; 22.2% knew about government digital services.

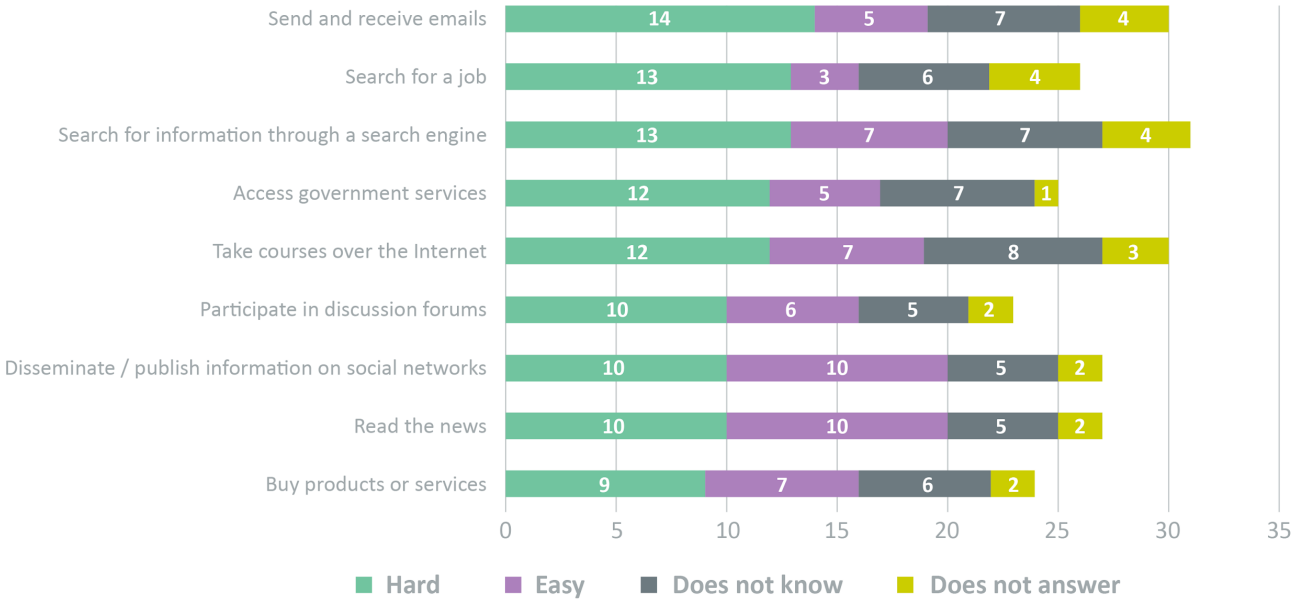
The high awareness of concepts such as “Internet” and “social networks” can be explained by two factors. First, due to the increase in coverage of telecom services and popular knowledge; second, by the type of telecom services most commonly contracted by women in this study, which are pre-paid (80%). In Mexico, most carriers offer prepaid services with unlimited access to social networks which makes services available to everyone with airtime.

In terms of online activities, 51.8% of women indicated sending and receiving emails as the hardest online activity from nine basic activities included in the DIS. The questionnaire considered a few questions about the use of ICT for daily activity in public life, such as searching for a job and e-governance. Nearly half of women affirmed they find it hard to use ICT to search information about jobs (48.18%) and make contact with government services (44.44%). The two easiest

activities to do online, as indicated by participants, were reading the news and disseminating/publishing information on social networks.

The response rate for the option "does not know" was high compared to other options in this question. This could be due to a low level of understanding of concepts like "taking courses over the Internet". It also demonstrates the significant gap between possible access and actual usage; for example, even though more than 50% of federal government services are available online, if people are not aware of them, they will not use them (Figure 26).

Figure 26. Level of difficulty when doing online activities according to Mexican women participating in this research



Note: Author's elaboration with data from DIS, (2017). Question 4.2. Graph presents answers to the question How difficult do you find doing the following activities online?

Module 5. Personal ICT usage

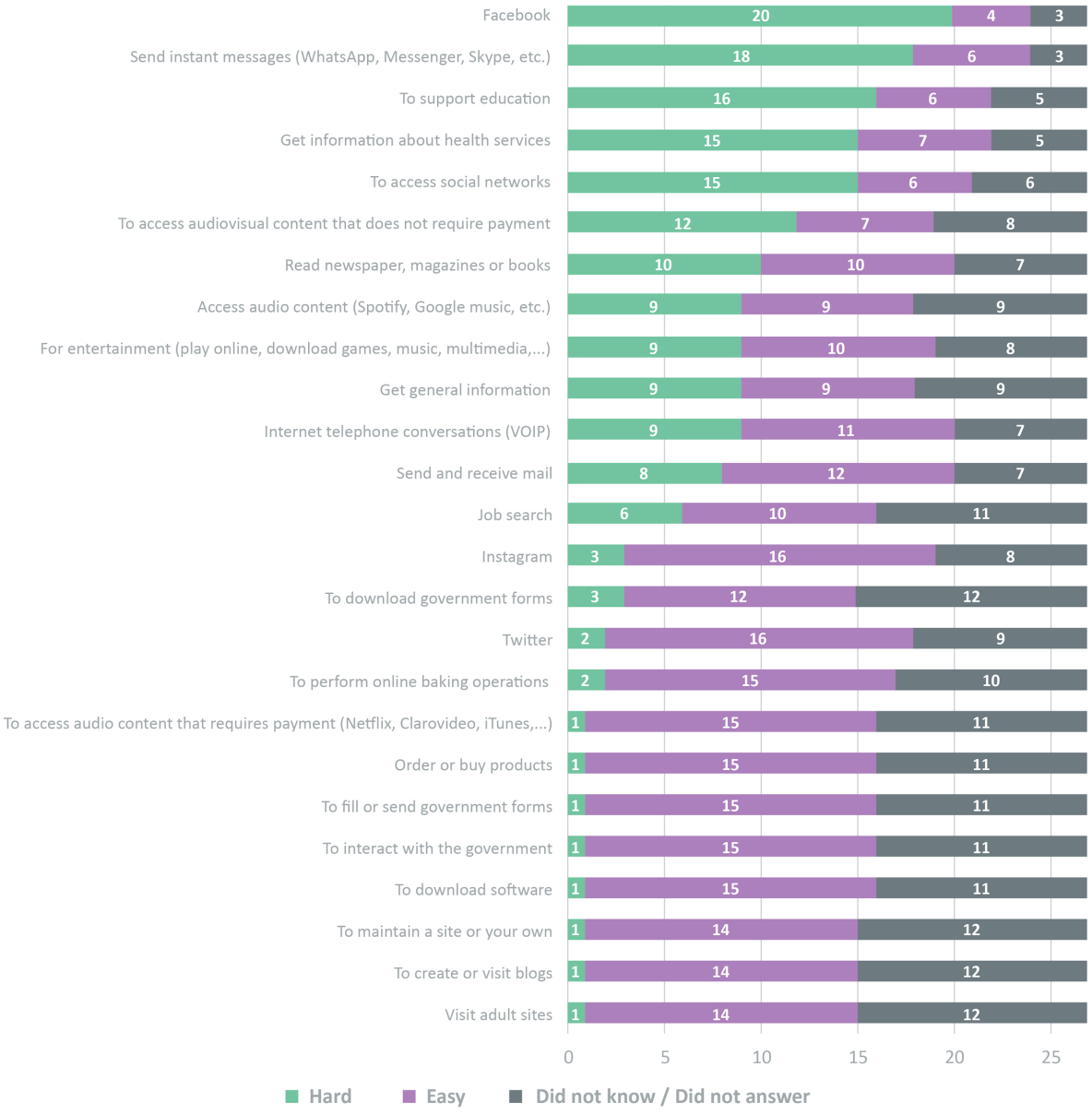
The next section of the DIS survey explored the utilization of ICT by women on their own, individually. Usage has been defined in terms of the time that women have been using the Internet and digital devices, as well as the type of activities they usually do on the Internet.

Regarding Internet-connected devices in the home, video game consoles were present in 56% of participants' households, considerably more than connected smart TVs (29%), and smartphones (14%). These three devices, although sophisticated, are very easy to buy in small payment installments at convenience stores strategically located in impoverished urban areas in Mexico. It is also the result of a credit bubble trap that has been growing significantly among people living in

vulnerable conditions, with borrowers ending up paying extremely high interest rates for basic appliances and products.

Results in terms of online activities carried out during the six months prior to the DIS (Figure 27) are consistent with activities shared in more detail during the focus groups sessions. Facebook appears as the number one activity, followed by instant messaging. This can be explained by the fact that 99.9% of Internet users in Mexico have a Facebook account (AMIPCI, 2017). The third activity is to support education, and in fourth place accessing information on health services. As will be seen in coming sections, poor health is an important constraint in this sector of the population, affecting people's productivity and -in the case of this research- the possibility for women to finish the courses. I analyze this constraint in more detail in section 4.5.

Figure 27. Online activities accomplished in the last six months prior to the DIS by Mexican women participating in this research

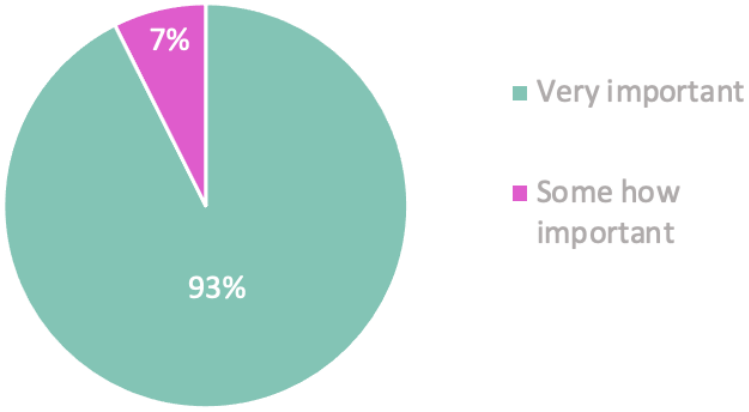


Note: Author's elaboration with data from DIS. (2017). Question 5.14. Graph presents answers to the question In the last six months, have you carried out activities of...

In accordance with previous results, complexity of Internet usage is correlated with a very low rate of activity. The more complex transactions of online purchases (Q5.15 DIS) and payments (Q5.16 DIS) were only made by just two and three women, respectively. When asked about perceptions of

their own digital competency, 77% of women claimed a basic level of knowledge (Q5.17 DIS), while 93% considered it very important for them to be trained in the use of the Internet (Figure 28). These responses suggested that participants recognized value in learning digital skills, that they were conscious of their low levels of competency and had precarious experiences in Internet usage.

Figure 28. Importance of training on Internet use for Mexican women participating in this research



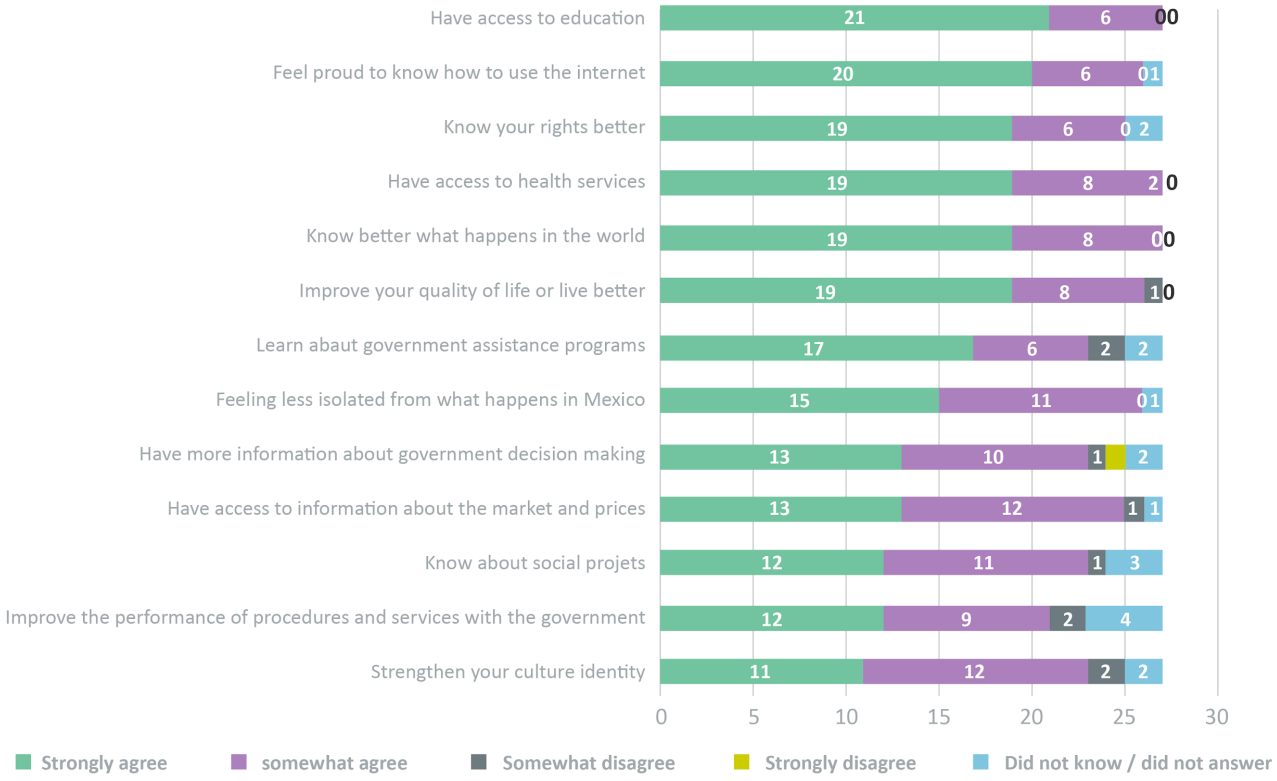
Note: Author's elaboration with data from DIS. (2017). Question 5.18.

Module 6. ICT for development

The final section of the DIS gathered information on ICT in relation to social, economic, political, and personal contexts. When asked how useful they considered the Internet for their development or life improvement, 81% of respondents claimed, “a lot”, while 15% responded “somewhat” (Q6.1 DIS), answers reflecting the challenges of the usage and value divide.

In terms of agreement with pre-determined usage options (provided in question 6.3 in the DIS), responses related to education, health, knowing one's rights and self-confidence (feeling proud). The option “To know how to use the Internet” received the second highest level of agreement (green color in Figure 29). However, more complex topics like strengthening of cultural identity, or improving the performance of procedures and services with the government, received the lowest number of responses (Figure 29).

Figure 29. Internet as an enabler according to Mexican women participating in this research



Note: Author´s elaboration with data from DIS. (2017). Question 6.3. Graph presents answers to the question "How much do you agree or disagree that the Internet allows…"

Summarizing the results of the DIS that was applied before the PMC Courses began (modules 1 to 6), data revealed that women participants relied mainly on the cell phone for accessing the Internet. Main usage of the internet was related to communication and information, whereas other activities such as sending and receiving emails, filling out government forms, or buying online, were performed only by two or three participants. Economic constraint is the primary factor for using a pay-as-you-go vs a 12-month plan. Women acknowledge the Internet allows them to have access to education and health services and exercise their rights. Women value ICT literacy and find it important for their development – and they know if they lack digital capabilities.

4. 1. 1. 1. Qualitative results analysis

Complementing the descriptive results in terms of usage, the collective nature of the focus groups allows for personal sharing of experiences, and the opportunity to explore participants' character and socio-cultural context. As mentioned in the methodology section, I conducted eight focus groups at three different stages in the study (before, immediately after, and seven months after the intervention). Focus groups comprised participants of this research and were directed by myself with the support of PMC Staff. Results from the first set of focus groups are taken into account for

this usage analysis section. The selected quotes were identified during the coding analysis of the transcripts and were grouped according to themes and categories previously described (at the beginning of the results section).

Figure 30. Photo of focus group three

Note: PMC. Photo showed participants from focus group three that took place on January 28th, 2017 from 10:00-12:00 hrs. [Figure] courtesy from the PMC team.

The focus groups contributed important findings that complement the DIS results, since participants made clear that their ICT usage corresponds more to family needs than their own. In general, the majority of participants of the five focus groups affirmed their use of digital devices primarily for communication. Other important uses were as means to gather information and keep it safe, like photographs or family memories; innovate in work activities; and the most frequent usage pattern in all focus groups, help their children with homework. They also shared experiences related to traditional gender roles, like their relationship with their husbands in terms of macho behavior and women's subordination, situations of violence, and safety incidents in the neighborhood.

The following quotes come from different participants in the focus groups. They illustrate different types of usage, and how family needs, specifically children's needs, motivate the effort they apply in accomplishing the courses. In order to better reflect the language used by participants as part of their social and cultural context, quotes in this research are presented in Spanish (the original language in which focus groups took place). In the accompanying translations I have attempted to retain the characteristics of language used by each individual participant. For a quick reference of the quotes in the transcripts, I used the abbreviation FG to refer to "Focus Group" followed by the number of the focus group session and the number of the page in the transcript where the quote was taken. Transcripts from the eight focus groups and the facilitator´s interview form part of the submission file of this thesis.

Examples of usage, expressed each by different participants:

"Por ejemplo, ahora ya información que vemos en las calles, letreros o anuncios, ya no anotamos, ahora ya sacamos foto a los avisos." (FG1, p. 1)

"For example, now [the] information that we see on the streets, signs or advertisements, we don't take notes, now we take photo to the advertisement" (FG1, p. 1)

"Por ejemplo, yo trabajo en un taller de costura y normalmente tratamos de sacar cada año modelos nuevos. Prácticamente trabajamos suéteres y hay veces que, este, en la computadora, el celular buscamos modelos de temporada y de ahí vamos copiando algunos diseños. Y ya no es necesario, ir por ejemplo ir a las tiendas y ver que modelos hay, ya con las imágenes que buscamos de ahí."(FG1, p.3)

"For example, I work in a small sewing manufacturer and normally we try to take out new models every year. We practically work sweaters and there are times that, on the computer, the cell phone we look for seasonal models and from there we copy some designs. And it is no longer necessary to go to, for example, to stores and see what models are there, with the images we look at there." (FG1, p.3)

*****

Example of importance, expressed by a focus group participant:

"Pues que ahora tener una computadora ya no es un lujo, sino una necesidad ¿no? Pa' tareas." (FG1, p. 1)

"Today having a computer is not a luxury, is a necessity, no? To do homework." (FG1, p. 1)

*****

These examples show how efficiency and productivity associated with the use of the Internet and computer devices (cell phone, tablet or computer) is valued in the daily lives of women. Being able to access and store information saves them time. In the case of the sweater manufacturer, accessing design options online is clearly a considerable time-saving exercise compared with commutes to multiple stores to view much smaller selections. In short, relevant usage increases adoption. This data confirms Amartya Sen's idea of development as the enriching of an individual's capabilities (Sen, 1999), as well as Christobel Asiedu's proposition that inclusion is not just about gaining access to ICT, but using ICTs to achieve certain goals (Asiedu, 2012).

To conclude this usage section, joint findings from the descriptive and qualitative methods showed that participating women in the program prioritized ICT usage to meet family needs (homework) rather than their own (work, health). Mobile is the predominant device to communicate and access the Internet over iPads or personal computers. In general, women know about the Internet,

consider it important to improve their life, but have basic knowledge on how to use it beyond information gathering. Results so far have provided important insights into women's usage of the Internet and their prioritization of family needs above their own.

4.1.2 Types of participants

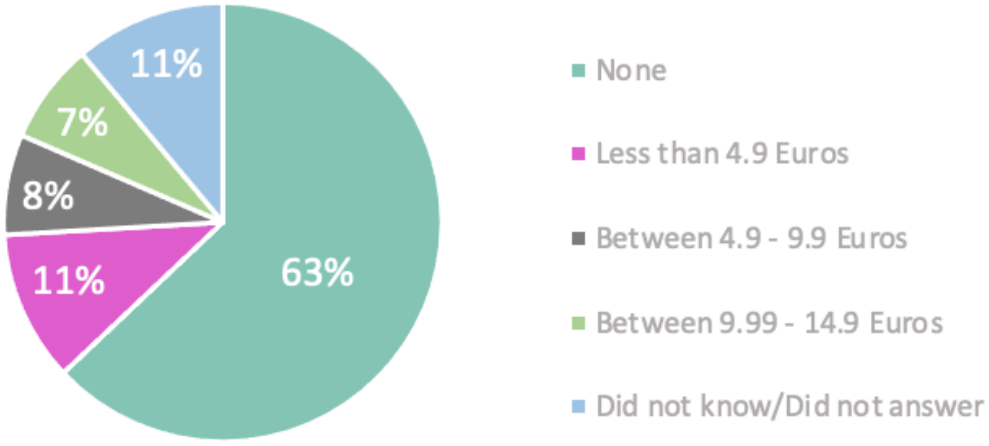
During the coding exercise, and complemented with the DIS results, I was able to identify attributes and characteristics of women trainees relevant to an understanding of their learning experiences throughout the course of the intervention. As referred to in the theoretical framework, these economic, socio and demographic characteristics of women provide a context that determines participants' everyday ICT usage, their motivations to participate, as well as their performance relative to learning objectives and ICT applications.

From the initial 64 participants that were invited to participate in the program, 32 participated in the first focus groups and responded to the DIS survey. Participants in this phase of the study were on average 41 years old. They have between 2 and 6 children with main concentration in 2 (9), 3 (5) and 4 (8); and two participants have no children (Q7.21 DIS).

The DIS results showed that the majority of respondents (80%) had upper-secondary education, and one participant reported undergraduate studies (Q7.3 DIS). Participants in the study had been on average 25 years out of a structured learning environment (school), an important aspect to consider in terms of how women participated in the PMC courses.

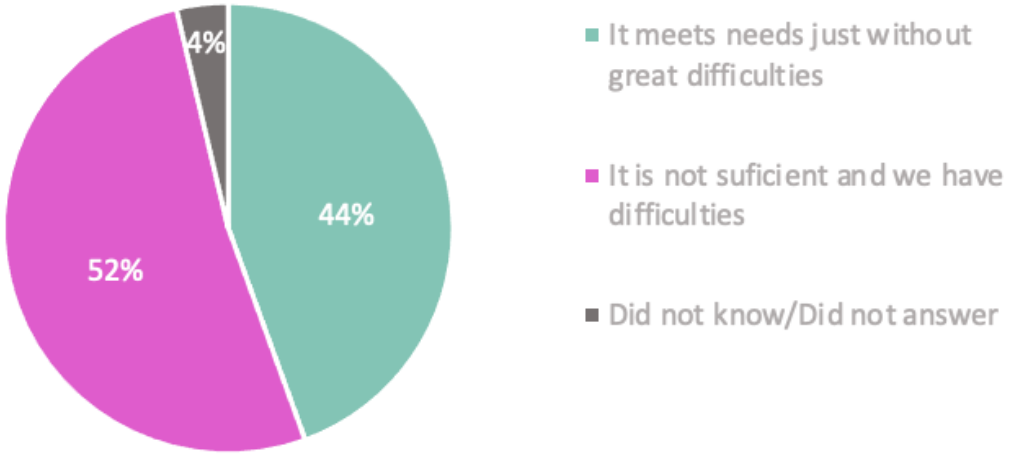
Notwithstanding the small sample size in this case study 63% of participants indicated that they did not have monthly savings (Figure 31), and 52% claimed that total family income was not sufficient to meet family needs and have difficulties (Figure 32). In terms of planning family expenditure, 70% of women indicated that they plan home expenditures when they receive their income (Q7.19 DIS).

Figure 31. Monthly savings of Mexican women participating in this research



Note: Author's elaboration based on data from DIS. (2017). Question 7.18. Graph presents answers to the question: "How much money do you save each month?"

Figure 32. Income sufficiency of Mexican women participating in this research



Note: Author's elaboration with data from DIS (2017). Question 6.17. Graph presents answers to the question: "With the total family income, would you say that…"

Complementing the DIS results, I reviewed five times (at least complete, and more times to look for partial information) the focus group videos and transcripts in order to identify different activities in which participants were involved at the time of the policy intervention. Following the analysis, I classified women participants in two types, with regards to socio-economic context and daily activity.

Table 7. Type of participants

Type	**Description**
Type A Women entrepreneurs or women who have a paid job	(1) Participants who manage their own micro-business, such as sewing, selling beauty products online, provision of beauty services (cutting and coloring hair, nail polishing, etc.), office & school supplies micro store, online sales of clothes. (2) Participants who had a paid job at the time of the study.
Type B Women without a paid job or entrepreneurial activity	Participants who stay home, do domestic work, and care for the family, including children who live at home.

Note: Author´s elaboration.

I distinguished between these two types of participants because while women's motivations to participate in the program match each other in terms of independence in ICT usage, women differed in desired usage and expected learning outcomes, according to their day-to-day activities. As previously mentioned, contextualizing the social, economic and cultural conditions of participants in this research, allowed for a better understanding of the learning experience, motivations to participate, and ICT application preferences, as the following section describes in more detail.

4.1.3 Motivations to participate

Qualitative research allowed an empathetic connection among women involved in the study, especially in terms of their motivations to participate in the ICT courses and willingness to share their experiences in ICT usage. Likewise, the women were more open and talkative in the focus groups, and their narratives allowed them to learn about their social context, reasons for participating in PMC, what barriers they faced in attending the courses, and how they overcame them.

Through this initial round of conversations, women expressed collectively that they usually depend on others (mostly their children or other family members) to learn how to use their mobile devices, subjecting them to the other person's availability and commitment to teach them.

The following quotes come from different participants in focus group one:

[Mujer hablando de su rol acompañando a sus cuatro hijos al momento de hacer la tarea] "... Casi no me daban las cosas entonces, luego hay veces que estoy ahí pero tengo que estar preguntando y

[Woman describing her role in accompanying her four kids when doing their homework]. "... they almost don't give me things, so sometimes I am there but I need to be asking, how did you do it?

¿cómo le hiciste? ¿cómo le hiciste?. Entonces prácticamente ellos son mis guías y ellos son los que me ayudan." (FG1, p.4)

How did you do it? So practically they are my guides, and they are the ones helping me." (FG1, p.4)

[Mujer compartiendo que al inicio de operaciones de su papelería no usaba para nada la computadora] "Cuando empezamos, y les decía a mis hijas, hijas, ayudenme, y se enojaban. Entonces dije, tengo que aprender y ya nada más viéndolas a ellas yo fui aprendiendo a prenderla, porque no sabía ni prenderla, pero fui aprendiendo poco a poco a prenderla a buscar imagenes y ya, pero todo por ver, y ya cuando me dijeron que para el curso dije Ay, sí, qué bueno porque voy a aprender más!" (FG1, p. 3-4)

[Woman commented that at the beginning of their school & office supply business she did not use the computer at all] "When we started, I said to my daughters, help me, they got mad. So, I said, I need to learn and just looking at them I started learning, because I did not know how to turn it on [the computer], but I started to learn little by little, how turn it on, search for images and all, but everything because of watching, and when they told me about the ICT courses I said, yes, because I am going to learn more!" (FG1, p. 3-4)

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Women participants consistently expressed their children's rude attitude and desperation when asked to teach them how to use mobile/computer devices. Therefore, a primary motivation to attend the PMC courses was to learn in different environments from their homes, and specifically in facilities designed for the acquisition of digital capabilities. Under these circumstances, women participating in the PMC courses gained freedom of usage not only to cover their family needs but also their own.

The following quotes come from different participants in focus groups two, four and five (thus at different points of their learning experience), and provide examples of children's attitudes towards teaching their mothers how to use the Internet and ICT:

"El mio es un muchacho de 24 años, ya está casado, entonces no me tiene nada de paciencia, él pues ya utiliza toda la tecnología, y acá y que el banco con el teléfono, entonces ya lee los libros, como dice la señora, con eso. Entonces no tiene nadita de paciencia. Y el otro que tengo tiene 13 años, sabe más que yo, le digo tenme paciencia si aprendo, pero tenme paciencia." (FG2, p. 8)

"Mine is a 24-year-old boy, he is already married, so he has no patience for me, he already uses all the technology, the bank with the phone, then he already reads the books as the lady says, with that [the phone]. Then he does not have any patience. And the other one that I have is 13 years old, he knows more than me, I say to him be patient, I can learn, but be patient with me." (FG2, p. 8)

"...Tengo, ahorita, me compre mi celular, pero todavía no lo sé manejar, mandar mensaje, nada. Incluso estaba yo platicando con mi hijo que me iba a venir a...todavia no sabia que era, ¿no? Yo le decía, no sé, me invitaron a un curso de computación, y yo para eso...vete mamá, vas a aprender, y vas a aprender a usar tu teléfono, porque yo me desespero porque yo te explico y te explico y no, no quieres aprender a tu celular, y tienes que aprender para que mandes mensajes, para que busques la información, pero ¿luego si verdad? O sea, yo nada más se contestar y ya, pero lo demás de mi celular, no sé mandar mensajes, no sé." (FG4, p. 4)

"...Now I have, I bought my cell phone, but I still don't know how to use it, send a message, nothing. I was even talking to my son that I was going to come to ... I still didn't know what it was, right? I was saying, I don't know, they invited me to a computer course, and for that ... go mom, you are going to learn, and you are going to learn to use your phone, because I despair because I explain to you and I explain to you and no, you do not want to learn on your cell phone, and you have to learn so that you can send messages, so you can look for information, but then yes? I mean, I just know how to answer and that's it, but the rest of my cell phone, I don't know how to send messages, I don't know." (FG4, p. 4)

"Aparte en está, enseñarnos la tecnología ¿no? Lo nuevo que está saliendo y no depender, por ejemplo, de mi hijo, ¿cómo le hago aquí? Y se molestan, entonces este es el querer saber sin necesidad de depender de otros."(FG5, p. 2)

"In this part, teach us the technology, right? The new things that are coming out and not depending, for example, on my son, how do I do here? And they get upset, so this is why I want to know without having to depend on others". (FG5, p. 2)

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Focus group results showed that another important factor for women's motivation to participate in the PMC courses was the support of family and friends. When participants were asked if they commented in their households the opportunity to participate in the Program, they responded that they did it. The following quotes come from different participants in focus group one, two and four, and provide examples of positive family influence in the motivation to participate in the PMC Courses:

"Yo sí le dije a mi esposo, mira, ¿cómo ves? van a hacer un sorteo de un curso de computación y mi hija la grande me dijo, ¡vete mamá! No lo dudes, ¡vete!, así me dijo, mira te distraes de la casa, no importa que dejes a tus hijas solas, tú vete, aprovecha, le digo sí hija." (FG1, p. 13)

"I did say to my husband, look, do you know? They are going to do a raffle for a computer course, and my oldest daughter told me, go mom! Do not hesitate, go! She said to me, 'Look, you can get distracted from the house, it does not matter that you leave your daughters alone, you go, take advantage', I said yes daughter." (FG1, p. 13)

"Yo le platiqué a mi mamá y a mis hijas, a mi esposo también y todos dijeron que sí, que estaba bien que siguiera aprendiendo." (FG1, p. 14)

"I talked to my mom and my daughters, with my husband too and everyone said yes, it was a good thing that I kept learning." (FG1, p. 14)

"Además, el sentirnos apoyadas te motiva" (FG1, p. 14)

"In addition, feeling supported motivates you." (FG1, p. 14)

"...y ya mi niño me dijo, ay mamá ya estas grande, pero yo creo que después como que le remordió la conciencia y me dijo, pues ve. Y por ejemplo el grande, el va en la secundaria, en segundo, no él estaba super emocionado, ¡mi mamá va a estudiar! Hasta uno como que el corazón empieza a hacerle así, o sea, a lo mejor no es un estudio tal cual pero pues si da emoción." (FG2, p. 17)

"And my boy said to me, oh, you're old it's late for you; but I think that afterwards he thought about it and told me, well go. And for example, the older one, he goes to middle school, second grade, he was super excited, my mom is going to study! My heart begins to beat hard, that is, maybe it is not a formal study, but it does give me emotion." (FG2, p. 17)

***

Given that participants had an average age of 41, and most had a basic school level of education, it was likely that some would find returning to a learning environment challenging. As testimonies reflected, children associated their mother's age with being "too old to study". Other testimonies referred to feeling afraid to participate in the courses because they did not understand exactly what the learning experience was going to be like. In the results analysis these areas are covered in more detail, in terms of their influence on the performance of participants during the courses.

To conclude, women's motivations for participating in the program derived from three main areas. Firstly, they wanted independence and autonomy in acquiring digital capabilities and to stop depending on others to explain how to use the mobile/computer or use the Internet. Secondly, they desired the potential to meet both their own and family needs by using a mobile or computer and acquire usage competences. For example, increasing productivity in their micro businesses, as well as being able to help their children with school duties. Thirdly, family and close friends support was key for women's initial motivation in accepting the invitation to participate; later they decided to remain in and finish the course by virtue of their own interest and motivation.

4.1.4. Text mining techniques

Text mining techniques were applied to the compilation of transcripts of the five focus group sessions held before the courses started. These techniques complement the coding exercise, the grouping of themes and categories, and provide important findings in each of the activities of the *results chain model*.

The first analysis applied to transcript data is a word cloud that facilitated rapid identification of topic words in terms of their relevance for the participants. The size of the word represents the number of times it was mentioned during the sessions. Words like “do”, “to learn”, “technology”, “important”, “mobile”, “children”, “time”, “work”, “Internet”, have the biggest size, representing their level of importance within group conversations. Words used commonly related to things women wanted to do or learn during the course of the program.

Figure 33. Word cloud in English of the five focus groups before policy intervention (pre intervention phase)

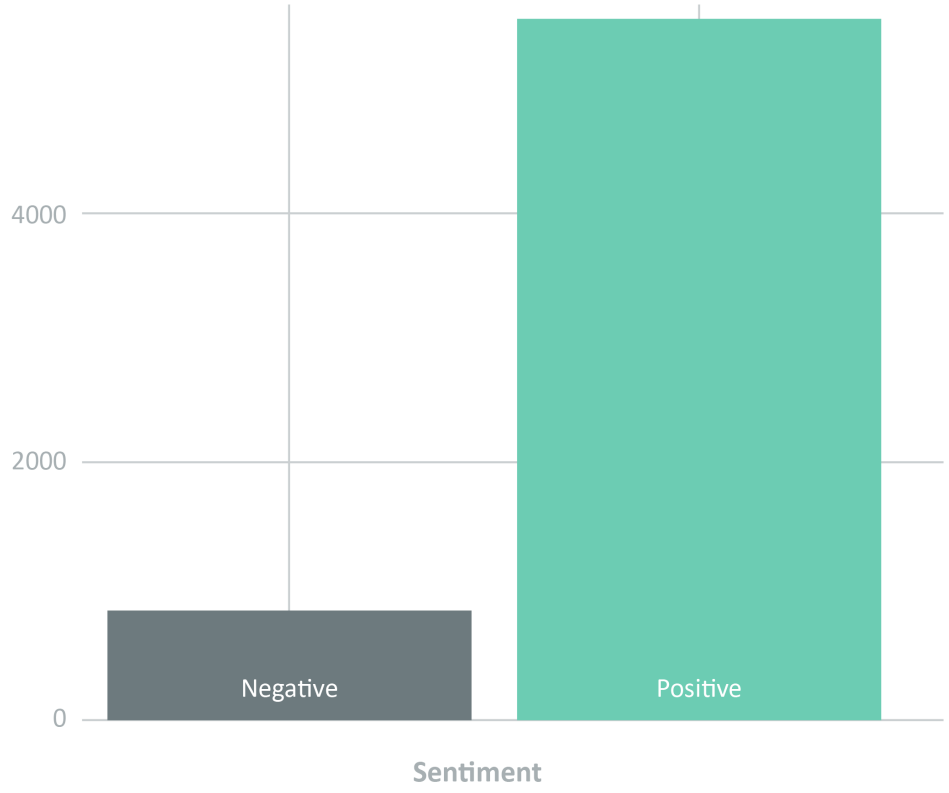
Note: Author´s elaboration based on transcripts of the first five focus groups which took place in January 2017.

Figure 34. Word cloud in Spanish of the five focus groups before policy intervention (pre intervention phase)

Note: Author´s elaboration based on transcripts of the first five focus groups, which took place in January 2017.

Following the word-cloud analysis, a "sentiment analysis" was applied to the aggregated transcriptions to better understand the social sentiment of participating women towards technology, its daily usage, and the opportunity to participate in the PMC courses. Sentiment analysis provides a positive and negative weight to each word in the text. The automatic classification was revised and adjusted by me as the responsible researcher of this study. As shown in Figure 35, the positive sentiments outweighed by a significant proportion the negative ones.

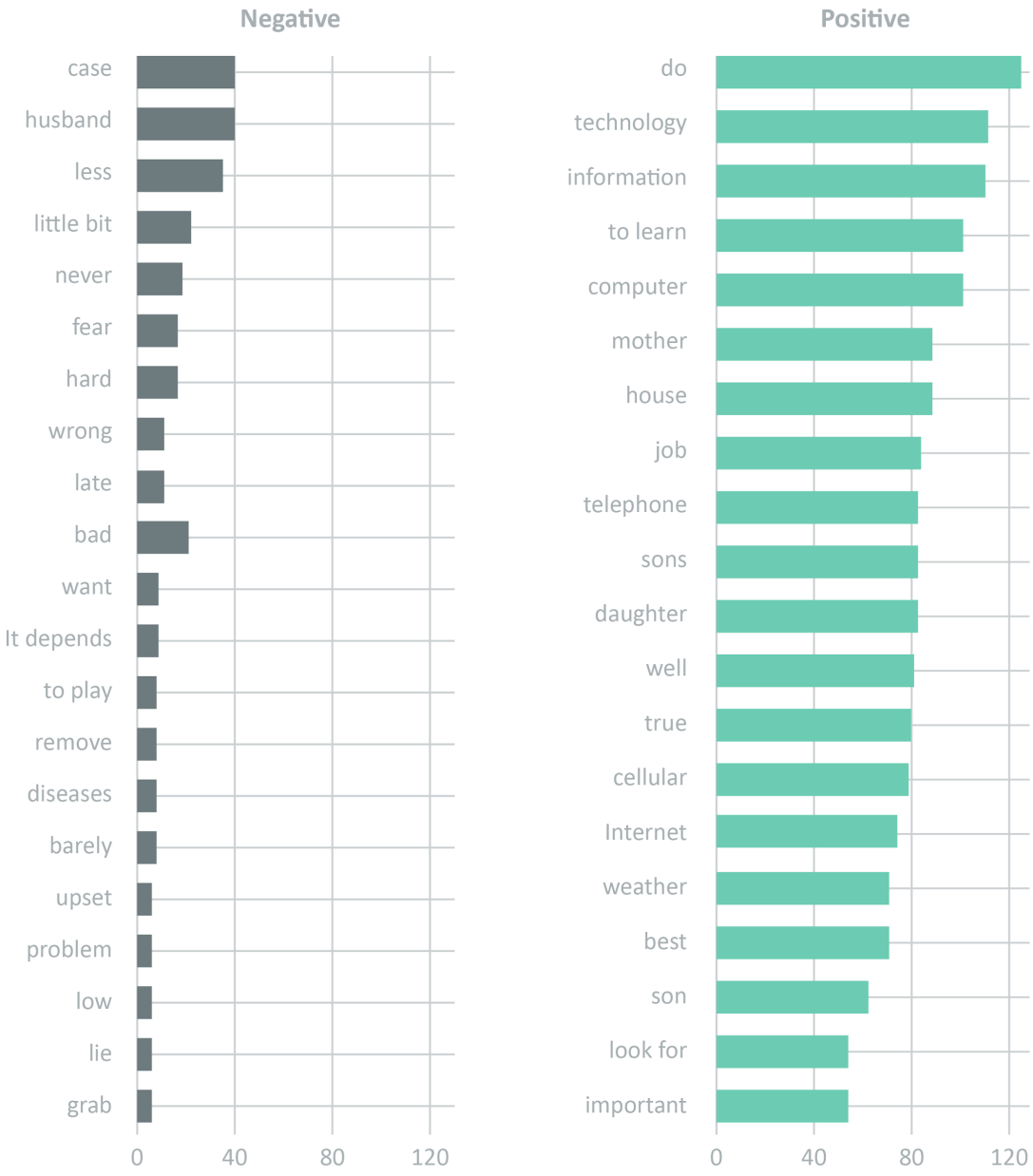
Figure 35. Sentiment analysis before policy intervention



Note: Author's elaboration based on transcripts of the first five focus groups that took place in January 2017.

To gain a deeper understanding of the type of words under the positive and negative sentiments, I conducted a sentiment classification extract, as presented in Figure 36. According to this classification, "husband", "afraid", "less", "bad", and "little" are words that represent women's negative feelings towards their participation in the program. For example, the word "husband" was constantly referred to as a gender category that constrained women's participation in the courses. This reflects the subordination of these women within a patriarchal society, where they need the permission of their husbands and other relatives to undertake their own objectives, such as these learning courses (see details in the next sections of this thesis). Positive sentiments included the words "do" and "to learn", actions that reflect women's motivation to participate in the program.

Figure 36. Sentiment classification pre intervention phase

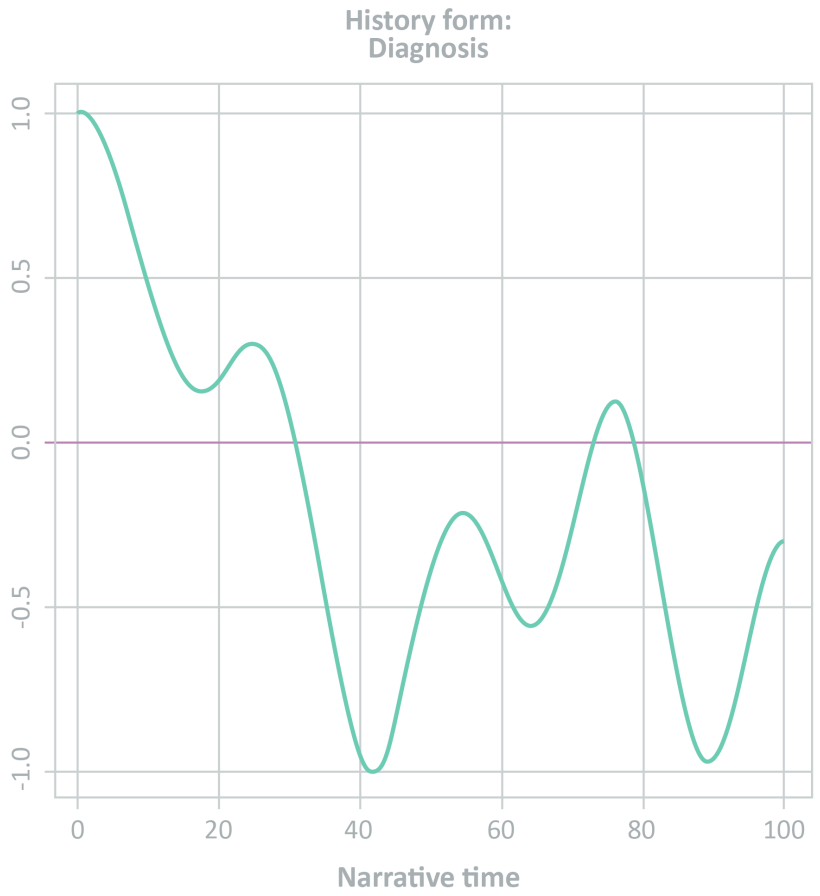


Note: Author's elaboration based on transcripts of the first five focus groups, which took place in January 2017.

The final text mining technique is the narrative time, which allows analysis of the flow of the narrative according to the focus group conversation timeline. The Y scale represents the positive and negative sentiment pondered by R, while the X scale represents the conversation timeline. The frequency of Fourier is a temporal analysis on the sequence of frequencies. The computation in R is based on counting how many words in the text have a positive value and how many have a

negative value, rating the result as a balance between positive or negative words expressed by women in their narratives (if it is zero it is neutral). The graph in Figure 37 represents the sentiment progression along the timeline narratives of the initial (five) focus groups.

Figure 37. Narrative analysis before policy intervention



Note: Author´s elaboration based on transcripts of the first five focus groups, which took place in January 2017.

The narrative analysis shows a very first positive mood of participants in terms of interest in the Internet and ICT. Following this positive expression of interest, the narrative becomes negative (slope curve goes down), this is a second moment in which the participants shared the constraints, limitations and their frustration on having to depend on others, mainly their children, to use the Internet. They also talked about personal situations, for example a participant shared the case of a missing child and her motivation to learn how to use computer simulation to see how the person will look as an adult to continue the search for him. At a third moment, their narratives evolve towards a positive tone when talking about family and close friends supporting them to participate in the program. At a fourth moment the tone goes down when participants shared and discussed

security incidents in their neighborhoods. Lastly, they assumed a positive tone in terms of their commitment and motivation to attend the course.

Results of the text mining techniques provided important insights of participants' perception of their own process of learning, the adoption of ICT in their daily lives, and ultimately their personal development, by creating their own opportunities through the acquisition of digital capabilities. A final comparison of the outcomes of all text analysis techniques is available at the end of the results section, which facilitates comprehension of participants' perceptions over the course of the intervention.

4.2 Beyond digital skills: building confidence and self-esteem

The set of five digital inclusion courses had a competency framework to guide course activity and to record participants' performance. The grading rubric of the courses used the rating scale of: excellent, satisfactory, moderate and not acceptable. Annex G presents the digital competency matrix for each of the courses under the policy aims and pedagogical methodology (for more details see section 3.6). It is important to note that these matrices were designed to be regularly updated at the PMC, given that the standardization model for teaching and measurement provides valuable insights and supports evidence-based decision making in curriculum design.

This section includes: (1) description of the courses under the policy intervention; (2) participants' examples from completed projects that demonstrate adaptation of ICT and acquisition of digital competencies; and (3) presentation of a summary table of the performance and assistance records of women participants for the entire policy intervention.

Table 8 displays a description of course content, date of realization, rubric and grades obtained by the participating women.

Table 8. Courses results

Course	Results
1. Getting to know the computer: trains for basic computer skills that facilitate everyday life processes with use of the most common programs. Competencies focused on login and authentication, hardware awareness, operating systems components and filing information, search and select information.	- Course ran from February 7th to February 23rd, 2017, with a total of six sessions. - Rubric ranges: 130–160 Excellent, 100–129 Satisfactory, 60–99 Moderate, ≤59 Not acceptable.

	- Results were very satisfactory, with 83% of the class scoring excellent, 12.5% (3) satisfactory, 1 moderate, 0 not acceptable. Average rubric score 130.42, median 140. Although there were 26 women taking the DIS, only 24 showed up for class, with an average assistance rate of 19 over the course sessions (drop out of 2 women).
2. Getting to know the Internet: aims to discover some of the data or services that the Internet provides that meet several needs. Competencies focused on searching capabilities, personal data protection, email usage and ethics of use, communicating with people in real time and in a secure way, access to government digital services.	- Course ran from February 28th to March 16th, 2017, with a total of 6 sessions. - Rubric ranges: 160–200 Excellent, 130–159 Satisfactory, 100–129 Moderate, ≤99 Not acceptable. - Results were very satisfactory, with 83% (10) of the class scoring excellent, 17% (2) satisfactory, 1 moderate, 0 not acceptable. Average rubric score 171.54, median 190. Dropout of participants between courses was similar to the previous course, with average attendance of 16. - Only participants that finished the course were scored.
3. Getting to know Office: aims at developing initial skills for the use of office software, such as word processors, spreadsheets, presentations and drawing editors. Competencies focused on text documents, processing data on spreadsheets, and graphic presentations on PowerPoint.	- Course ran from March 21st to April 27th, 2017, with a total of 12 sessions. - Rubric ranges: 91–120 Excellent, 61–90 Satisfactory, 31–60 Moderate, ≤ 30 Not acceptable. - Results were very satisfactory, with 7 participants of the class scoring excellence, 7 satisfactory, 4 moderate, 0 not acceptable. Average rubric score 87.65, median 90. Dropout of participants between courses was less significant, with average attendance of 14.

4. Exploring the Internet: aims at developing cyber cultural skills to communicate with others by creating and publishing multimedia content on social networks and blogs. Competencies focused on defining a problem, research, planning and executing a course of action, knowledge management, co-creation and collaboration with others.	- Course ran from May 2nd to June 8th, 2017, with a total of 12 sessions. - Rubric ranges: 181–240 Excellent, 121–180 Satisfactory, 61–120 Moderate, ≤ 60 Not acceptable. Results reflect the level of complexity in the activities of the course, with 2 of the class scoring excellent, 6 satisfactory, 2 moderate, 0 not acceptable. - Average rubric score 154, median 145. Dropout of participants between courses was at the same rate as the previous course (3 participants did not continue), with average attendance of 11.
5. Personal Finance: aims at exploring personal financial goals by organizing income flows in a monthly budget to establish savings and investment strategies and identify borrowing capacity to achieve those goals. Competencies focused on planning financial goals, monthly budgeting, savings strategies, investment strategies, analyzing credit convenience and options to pay existing or future loans. Manage knowledge, co-create knowledge with others.	- Course ran from June 27th to July 13th, 2017, with a total of 6 sessions. - Rubric ranges were 211–280 Excellent, 141–210 Satisfactory, 71–140 Moderate, ≤70 not acceptable. Results reflect the level of complexity in the activities of the course, with 0 of the class scoring excellent, 8 satisfactory, 1 moderate, 0 not acceptable. - Average rubric score 167.78, median 180. Final dropout of participants courses was at the same rate as the previous course (3 participants did not continue), with average attendance of 8.

Note: Author´s elaboration.

As referred to in the methodology section, in addition to exploiting the potential of both learning by competencies and the Merriënboer model, course design was based on a methodology by projects. It yielded substantial learning for participating women who worked in a collaborative model based on enterprise simulation oriented towards a concrete production of a product. The following examples (Figures 38 & 39) show two final project products developed by the participants applying the informational capabilities acquired during the courses.

Figure 38. Graduation invitation

Note: Course product made by one participant of the program.

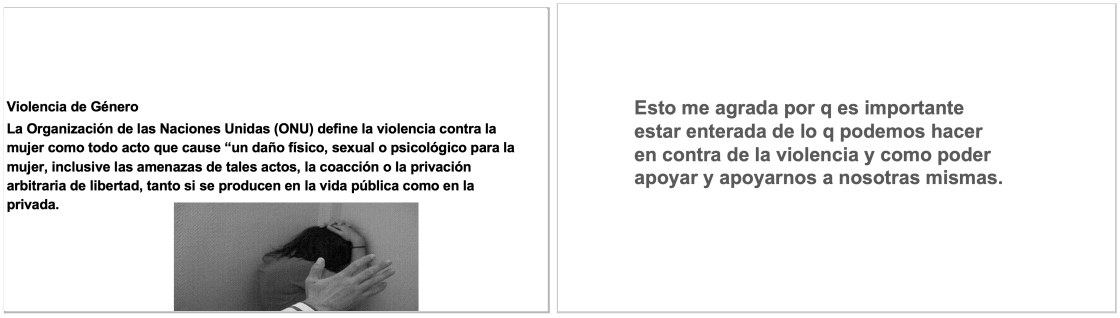
- Project scope: Use digital technologies to elaborate an invitation to the graduation of one of the participants' children.

- Competencies used: Search an image on the Internet, evaluate copyright policies that might be applied, copy and paste the image in a PPT, add an icon element like the graduation hat, insert a text box, organize the elements and adapt information into a new product.

- Complexity: Basic

- Relevance in the context of the participant: Save costs on invitation design, since participant designs on her own.

Figure 39. Social problem presentation



Note: Presentation of a community problem created by a participant of the Program. [Figure]. Course products, complete PPT is in Annex H.

- Project scope: Describe a social problem using a PowerPoint (PPT) presentation

- Competencies: Storytelling; identify a problem and describe the motivation to make a presentation about it; search for information and valid references on the topic (in this case, women referred to information from the United Nations); search an image on the Internet, evaluate copyright policies that might be applied, copy and paste the image in PPT, insert text boxes to develop the story, organize the elements and adapt information into a new PowerPoint product that describes the problem of violence and why is important.

- Complexity: Moderate

- Relevance in the context of the participant: Recognition that violence is a public interest policy problem, and a very common phenomenon in Ecatepec, as referred to in the case study unit of the analysis section.

The examples above showcased digital competencies acquired during the program. Women made significant improvements in their digital capabilities, not only in using computer devices, software packages and the Internet, but also in expressing topics that are relevant to their context and reality. They were empowered and confident to present community problems surrounding them.

4.2.1 Performance of the participants in the program

A summary of participants' attendance records and grades for each course is presented in Table 9. Attendance records provided data for in-depth analysis on drop out, described in more detail in section 4.5 on barriers to participation. Grades are structured in four categories: excellent, satisfactory, moderate and not acceptable. For each category, some ranges are established under the course design, and some statistical measures, such as the mean and the median, were calculated.

Table 9. Performance in the program

Module	Get closer to the computer	Get closer to the Internet	Get closer to Office	Explore Internet	Personal finance
Date	February 7th-23rd	February 28th March 16th	March 21st April 27th	May 2nd June 8th	June 27th July 13th
Total number of sessions	6	6	12	12	6
Attendance (average)	19	16	14	11	8

Rubric	Excellent: 130–160 Satisfactory: 100–129 Moderate: 60–99 Not acceptable: ≤59	Excellent: 160–200 Satisfactory: 130–159 Moderate: 100–129 Not acceptable: ≤99	Excellent: 91–120 Satisfactory: 61–90 Moderate: 31–60 Not acceptable: ≤30	Excellent: 181–240 Satisfactory: 121–180 Moderate: 61–120 Not acceptable: ≤60	Excellent: 211–28 Satisfactory: 141–210 Moderate: 71–140 Not acceptable: ≤70
Excellent	20	10	7	2	0
Satisfactory	3	2	7	6	8
Moderate	1	1	4	2	1
Not acceptable	0	0	0	0	0
Mean	130.42	171.54	87.65	154	167.78
Median	140	190	90	145	180

Note: Author´s elaboration with participants performance data.

Overall, women performed very well in the program, with the first two courses in the range of "Excellent" and the rest in the "Satisfactory" ranges; grades reflected the women's commitment and motivation to learn how to better use ICT in their daily lives.

By comparison, according to ENOVA's experience in digital inclusion courses, an average of 90% of participants in courses developed by ENOVA's RIA or telecenters reaches a grade of "Excellent". Though the performance of women in this case study is below ENOVA's reference data, results are considered satisfactory because of participants' digital skills acquisition, completed learning experiences, and gained self-esteem and self-confidence. Empowerment and informational capabilities (ICT skills) are two important factors for women's personal development, as further described in this section.

Data also reveal that the complexity of course tasks correlates with the grade of competences acquired by these women. The first two initial courses were oriented to basic abilities and elementary grid skills related to the functioning of the computer and mobile, and simple processes on the Internet, such as searching information on the web.

According to the DIS, the majority of participating women had previous experience in these types of activities but were not advanced users. As courses advanced, the competency matrix varied the type and complexity of activities and was reflected in women's grades, dropping from the

"Excellent" to "Satisfactory" range. I still considered this a very positive result for the objectives of this research.

The following quotes illustrate women's feelings in undertaking the courses; each quote came from a different participant during the focus group session held after finishing the courses at the PMC. This focus group, for the purpose of this investigation, allowed for a closer and more personal connection with participants' experiences in the program, complementing descriptive results. Some quotes from participating women in this case study show their learning experience and the assessment of the contents and skills acquired in the PMC courses. Their narratives demonstrate positive feelings and how helpful they consider this learning to be.

"Para mi fue mucha retroalimentación, porque sí este, pues absorbimos mucho la verdad. Hay varios temas que yo no conocía y entonces este, pues sí, a mi me agrado mucho, me agrado mucho. Más que nada lo del Internet, que el face [Facebook] nada más para publicar lo agarramos y, pero ahora sí este, vimos las páginas, el blog...si son varios temas ¿no? de word, estee, ahora sí que tener el grupo, eh, ya que los correos también fue algo que no, yo no conocía, y la nube." (FG6, p. 2)

"For me it was a lot of feedback, because yes, we really learned a lot. There are several topics that I did not know, and I really like it, I really like it. More than anything, the one course on the Internet. We used Facebook only to publish things, but now we know about websites, blogs and other various topics. Word, emails, and now have the group, was also something that I did not know, and the cloud." (FG6, p. 2)

"A mi en lo personal también, me daba mucho miedo la computadora, allá mi hijo la que tenía y yo ni la tocaba, porque dije, no le vaya a mover y la vaya… le voy a mover ahí sus cosas. Y no, nunca la agarraba y siempre estaba, a ver muévele acá, a ver ayúdame. Y ahorita ya se va a la escuela y yo la agarro y ya estoy ahí, practicando o viendo cosas. Entonces sí, para mi si me gustó mucho y aprendí mucho también. Ya sé que, qué puedo hacer en caso de que le mueva yo algo, ya sé para dónde irme y dejar como estaba. Me gusta." (FG6, p. 2)

"Personally, I was very scared of the computer too, my son had one and I didn't even touch it, because I was afraid of doing something bad to his things. I was always asking for help to use it. Now when he goes to school, I grab the computer and I'm already there, practicing or seeing things. So yes, I really liked it and learned a lot too. I know what to do in case I move something, I already know where to go and leave it as it was. I like it." (FG6, p. 2)

"Pues también para mi fue un gran apoyo porque, ahí aprendí a, a lo de las finanzas, de cómo ahorrar, cómo administrar mi dinero y todo eso. Y, ya usando también lo de la computadora, yo no sabía ni cómo encenderla y aquí aprendí todo eso." (FG6, p. 2)

"Well, it was a great support for me because there I learned about finances, how to save money, how to manage my money and all that. I also learned how to use the computer, I didn't even know how to turn it on and here I learned all that." (FG6, p. 2)

"A mi me gustó más el de finanzas personales porque ahí esteee, pus yo no sabia que era el gasto hormiga y que era lo que más se gastaba y todo eso. Y sabiendo que eso lo podíamos invertir en algo y ahorrar y todo eso." (FG6, p.4)

"I liked the personal finance course more, because there hmm, well I didn't know what the micro-spending was and that it is the biggest spend and so on. And being aware of that, we can invest that in something and save money and so on." (FG6, p.4)

"Pues a mí, lo que son las páginas y el blog. Yo, estee, era desconocido para mi negocio, para tener contacto con las demás personas y este , pues si, puede ser el Blog y las páginas." (FG6, p. 5)

"Well, to me, I liked how to do web pages and blogs. To me all this was unknown to my business, now is valuable to have contact with other people using the blog and the web pages." (FG6, p. 5)

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As testimonies reflected, for some participants acquisition of digital capabilities implied learning the very basic, like how to turn on a computer. Others achieved more advanced capabilities – complementing previous knowledge – with the acquisition of new concepts, such as those learned in the "personal finance course", which according to testimonies were greatly appreciated. Testimonies also reflected women's motivation to learn about and acquire new concepts and skills, like writing blogs, designing a website, and managing their finances better. Further, testimonies reflect how gaining digital independence increases women's self-esteem and self-confidence, equipping them to learn and undertake a wide range of daily tasks.

As part of the focus group conversation, women were asked about the duration of the program and each of the courses, time devoted to the learning process (practice after class), usefulness of supporting materials, and recommendations for future course design. Their opinions were in fact an evaluation of the methodology of the course, since they offer clues about desirable duration and which structure would be more interesting from their point of view. In this way, these user testimonials constitute an evaluation of participant satisfaction and a proposal for improvements of the course themselves.

Regarding the duration of the program, the participants expressed that they would like to continue attending classes in order to learn more. One said she would like to have more time in class, and another that three days a week would also be a good alternative for future courses. One important aspect of the PMC learning model is after-class practice, a time designed to review and practice concepts learned in the classroom. Participants of PMC courses can attend at any time during opening hours to use a public computer room located at the entrance hall of the PMC, where there are 8 to 10 desktops available. This after-class practice is also an opportunity for students to build community and network by taking part in other activities at the PMC during the week. Network and connections are important factors for women development.

Taking this into account, women participating in the study were asked if they wanted to come at any other time to the PMC for complementary digital skills practice, but all of them affirmed that they did not. Participants said they preferred to remain a while after classes for practice on the PMC computers, or practice at home. These responses suggest that women got involved only in PMC activities related to the courses under this research program; although these were held just two days a week at the PMC, participants appear to have had limited time for other PMC activities. This limitation was also referred to by the facilitator, as I describe in section 4.3. This points at geographical mobility as a handicap to success, learning programs for women in Mexico faces mobility and security issues (see section 4.5).

Also important to the PMC learning model are course materials designed to reinforce concepts taught in the classroom. Course materials are given as part of the PMC learning experience. Participants in the study expressed that they were useful, especially because, according to one of them, “in the house it’s like everything can be forgotten” (FG6, page 7). Regarding women’s contexts of vulnerability, this particular quote reflects how learning new abilities could be challenging (25 years after last time at school, time constraints because of house duties, etc.); supporting learning materials therefore provide an important opportunity to review and reinforce concepts taught by the facilitator in the classroom.

Duration of the courses was an important factor to analyze in terms of time needed to attend the program. The arrangement of the courses and time needed to go through the content of each course is subject to the competency matrix and the learning process of the participants. The objective is to be able to cover all content in a way that allows for a high level of comprehension and the adoption of skills. Regarding the length of the course, participants expressed a positive opinion.

The most positive element highlighted by participants was that the facilitator dedicated a lot of attention to explain certain topics. All commended the role of the facilitator and that this was key to the program, which must be taken into account for similar future interventions. The facilitator role is covered in depth in section 4.3. Personal finance was the shortest course of the program and one with the best reviews from women attendees. In general, participants expressed that a little bit of time was needed in this particular course. This shows that when the content and teaching method is perceived as useful by the participants, the acquisition of knowledge is easier. This also has to be taken into account in future political interventions.

As a whole, participants’ evaluation of the course was very positive. To the specific question of whether they wanted to continue, all women participants in the two follow-ups focus groups said “yes” (FG6, p. 9). This reflects high motivation to learn and the valuable experience of the PCM program for these women. To finish the analysis of women’s opinion on the PMC learning model, I asked if there was something to change on the course program to make it more accessible to them. Their responses were related to context rather than content. For example, some participants

referred to the distance and time taken to attend the courses, and one participant referred to security concerns due to feeling unsafe while walking the route to the center. A subsection of barriers to participation describes in more detail how these factors affected attendance rates (see 4.5).

The following set of quotes come from different women in focus group number six that took place after finishing the courses in the PMC. The intention of the session was to check participants' opinion of the courses, how they were using what they learned in their daily lives, and how they think they were going to use it in the future.

"Yo sí aprendí, quería saber como se hace un correo y ya." (FG6, p. 9)

"I did learn, I wanted to know how to do an email and I did." (FG6, p. 9)

"A mandar mensajes, todo eso. Gracias Claus sí aprendí." (FG6, p. 9)

"To send messages, all that. Thanks Claus, I did learn." (FG6, p. 9)

"Las video llamadas también las aprendimos… Ya nos podemos comunicar así." (FG6, p. 10)

"We also learned video calls...we can now communicate like that." (FG6, p. 10)

"Pues sí yo aprendí más de lo que esperaba, por que no sabía lo del correo, no sabía lo de un blog o un video o tan solo, este la música, oír música, no sabía yo como. Pero si aprendí mucho. Mucho más de lo que yo esperaba." (FG6, p.10)

"Well, yes, I learned more than I expected, because I did not know about the mail, I did not know about a blog or a video or just music, listening to music, I did not know how. But I did learn a lot. Much more than I expected." (FG6, p. 10)

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As women's testimonies revealed, actions like using email, video calling, making blogs, uploading videos, and listening to music were concepts that in some cases women barely knew about and wanted to learn; they were thankful that they learned them.

Testimonies also revealed in what situations women use technology and how they applied learning from the PMC courses in their daily lives. The next set of quotes come from different participants in focus group number six and describe their ICT learning applications:

"Yo por mi parte, que no hay que malgastar el dinero, por ejemplo, si le pones tiempo aire[38] 50 pesos (2 Euro), yo le pongo menos o no le pongo nada, tengo internet en la casa pues mejor." (FG, p. 10)

"On my part, I learned that money should not be wasted, for example, if I have to recharge my pay as you go with 50 pesos (2 Euro), I put less or nothing, since I have the internet at home, it is better." (FG6, p. 10)

"O si ya cualquier cosa que quieren comprar los niños ya les digo: no, ese es gasto hormiga, eso es malgastar y ya. Y ya ahora el niño más chiquito, igual dice también todo eso es gasto hormiga ´no lo compres´ y ya de ahí pues uno aprende más cosas". (FG6, p. 11)

"*Now when the children want to buy anything, I say to them: no, that is micro-spending, that is wasting and that's it. And now the youngest child, the same thing, he also says all that is micro-spending, ´don't buy it and that's the way we learn more things". (FG6, p. 11)*

"El de finanzas, igual no me motivaba mucho como los otros, pero también es importante el tema, porque nunca me había sentado a ver cuánto me dan, cuánto me gasto, o sea, ya después… Pero al principio sí se me hizo, no me gusta, como que quiero otra cosa, como que me gustaban los videos, face, el correo, y con este sí, como que no." (FG6, p. 20)

"The finance course, likewise, it did not motivate me as much as the others [courses], but the subject is also important, because I had never sat down to see how much they give me or how much I spend. So, at first, I did not like it, I wanted something else, like with course on the videos, Facebook, the mail." (FG6, p. 20)

"Y a mi me sirvió para buscar precios, es que voy a cambiar mi techo, pues cayó la granizada, y ahí busqué precios de láminas, eso y ya, bueno cuánto saldría. " (FG6, p.15)

"And it helped me to look for prices, because I am going to change my roof, because the hailstorm came, and there I looked for roof panels prices and, well, how much would it cost." (FG6, p. 15).

"A mí, esta de finanzas sí me hizo reaccionar mucho porque yo soy de esas personas que, que si cada semana, si taquitos, tortas o así, todo gastar de la ¿cómo se llama? de fin de semana gastar en comida chatarra, y pudiendo hacer de comer se gasta uno menos. Y darse cuenta de que si gasta mucho uno en los gastos hormiga". (FG6, p.20)

"To me, this [course] of finance made me react a lot, because I am one of those people who every week wonders what if taquitos, cakes or so, spending in everything. Then, I think, instead of a weekend spent on junk food I am able to cook and I could spend less. And I did realize that people spend a lot on micro expenses". (FG6, p. 20)

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These experiences show how learning financial concepts have a positive impact not only on women's personal finance practices, but also on their children. Concluding this focus group results analysis, there are some important findings in ICT usage for entrepreneurial activities. The following quotes come from different women in focus group six:

[38] Airtime refers to data and voice services provided as a pre-paid service to telecom service providers.

“Yo, el correo, o sea, ya como tengo mi correo lo puedo dar, por ejemplo, el teléfono ya no me llega este, ya el recibo, ya me llega por correo, ya ese es el uso que… Y luego me piden un correo y ya les doy mi correo. Ya lo sé abrir y leer. Ese es otro uso que yo no sabía y ya lo tengo” (FG6, p.12)

"For me, the mail, that is, since I have one, I can give it, for example, the phone bill no longer arrived to me [to her home], now I receive it by mail, and that is its useful... And then when they ask me for an email, and I give them my email. I know how to open it and read it. That is another use I didn’t know, and now I have it” (FG6, p. 12)

“Yo de igual, el correo, el Dropbox, el de las flechitas, este igual estee, pues si yo estee, doy masajes y hago auri … entonces subí todas las imágenes. Entonces ya de ahí, ya me guio ya nada más busco la imagen y ya pongo los balines. Entonces para mi fue muy fácil y muy efectivo, la verdad.” (FG6, p.12)

“Me too, the mail, the Dropbox, the one with the little arrows, so hmm, I give massages and ... then I upload all the images. So, from there, I just guided myself through the Balinese Massage. So, for me it was very easy and very effective, really.” (FG6, p. 12)

“Pues a mi, lo que son las páginas y el blog. Yo, estee, era desconocido para mí cuando descubrí. Pues la verdad si es muy útil, muy útil, para mi negocio, para tener contacto con las demás personas y estee, pues sí, puede ser el blog y las páginas”. (FG6, p. 5)

"Well, to me, the pages and the blog. They were unknown to me when I discovered [them]. So truthfully it is very useful, very useful, for my business, to have contact with other people and yes, it could be the blog and the pages.” (FG6, p. 5)

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As testimonies reflected, entrepreneurial activities benefited from ICT usage in terms of productivity (like the example of uploading photos to facilitate follow-up massage therapy routine), and to make contact with clients agile and faster, by using blogs, web pages, and email. These concrete examples provided supporting evidence on what women did with their recently acquired ICT capabilities, and prove that their ICT adaptations were satisfactory, because they incorporated digital and informational skills into their daily lives. They created meaningful uses of ICT in terms of their personal development and their own goals; for example, to launch small entrepreneurial activities and increase productivity and results in their business.

A final topic discussed in the focus groups was the women’s future plans after the course. The majority of participants said they wanted to continue practicing and attend further courses, if possible. These responses reflected women’s motivation for learning and affirmed their belief in the courses’ utility. Women also referred to the possibility of family members as new students. As the facilitator stated in her interview, “Some, the most constant, broke that barrier” [referring to only attending the PMC because it is a government program]. According to the facilitator´s

knowledge some participants brought their child, cousins, aunts, and involved them in the PMC activities. However other participants come, comply, and leave.

To complement the testimonies analysis, a second text mining analysis was applied to the transcription of the sixth focus group. Results allowed a contrast and comparison analysis with the pre intervention focus groups. This second analysis facilitated the exploration of women's learning experiences and ICT usage after the policy intervention. The first text mining technique is the frequency analysis reflected in a word cloud where the size of the word reflects its importance in the text. The bigger the size of the word, the more important it is in the context of the participants' learning experience. I performed some revision and refinement of the automatic analysis of R. For example, the word "well" should be "good", in reference to women's experience during the courses.

Other words like "I learned", "do", "thank you", "important", "finance", "mail", "video", "blog", and "time" support the argument that women in this particular policy intervention did learn ICT skills, were thankful for the opportunity to participate, and used digital capabilities in a meaningful way according to their needs. They increased their vocabulary and technical understanding in terms of activities that can be done on the Internet, like "mail", "video", or "blog". They transitioned from "I want to do…" to "I learned…", reaffirming that they did learn digital capabilities and put them in action. They also incorporated words regarding learning experience like "hard", reflecting on their effort to learn and acquire new concepts and skills.

Figure 40. Word cloud focus group six: English

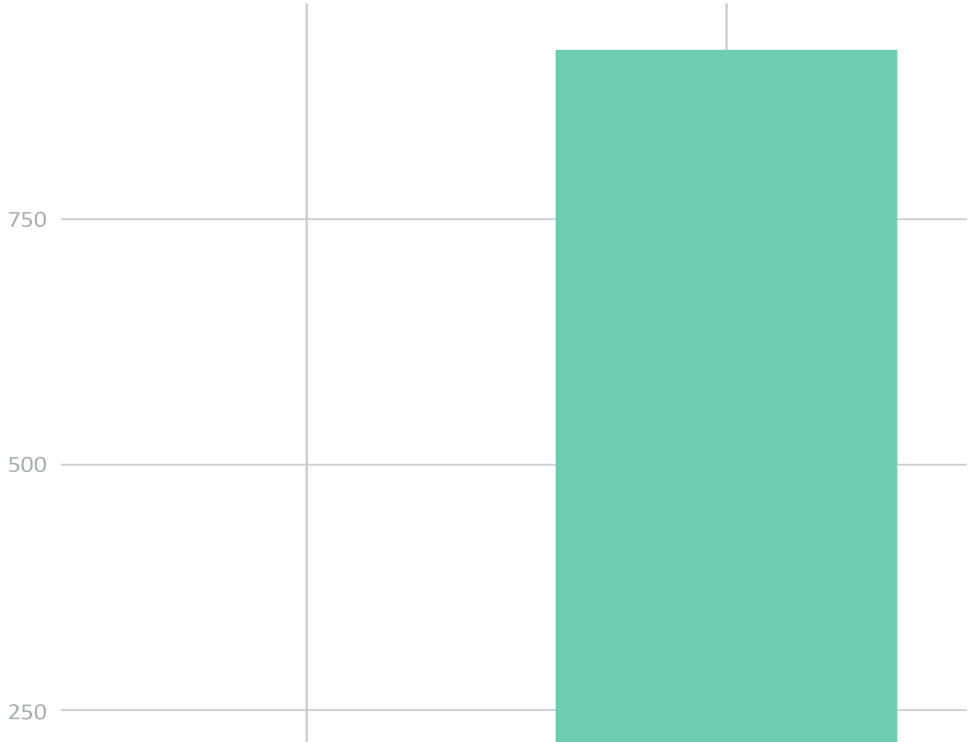
Note: Autor´s elaboration based on focus group number six after policy intervention

Figure 41. Word cloud focus group six: Spanish

Note: Author´s elaboration based on focus group number six, after policy intervention

Following the word-cloud analysis, a “sentiment/feelings analysis” was applied to the transcription text in order to understand the feelings of participating women towards their learning experience. As shown in Figure 42, the positive sentiment outweighed by a significant proportion the negative one. As previously mentioned, sentiment analysis provides a positive and negative weight to each word in the text. To decide if a word has a positive or negative notation there are libraries available with this classification; however, I created the classification for this case study according to this research context.

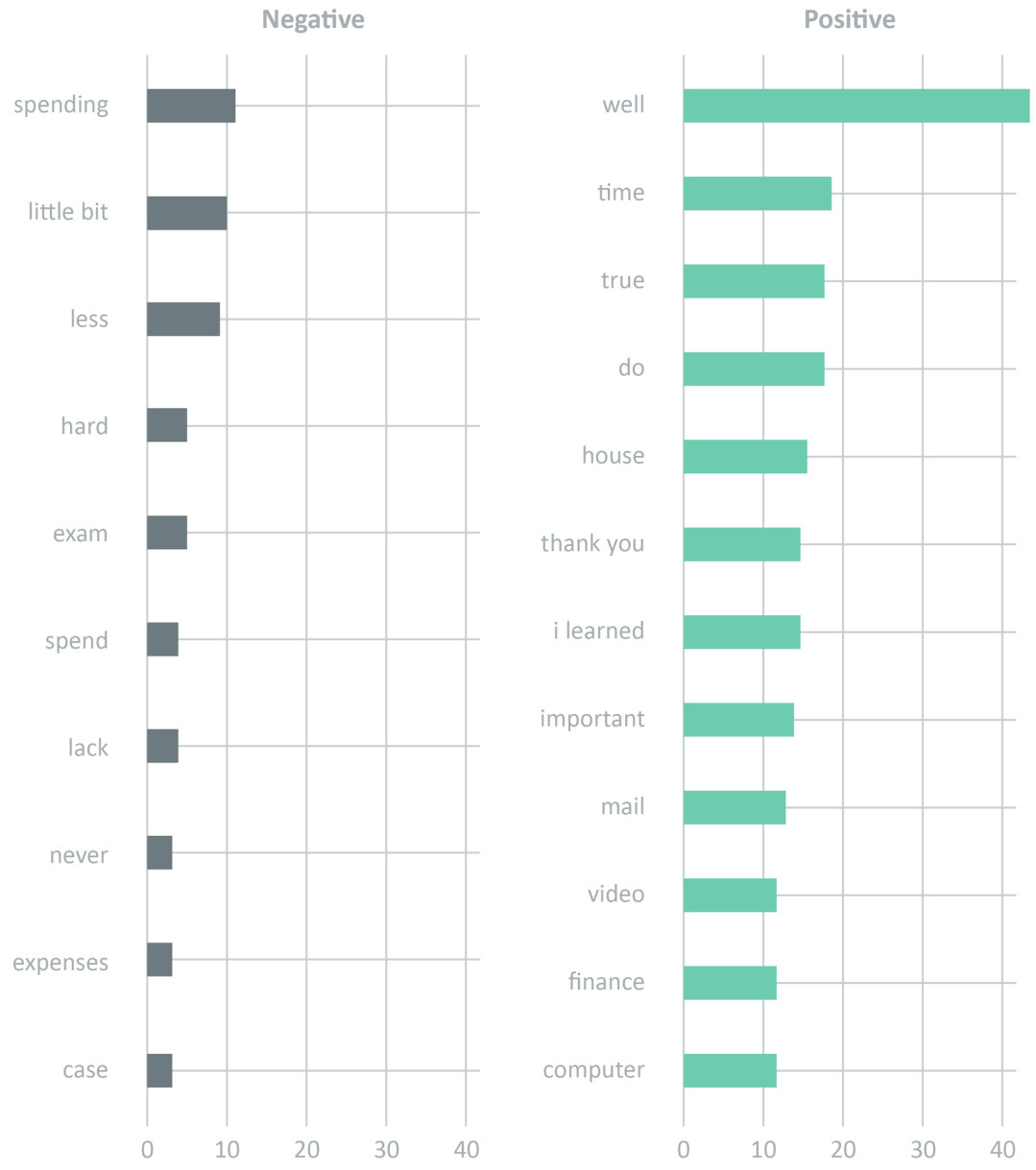
Figure 42. Sentiment analysis of focus group number six



Note: Author´s elaboration based on focus group number six, after policy intervention

To have a deeper understanding of the type of words under the positive and negative notation, a sentiment classification extract is presented in Figure 43. Words like “spending”, “expenses”, “hard”, “exam”, reflect concerns of women, although with a very little frequency compared to words like “well/good”, “time”, “true”, “do” or “thank you” – adjectives, actions and sentiments that reflect women’s positive experience during the intervention.

Figure 43. Sentiment classification post intervention

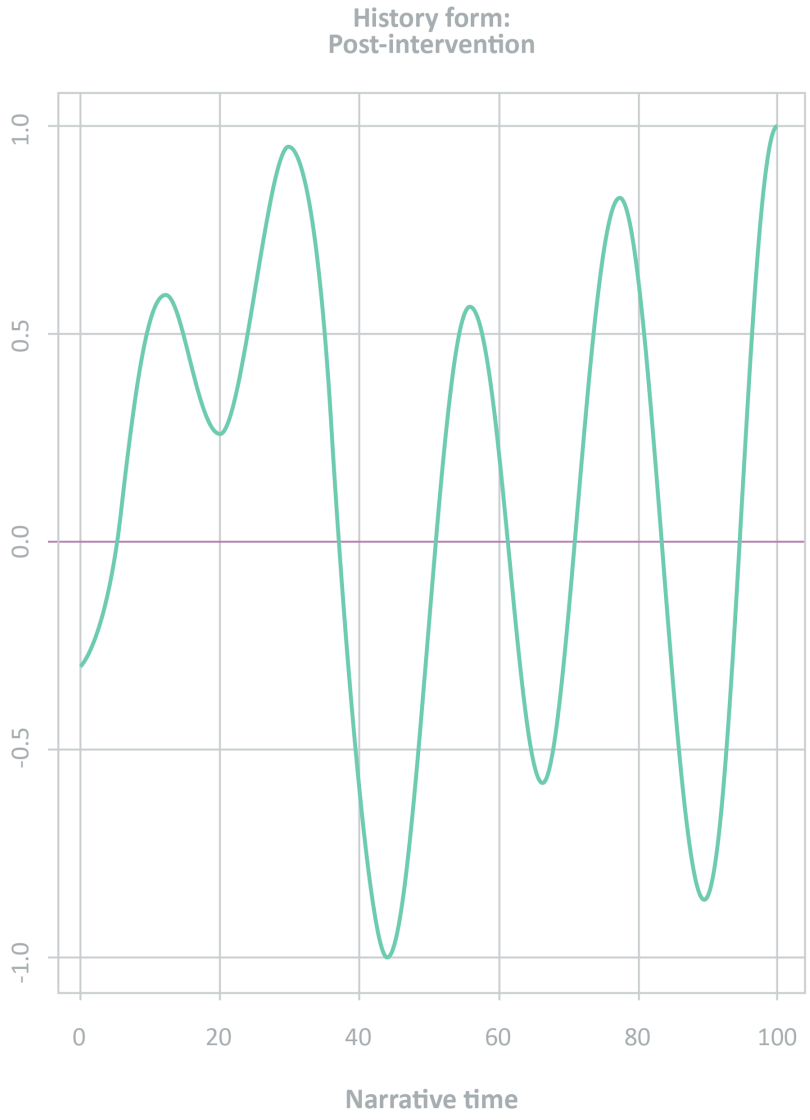


Note: Author's elaboration based on focus group number six after policy intervention

The final text mining technique is the narrative time, which allows me to analyze the flow of the narrative according to the mood and emotions of the focus group. The Y scale represents the positive and negative sentiment pondered, while the X scale represents the conversation timeline. It is based on counting in the text under examination how many words have a positive value and

how many a negative value, and a balance is established that can be positive or negative (if it is zero, it is neutral). The graph represents the sentiment progression along the narrative of the focus group.

Figure 44. Narrative analysis, post intervention



Note: Author's elaboration based on focus group number six, after policy intervention

Focus group six represents participants' learning experience after finishing the training courses. The narrative analysis shows a positive start in terms of interest and motivation to learn, then turns negative as participants share the challenges of learning and the necessity of having the

facilitator devote sufficient time to explain certain concepts in more detail (since many found them difficult to grasp). It then returns to positive sentiments as participants discuss the usefulness of materials and examples of applications; and again, turns negative when the women share insecurity conditions, like having to walk along an empty street. Finally, the narrative concludes with a positive tendency because women expressed their desire to continue learning and recommend the courses of PMC to their family and friends.

Overall, data analyzed at this point shows that the policy intervention contributed to women's learning and acquisition of ICT capabilities, and that the learning process strengthened women's self-confidence and self-esteem. In addition, as the focus group and their discourses reflected, participants incorporate digital competencies in their daily lives, since they use them according to their needs. Type A women (entrepreneurs and/or with a paid job) described their usage in the context of increasing their microbusiness or work productivity, whereas type B women (non-entrepreneurs, non-employed) described their usage in terms of housekeeping and family care. Some concepts were transversally applied across the two types of participants, such as using new knowledge on micro expenditure to explain personal finance concepts to children or saving time by using email instead of physical communications with clients.

Continuing the intervention analysis, I interviewed the facilitator of the courses in order to explore and explain the learning experience at the PMC. The following section describes her feedback and overall assessment of the experience, providing important insights on the challenges faced by participants to learn, how she managed those challenges, and what considerations are relevant in terms of the objectives of this research: facilitating ICT acquisition, adoption and relevant usage to enhance women´s development.

4.3 The role of the facilitator in the learning process

This section addresses the facilitator's role in the learning experience of women who participated in this study. The facilitator is a key position within the PMC learning model. This role is part of the educational team in each PMC, composed of digital inclusion professionals and managed by a central leadership team responsible for curriculum actualization and PMC operation guidelines. Central coordination of the PMC was the responsibility of the Deputy Secretary of Telecommunications, through the Coordination for Information and Knowledge Society. PMCs were part of the National Digital Strategy enablers of ICT infrastructure and Digital Skills.

The policy intervention design considered the assignment of a facilitator to work in a continuum with women participating in the study. I chose this option, instead of having multiple facilitators (a different one for each of the courses), in order to have a consistent observation of women's development over the course of the program. The trade off with this approach was the absence of different perspectives on women's performance in the different courses. However, consistency in the assessment of participants over time was more relevant for the objective of this study.

The facilitator assigned to the Program was Claudia Alcántara, a young PMC professional who was tasked with leading the courses in the case study. Claudia was a psychology major and a digital culture promoter at the PMC. She became part of the PMC Ecatepec team from the beginning of the project and had been an educational counselor for almost a year. Even though she had ascended in the PMC structure, she continued facilitating different courses, since teaching is her passion.

As educational counselor she was a course facilitator for the digital inclusion courses, helped students with their homework, provided them with personal assistance, collaborated in the design of learning strategies, gave vocational orientation, and helped students handle complex topics. Her teacher evaluation, as assessed by students, is high, and the PMC staff consider her an empathic person and a supportive, patient course facilitator. It was because of this past experience and performance that this particular facilitator was assigned to the program.

The interview with the facilitator took place on July 18th, 2017 after finishing the program, with the objective of understanding her opinion on the process of learning, the challenges for participating women, and the design of the policy intervention. The interview was structured in three sections: (1) her experience facilitating the program; (2) impressions on reasons for the drop out of participants; and (3) considerations for future policy interventions.

Regarding the experience facilitating the courses under the program, the facilitator referred to:

“Es una hermosa experiencia porque comienzas a generar vínculos con las mujeres participantes. En momentos fue difícil porque comenzó como un grupo grande y con el tiempo las mujeres abandonaron la escuela requiriendo un cambio en la dinámica de aprendizaje, y el entorno del curso fue un poco diferente a cómo funciona normalmente el PMC ”(Facilitadora del PMC, julio de 2017)”

“It's a beautiful experience because you begin to generate links with participating women. At moments it was hard because it started as a big group and with time women dropped out, requiring a change in learning dynamics, and the atmosphere of the course was a little bit different to how the PMC usually works” (PMC Facilitator, July 2017).

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According to her testimony, full immersion in the PMC experience is an important factor for the digital inclusion of the student; it means that they should not just participate in the courses, but also the networks, and spend time in the PMC facilities. The learning experience should involve using different PMC working areas, like the “Robotics room”, the “Free Internet Area” or “Practice Room”, the “Kids Place”, combined with an agenda of extracurricular activities like coffee talks, guest speakers, and workshops, which are all targeted to normalize digital culture in the community surrounding the PMC.

According to the facilitator, the fact that women were in a special set of classes after being randomly selected to participate in the program may have impacted the level of commitment to attend the courses regularly. Normal PMC process for course application requires interested people to sign up and wait for a space. So, when a course space opens up, participants value it. This does not mean that nobody drops out, but in her experience, attendance commitment under these circumstances is higher. To her mind, this explained the higher level of dropouts among women in this study.

Women participants shared with the facilitator reasons for dropping out; these comprised family matters, work commitments that conflicted with the class schedule, and entrepreneurial activities that did not allow them to continue attending. The majority expressed having to take care of their children as the main reason for stopping the courses. In response, the facilitator offered mothers the facilities of the PMC "Kids' Place" for their children, while they attended class. However, women did not use this resource. One possibility is that women considered time spent in the PMC as their personal time out of family or work dynamics, which evidence the patriarchy dynamic of their family structure and subordination to traditional gender roles.

In terms of digital skills development, the facilitator described how challenging it was for women with no more than upper-middle school education to return to classroom learning. Tasks took time and were demanding, such as reading and writing, sitting in front of a computer, or working on an online course platform. It was necessary to design activities outside the platforms to review basic mathematical logical concepts, and reading and comprehension techniques, in order to prepare them better for class. The following testimonies from the participants of this case study referred to their learning experience and the importance of the facilitator in it.

"Yo también estoy contenta de haber venido, pus porque he aprendido mucho y yo ya iba a renunciar ¿verdad Clau? Si por que...yo siempre chillo cuando no puedo y esta, ya por poquito, yo ya no vengo. (FG6, p. 2)"

"I am also glad that I came, because I have learned a lot. I was going to resign, right Clau? [term used by women when referring to Claudia] I always complain when I can't do something. I have almost stopped attending. (FG6, p. 2)"

"A mi me gusto mucho, porque aprendí más. Más cosas de lo que yo esperaba. Estee, aprendí a hacer el blog…(inaudible)... como que una cosa muy nueva para nosotros, bueno, para mi. Fue nuevo porque aprendí y fue muy interesante todo. Y pues darle las gracias a Claudia, que nos tuvo mucha paciencia. (FG6, p. 4)"

"I really liked it, because I learned more. More things than I expected. I learned to do the blog ... (inaudible) ... which is a very new thing for us, well, for me. It was new, because I learned, and everything was very interesting. And so, thanks to Claudia, who was very patient with us." (FG6, p. 4)

"Para mí fue muy importante, fue algo que ya sabíamos, pero hacerlo uno mismo es emocionante. Aprendimos muchas cosas, lo que era la hoja de cálculo fue algo muy… si nos estresó, muchas cosas si nos estresan. ¿De veras lo vamos a hacer nosotros? Pero haciendo las prácticas y, la verdad Claudia fue de mucho apoyo para nosotros y todas las personas que colaboraron con ella en nuestro grupo, siempre estuvieron ahí…Y aunque yo no había terminado todo el curso, tuve que salir por problemas familiares, pero la mayoría de los demás cursos sí los pude, me faltó uno, el de finanzas. Me dolió, por que me sentía muy bien con las chicas, chicas las extrañe mucho (risas); me dolió mucho porque yo soy de las personas que dicen -si ya empezaste, terminas-" (FG7, p. 2)

"For me it was very important, it was something we already knew, but doing it on our own is exciting. We learned many things, like using the excel sheet... many things stressed us. Are we really going to do it? But doing the exercises and, the truth, Claudia was very supportive for us and all the people who collaborated with her in our group, they were always there… And although I had not finished the whole course, I had to leave due to family issues, but most of the other courses I could [finish it], I missed one, the one about finance. It hurt me, because I felt very well with the girls, girls I missed you a lot (laughs); It hurt a lot because I am one of the people who say -if you already started, you finish-" (FG7, p. 2)

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The facilitator referred to the type of activities she carried out as part of her educational approximation. For example, she stressed the importance of learning as a tool for empowerment, and how knowledge allowed women to defend their rights. She saw women as active agents of change and encouraged them to continue with the program. The following quote illustrates the facilitator's commitment, motivation and empathy with the objective of this study:

"Así es como viven las mujeres en nuestras comunidades. Trabajan, cuidan a sus hijos y familia extendida, podrían ser violados, viven en condiciones de vulnerabilidad, por eso el desafío fue enseñarles cómo el aprendizaje de las habilidades digitales los empodera, cómo el conocimiento les permite defender sus derechos, eso es parte del trabajo que hago con ellas" (Facilitador de PMC, julio de 2017).

"This is how women in our communities live. They work, take care of their kids and extended family; they could be violated, they live in vulnerable conditions. So, the challenge was to teach them how learning digital abilities empowers them, how knowledge allows them to stand up for their rights – that is part of the work I do with them." (PMC Facilitator, July 2017).

***

During the interview, the facilitator referred to the importance of adapting course material to students' context and background in order to facilitate the understanding of key concepts and real-life application. One example of course adaptation was the work done with PROSPERA supervisors to adjust course amounts and financial calculations to reflect beneficiaries' socioeconomic contexts.

Regarding examples of learning applications, the facilitator described how she received emails from participants notifying that they would miss class. This is an application example of the competency of sending and receiving emails, even though they were to communicate their absence in the classroom. The facilitator mentioned that she was very satisfied when participants shared with her how their classroom learning was applied at home or in their micro-businesses. A woman participant shared that she built the web page for her husband's business. Some participants who had to expend much effort in order to learn also informed the facilitator that certain ICT activity was now possible on their own.

This type of interaction and feedback reflects the relationship of trust that was built between the facilitator and the participants, which in turn boost their empowerment and self-confidence and became a key element of the learning experience. In a trusting environment the facilitator can manage special situations with personal sensitivity and empathy. In one case, for example, a participant did not know how to read; the facilitator recognized this on the first day of class when she passed a white paper requesting participants to write their name and what they want to learn in class. When the facilitator realized that the participant wrote her name with difficulty, she assigned a person to be with the participant during the entire class, this participant did not return to the PMC.

With this example, the facilitator reiterated the importance of analyzing abilities at the outset and being empathetic to the participants' context. In this way the facilitator can prepare and deal with frustration and motivate participants to continue in the course. This example also showed that despite Mexico's literacy rate standing at 95.38% (World Bank, 2018), in a small, randomized sample from a vulnerable impoverished community there are likely to be cases of illiteracy.

Finally, the facilitator commented that women coming from a social program – in the case of this research, the PROSPERA program – could come to the PMC courses because they see it as another condition of the program. In the context of PROSPERA, women are called to attend regular meetings related to health, nutrition, and children's schooling. Although this was a voluntary activity to learn digital skills, for some participants this was simply another activity to attend. Although this observation could apply to some women, results from this study reflected that participants did indeed learn digital skills, and that this learning was meaningful for their development, as they also increased their self-esteem and confidence.

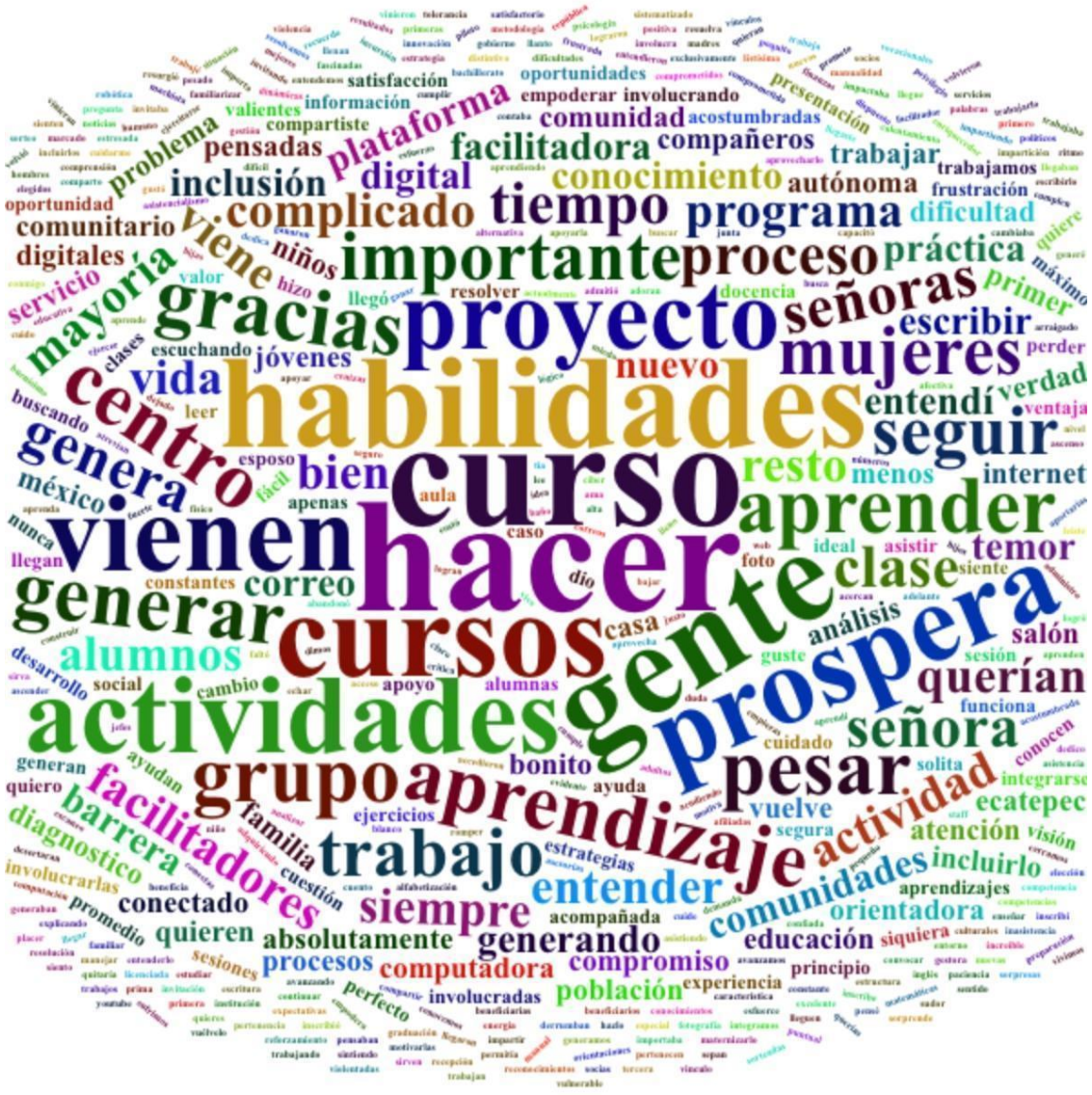
To complement the analysis of the facilitators' interview, text mining techniques were applied to the interview transcript. The first text mining technique is the frequency analysis, reflected in a word cloud where the size of the word reflects its importance in the text after cleaning for stop words. The bigger the size the more important it is in the context of the facilitators' experience and feedback on the program. Words like "do", "thank you", "abilities", "prosper", "important", "to learn", "center", and "communities" support the facilitator's motivation and commitment with regards to the learning process of the participants, and also with the PMC learning experience.

Further, the discursive level of the facilitator is shown in the greater number of word volumes, not comparable with the focus group performed on the women participating in the program.

Figure 45. Word cloud of facilitator's interview: English


abilities
Thank you
people
draft
courses
activities
course
prosper
they come
women
generate
learning
important
facilitators
process
exercise
complicated
i understood
forever
Mexico to write
generating
ecatepec
counselor
commitment
female students
we work
developing
satisfaction
listening
Internet
companions
returns
exercises
diagnosis
presentation
involving
involved
autonomous
connected
they wanted
facilitator
integrate
first
service
alone
wants
nice
value
average
frustration
barrier
students
community
they want
Attention
processes
experience
sessions
involve them
they know
accustomed arrive
question
practice
teaching
learnings
House
to lose
center
ladies
family
generate
new
even
feel
to learn
time
Ms
rest
children
to weigh
analysis
Photo
follow
program
watch out
knowledge
problem
understand
thought
beginning
absolutely
population
strategies
community
inclusion
include it
young boys
opportunities
maximum
to empower
opportunity
living room
difficulty
to work
advantage
information
computer
comes
education
digital
lessons
help
change
classroom
Social
husband
ideal
group
lifetime
platform
searching
perfect
digital
job
class
true
constant
it gave
safe
did
help
fear
assist
support for
most
you shared
works
case
accompanied
I want
less
easy
mail
never
well
barely
do
to
easy
mail
like
top
high
learn
safe
Wait
ahead
White
Chat
Ms
rest
children
to weigh
analysis
Photo
follow
program
watch out
knowledge
problem
understand
thought
beginning
absolutely
population
strategies
community
inclusion
include it
young boys
opportunities
maximum
to empower
opportunity
living room
difficulty
to work
advantage
information
computer
comes
education
digital
lessons
help
change
classroom
Social
husband
ideal
group
lifetime
platform
searching
perfect
digital
job
class
true
constant
it gave
safe
did
help
fear
assist
support for
most
you shared
works
case
accompanied
I want
less
easy
mail
never
well
barely
do
to
learn
time

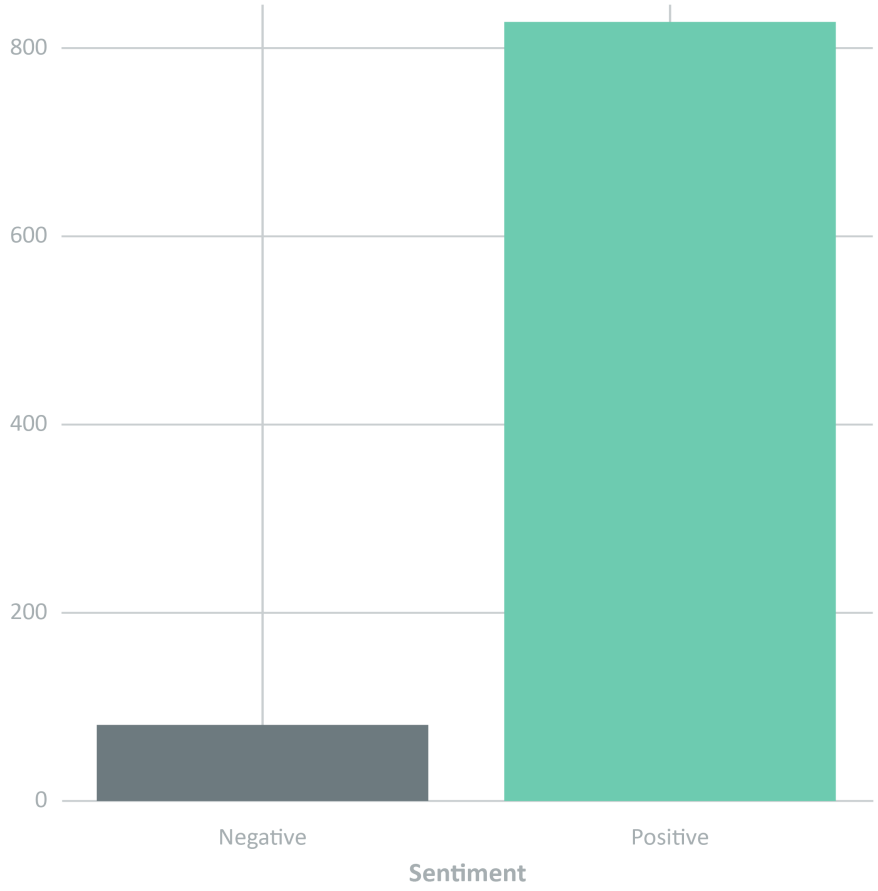
Figure 46. Word cloud of facilitator's interview: Spanish



Note: Author's elaboration based on transcripts of the facilitator's interview in July 2017.

Following the word-cloud analysis, a “feelings analysis” was applied to the transcript to understand the social sentiment of the facilitator along the different interview topics. As shown in Figure 47, the positive sentiment outweighed by a significant proportion the negative. Sentiment analysis provides a positive and negative weight to each word in the text. This classification was revised and adjusted to this particular study context. Although the facilitator provided relevant feedback on the intervention design and learning experience overall sentiment towards the facilitation experience was positive.

Figure 47. Sentiment analysis of facilitator’s interview

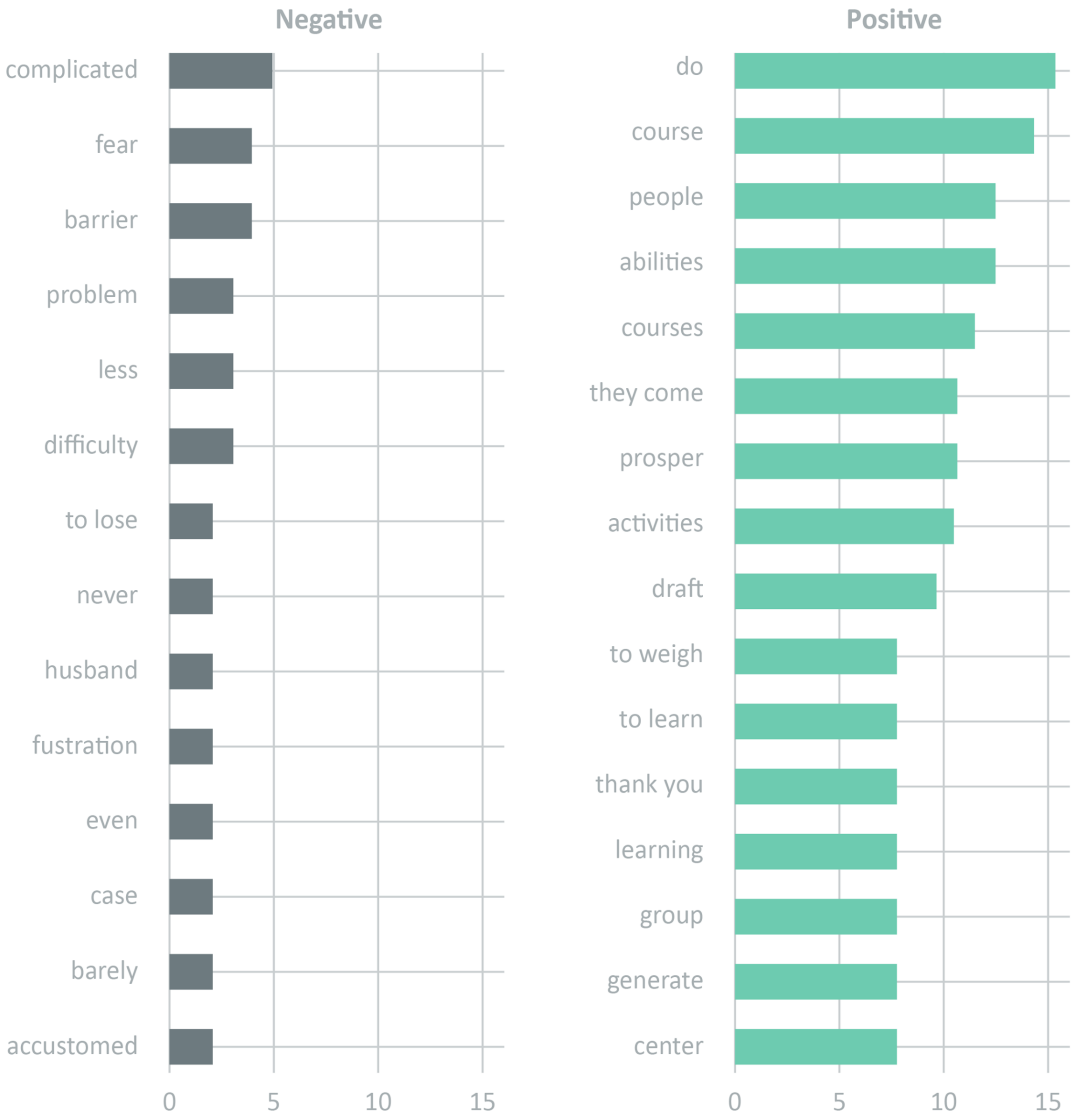


Note: Author's elaboration based on transcripts of the facilitator’s interview in July 2017.

To gain a deeper understanding of the type of words related to positive and negative sentiments, a sentiment classification extract is presented in Figure 48. Words like “complicated”, “fear”, “barrier”, “problem”, reflect concerns of the facilitator with the learning experience, although with

very little frequency, compared to words like “do”, “abilities”, “prosper”, “to learn” or “thank you” – adjectives, actions and sentiments that reflect the facilitator’s positive experience during and after the policy intervention.

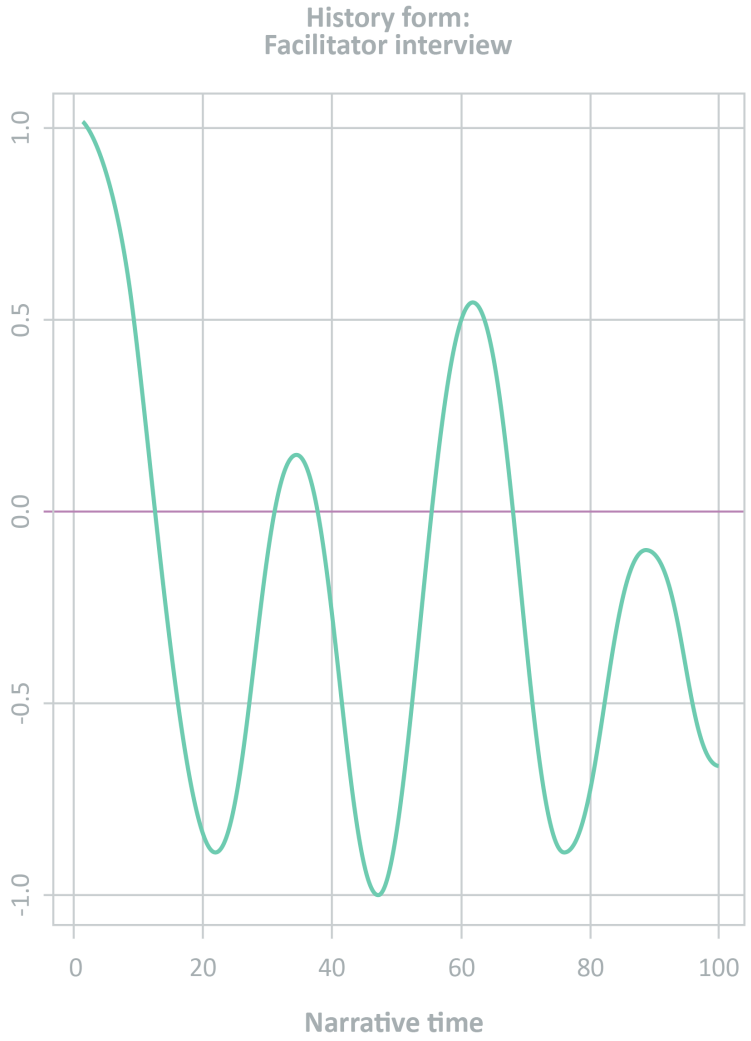
Figure 48. Sentiment classification of facilitator’s interview



Note: Author's elaboration based on transcripts of the facilitators interview in July 2017

The final text mining technique is the narrative timeline, which allows analysis of the flow of the narrative according to the mood and emotions of the focus group, as shown in the following graph. The Y scale represents the positive and negative sentiment pondered, while the X scale represents the conversation timeline. It is based on counting in the text under examination how many words have a positive value and how many have a negative value; with that, a balance is established that can be positive or negative (if it is zero it is neutral).

Figure 49. Narrative analysis of the facilitator interview



Note: Author's elaboration based on transcripts of the facilitator's interview in July 2017.

The narrative analysis shows a positive start in terms of the facilitator's motivation and commitment with the objectives of the program. The sentiment indicator dips into the negative scale when the facilitator shares the learning challenges and the necessity to adjust time devoted

to explain certain concepts in more detail. After that, sentiment turns positive when talking about how participants shared the usage of concepts learned in class, but turns negative when sharing insecurity and community conditions, such as work overload and very little time for women's own interests. Finally, the narrative line concludes with a positive tendency when the facilitator shares positive reasons for participating in the Program.

In summary, insights from the facilitator interview, the direct observation of her interactions with participants over the course of the program, the testimonies of the participants recognizing her role in their continuity in the program, all supported the importance of the facilitator's role within the PMC learning model. As Ferro, Helbig and Gil-Garcia (2011) noted, variables related to the process of acquisition of ICT skills have been found very influential in successful digital inclusion programs. This research has shown that in the process of acquiring digital skills, the facilitator plays a decisive role. The following section focuses on steps two and three outlined by UNESCO (2008), in terms of describing if women continued incorporating ICT in their daily lives (during the seven months following completion of the program) and whether utilization was useful.

4.4 The rise of digitally empowered women

As discussed by Sen (2009) from a development perspective, the rise of digitally empowered women refers to the decisions women make to use technology creatively to improve their entrepreneurial activities, exercise their rights, and supporting their family needs like helping their child with their school activities. The following subsections describe in more detail the learning experiences as well as the socioeconomic contexts that prevented women from continuing in the program. Understanding these barriers will provide important insights for future policy design.

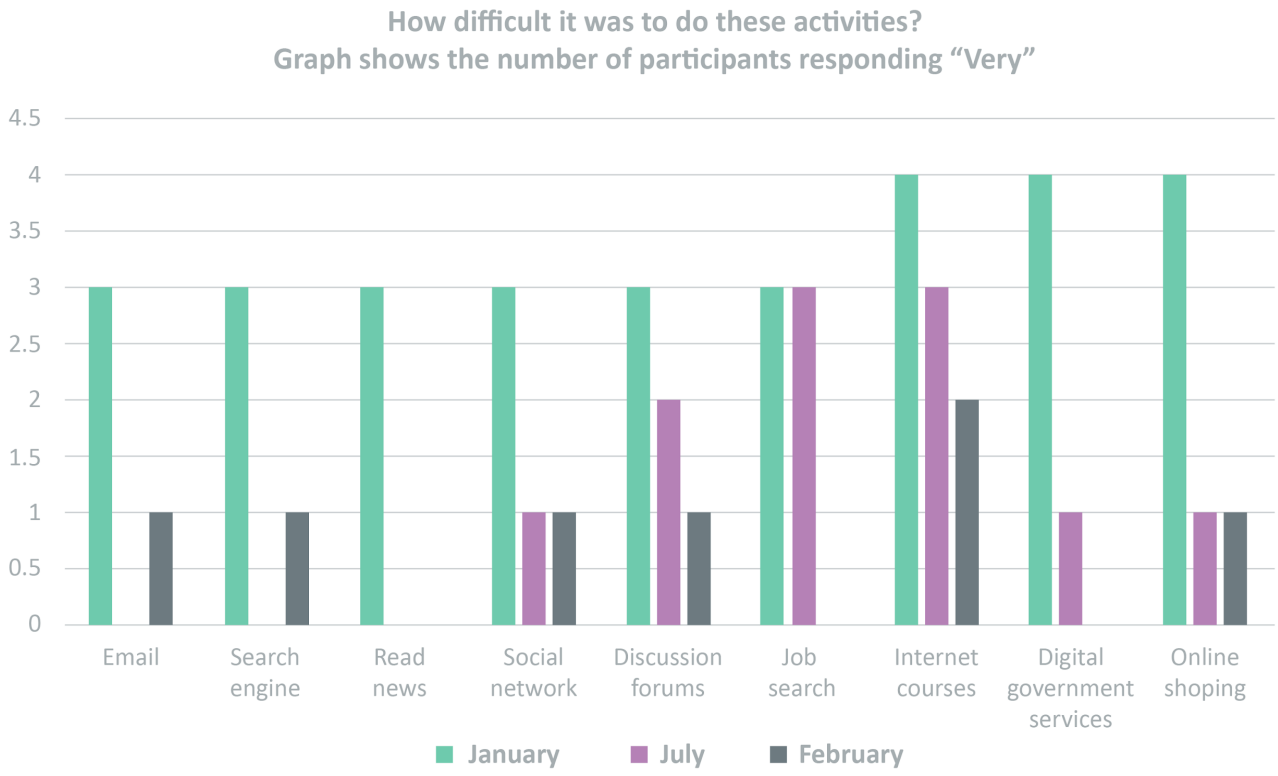
4.4.1 Personal achievement after finishing the program

This section addresses participants' learning experiences, reasons for dropout, and ICT usage seven months after finishing the program. As described in the methodology section, research designed considered a mixed-methods longitudinal study in order to explore and describe if women participants of the program continued incorporating ICT capabilities into their daily lives and if that incorporation enhanced their development (Zheng, 2009).

The DIS was applied at the beginning of the program, at the end of the courses, and then another seven months' later, in order to explore and describe if and how women's ICT usage in their daily lives changed over time. However, due to the fact that only six participants completed the entire program (with 100% course attendance), I selected three questions from the survey and presented the results over time. This information was complemented by two focus groups which took place seven months after the completion of the program. Testimonies from these focus groups provided valuable insights on women in different contexts and situations to partially attend the program. Finally, I applied a set of text mining techniques to the focus groups' transcripts to complement findings from testimonies and descriptive statistics from the DIS.

The following graph displays the difficulties that participants found in the use of the Internet across the time (only the answer “very” was plotted).

Figure 50. Level of difficulty in Internet-related tasks for participants



Note: Author's elaboration based on data from Digital Inclusion Survey taken seven months after finishing the Program in February 2018.

As can be observed, at the beginning of the courses in January 2017, three activities were categorized as very difficult by participants – Internet courses, digital government services and online shopping. By February 2018, that assessment had dropped significantly. Internet courses demanded time commitment and a positive learning experience in order for participants to attend classes (given no other contextual constraints stopping them from attending). However, the more advanced activities, like online shopping, required mathematical calculations like adding, extracting, and calculating interest rates, so this could explain why responses do not drop as significantly as in other categories.

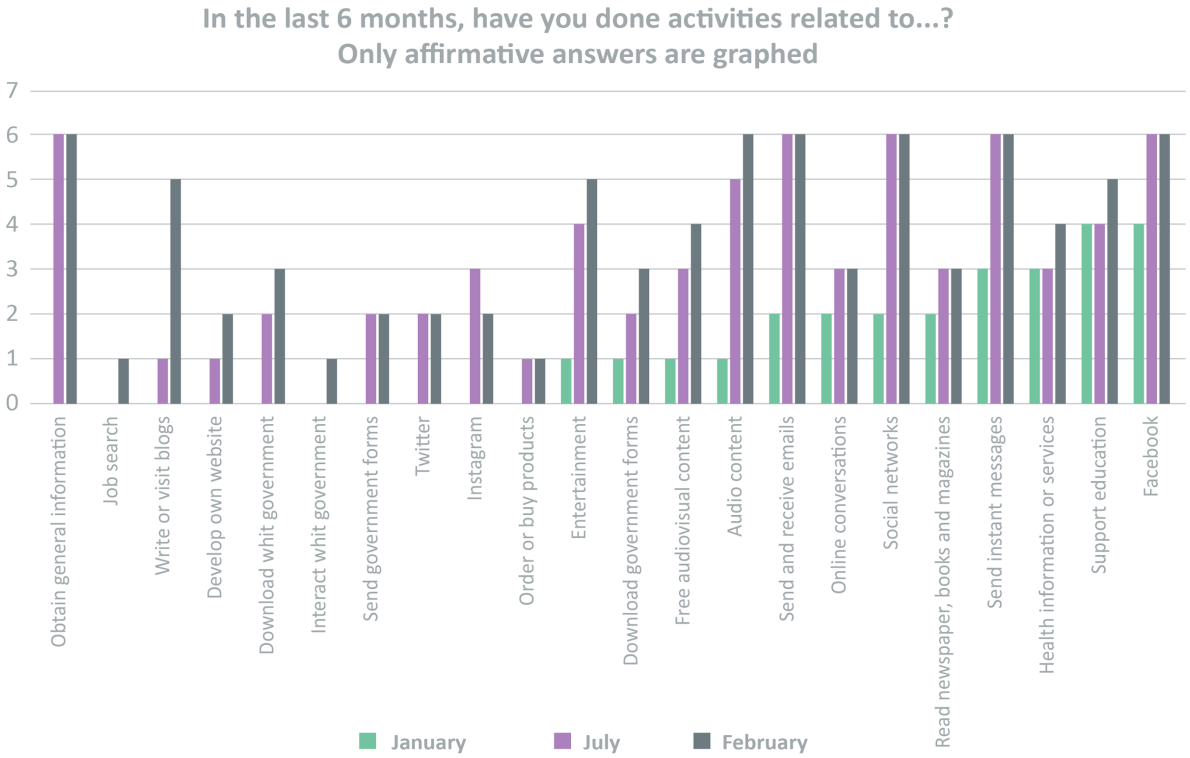
In the category for digital government services, transactions considered in the course curricula are basic services and the most demanded as documents required for other government services. Although the government has been improving processes for digital services and government

records interoperability, there are certain procedures that still require identification documents in order to access a particular program or service. A drop in the assessed difficulty level could be explained by the fact that as digital government services are standardized, uptake by users is easier once people have learned how to make a transaction, as all other services follow the same standard.

Similarly, processes are standardized for much online shopping: selecting the products, putting them in the basket for check out, selecting from different alternatives of payment methods (credit, debit, wallets, prepay, cash), while understanding their implications in terms of data protection, and identity theft. These competencies are complex, but once participants had learned them, they valued the convenience, as testimonies have described.

Continuing with the analysis of the DIS results, Figure 51 presents women's responses as to whether they had undertaken any of the cited digital activities during the last six months.

Figure 51. Internet related activities in the last six months



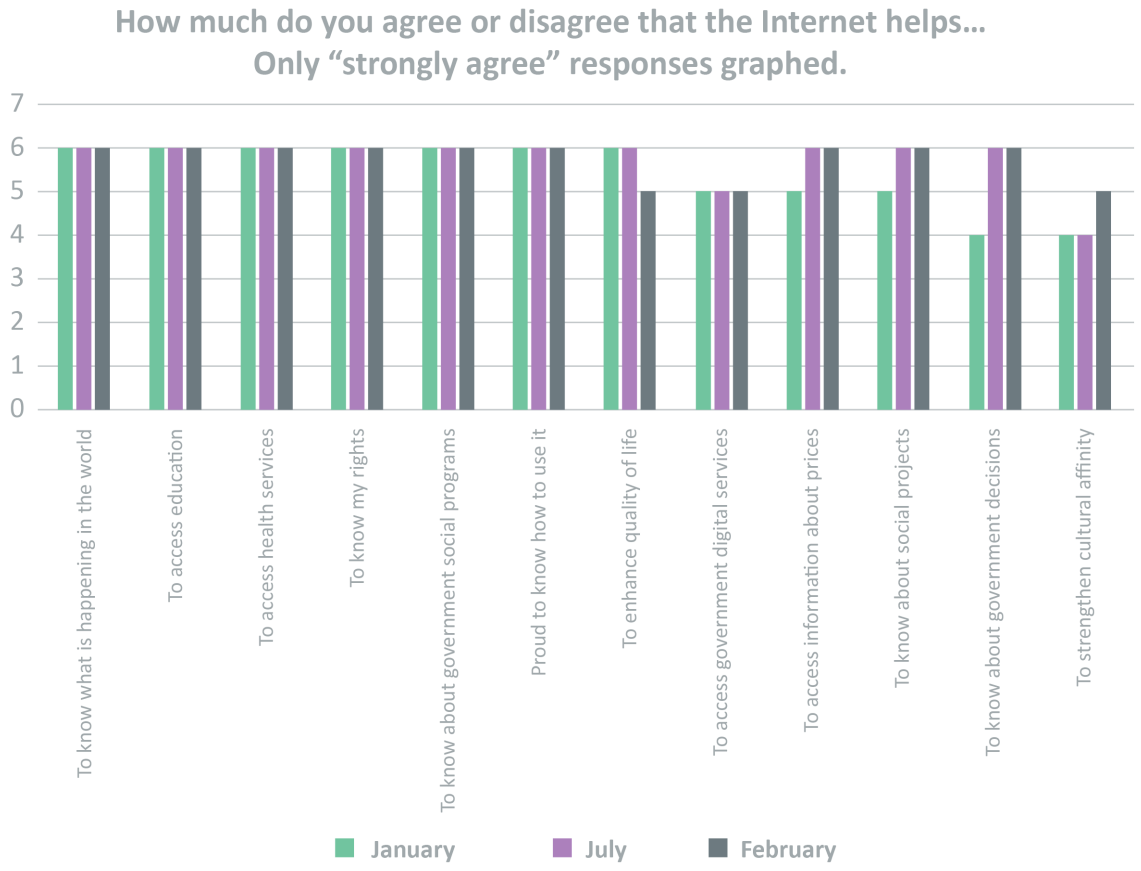
Note: Author's elaboration based on data from Digital Inclusion Survey taken seven months after finishing the Program in February 2018.

Results show that digital skills acquisition was possible in all categories. Some activities not commonly practiced before the program, such as interaction with government digital services, were finally utilized. Activities that were already undertaken were increased, such as downloading government forms to request a service, accessing audiovisual and audio content, sending and

receiving emails, use of online communications, and social networks. Support for education was in common use by participants before entering the program, but also one of the main reasons and motivations for participation in the courses. Usage continued increasing during the seven months after finishing the program.

A final set of DIS data analyzed over the course of the program is participants' agreement on Internet usefulness (Figure 52).

Figure 52. Personal Internet usefulness



Note: Author's elaboration based on data from Digital Inclusion Survey taken seven months after finishing the Program in February 2018.

Results for six categories maintained the same level of agreement throughout the survey period, with the Internet recognized as helping the women know what is happening in the world, access education, access health services, know their rights, know about government social programs, and to feel proud of knowing how to use these services. Other categories saw increases after the courses ended and kept a high level of agreement among participants seven months after finishing

the program. These categories were to access information about prices, to know about social projects, to know about government decisions, and to strengthen cultural affinity.

4.4.2 Self-esteem and empowerment as drivers for development

The following subsection addresses one of the most important aspects of the results of this research and connects with the approach of Amartya Sen, who maintains that the learning process stirs personal development, autonomy and self-confidence. In terms of Hatakka and Lagsten (2012) development is understood as freedom of choice in the personal, social, economic, and political sphere. Having in mind the foregoing, I used testimonies as supporting evidence of women's growth in self-esteem and empowerment. Women reported how learning to use the Internet and ICTs and incorporate them into their daily lives had empowered them to decide on usage according to their own goals.

For women entrepreneurs and employees, digital empowerment has brought improved business and work efficiency and productivity. For both typology A and typology B participants (see Table 7), digital empowerment has resulted in efficiencies in domestic duties and the educational support of children.

The following quotes were taken from the focus groups transcripts of February 2018. This exercise provided insights to better understand and explore how women were using the Internet and ICT seven months after finishing the PMC courses.

"Incluso nunca le he ayudado a uno de mis hijos, que es mi motor, pero él siempre ha sido muy independiente, y ahora que está ya en tercero de secundaria, me dice ' Ay mamá tengo que hacer un libro', así y así. Le dije descargalo hijo, '¿Y cómo?' Ya le enseñe, hicimos el trabajo. Mamá, me dice, te sacaron 10. ¿A mi porque? 'Porque tú lo hiciste'. Le dije, no, yo te enseñé como y tú lo hiciste. Entonces para mi es algo muy padre porque yo tenía que pedir favor que ellos me tenían que ayudar y ahora yo les puedo ayudar. Ya lo puede uno hacer y eso es bonito porque a veces nos cerramos las puertas nosotras mismas. Y cuando te las abren pues hay que aprovechar. " (FG7, p. 3)

"I was never able to help one of my children, the one who is my engine. He has always been very independent, and it is now in the third year of high school. He said once to me, 'Oh, mom, I have to make a book', and so on. I said download it son, 'and how?' I already taught him; we did the job. Mom, he says, they get you a 10. Why me? 'Because you did it'. I said, no, I showed you how and you did it. So, for me it is something very cool, because I had to ask for a favor every time they had to help me and now I can help them. You can do it now and that's nice because sometimes we self-limited ourselves. And when opportunity comes, you have to take advantage of them." (FG7, p. 3)

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As we can see from the above quote, learning ICT skills gave women independence in usage, and this independence empowered them to use those learnings to help their children. Moreover, in the

cited example, it brought the mother recognition and credit from her very independent son, because she was able to download the book from the Internet. This process of change from being dependent on someone to use the Internet, to being the one that shows others how to use it, changes women's self-perception of their own capacities to change situations/contexts that affect them. The participant's final reflection relates to women sometimes closing the door to opportunities, and why it is important to take opportunities when given the chance; however, her response also suggests the attitude of waiting for opportunities to come to women, rather than going to look for them.

This final point is a very important finding that might explain why none of the women continued attending courses at the PMC after finishing the program in July 2017 – despite recognizing the value of digital tools for progression. As the facilitator mentioned in the interview, they might have come because the PROSPERA program called them to participate. This is why incorporating the digital poverty variable within the conditionality matrix of the program is important, recognizing that initial incentives are needed in order for women to attend digital literacy courses.

To continue with the analysis of daily usage, the following quotes come from different participants of typology A (women entrepreneurs) who attended focus groups seven and eight:

"Me tocó, es que yo en su casa hago trabajos de estilismo, entonces pues yo los trabajaba personalizados y lo veía por teléfono, y muchos me pedían tarjeta de presentación. Entonces un día fui para que me hicieran las tarjetas, pero estaba una personita que se porto muy grosero, no sabe atender a las personas. 'Es que tiene que traer usted su diseño'. Y que me doy a la tarea, me fuí a un café internet y lo pude hacer; yo misma diseñe mi tarjeta y con esa misma tarjeta saque un volante y lo mandé a resetear. Entonces yo cuando lo hice lo mande a uno de mis hijos porque él estaba en computación y tenía chance de hacer impresiones y le digo sácame un ciento de impresiones, y ahora ya lo que hago es que doy mi tarjeta y ya tengo mis volantes. Incluso detrás de la tarjeta les puse para hacer la cita, fecha, costos, y todo por adelantado. O sea yo todo ahí lo especifiqué atrás y mi hijo se empezó a reír - no manches mamá cómo haces eso - Pues sí, le digo, de algo tiene que servir la tarjeta y no nada más la parte principal." (FG7, p. 7)

"I do hair style work in my house and arrange the scheduling of services by phone, however, many clients asked me for business cards. So, one day I went to get the cards done, but there was a person who was very rude, who didn't know how to treat well their clients. [The person specified that to get the cards printed] 'You had to bring your own design'. So, I put myself into the task, I went to an internet cafe and I could do it; I designed my card myself and with that same card I took out a flyer. So, when I did it, I sent it to one of my sons because he was on the computer and he had a chance to make copies and I told him to get a hundred of them, and now what I do is I give my card and I already have my flyers. Even behind the card I put a paragraph for appointments, date, costs, and everything in advance. I mean I specified everything back there and my son started laughing and asking- how did you do that mon? [referring to the design of the card] - Well yes, I tell him, the card has to do something more and not just the front part." (FG7, p. 7)

"Cuando me llamaron para que viniera yo les comentaba que queríamos mi hermana y yo empezar a vender nuestra ropa por internet, y gracias al curso, pude hacer la página para vender la ropa, entonces, ya tenemos más difusión. Ya hemos tenido varias ventas por Internet, entonces a mí, sí me sirvió bastante eso. Y tener la satisfacción de haber hecho yo la página sin que nadie me ayudara pues es algo que se siente muy, muy padre. Se llama La Moda de Nancy" (FG7, p. 9)

"When I was invited to participate in the PMC courses, I told them that my sister and I wanted to start selling our clothes online, and thanks to the course, I was able to make the page to sell the clothes, so we already have more distribution. We have already had several sales on the Internet, so that served me well enough. And I have the satisfaction of having made the page without anyone helping me, and it is something that feels very, very cool. It is called The Fashion of Nancy." (FG7, p. 9)

"Pues yo aprendí a hacer invitaciones, hice una fiesta a mi hija, y salen bastante caritas. Entonces yo diseñe la invitación de mi hija, las de mi sobrina, y les hago sus invitaciones." (FG7, p. 9)

"I learned how to make party invitations. I threw a party for my daughter, and they are pretty expensive. So, I design my daughter's invitation, my niece's, and I make them their invitations." (FG7, p. 9)

"Yo que trabajo en una estética, me ayudó a conseguir los productos más baratos, todo eso. Pues encontré varias formas para encontrar los productos más baratos."(FG8, p. 1)

"I work as an hairstylist, and the courses helped me to get the cheapest products. Because I found several ways to find the cheapest products." (FG8, p. 1)

"Ahí yo aprendí a hacer una hoja de cálculo y todo eso y ahora que tuve que hacer un trabajo, me fui al Internet y sí lo pude hacer. No sabía yo nada, ni abrir una computadora. Hasta yo me sentí orgullosa de que sí pude hacerlo." (FG8, p. 5)

"I learned how to use a spreadsheet and all that and now that I have to do a job, I went to the Internet and I did it. I didn't know anything, nor even how to turn on a computer. Even I felt proud that I could do it." (FG8, p. 5)

"Para lo de mi trabajo … para poder subir lo que hacía yo y todo eso, para que la gente se diera cuenta. Lo subí a Facebook. Supongamos que hacía un peinado de varias trenzas, ya me decían - ¿Cuánto? - y ya lo subía y me decian que querian y ya." (FG8, p. 9)

"I used what I learned for my work ... to be able to upload what I was doing and all that, so that people would notice. I uploaded my work to Facebook. Suppose I did a hairstyle, they were already telling me - How much? - And I was uploading it and they told me what they wanted, that was it." (FG8, p. 9)

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As we can see from these examples, focus groups allowed me to capture in more detail the ICT and Internet usage for entrepreneurial activities, and how important it was for women to accomplish what they envisioned after taking the courses. Self-awareness of their own capacity to learn was valued and a key aspect of the empowerment process and growth of self-esteem. These results support the approach of Heeks (2008) on ICT4D 2.0, asserting vulnerable groups as active

producers, and co-producers, of innovations. Testimonies demonstrated that these groups did respond to incentives to create new income through the utilization of ICT, by applying what they learned in class to improve their business.

In terms of Amartya Sen's (1999) capability approach, functionings are the various actions a person may value doing or being, such as being adequately nourished, being healthy and being able to take part in the life of the community. In Sen´s terminology, a person's "capability" refers to the alternative combinations of functioning that are feasible for her/him to achieve. The focus of development thus becomes increasing a person's capability set, or her/his substantive freedom, to lead the life she/he values.

Examining this framework in terms of this digital development program, functionings are what women value in the first place – growing their business (Type A Entrepreneur), helping their children with school (Type A Entrepreneur and/or with a paid job & B Non entrepreneur) –; more importantly, being independent in the process of using the Internet and ICT, being aware of the importance for the daily lives (Type A & B). To accomplish this, they need to acquire digital competencies and incorporate them in their daily lives to fully realize freedom of choice in ICT usage, covering both family needs and those of their own.

Other learning experiences shared by participants in both typology (A & B) groups of 2018 were very similar to the learnings expressed by the participants in the July 2017 focus group. These were mainly related to helping children with school homework, accessing government services online, entertainment, cooking, and hobbies, such as looking for YouTube videos on how to knit.

Another important aspect of these final focus groups was the gratitude that participants expressed towards their facilitator, reinforcing the relevance of this role in digital inclusion programs.

In sum, after analyzing data from the focus group session at the end of the courses, and the two sessions seven months after the intervention, I classified ICT usage in three categories:

A) General usage of digital capabilities –such as the participant describing a bad attitude from people in the printing business, and how she rather did her business cards on her own. This saved her time and money, but most importantly increased her self-esteem and creativity, since she incorporated in the design the appointment record on the back of the card.

B) Helping children with schoolwork – usage relevant to all women with children in the program.

C) Transactional entrepreneurial usage – such as designing a website and being able to sell products and services online, or producing videos and uploading them on social media to increase the business' client base.

To complement the analysis of participants' testimonies, text mining techniques were applied to the transcript of the two focus groups sessions that took place in February 2018, seven months

after the intervention. Results enabled a longitudinal analysis on women's learning experiences and ICT usage after the policy intervention (attendance to the PMC courses). The following word cloud reflected the number of times a word was mentioned during the focus groups sessions. The bigger the size of the word, the most it was mentioned. Words like "well" "to learn", "I learned", reflect in general a positive experience; however, compared to the word cloud seven months previously, this analysis lacked more specific examples in terms of new words emerging from the frequency analysis.

These results might be explained by the fact that women participating in these focus groups were a combination of participants, including those who finished the program as well as participants who dropped out during the program. In consequence, more specific examples in terms of relevant usage were extracted as testimonies of the focus groups but are not reflected in the frequency analysis since general terms were more repeated during the sessions.

Figure 53. Word cloud focus group, seven months after policy intervention: English

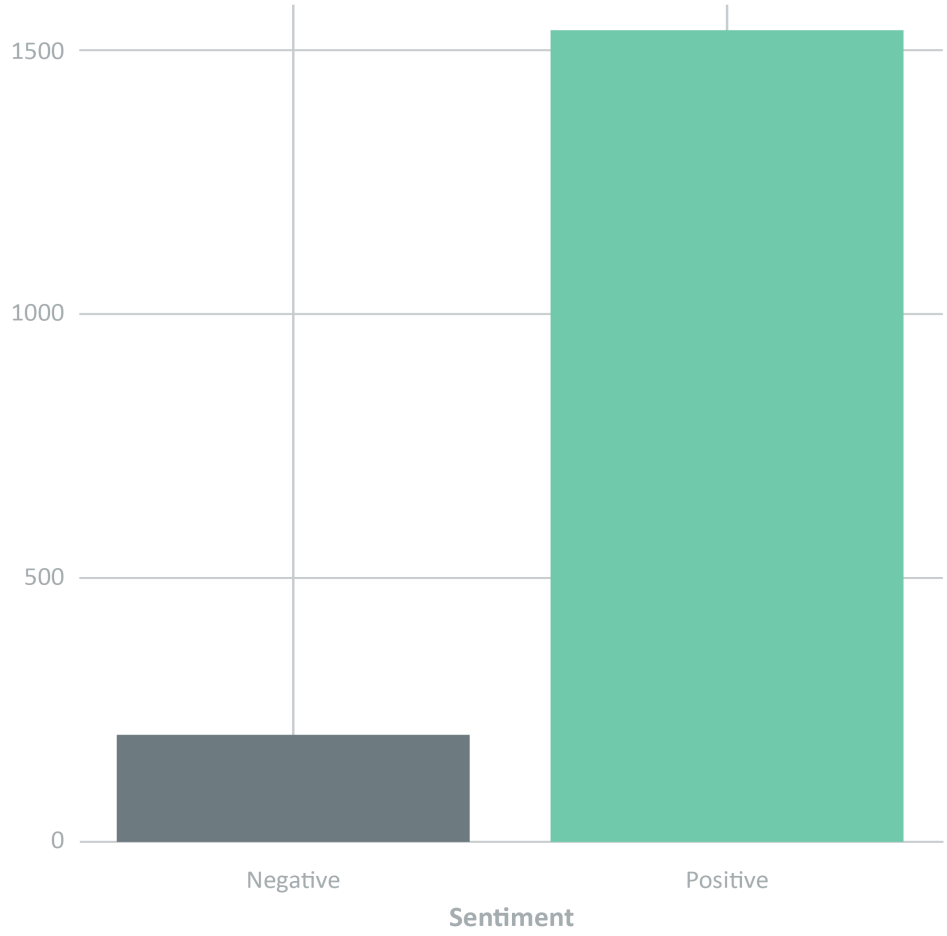
Note: Author's elaboration based on transcripts of focus groups seven and eight, seven months after intervention in February 2018.

Figure 54. Word cloud focus group, seven months after policy intervention: Spanish

Note: Author's elaboration from the transcripts of focus groups seven and eight, seven months after intervention in February 2018.

Following the word-cloud analysis, a feelings analysis was applied to the transcript to better comprehend positive and negative sentiments towards the learning experience. As shown in Figure 55, the positive sentiment outweighed by a significant proportion the negative. As with all previous analyses, participants of the focus groups showed a very positive feeling towards the learning experience and the impact of technology in their daily lives.

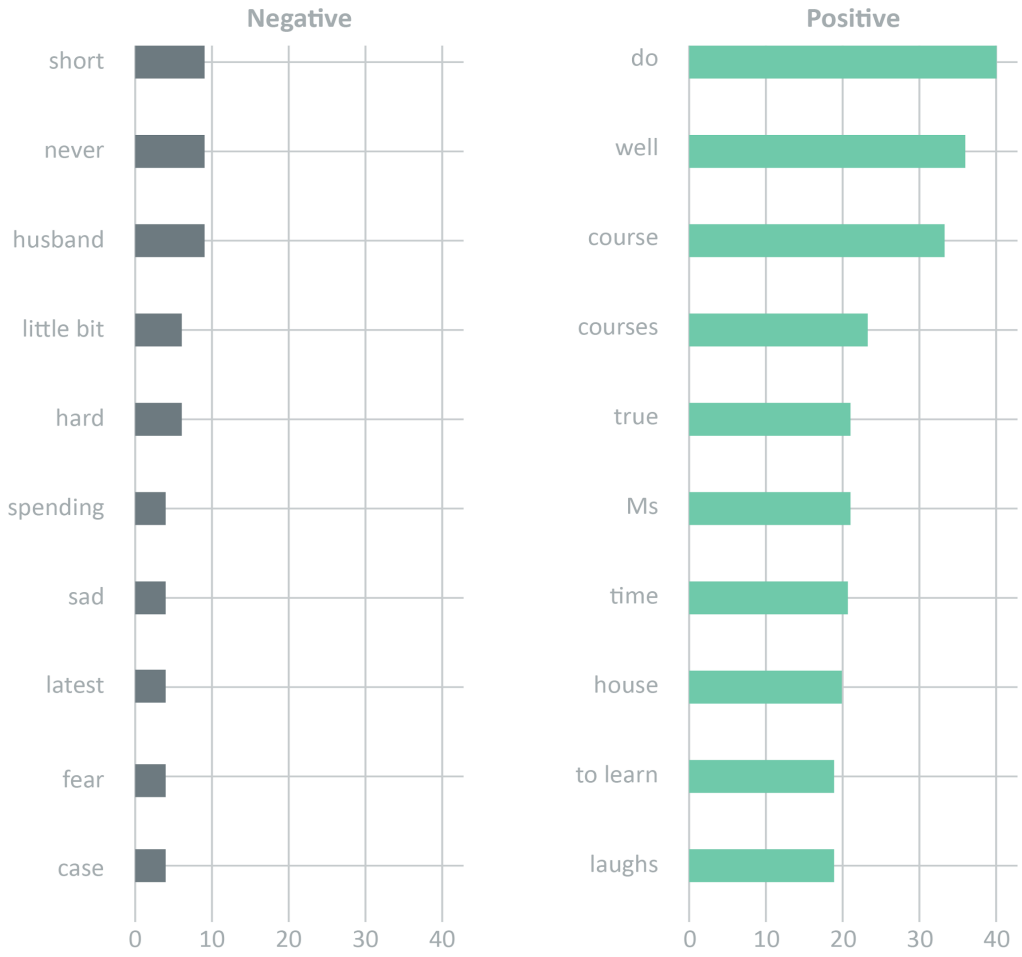
Figure 55. Sentiment analysis of focus groups sessions, seven months after the intervention



Note: Author's elaboration based on transcripts of focus groups seven and eight, seven months after intervention, February 2018.

Positive and negative feelings can be further analyzed by a sentiment classification extract, as presented in Figure 56. Words like “husband”, “hard”, “spending”, “fear”, reflected participants’ concerns with their learning experience. The word “husband” was present in all text mining analyses. (I describe in more detail the macho culture surrounding women participating in the program in the following section.) Positive words like “do”, “well/good”, and “course” are consistent with words included in the previous text-mining exercise; however, they represent very general statements in comparison to the expanded vocabulary resulting from the focus group that took place after course completion.

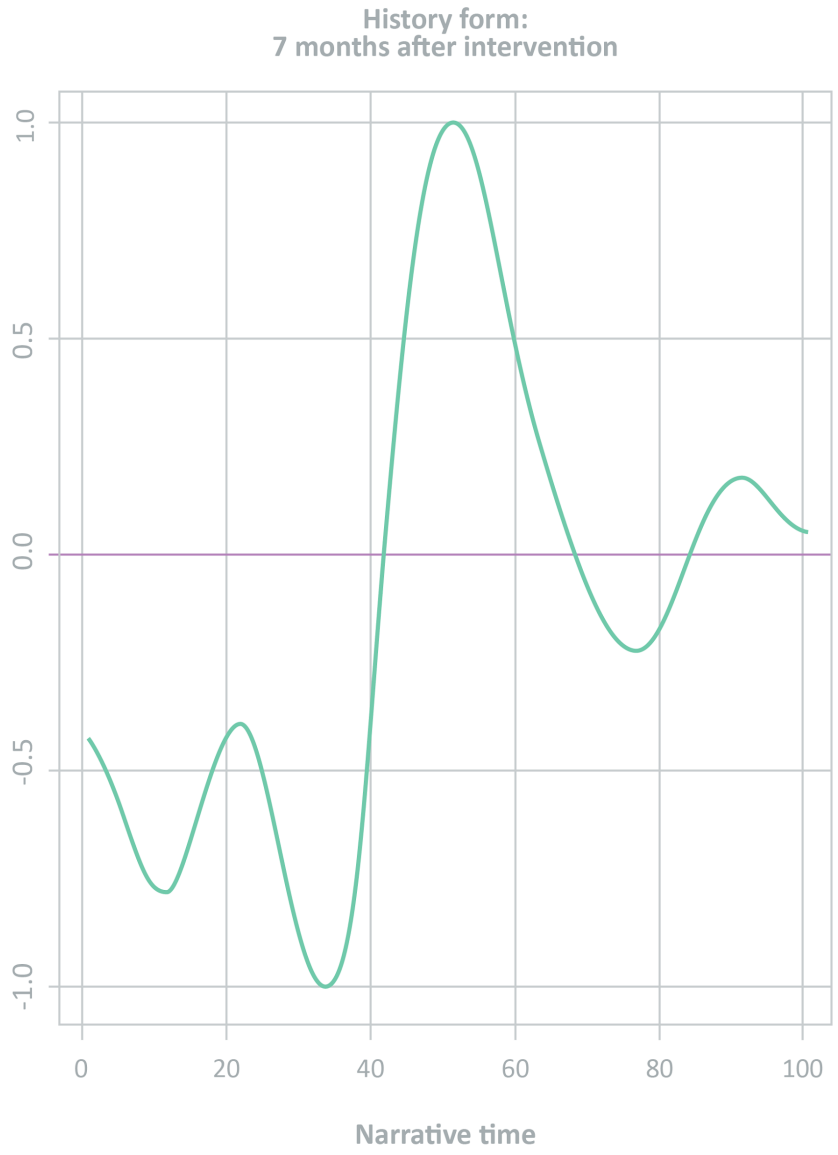
Figure 56. Sentiment classification, seven months after the intervention



Note: Author's elaboration based on transcripts of focus groups seven and eight, seven months after intervention in February 2018.

To conclude the final round of text mining techniques, I used a narrative analysis, which allowed me to analyze the flow of the narrative according to the mood and emotions of the focus group. The Y scale represents the positive and negative sentiment pondered, while the X scale represents the conversation timeline. The graph represents the sentiment progression along the narrative of the focus groups.

Figure 57. Narrative analysis, seven months after the intervention



Note: Author's elaboration based on transcripts of focus groups seven and eight, seven months after intervention, February 2018.

The narrative analysis showed a negative start in terms of participants expressing dropout reasons, which are analyzed in detail in the following section (Barriers to participation). Sentiment then turned positive when participants shared their learning experiences, usage examples and expressions of gratitude towards the program and facilitator. As with previous analyses, the graph reflects the ups and downs of the learning experience and ends with positive sentiment. This gives hope for future policy design, since although there are barriers and constraints along the learning

journey, positive feelings towards digital skills prevailed throughout the duration of the policy intervention.

To summarize this section, I refer to the themes and categories from Table 6 (page 56). For the theme "Performance of the participants", there were three categories identified: firstly, participants of the program did acquire digital skills (category one); they incorporated ICT in their daily lives, and with the new ICT knowledge, chose to use ICT (Sen, 1999) to better meet their family needs, and also those of their own. Secondly, ICT capability increased participants' self-esteem (category two) and, thirdly, ICT increased participants' self-confidence (category three), empowering them to accomplish their learning objectives.

The findings described in this section also support the approach of Heeks (2008) on the overarching challenges for the next digital development phase, which sees vulnerable groups as active producers and co-producers of innovations. Under this research, it was possible to demonstrate that when given the tools to produce digital content and services, participants in the PMC courses did so – such as writing blogs, recording videos of their work and uploading them on YouTube, or creating a webpage to sell products online. Improving their entrepreneurial activities through the utilization of ICT impacted women's income and employment opportunities, although this study did not examine their profit. Finally, a consistent result throughout the different methods of analysis – DIS, focus groups, text mining – was the recognition of ICT as a valuable tool for progression.

Although results demonstrated positive outcomes in terms of the research objective, there is a particular aspect of the policy intervention that deserves in-depth analysis: the dropout rate. The following section addresses reasons shared by the participants as to why they stopped attending the courses, even though they found them useful and relevant for their daily lives. Exploring the barriers to participation under this particular policy intervention provides information on women's contextual situations that prevent them from accomplishing their learning objectives.

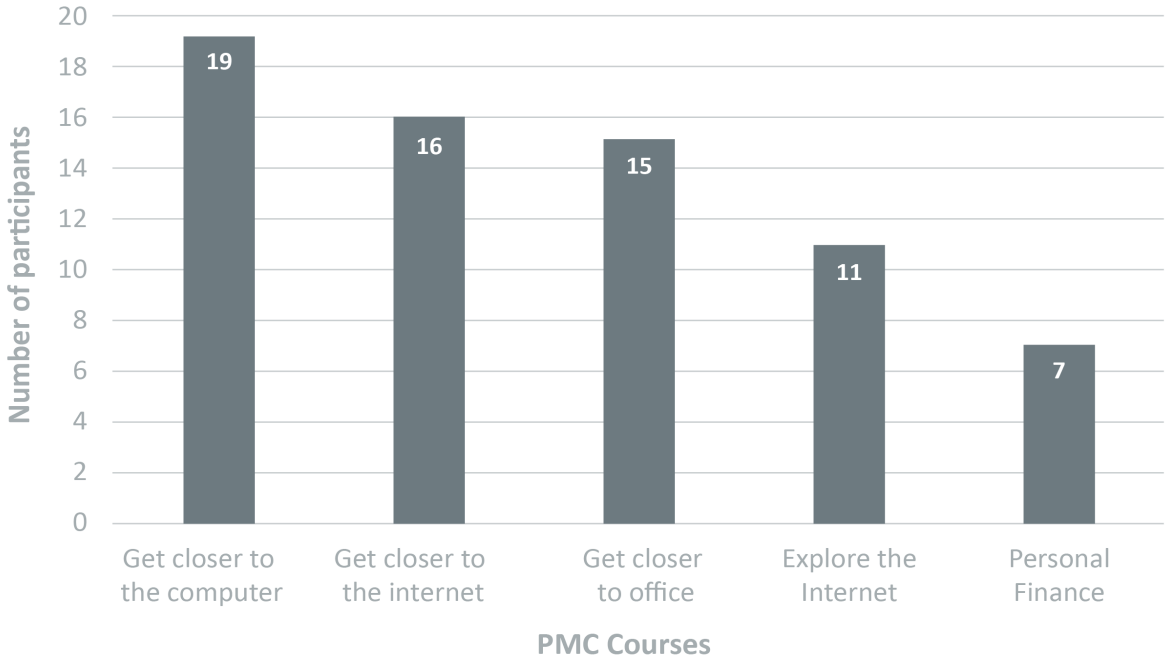
4.5 Barriers to female participation in the Program

This section describes case study findings regarding women's constraints to fully take advantage of the program. As Meadon et al. (2009) have pointed out, the so-called digital divide is a matter of not only the unavailability of ICT but also the social, political, institutional, and cultural contexts that shape people's inability to value and use them effectively. Therefore, addressing in detail the barriers limiting women's participation in this case study will provide insights to mitigate them in future digital inclusion policies. It will also provide evidence to guide government efforts towards a continuous revisitation of community context in order to maximize program attendance and policy outcomes.

I structured the analysis of barriers to participation in the program according to the results obtained from three sources of information: firstly, direct contact between the facilitator and participants who stopped attending PMC courses; secondly, the testimonies shared by participants in all focus group sessions; and thirdly, text mining, applied throughout the entire set of transcripts.

The facilitator's role in class was to guide learning and monitor participants' progress towards the program objectives. In order to acquire digital skills, attendance is key, since as the learning framework described, learning comes from class exercises, group projects, time devoted to practice, and access to a facilitator who can address questions with empathy and in a timely manner. The following graph presents the average number of participants per course (Figure 58).

Figure 58. Average number of participants per course



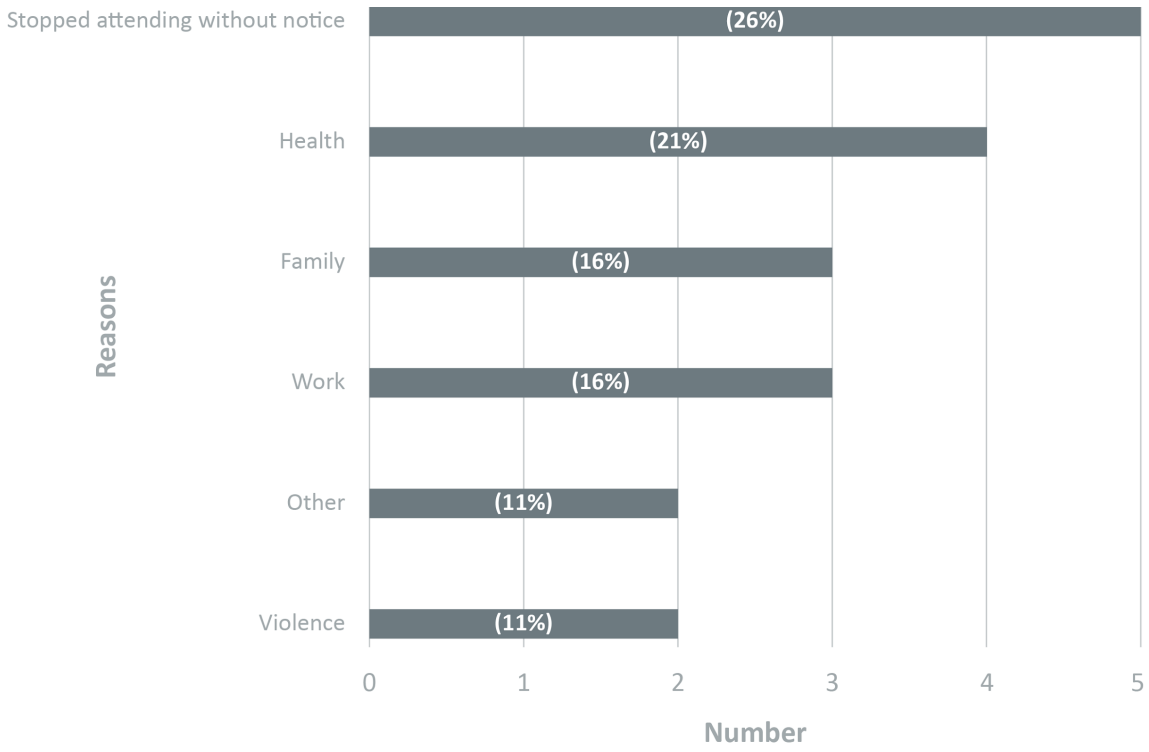
Note: Author's elaboration based on data from course enrollment.

At the beginning, there were 64 women randomly selected to participate in the program, and 64 accepted to participate. However, only 27 took the digital inclusion survey, and 23 attended the first day of the course. The six sessions of the first course, "Get closer to the computer", had on average 19 participants by the end of them, four participants had dropped out; the second course, "Get closer to the Internet", had on average 16 participants, and the third course, "Get closer to office", 15 participants. By this point, eight women had stopped attending the PMC courses. The fourth course, "Explore the Internet", had on average 11 participants, 4 less than the previous one. The fifth and final course, "Personal finance", had on average 7 attendees.

As results show, although the dropout rate was gradual between courses, only six participants completed the entire program of five courses (although there are seven regular women attendees in all courses). Therefore, understanding the factors that affected women´s participation is a key component of this research. To this end, the facilitator played an important role, since she followed up with women who missed class by phone call, email or text message.

Figure 59 presents reasons shared by participants to explain why they missed out on classes. Data include the number of women that the facilitator tried to reach, although not all participants who dropped out were able to be contacted.

Figure 59. Participants' reasons for dropout



Note: Author's elaboration based on files of this research.

The facilitator's follow up allowed for data gathering in a personal, private and trusted setting, showing empathy and interest in why women were missing class. Participants shared various reasons, such as health problems, family care duties (either of children or elders), work commitments that conflicted with the course schedule (mornings, twice a week), and violence, defined in this particular case as when women reported to leave the program because their husbands did not allow them to continue attending the PMC.

These reasons are a reflection of women's social, economic and cultural contexts, and how these interfere in their learning progression. In terms of economic constraints, work schedule is a critical factor to consider when designing digital inclusion policies; that is why PMC class schedules manage extended hours, Monday through to Friday from 8:30 am to 9:00 pm, and Saturdays from 9:00am to 3:00pm. During the design of this policy intervention, the schedule was set as two days per week during the morning, due to PMC space and the facilitator´s availability.

In terms of health, family care duties and violence, these reasons demonstrate how gender stereotypes are strongly present in urban impoverished communities, making it hard for women to commit to nurture their own interests and progression. Poor health was the reason most often mentioned by the participants, indicative of health vulnerabilities endemic to impoverished urban communities. Family care and the husbands' command to stop attendance demonstrated how women are commonly viewed as objects that husbands possess and decide what to do with.

The second source of information that allowed me to confirm participants' contexts affecting course attendance were testimonies shared during the focus group sessions held throughout the policy intervention (January 2017, July 2017, February 2018).

I divided their testimonies into three groups: first group of reasons provides valuable evidence on gender stereotypes and a macho culture surrounding women; second group condenses testimonies related to public security; and third group includes their testimonies for drop out shared by participants.

(I) Gender stereotypes and macho culture

As mentioned above, qualitative research provided a deeper understanding of participants' social context, allowing me to identify and describe the factors that might have discouraged completion of the program. In terms of gender stereotypes, a macho culture was present in various experiences that women shared during the focus groups, as the following testimonies exemplify:

"Sí, estee, con mi marido, le comenté pero me dijo, '¿dónde vas?' Le digo, voy a ir a un curso de computación, y me dice, '¿a poco si vas a ir? Y ¿a qué horas?' Lo que no me gusta es… Presiona mucho, me toma el tiempo y la verdad no me gusta, entonces yo le digo, ahorita no me esperes no sé a qué hora. 'Llegas y haces de comer', digo, ¡ay dios mío! si por eso me voy, '¿a qué horas vas a entrar?' le digo, a las once, digo, pero mientras tengo que darles de desayunar a ellos, a mis hijos y

"[Referring to participant´s husband reaction when sharing that she was considering participating in the program] I told my husband, but he said, 'where did you go?' I tell him, I'm going to go to a computer course, and he says to me, 'how is that? When are you going? And at what time?' I don't like that... He pressures me a lot, he keeps track of the time and I really don't like it. So, I tell him, don't wait for me right now, I don't know what time. 'You arrive and you cook'. I say, oh my god! if that's why

a él para poderme venir, y nunca me doy la libertad de salirme o algo." (FG2, p.18-19)

I'm leaving, 'what time are you going to go there?', I say, at eleven, I say, but in the meantime, I have to give my children and him breakfast so I can come, and I never give myself the freedom to go out or do something." (FG2, p.18-19)

"Pero la verdad para mí, yo digo que el aprender es bueno, y yo dije: pues me vale lo que digas ¡Yo si voy! La verdad, no me importa, porque él también me decía, es que tu nada mas quieres estar en la calle. Pero la verdad, es que a mi me gusta hacer esto, y yo digo, y a lo mejor pasó sobre él, porque dice que yo paso sobre su autoridad, pero yo digo, pero si yo quiero hacerlo...Yo le dije, yo no soy de tu propiedad y no me vas a decir lo que tengo que hacer, porque independientemente de eso, en la casa tiene su comida, tiene su ropa y no le fallo, entonces esto ya es extra. Entonces, la verdad yo estoy muy emocionada con este nuevo proyecto que nos brinda PROSPERA, la verdad, no la creía, y dije, no me importa si se enoja o no". (FG5, p. 10)

"But, for real, I say that learning is good, and I said: well, I don't care about what you say to me, I will go! Really, I do not care, because he also told me: you just want to be out. But the truth is that I like to do this, and I say, maybe I disrespect him, because he says that I pass on his authority, but I say, but if I want to do it… I said, I am not your property and you are not going to tell me what I have to do, because regardless of that, in the house he has his food, he has his clothes and I do not fail him, so this is already extra. So, the truth I am very excited with this new project that gives us PROSPERA, the truth, I did not believe it, and I said, I do not care if he gets angry or not" (FG5, p. 10)

"Por ejemplo, nosotros en mi casa ya dijimos pues si en un dado caso que me llegue a quedar, sería martes y jueves. Entonces mi esposo me dijo, bueno, yo llego y te lavo los trastes, no hay tanto problema y ya los niños arreglarían su cuarto y así. Pero ya es la voluntad y las ganas que tengan de ayudarnos, porque sino también uno se viene a la buena de dios y no hay quien nos ayude pues también no se puede, tenemos que tener a alguien a lado que nos diga, órale pues se puede porque se puede, yo te ayudo. Y si desde los chiquitos nos ayudan pues mejor. Yo, mi niña la chiquita tiene 8 y ya me dijo, yo te ayudo, y el otro me dijo, yo cuando llegues ya está mi cuarto y el de en medio, él ya sabe lo que le toca, ya sabe cada quien." (FG2, p. 19)

"For example, we already said in my house, if in a given case I could stay [in the course], it would be Tuesday and Thursday. Then my husband told me, well, I will come and wash the dishes, there is no problem, and the children would fix their rooms and so on. But that is the goodwill and desire they (the family) have to help us, because if not, we come to "the God will" and if there is no one to help us it is impossible, we have to have someone next to us to tell us "Órale" you can because you can, I will help you. And if they help us from a very young age, so much the better. My little girl is 8 and she already told me, I will help you, and the other one told me, when you get here my room will be clean and the one in the middle already knows what he has to do, everyone knows what their task is." (FG2, p. 19)

"Y mi suegro me dijo que no desaprovechara la oportunidad y estudia para que puedas tener algo mejor, y le dije, no pues sí, y con mi esposo no lo comente por que él no me deja estudiar, pero me dijo mi suegro que iba a hablar con él y que le iba a decir, y tú te vas. Entonces pues sí le dijo mi suegro a mi esposo que yo me iba a poner a estudiar, le dijo si no quedas seleccionada ahí, ella de todos modos va a buscar para estudiar la prepa y le dijo mi suegro, y no quiero que le digas nada y ella se va a ir a estudiar la prepa y le dijo mi suegro, y no quiero que le digas nada y ella se va a ir a estudiar. Le dijo mi suegra, si tú no quieres ser nada en la vida es tu problema pero a ella déjala y por eso estoy aquí." (FG4, p. 21)

"And my father-in-law told me not to miss the opportunity and to study so that you can have something better. And I said yes, that's right, and with my husband I didn't mention it because he won't let me study, but my father-in-law told me that he was going to speak with him and that he was going to tell him, and I could go (to the course). So, my father-in-law told my husband that I was going to study. He told him, even if she is not selected there, she is still going to look for study in the high school and I don't want you to say anything to her and she is going to go to study. My mother-in-law told him, if you don't want to be anything in life it's your problem but leave her, and that's why I'm here." (FG4, p. 21)

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Gender stereotypes were present in all focus groups sessions, the husbands' control over the women was very present. Husbands' reactions on hearing about their wives' desire to participate in the program were in some cases very extreme, as illustrated by the first two testimonies, above. We see in these cases how husbands' attitudes reflected the notion of 'wife as property' and how domestic work is primarily a woman's responsibility. Participants described how they had to give breakfast to everyone in the family before leaving the house to attend the courses. In the first testimony, the participant even admitted that she rarely allowed herself to leave the house (self-limitation due to context). But in both the first and second case, motivation to participate in the program empowered the women to confront their husbands´ control and participate in the PMC courses.

In the third testimony, although there is a sense of husband and family support to the women's participation in the courses, dividing household work was conditional to this participation, and does not indicate a fair balance of housework and parenting responsibilities. The participant even felt lucky that her husband had the will to help in housekeeping activities in order for her to attend the program.

The final quote shows how extended family support was key for the participant to feel supported in her interest in the program. The father-in-law also pledged to support her beyond the PMC courses, for her to finish high school. This reflects how strong the role of the father is in a macho culture, in terms of even holding an ability to impose authority over an adult son.

As these examples show, macho culture is present in these population groups and has a strong impact on women's development opportunities. Gender stereotypes consider women as property of their husbands and the ones responsible for domestic work and family care. This overloads women's unpaid work and significantly limits their capacity to participate in other activities related to personal progression.

Another contextual constraint strongly present in all focus groups was public safety, which reflected Ecatepec's high-risk living conditions, as described in the case selection section of this study. Participants' testimonies exemplified how exposed vulnerable groups are to security threats, and how such threats impact participants' development.

(II) Public security

Public security incidents were mentioned in all focus groups sessions, with participants sharing examples of how family members suffered from different types of unsafe situations. The following quotes – extensive in number compared with those of other sections – come from different participants within the focus groups:

"Yo tengo una pequeña papelería, que ahí vamos, este, y pues si hago trabajos de los niños que van a imprimir los trabajos. Trato de dar lo más económico que puedo, porque luego va gente y me dicen cuanto me va a...es que me acaban de robar 20 pesos por esto, y luego les digo ¿para que van para allá? ". (FG1, p. 6)

"I have a small office depot, we are managing it, and well, I do children's work, when they go to print their homework. I try to give the most economic pricing that I can, because then people go, and they ask me how much is going to (cost) ... 'because someone stole me 20 pesos', and then I told them why you are going there? [Referring to dangerous areas in the neighborhood]" (FG1, p. 6)

"Toda tecnología me imagino que tiene algo bueno, pero si le da uno mal uso es lógico que todo puede ser negativo. ¿Por qué lo digo?, con el teléfono que me robaron y le robaron a mi hija le dieron mal uso porque en el momento ella sospechó que todo lo que había vivido (con el teléfono) no canceló ni nada, entonces dejó pasar un día y en facebook publicaron cosas feas, entonces depende del uso que le den las personas." (FG2, p. 10)

"All technology - I imagine- has something good but if one misuses it, it is logical that everything can be negative. Why do I say it? with the phone that was stolen from me and the one stolen from my daughter, they misused it [referring to the person that stole the device] since she didn't cancel or anything, so she let a day go by and they posted ugly things on Facebook, so, it depends on how people use it." (FG2, p. 10)

"[Mujer describiendo porque su teléfono es diferente:] No, compro de los baratos, porque los roban en el camión." (FG3, p. 4)

"[Woman describing why she does not have a smartphone] I buy cheap phones because they get stolen from me on the bus." (FG3, p. 4)

"Es que él, mi hijo, en el micro donde venía, le aventaron su mochila, le quitaron la mochila. El que le digo que está estudiando diseño gráfico, se quedó sin… pero está agarrando una tableta." (FG3, p. 8)

"My son was in the bus when they [the thieves] took off his backpack. The one I told you that is studying graphic design, he ran out ... and now he is getting a tablet." (FG3, p. 8)

"No sé, no sé nada de computadora. Ya na´más estee, como me compro los teléfonos, de esos como pa´andar en la calle, así que me han robado varios y aunque sea barato o chiquito, pues me cuesta $300 pesos, $350. Entonces está, compro de los negritos baratos. Pero no, na´ más para que mis hijos me avisen si ya llegaron a su trabajo o cualquier cosa así que necesiten, pero yo de la computadora no sé nada." (FG3, p.16-17)

"I don't know, I don't know anything about the computer. I just buy phones to have on the street, because several have been stolen, and even if it is cheap or small, it costs me $ 300 pesos (11.5 Euros), $ 350 (13.4 Euros). So, I buy cheap phones…so that my children can let me know if they have already arrived at work or whatever they need." (FG3, pp. 16-17)

"¿La información muy importante? Por ejemplo de ahora que, bueno fue muy importante porque.. que está, por ejemplo, la información que nos llega, por ejemplo yo me meto al google y está por ejemplo cuando hay un sismo o así, por investigación. Tenemos familiares, o sea cercanos todo, todo lo que hicieron, todo es vandalismo. Yo, mis hijos estaban fuera, entonces a uno de ellos, el que le digo que estudia, este, lo agarraron acá por avenida central, llegaron vándalos y le quitaron hasta su comida, cositas así, entonces las ubicaciones de las informaciones que bajas te llegan de inmediato, por ejemplo, en qué zonas no debes andar." (FG3, p. 22)

[Participant talking about the importance of information] "It was very important because ... for example, the information that comes to us, for example, I go to google and it is, for example, when there is an earthquake or so, for investigation. We have family members, close ones, everything they did, everything was vandalism. My children were outside, so one of them, the one I tell you that he is studying, this one, he was grabbed here on Central Avenue, vandals arrived and took away even his food, things like that, then the locations of the information you download come to you immediately, for example, in which areas you should not walk." (FG3, p. 22)

"Es que a veces anda uno como madre, en mi caso me alarmó mucho porque a mí me pasó hace años, no de ahorita. Haga de cuenta que la comunicación se nos cortó, no supe por qué pero todos traían el celular del chiquito ¿no? En ese entonces, este, no había pagado el teléfono de la casa, y me hablaron que tenían secuestrado a uno de mis hijos de los mayores y nos pedían cierta cantidad, entonces en ese momento yo le marcaba a mis hijos... y por medio de todos nosotros lo ubicamos, y resulta que mi hijo, uno de sus amigos le había quitado el celular, lo apagó." (FG3, p. 23)

"It is that sometimes as a mother, in my case it alarmed me a lot because it happened to me years ago, not right now. I received a call and the person on the phone told me that they had kidnapped one of my oldest children and they were asking us for a certain amount, so at that time I dialed my children…. and through all of us we located it him, and it turns out that my son, one of his friends had taken his cell phone, [and] turned it off." (FG3, p. 23)

"Bueno, hay un caso igual, no tiene mucho, pues el director de la escuela de mi hija se comunicó conmigo, tenemos contacto, de hecho, ese día salió mi esposo con mi hija para llevarla a la escuela y los iban siguiendo unas personas, querían yo creo, no sé la verdad, yo no viví el momento de ellos y a mi se me hacía, pues yo decía bueno si mi hija ya está en la escuela ¿por qué me marca la orientadora no? Y ella decía que porque mi esposo se espantó con mi hija y no sabía qué hacer y por medio de eso igual hay comunicación y yo digo pues es bueno, porque si no yo ni enterada." (FG3, p. 26)

"Well, there is an identical case, it is recent, the director of my daughter's school contacted me, we have contact, in fact that day my husband left with my daughter to take her to school and some people were following them. They want …, I do not know the truth, I did not live the moment with them, and I was afraid, because I said well if my daughter is already in school, why does the counselor call me? And she said that because my husband was scared for my daughter and did not know what to do and through that there is still communication and I say well it is good, because if not I did not know." (FG3, p. 26)

"Si pero ya él, le dijo el hombre ese no era no más uno que ya eran varios los que estaban ahí, que ella se saliera del metro pero ya la tenían con el cuchillo. Yo creo que reaccionó, entonces yo le dije, no hija, pues es que si vas a vendiendo tu silla, tu dale la ubicación donde se pueden ver, el no tiene por qué citar, pero ella no se salió del metro ahí mismo le llamó al policía y si lo captó, la ¿cómo se llama? la cámara, entonces ya no le pudieron hacer nada, pero yo siento que eso es peligroso, ¿no?" (FG4, p. 13)

"A man told my daughter that there were several other men, she should have left the subway, but they already had her with the knife. I think she reacted, so I said, no daughter because it is that if you are going to sell your chair, you give him the location where they can be seen, he does not have to tell you where to meet, but she did not get out of the subway right there she called the police and it got it, what is the name? the camera, so they couldn't do anything to her, but I feel that this is dangerous, right?" (FG4, p. 13)

***

As these testimonies show, safety conditions affect women, their families and communities in very important ways. From robbery of their devices (phone, tablets, laptops) while using public transport, to a personal attack in the metro system with a knife, and fake kidnapping calls. According to the National Survey of Urban Public Security (ENSU), Ecatepec de Morelos was the city with the highest perception of insecurity (93.4%) in the last trimester of 2018, higher percentage to previous measures in 2017 (86.4%).

Experiences expressed by participants reflect how public safety affects access to internet-enabled devices (cell phones, tablets, notebooks), and causes stressful situations in daily life, evidenced by children needing to notify mothers when reaching their destinations. Safety conditions is a very important variable to be taken into account when designing digital inclusion policies.

(III) Social context constraints

Participants who dropped out halfway through the program shared their reasons for leave, providing insights to understand better how social constraints impacted their availability to continue and complete the courses. The following testimonies come from different participants of the seventh focus group:

"Mi motivo fue que me sometieron a tres operaciones, pero sí, me estuvieron llamando y le conté mis motivos. Y todavía ando en eso. Me van a volver a operar otra vez." (FG7, p. 4)

"My reason was that I had three operations, but yes, they were calling me [referring to the facilitator´s call for follow up on missing classes], and I told them my reasons. And I'm still working on it. I'm going back into surgery." (FG7, p. 4)

"A mi nada más me faltaron, yo creo, unas cuatro clases. Mi esposo tuvo un accidente y ya no pudo caminar, entonces yo le compartí: sabes qué, tengo que dejar de venir a clases, me tendré que ir a trabajar porque en estos momentos mi esposo ya no puede solventar los gastos porque tuvo el accidente". (FG7, p. 4)

"For me, I only missed, I think, about four classes. My husband had an accident, and he could no longer walk, so I shared with her [referring to the facilitator inquiring on why the participant stopped attending classes]: you know what, I have to stop coming to classes, I will have to go to work because right now my husband can no longer pay for the expenses because he had the accident." (FG7, p. 4)

"Yo no pude terminar el curso de finanzas porque tuve que entrar a trabajar, pero la verdad es que todos los demás cursos que tomamos me gustaron mucho. Yo ya sabía usar la computadora, pero aprendí más, y el tiempo que me dedicaba a mi, la verdad es que me hacía sentir bien. Porque sí, queremos a nuestros hijos y todo, pero sí queremos de repente dedicarnos algo de tiempo para nosotros." (FG7, p. 5)

"I couldn't finish the finance course because I had to go to work, but the truth is that I liked all the other courses we took. I already knew how to use the computer, but I learned more, and the time that was dedicated to me, the truth is that it made me feel good. Because yes, we love our children, but we also want to dedicate some time to ourselves." (FG7, p. 5)

"A mí sí me gustó mucho el curso, e igual no pude terminar porque cuido a mi mamá, mi mamá tiene 80 años. Y el último curso de finanzas, nada más vine la primera clase, pero sí me gustó, y como dice la compañera, si es cuestión de que nos acoplemos al horario, y pensar que de martes y jueves tenemos que venir. Sí me gustó venir y aprendí mucho." (FG7, p. 7)

"I really liked the course, but I couldn't finish it, because I take care of my mom, my mom is 80 years old. The last finance course, I only came to the first class, but I did like it, and as the classmate says, it's a matter of joining the schedule and thinking that we have to come from Tuesday and Thursday. I did like coming and I learned a lot." (FG7, p. 7)

*****

As these testimonies demonstrated, gender stereotypes determine the type activities that women can carry out, like taking care of their children and husbands. Testimonies also showed how health

issues affect women and how women prioritize family care over their own needs. But this focus group also showed that having the opportunity to attend PMC courses allowed them to spend (and enjoy) time for themselves.

4.6 Text mining techniques, longitudinal summary

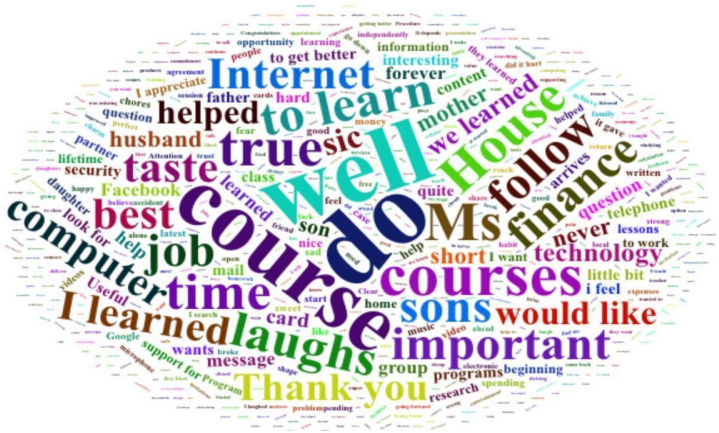
Descriptive data from the facilitator's follow up and focus group testimonies were complemented by a comparison and contrast analysis of the text mining techniques applied to focus groups transcripts. This allowed me to explore and describe the evolution of the learning experience, and how women's reflections changed over time. It also provided insights on economic, social and cultural contexts surrounding women. The first technique analyzed was word clouds (Figure 60).

Figure 60. Word clouds by phase of the courses

Word cloud pre intervention, January 2017

Word cloud after finishing the courses, July 2017

Word cloud seven months after intervention, February 2018

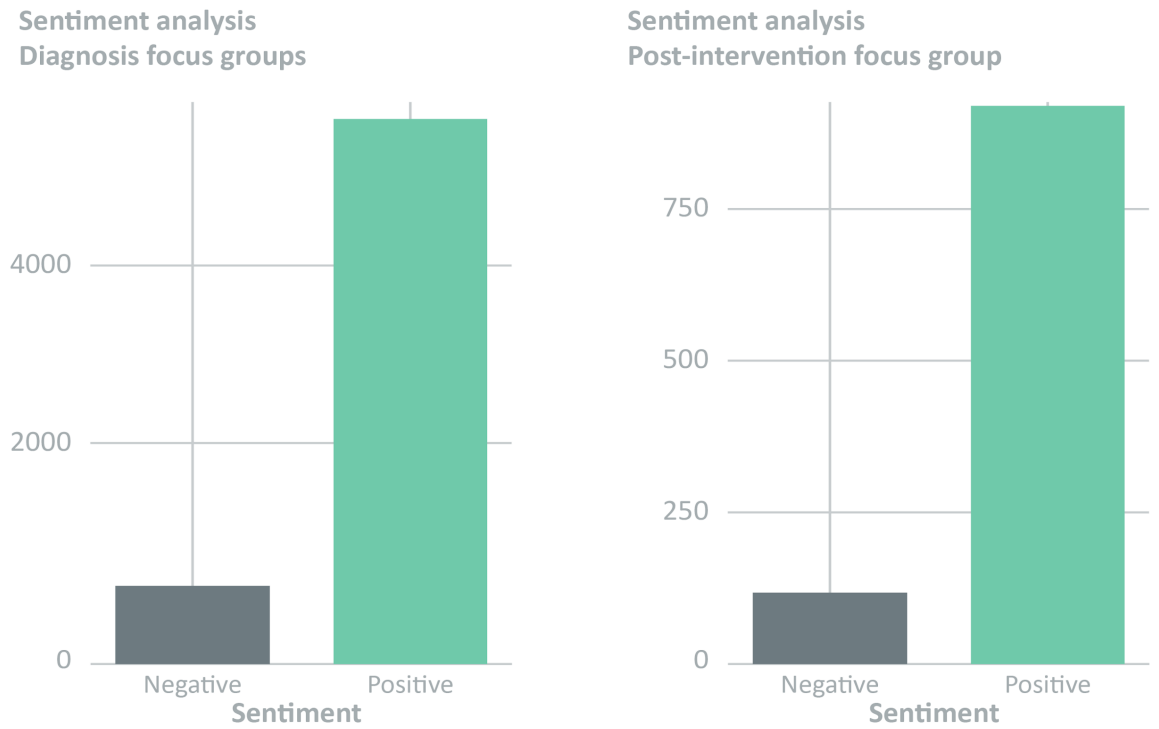


Note: Author's elaboration with transcripts' data from focus groups sessions one to five in January 2017, focus group session six in July 2017, and the seventh & eight session in February 2018.

As word clouds revealed, women moved from expressions like “To learn” in the pre intervention focus group to action-oriented phrases, like “I learned” and “Do”, and gratitude phrases, like “Thank you”. In their assessment of the learning experience, participants used words like “Well/Good” and “Useful”, both in sessions held immediately after the courses, as well as seven months after finishing the courses. This demonstrated that women felt they had achieved their objective, which was “To learn” ICT skills and capabilities. They incorporated that learning into their daily lives and did things with it, such as “blog”, “mail”, “job”, “music”. Words that were present in all three-word clouds are “daughter”, “son”, “houses”, “husband”, which reflected how important family is for women. “Finance” was another word presented in the focus groups after intervention and seven months later, reflecting how important this course was for participants.

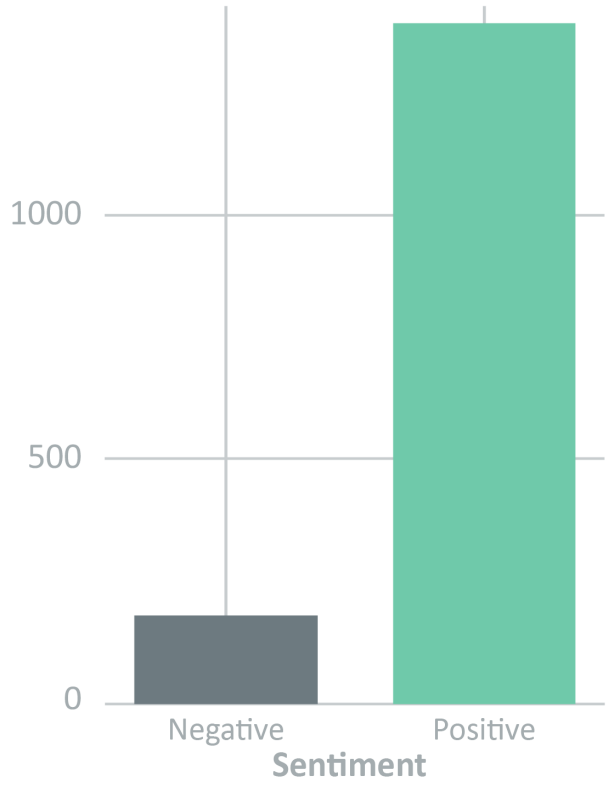
Sentiment analysis reflected a positive tendency over time. This might be explained by the fact that women who accepted to participate in the program valued ICT skills development as something positive for their lives. What changed over time was the number of observations under the analysis. The focus groups previous at the intervention were five in number, compared to just one after the intervention and two seven months after the intervention.

Figure 61. Sentiment analysis focus groups, previous and post intervention



Note: Author's elaboration based on transcripts one to five for the sentiment analysis pre intervention and used data from transcript six for Post - intervention sentiment analysis.

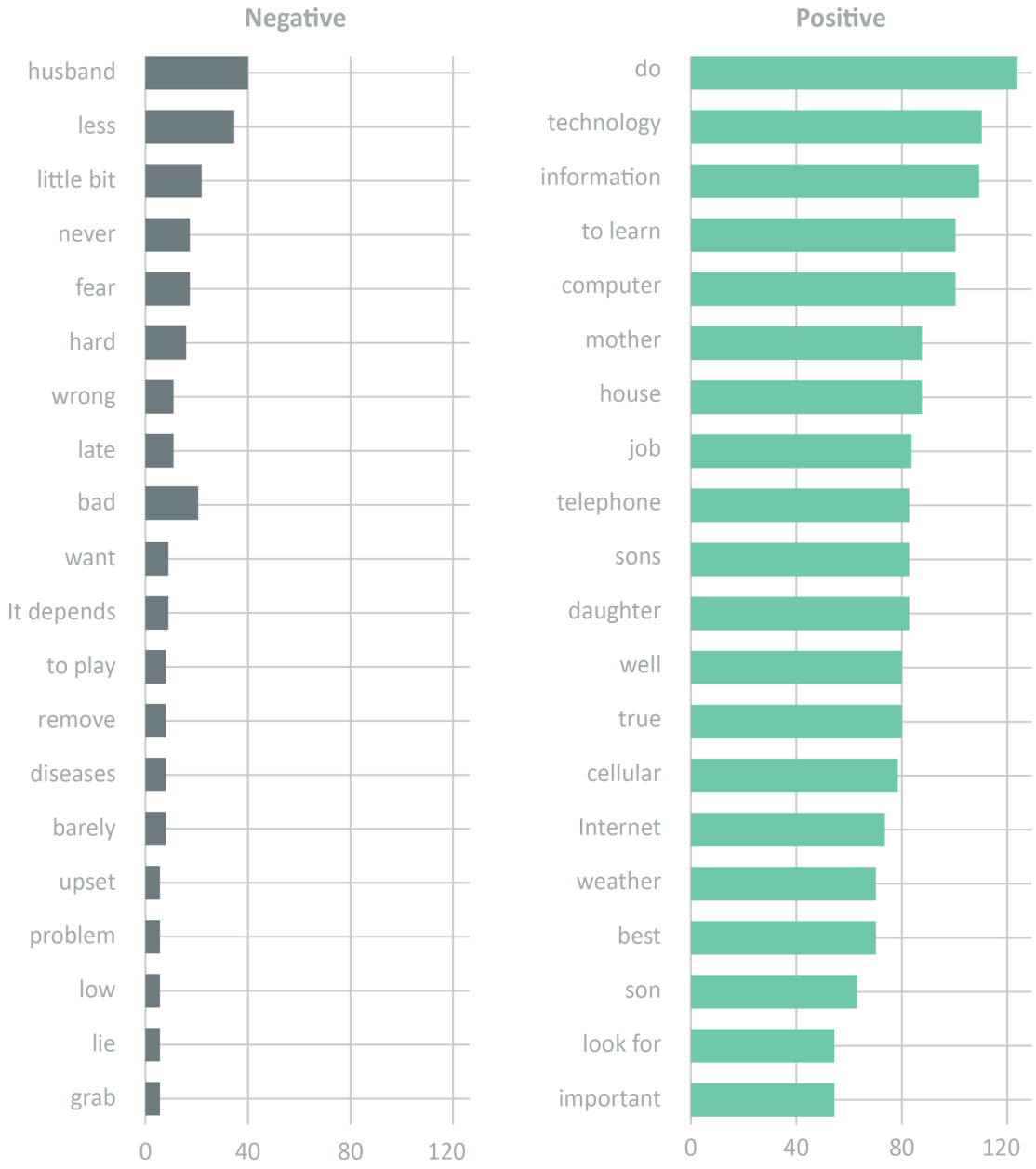
Figure 62. Sentiment analysis seven months after intervention



Note: Author's elaboration based on data from transcripts seven and eight.

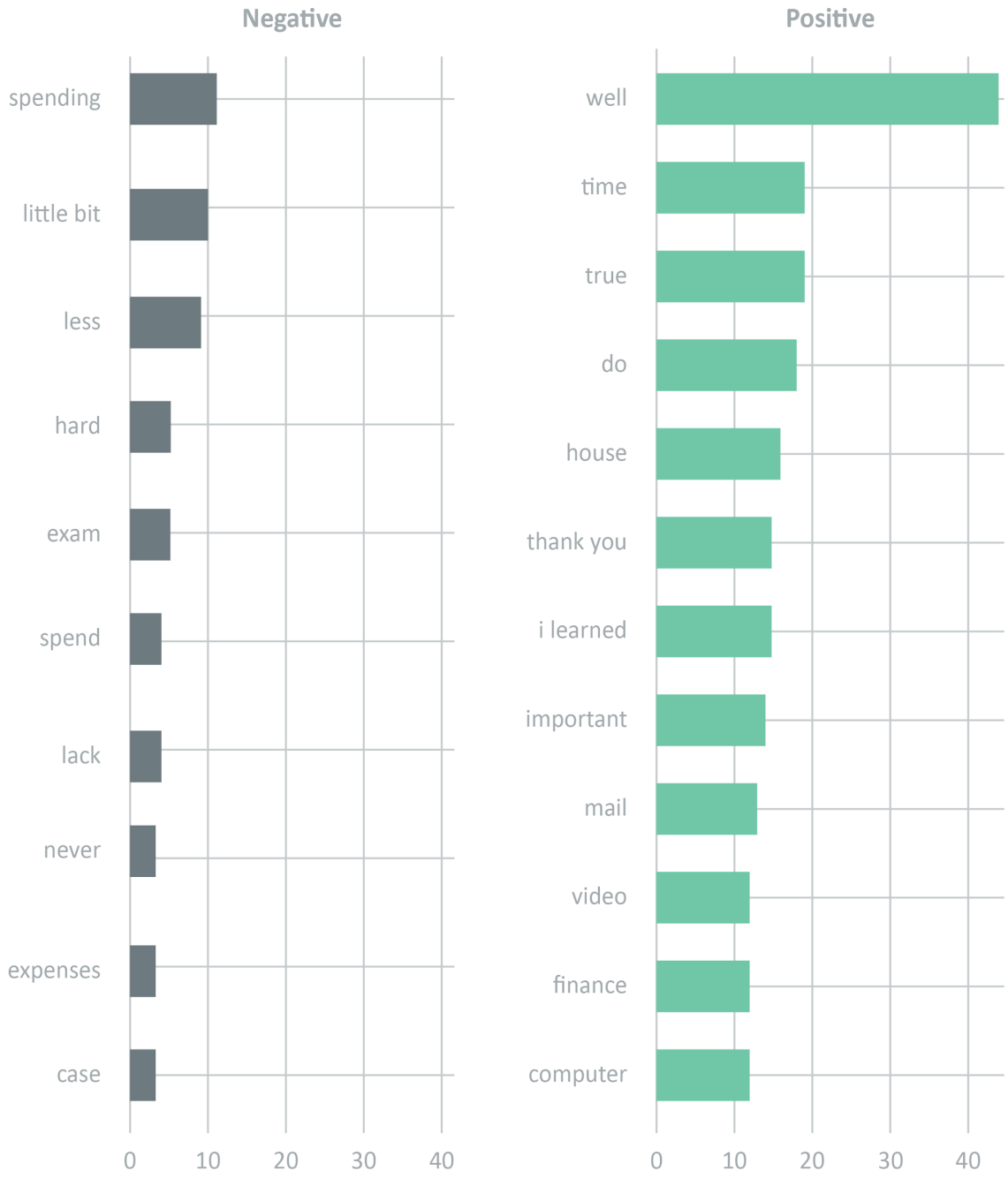
As the graphs show, there were very positive sentiments towards technology and women's learning experiences; however, negative sentiment provided insights to better understand how context influenced the learning experience. A sentiment classification technique allowed me to analyze a key set of words under positive and negative sentiment. The following graphs present the results of sentiment classification over the course of the program:

Figure 63. Sentiment classification pre-intervention focus



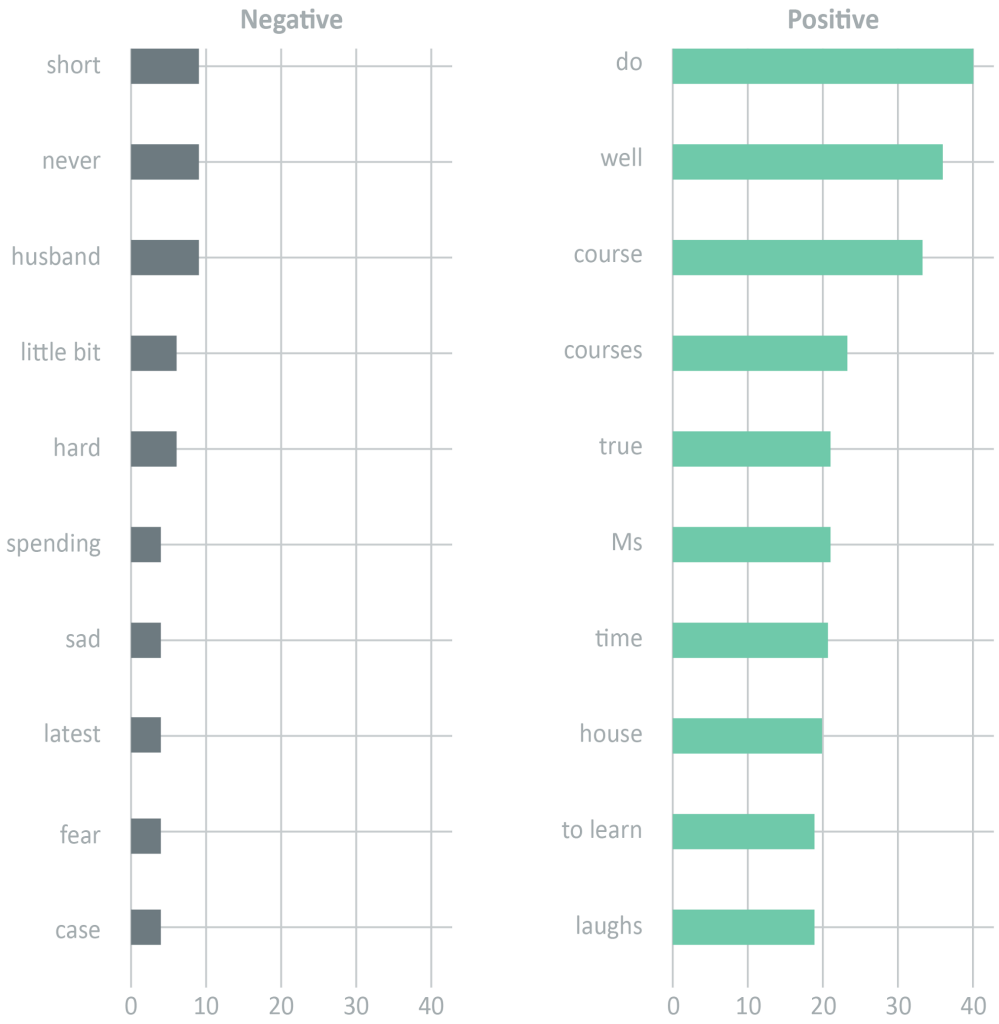
Note: Author's elaboration based on data from transcripts one to five.

Figure 64. Sentiment classification, post intervention



Note: Author's elaboration based on data from transcript six.

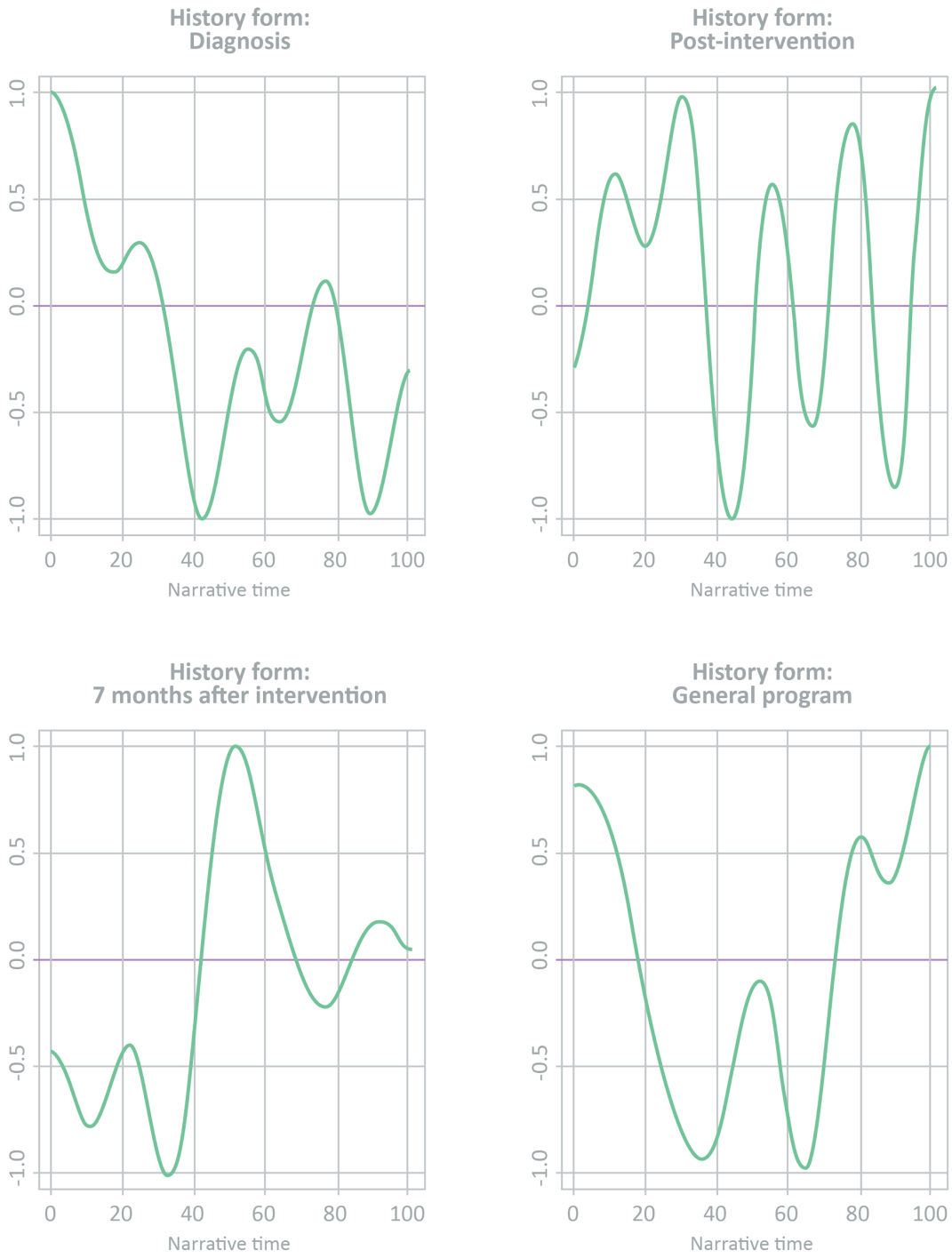
Figure 65. Sentiment classification seven months post intervention



Note: Author's elaboration based on data from transcript seven and eight

Words like “Husband” were present with the highest frequency during the pre-intervention and seven months after finishing the PMC courses. “Hard” was present in all three series of focus group sessions (before, just after, seven months after finishing the Program), which supports testimonies, performance records, and facilitator’s feedback on the challenges that the learning experience held for some participants. Complementing that sentiment classification is the narrative time: each set of focus groups present a series of positive and negative situations, but at the end, all three finished with a positive tendency.

Figure 66. History form



Note: Author's elaboration based on transcripts files from the complete process with the focus groups.

I found narrative time an interesting technique to complement research findings on how the conversation evolved over time. The analysis was performed according to each set of focus group transcripts – diagnosis, after intervention, seven months after intervention – and I added a final analysis, putting in a single document all focus group transcripts. As the set of graphs revealed, pre-intervention conversations started very positively, then turned negative as when participants expressed how difficult it was to depend on others to use the Internet and ICT; positive tendencies were then expressed at the end in terms of motivation. The words “to learn” were among the most repeated, as reflected in the word cloud exercises.

The narrative form post-intervention reflects the learning process shared by participants over the course of the focus group. Participants recognized that although learning was hard, “they learned”, increasing their self-confidence and self-esteem, and empowering them to implement learning in daily life. Entrepreneurial women shared specific examples of Internet and ICT applications of learning to improve their businesses and cover family needs. The narrative form of this particular focus group disclosed the ups and downs of the learning experience, finishing with a positive tendency. The narrative graph of the transcript for focus groups seven and eight, applied seven months after the intervention, started negative as many participants shared drop out reasons. Sentiment later turned positive as participants shared how they applied what they learned in class.

A final narrative analysis was performed over a complete transcript that included all focus group narratives. The result reflected participants’ learning experience over the entire duration of the policy intervention, from January 2017 to February 2018. In general, women were motivated “to learn”, as the positive start showed; sentiment then turns negative as the women discuss the start of the courses. Although hard, they “did learn”, and gained self-esteem, confidence and empowerment through the process, hence the turn towards positive sentiment, and finishing with a very positive tendency as participants shared ICT applications in their business, usage of personal finance concepts to better manage their expending patterns, and gratitude to the facilitator and the program itself.

To conclude on barriers to participation, findings can be summarized as follows: Internet and ICT usage among vulnerable women tends to focus on covering family needs, like helping children with homework or monitoring teen activities online, more than their own. Motivation to participate in the courses was associated with reaching independence in usage, since most participants depended on others to explain to them how to use their computing devices, which were mostly mobile. Family support was a very important factor for women’s acceptance to participate in the program.

As the policy intervention advanced, dropouts started to occur, with an average of three women missing each course. Reasons shared by the participants were mostly related to gender stereotypes, such as having to leave the course to take care of their children and elders, attend to family health issues, and a macho culture that explicitly prohibited participants to attend the

courses. Other reasons for drop out, not related to gender stereotypes, were job opportunities and/or having to take care of their own entrepreneurial activities.

Digital skills most useful in their daily lives – in family, entrepreneurial activities and for their own interest – comprised email, blog, websites, YouTube, government services online, and personal finance. Women accomplished independence and autonomy in ICT for their own interests and needs, not just for those of their families.

Key success factors in the experiment were the facilitator's empathy and diligence in leading the course learning according to the group context and educational background. Performance was excellent for the three first courses and satisfactory for the rest, with "Getting to know the Internet" and "Personal Finance" the courses women liked the most.

Chapter V. Limitations of the study

This research design has three limitations due to the scope of the study. First, this is a single case study analysis, and as such findings apply under the specific context and considerations of this research design. However, there are many insights that can be learned from a particular case, and evidence based on findings can be generalized to similar contexts (Yin, 2014) and be considered relevant for policy – not only in Mexico but in other countries with vulnerable populations. An associated limitation of a single case is its replicability constraints, given the characteristics of the fieldwork and the multi-stakeholder coordination specific for every policy design. However, it is the particular institutional, social, political and cultural contexts around this case study that provided very relevant insights in terms of the enabling factors needed to articulate initiatives like the PMC to increase knowledge about ICT usage and utility for vulnerable populations.

Another associated limitation of a single case study is the dropout rate under this particular research. Data limitation in terms of the small number of participants that actually finished the five courses under the program might have limited the study´s ability to fully answer research question No. 1, 1.c and 1.d. However, the longitudinal design of the study allowed the repeated examination of the same individuals to detect any changes that might occur over a period of time. For this particular research the evolution of participants (although a small number) in terms of ICT adoption in their daily lives, and how this adoption enhanced or not women´s personal development. This repeated examination on a small number of participants provided relevant quantitative and qualitative information to address research questions under this study.

The second limitation is that this research was not designed to measure the impact of the PMC program. This study uses the PMC structures of Ecatepec, Estado de Mexico, as a digital inclusion facility where participants of this study took digital inclusion courses. Thus, I did not collect “hard” data on the PMC program – for example, total attendance in the courses, or evaluation of the PMC program by students. As described earlier, a set of courses were selected for this research in order to explore and describe how the acquisition of informational capabilities may enhance the development of women from vulnerable families in Ecatepec. The research design does nonetheless highlight the importance of the PMC in terms of its democratizing effect, meaning that the learning process has a strong effect when people enjoy the best facilities available. Digital inclusion is easier when people access fast and quality devices and the Internet. Therefore, the current research aims to prove the positive effect of the digital inclusion facilities and content freely available through their strategic location in the most vulnerable impoverished urban communities.

A third limitation is related to my double role as researcher and governmental representative involved in the PMC program. This bias is an important issue, since during field work, I was a public servant directly related to the PMC program; and, although I presented myself as the researcher responsible for the study, it is likely that participants and the facilitator were more cautious during

their interactions in the respective focus groups and interview respectively. To mitigate this risk, focus group settings and guidelines were carefully arranged to center the conversation on women's experiences with ICTs, with no right or wrong answers, since each person is unique in their ICT needs. In particular, related to the facilitation processor, I found participants´ find her answers sincere and honest with criticism and opinions about the program and the organization. Also, it was important to continually compare and contrast information from different sources (class observation, facilitator's feedback on participants' performance quantitative data and evolution of their responses over the time) in the digital inclusion survey data.

Chapter VI. Conclusions

This research aimed to explore and describe to what extent the adoption of digital capabilities in women's daily lives may enhance their personal development. It also sought to analyze to what extent digital inclusion centers like the *"Puntos México Conectado (PMC)"* foster the acquisition of informational capabilities and under what conditions educational ICT interventions can promote development. To accomplish this aim research design was constructed by the theoretical and analytical framework of Amartya Sen's "Capability Approach"[39] to offer a way of thinking on development, not as economic-income growth, but as enhancement of individual freedom (Sen, 1999).

As described in the theoretical framework section of this document the Capability Approach assumes that "choice" is the primary mean of individual development and, at the same time, outcomes will vary from person to person depending on what kind of life each person values; e.g., ICT may increase their knowledge and capability to improve personal incomes. According to this framework, ICTs are an important instrument to development because they offer capabilities to enhance new opportunities to make choices (Zheng, 2009; Gigler, 2014). In the context of this research, as results showed, freedom and enjoyment were enhanced when women learned how to use the Internet and ICT with independence (personal autonomy) of anyone, in this way they were able to deal with personal life conditions.

I defined a set of three research questions and six sub-questions in order to study the aforementioned phenomenon according to Sen´s propositions. The first research question looked to explore and describe to **what extent does the acquisition of digital capabilities promote personal development in women living in impoverished urban communities?** As results showed, women were motivated to learn digital skills, adopted ICT in their daily lives, and enhanced and expanded their personal choices leading their own development. However, results also exposed how cultural, social and economic contexts extremely affected women's continuity in the program. The lesser support they receive from their families, the more probable is they dropout the courses, among other perceived problems that I further describe in this section.

The first research question had four sub-questions starting with one that aimed at exploring and describing **what were women's motivations for participating in the digital inclusion program?** Results indicated that participants' motivations were associated with three main factors; firstly, gaining independence from others in using the Internet and ICT; secondly, helping children with schoolwork; and thirdly, enhancing self-entrepreneurial activities. Preference for covering their family informational needs rather than their own was a significant finding. This preference was

[39] "In Sen's approach, 'functionings' are the various things a person may value doing or being, such as being adequately nourished, being healthy and being able to take part in the life of a community. In Sen's terminology, a person's 'capability' refers to the alternative combinations of functionings that are feasible for her/him to achieve. The focus of development, thus, becomes increasing a person's capability set, or her/his substantive freedom, to lead the life she/he values. Functionings represent the 'outcome' component, while capabilities are the 'freedom' component in this approach" (Kleine, 2010).

later neutralized as the women began applying new digital learning in their daily lives, allowing them to cover their family needs as well as their own. Being part of the PROSPERA program also suggested the importance of some kind of initial incentive to stir the participation of people that may be low motivated and highly pushed to not-participation, for example, in the case of women in a patriarchal, impoverished and unsecure society.

Sub-question two described **how the participants' educational performance was? Were there any barriers for educational performance? What were those barriers?** As qualitative and descriptive data exhibited, women performed the first two courses in the range of "Excellent", and the other three curses in the "Satisfactory" range. These grades demonstrated the women had the capacity to learn digital capabilities and have the commitment and motivation to do so. While grades dropped from "Excellent" to "Satisfactory" as the complexity of activities increased, I still considered this a very positive result for the objectives of this research.

In terms of barriers to participation in the program, health, family care, and work were the most common reasons cited by participants as reasons for dropout. Health issues reflect how at-risk vulnerable populations are of dropping out of not only digital inclusion courses, but also work and/or entrepreneurial activities. As beneficiaries of the PROSPERA program, participating women in this research have access to public health services. However, for women in vulnerable conditions who do not participate in the PROSPERA program, health costs could significantly affect their income and limit their opportunities for independence.

Family care was the second most cited reason for dropping out, with women directly referring to their husbands preventing their continuation with the program in order to make them focus on the needs of children and spouse. There was reference also to the care of elders as a reason for drop out. These results revealed how social and cultural contexts related to gender stereotypes affect women's ability to fully participate in digital inclusion courses.

The third main reason for dropping out of the program related to work schedules conflicting with courses schedules. This policy intervention required participants to be physically present at the PMC two days a week, and schedules were fixed. I chose this arrangement because close observation of women's behavior at the PMC and personal interaction through the focus groups was a very important component of the study design. In the policy recommendations section, I suggest the use of different learning channels when designing digital inclusion programs – virtual, with preloaded content in TV sets, or official school devices, considering that not all women have digital access in their homes.

Sub-question three aimed to explore and describe **if the acquisition of informational capabilities enhanced the adoption of ICTs in women's daily lives? And what type of usages have they adopted?** As testimonies obtained through the different focus groups showed participants did adopt ICT in their daily live being primary usage associated with helping their children with schoolwork (family needs), followed by their own needs like enhancing their personal finance skills,

innovating and increasing productivity in their entrepreneurial activities, expanding their options for recreational activities, such as downloading music, searching videos on YouTube for recipes. In the line with Heeks (2008), women participants manage their digital competences for co-production of their own goals which is related to their personal development. In order to better explore and describe results for this sub-question I identified two types of participants: Type A - Women entrepreneurs or women who have a paid job. Type B - Women without a paid job or entrepreneurial activity.

Type A women used what they learned in class to enhance their business activities, such as developing a web site, uploading videos of their work to YouTube to increase visibility and potential clients, and designing presentation cards with innovative appointment reminders. An important difference within women types was the active content creation of entrepreneurial participants, in comparison with non-entrepreneurial women (type B), who became more active consumers of Internet content.

The final sub-question of the first research question aimed to explore and to describe if daily adoption enhanced women's personal development and, how was this enhanced. As previous answers showed, women did learn digital capabilities and incorporated ICT in their daily lives, covering their family needs and also those of their own. In terms of women´s personal development following Amartya Sen's (2009) capability approach, participants enhanced their development according to their own needs and interests.

Under this research design women participants had freedom to choose whether they participated in the PMC courses or not, freedom to define their own learning objectives, and freedom to use ICT as considered useful for daily life like helping their children with schoolwork, and/or enhancing their entrepreneurial activities. One of the most important factors in the analysis of participants´ development was how the learning process proved women's capacity to learn new skills. This learning experience increased women's self-confidence, their independence and empowered them to expand their options on the type of usages they incorporate in their daily lives.

An important consideration for how the first research question and sub questions were addressed is the longitudinal aspect of this research design. The data limitation resulting from the participants' drop out over the course of the program, did not affect the repeated observation of participants (a small number) over time (longitudinal design) providing relevant insights on women that did stay the entire duration of the program, in terms of their daily usage of ICT and development improvement under their own terms.

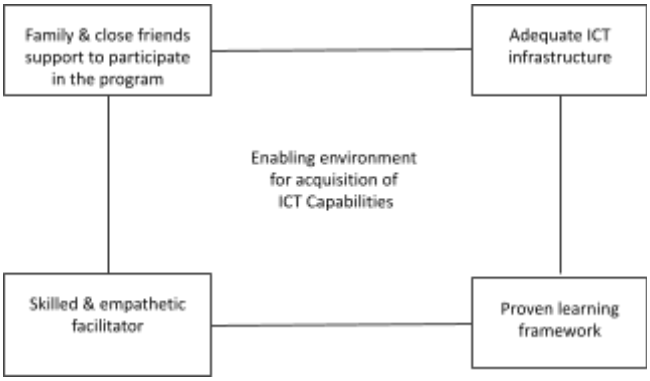
Second research question related to exploring and describing to **what extent do digital inclusion centers, like *"Puntos México Conectado (PMC)",* foster the acquisition of informational capabilities?** Sub-questions following this research question related to explore and describe **How were the courses evaluated by participants of the program?** and, **how was the facilitator of the courses evaluated?** As course performance exhibited, women did learn digital skills and expressed

a positive learning experience. Investing in a proven learning framework is a very important aspect of digital inclusion policies. In the case of the PMC, the digital inclusion experience was carefully curated through the design of the facilities, with open spaces facilitating collaboration and easy access to up-to-date technology devices. Curricula that can adapt content according to user needs and contexts was clearly important, such as the personal finance course that was adapted with examples according to beneficiaries' contexts.

In terms of the facilitator's performance, focus group testimonials referred to a positive evaluation of the learning experience and her work. Empathy and facilitation skills were extremely important in guiding the learning of middle- and older-aged women from impoverished communities. Furthermore, women participating in the program developed a trust relationship with the facilitator. Trust was vital for women to feel confident in communicating difficulties with concepts and ask for more time to practice or expressing personal matters that were affecting their continuation in the program. In all focus group sessions, women thanked the course facilitator extensively.

The third research question explored and described **under what conditions and policy designs can educational interventions focused on the adoption of ICTs promote development?** Based on the results of this research, I identified four drivers to develop enabling environments for the acquisition of ICT capabilities: Firstly, family & close friends support to participate in the program; secondly, adequate ICT infrastructure including safe space for users; thirdly, a proven learning framework; and fourthly, skilled and empathetic facilitators (Figure 67).

Figure 67. Enablers for the acquisition of informational capabilities



Note: Author's elaboration based on conclusions from the investigation.

The relationship between the four drivers is complementary but not indispensable. For example, people can learn if content is designed and available in multiple devices and considering minimum technical capabilities in places outside the PMC, so physical presence becomes optional. However, having the PMC as physical spaces located in impoverished urban communities becomes a community asset and an equalizer space, where people from different socioeconomic conditions are equally treated and have equal access to a meaningful digital learning experience. People can still learn digital capabilities if they do not have the support of their family to attend the PMC, since this situation can be compensated with good learning materials available for self-learning online, with guidance from the PMC facilitators available through online chat.

Of the four elements, the most important is the proven learning framework. Not having this might affect the pace of learning or even increase the dropout rate from the courses if participants do not find the learning experience useful. The proposed enablers aim to guide digital inclusion policy design with the objective to maximize users´ learning experience specially people living in impoverished communities. The four elements combined do provide a safe place to boost learning, creativity and innovation skills. Policy makers working on digital inclusion policies should consider the transformational power of this combination of elements and try to incorporate them as much as possible in the policy design process.

In summary, this case study showed that women living in vulnerable impoverished communities like Ecatepec, Estado de México, when given the opportunity to learn and develop digital (informational) capabilities, do actively participate in digital inclusion programs. They have the motivation to learn and gain independence in their Internet and ICT usage, they incorporate new learnings in their daily life and give it meaningful usage. Based on the theoretical framework selected for the analysis of this phenomenon, the aforementioned results contributed to better understand, explore and describe the mechanisms under which digital skills help people under vulnerable conditions enhance their development.

The impact the learning experience had in women's self-esteem, empowerment and independence in usage met my expected results for this research design. However, I was not expecting that dropout rates were so high as the policy intervention evolved given high motivation to participate exhibited by participants at the beginning of the program. Reasons expressed by women to stop attending the courses made me reflect on the challenges ahead to mitigate gender stereotypes and public safety conditions, as major factors under the socio-economic contexts that characterize the population under study.

Location of the PMC in impoverished urban communities does make a difference in terms of democratizing access to the Internet and ICT and enabling digital inclusion and skills among the most vulnerable population groups. However, an important lesson as a researcher is that physical learning opportunities need to be complemented with other learning opportunities, like on-line classes, educational content delivered through WhatsApp and/or TV capsules, among others.

These channels are easy to enable, but since I was not expecting dropout rates so high, I decided to focus this research design on the physical presence to the PMC.

I also reinforced the notion that although social programs are an effective vehicle to target different social risks - like gender discrimination and cultural stereotypes - this demands a high level of inter institutional collaboration like it was the case in this case study. Under different political conditions this collaboration may not be always possible.

The following section gathers the major findings of this research and provides policy recommendations that can be implemented in current and also future digital inclusion initiatives.

Chapter VII. Policy recommendations

Independence in usage of the Internet and ICT as the primary motivation to learn digital skills is a powerful finding. As coverage of Internet and mobile devices reaches the most vulnerable groups in many developing countries, digital inclusion programs need to be strategically designed and implemented as complementary policies of telecom infrastructure deployment. I recap this idea in the policy recommendations section of this study.

Based on the case study results and conclusions, the following policy recommendations seek to strengthen digital inclusion programs and future digital policy development in countries around the world. Although both programs supporting this research have now been restructured[40] (as described in the introduction section of this paper), the following recommendations can apply to any program at the intersection of digital inclusion and social protection for women living in impoverished communities. Policy recommendations are as follows:

1. Incorporate digital inclusion courses as a poverty reduction measure of Social Protection Programs in order to increase women's development opportunities. Conditionality measures tied to PROSPERA cash transfers included attending health care appointments, regular attendance to school, and nutrition check-ups to track muscular development of the child. An improvement measure of a social program to include digital capabilities could provide women with access to new opportunities for development, in terms of their empowerment to make informed decisions, expand their job opportunities or enhance their entrepreneurial initiatives. Digital inclusion courses should also apply to children, so they complement educational attendance with digital skills development.

*2. Integrate as part of the Social Pro*tection Program content associated with gender stereotypes. As this research shows, drop out of the program was in part associated with gender-related gaps, like women's partners' instructions to attend to home duties and childcare instead of going to the PMC. Working in topics related to unconscious gender bias can empower women to better manage the macho culture they are surrounded by and raise their children with different values.

3. Widen access to PMC curricula through different learning channels, like MOOC courses, TV tips, micro-videos and text messaging campaigns with tips on digital skills and personal finance. As women participants of this study expressed it in the focus groups, they needed to practice what they learned at the PMC Courses in their daily lives. However, they sometimes lack the resources to pay as you go Internet services. Accessing free WIFI spots is an alternative to continue practicing and assessing different digital services. Furthermore, digital inclusion curricula at the PMC have quality and are updated frequently, opening up different channels to access this content could benefit and impact more beneficiaries and their families.

[40] PROSPERA became "Bienestar", and the PMC became Digital Inclusion Centers (DIC)

Channels could also include educational TV capsules, facilitators' participation on local radio programs, digital inclusion buses to take content and facilitators to remote areas, and TV capsules in waiting areas in health clinics. Design digital inclusion courses based on digital service design principles.

4. *Launch a permanent communications campaign to promote usage of free Wi-Fi spots*. Under the México Conectado Program of the Ministry of Telecommunications and Transport (2012–2018), more than 100,000 free Wi-Fi spaces were deployed using school buildings, health clinics, and government offices as public infrastructure where people could access the Internet at no cost. A communications campaign could increase user awareness of the free connectivity service, which can be complemented with high-quality content based on the previous policy recommendation.

5. Design on-site dissemination of PMC curricula through facilitators' participation at different Social Protection Program facilities in order to increase women's participation in digital inclusion activities. Social programs considered beneficiaries to attend health preventive talks, school meetings, Program related events, among other gathering opportunities which can be utilized for digital on boarding of beneficiaries, showing them basic Internet and ICT tips and ways to access PMC curricula online.

6. Incorporate a financing and insurance mechanism as part of the Social Protection Program to cover for personal computer devices to support participants in accessing learning content. As this case study shows, public safety is a barrier for women's mobility and attendance at the PMC. It also affects women's ownership of smart mobile devices, since these are at risk of being stolen from them.

7. Pass from passive to active (Heeks, 2008) policy makers that continuously evaluate, and redesign public policy related to digital inclusion strategies. As digital skills expire quickly due to the accelerated technological change digital inclusion programs demand an active participation of researchers that continuously evaluate policy effectiveness. Joint collaboration with research centers expands the government's capacity for continuously designing and testing new learning methods.

Chapter VIII. Future work

By the time of this report´s writing the world had been one year in the COVID-19 Pandemic. The social distance measures driven by the majority of governments in the world considered long term lockdowns, suspension of face to face classes at schools, as well as, the suspension of economic activities of high socialization. These measures exponentially accelerated the adoption of digital platforms for online learning, telework, and e-commerce. However as the year passed this accelerated digital adoption also exposed the challenges ahead in terms of unequal Internet access (first-level digital divide), deficiencies in terms of Internet skills and use (second-level digital divide) which resulted in different outcomes of Internet usage (third-level digital divide) (Scheerder, van Deursen, van Dijk, 2017) among different population groups.

For example, in Mexico according to a UNICEF survey related to COVID-19 experiences 78.6% of people reported having difficulties in continuing with the education of girls, boys and adolescents at home, for any of the following reasons: 48.5% due to lack of a computer and Internet (first digital divide), 31.4% due to lack of support from teachers (second digital divide), 21.1% due to distraction of boys and girls, 17.1% due to lack of knowledge (second digital divide), 14.9% due to lack of books and / or teaching materials (material access gap) (UNICEF, 2020).

Future studies may account for a more detailed analysis on how the PMC's communities managed the COVID19 pandemic in terms of exponential digital uptake and/or the barriers to access positive outcomes of this digital surge. This in deep analysis may consider contacting participating women in this research in order to explore and describe how the learning and adoption of ICT in their daily lives impacted the way they lived the COVID 19 Pandemic. From a longitudinal perspective, reaching to participating women will provide valuable insights on how usage and outcomes evolved in terms of their empowerment and development after three years of the last focus group.

Another opportunity area for future research in ICT adoption, empowerment and development of women living in vulnerable conditions may considered collaborating with bootcamps[41] like "Laboratoria"[42] which trains women from impoverished communities on entry level programming skills. This type of collaboration opens the opportunity for longitudinal measurements while mitigating for significant dropout rates due the high and stable participation of women in this type of bootcamps. During the last 5 years a series of boot camps in Latin American and the Caribbean Region have emerged, currently there are 10 boot camps providers in this region (Cathles & Navarro, 2019). They offer an alternative to retrain people in digital capabilities and job placement with location rates higher than 75% as is the case of Laboratoria.

[41] Bootcamps are intensive training programs in digital technologies, which are being offered by innovative startups in the educational field, either for updating and retraining workers, or as an alternative or complement for young people seeking technical and university courses (Cathles & Navarro, 2019).

[42]Laboratoria trains women and organizations through bootcamps with an innovative method, with the aim of promoting a more diverse, inclusive and competitive digital economy. It is currently present in four countries: Colombia, Mexico, Peru and Chile. For more information visit https://www.laboratoria.la

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Annexes

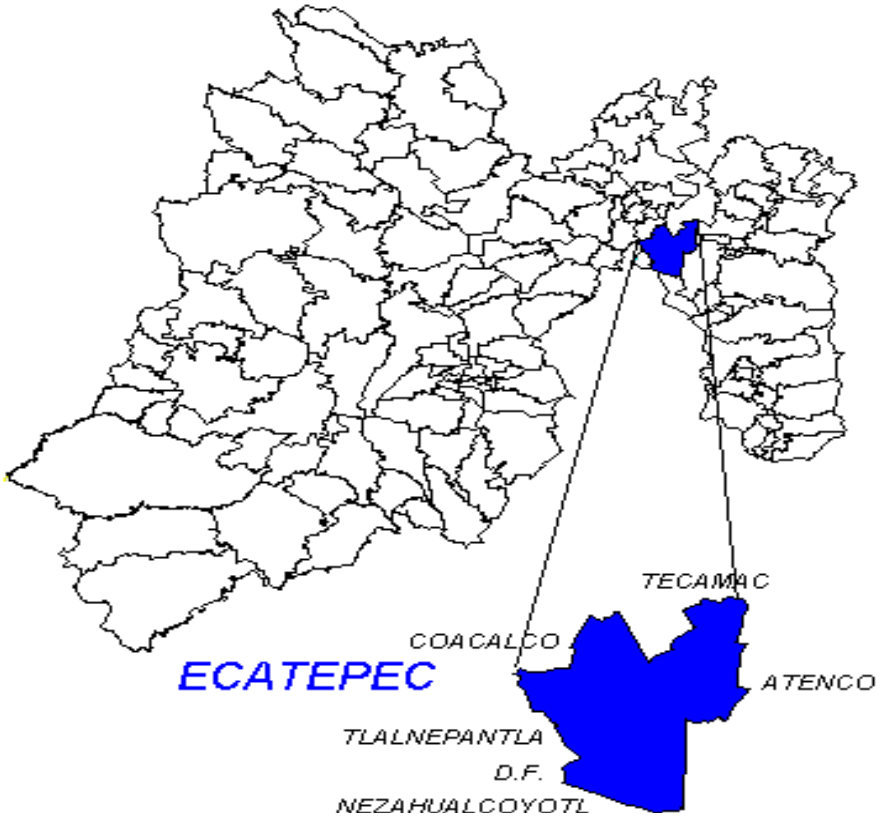
Annex A - Case study location

Ecatepec de Morelos, Estado de México

Figure 68. Map 1. Estado de México (Territory delimitation corresponding to one of the 32 States that integrate the United Mexican States).

Note: Wikipedia. (n. d.). State of Mexico. [Figure]. Retrieved from: https://en.wikipedia.org/wiki/State_of_Mexico; the red color indicates Estado de México *(State of Mexico).*

Figure 69. Map 2. Ecatepec de Morelos, Estado de México (Territory delimitation corresponding to one of the 125 Municipalities that are within the Estado de México).



Note: Unattributed. (n. d.). Ecatepec [Figure] Retrieved from: https://web.facebook.com/405364033523174/photos/a.405364083523169/40537028018; in color blue is the municipality of Ecatepec, Estado de México.

The following pictures provide a sense of what was described in the Case Study location section of this research and in the testimonies of participants of the program regarding surrounding areas of the *"Punto México Conectado"* in Ecatepec, State of Mexico.

Figure 70. Photo 1. Avenue Intersection on the way to the "Punto Mexico Conectado", in Ecatepec de Morelos, Estado de México.

Note: Martínez, Y. Photograph taken between January 2017 and February 2018.

Figure 71. Photo 2. Micro business for bike´s tire maintenance and repair, on the way to the “Punto Mexico Conectado” in Ecatepec de Morelos, Estado de México.

Note: Martínez, Y. Photograph taken between January 2017 and February 2018.

Figure 72. Photo 3. Crosswalk of main avenue to get to the “Punto México Conectado” in Ecatepec de Morelos, Estado de México.

Note: Martínez, Y. Photograph taken between January 2017 and February 2018.

Figure 73. Photo 4. Bikeway of main avenue to get to the "Punto México Conectado" in Ecatepec de Morelos, Estado de México.

Note: Martínez, Y. Photograph taken between January 2017 and February 2018.

Figure 74. Photo 5. Avenue where is located the “Punto México Conectado” in Ecatepec de Morelos, Estado de México.

Note: Martínez, Y. Photograph taken between January 2017 and February 2018.

Annex B – Building facilities at the "Punto México Conectado"

Punto México Conectado ubicado en Carlos Hank Gonzalez Mz. 67 Lt. 38, Col. Granjas Valle de Guadalupe, 55270 Ecatepec de Morelos, Estado de México.

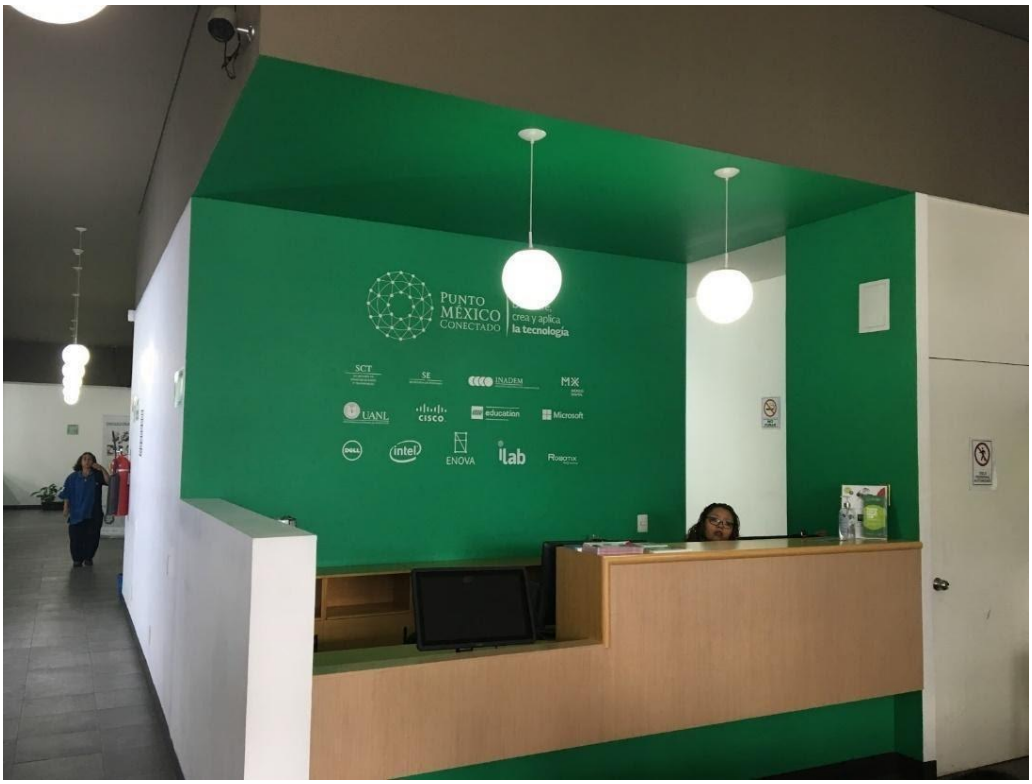
Figure 75. Photo 6. Building facade of the "Punto Mexico Conectado" in Ecatepec de Morelos, Estado de México.

Note: Martínez, Y. Photograph taken between January 2017 and February 2018. According to program guidelines all PMC buildings follow a set of standards in terms of colors, design and layout of the Center, in order to promote that same digital inclusion experience.

Figure 76. Photo 7. Plaque indicating the “Punto México Conectado” in Ecatepec de Morelos, Estado de México is a free Wi-Fi spot.

Note: Martínez, Y. Photograph taken between January 2017 and February 2018. According to program guidelines all PMC buildings are public and free WIFI spots, a plaque indicating that is located outside every public building with the indication so people know they can connect either inside or outside the building.

Figure 77. Photo 8. Registration Area at the “Punto México Conectado” in Ecatepec, Estado de México.



Note: Martínez, Y. Photograph taken between January 2017 and February 2018. The first contact area for visitors of the PMC is the registration area, where attendees can request information and/or access to PMC services. All visitors that want to use the PMC facilities have to register as members.

Figure 78. Photo 9. PMC Member Card at “Punto México Conectado” in Ecatepec, Estado de México.

Note: Martínez, Y. Photograph taken in September 2016. All members of the PMC must have a member's card. The card is free and provides an ID number to track member´s visits, courses, usage of communal areas and services, as well as activities attended.

Figure 79. Photo 10. Supporting organizations of the “Punto México Conectado” in Ecatepec Estado de México.

Note: Martínez, Y. Photograph taken between January 2017 and February 2018. PMC is a collaborative initiative among different government programs, academia and private institutions, all recognized at the registration areas of the PMCs.

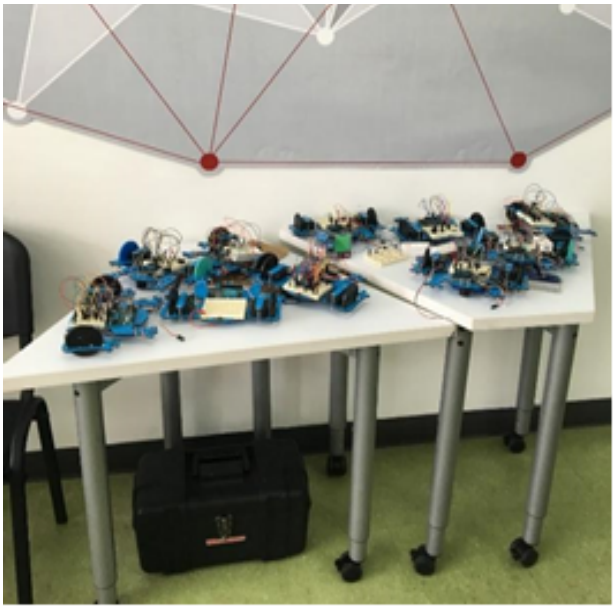
Figure 80. Photo 11. Welcome lobby at the “Punto México Conectado” in Ecatepec, Estado de México.

Note: Martínez, Y. Photograph taken between January 2017 and February 2018. At the main entrance of the building there are open areas of work and computers where visitors can access learning content, government digital services and Internet, all services are free to the public.

Figure 81. Photo 12. Miscelánea Digital - Robotics Room at the “Punto México Conectado” in Ecatepec, Estado de México.

Note: Martínez, Y. Photograph taken between January 2017 and February 2018. The robotics rooms promote teamwork, and initial immersion to robotics, courses are open to all ages.

Figure 82. Photos 13 & 14. Robotics materials and class attendees at the "Punto México Conectado" in Ecatepec, Estado de México.



Note: Martínez, Y. Photograph taken between January 2017 and February 2018. Part of the photo gallery of this research.

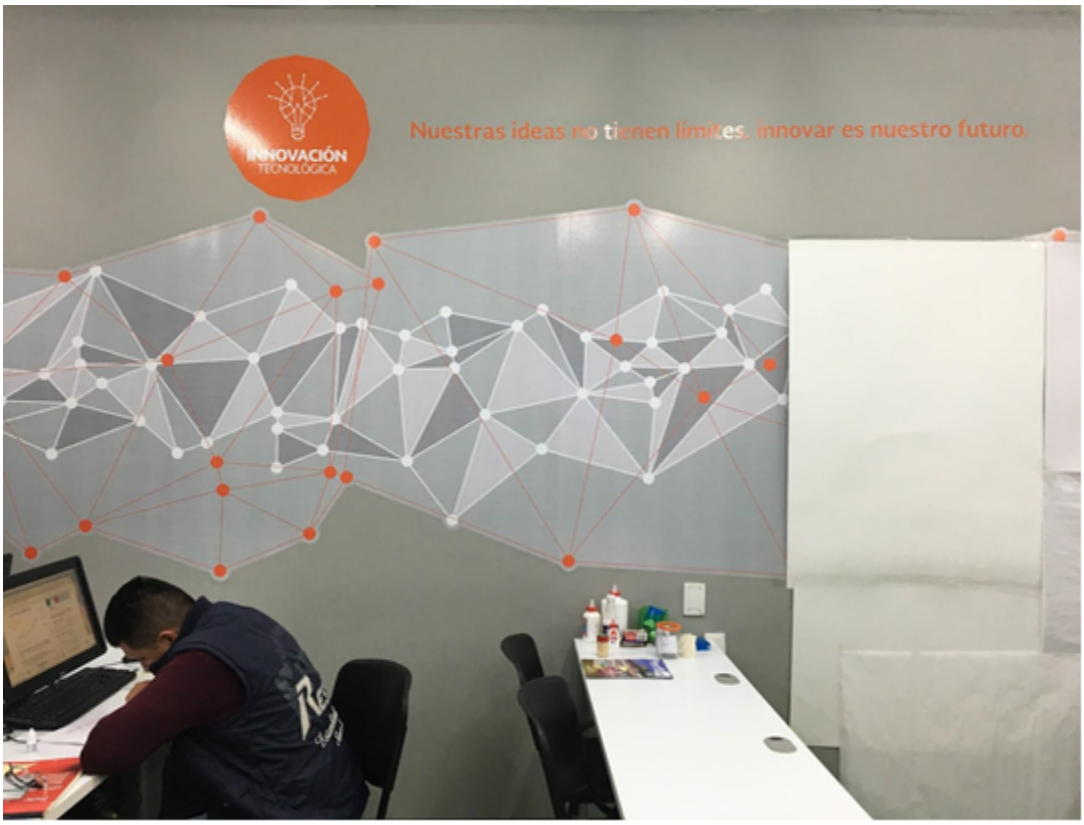
Figure 83. Photo 15. Multi Activity & device Rooms at the “Punto México Conectado” in Ecatepec, Estado de México.

Note: Martínez, Y. Photograph taken between January 2017 and February 2018.

Figure 84. Photo 16. Cultural activities room at the "Punto México Conectado" in Ecatepec, State of Mexico.

Note: Martínez, Y. Photograph taken between January 2017 and February 2018. Digital Innovation Rooms were designed to allow different settings on tables and devices required for the course, iPads, desktops, laptops, that is why nodes are located at the top of the room. All working areas of PMC have phrases that motivates participants to share and put into action their ideas.

Figure 85. Photo 17. Technology Innovation Phrase: “Our ideas have no limits, innovation is our future” at one of the working rooms of the “Punto México Conectado” in Ecatepec, Estado de México.



Note: Martínez, Y. Photograph taken between January 2017 and February 2018. All working areas of PMC have phrases that motivates participants to share and put into action their ideas.

Figure 86. Photo 18. PMC Impact results poster in open space at the “Punto México Conectado” in Ecatepec, Estado de México.

Note: Martínez, Y. Photograph taken between January 2017 and February 2018.

Annex C - Research activities and participants at the PMC

Figure 87. Photo 19. Example of teamwork usage of the facilities at the “Punto México Conectado” in Ecatepec, Estado de México.

Note: Martínez, Y. Photograph taken between January 2017 and February 2018.

Figure 88. Photo 20. Digital Inclusion Survey (DIS) session at the "Punto México Conectado" in Ecatepec, Estado de México.

Note: Martínez, Y. Photograph taken in January 2017. Photo shows participants taking for the first time the DIS using iPads and with PMC facilitators to provide guidance.

Figure 89. Photo 21. Focus group participants at the "Punto México Conectado" in Ecatepec, Estado de México.

Note: Martínez, Y. Photograph taken between January 2017 and February 2018. Photo shows participants, digital inclusion facilitators, and I at the end of one of a focus group session.

Figure 90. Photo 22. Participants in class at the “Punto México Conectado” in Ecatepec, Estado de México.

Note: Martínez, Y. Photograph taken between January 2017 and February 2018. Participants were allowed to take their child to class and participated in a set of activities within the PMC

Figure 91. Photo 23. Participants in a personal finance session at the “Punto México Conectado” in Ecatepec, Estado de México.

Note: Martínez, Y. Photograph taken in July 2017.

Figure 92. Photo 24. Participants in a focus group session at the “Punto México Conectado” in Ecatepec, Estado de México.

Note: Martínez, Y. Photograph taken between January 2017 and February 2018.

Figure 93. Photo 25. Participant's graduation at the "Punto México Conectado" in Ecatepec, Estado de México.

Note: Martínez, Y. Photograph taken between January 2017 and February 2018. As part of the PMC Learning Model participants in the program receive a competencies certificate for each of the five courses taken during the policy intervention. The picture below was taken during the graduation ceremony organized after the fifth course finished. Family members and friends were invited to participate in the graduation session.

Annex D - Digital Inclusion Survey (DIS)

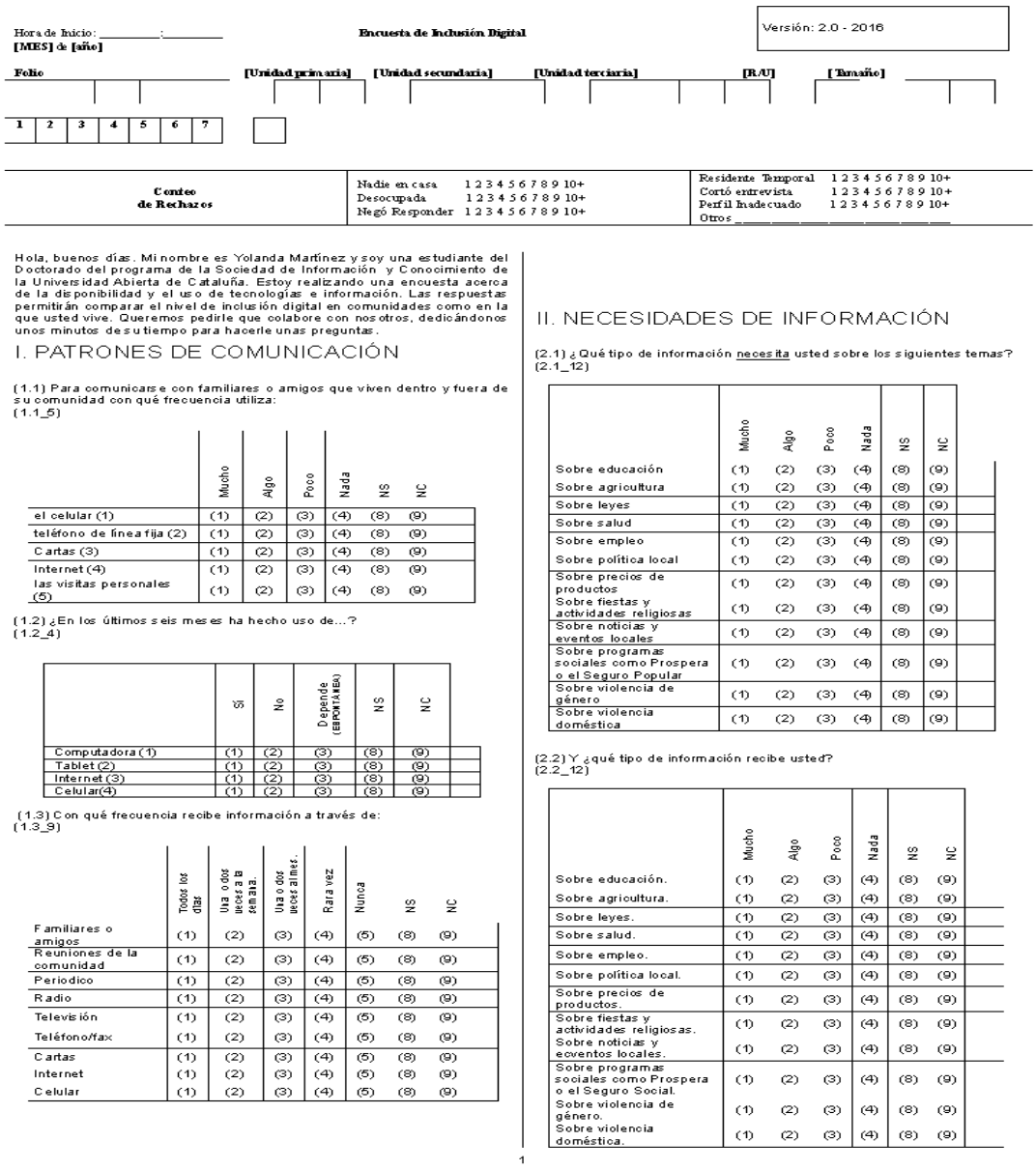
The survey was applied before the intervention and after the intervention and it measured the degree of access to telecom services, digital capabilities, Internet/ICT usage & information needs, and socio demographic data of the beneficiaries participating in the research study.

Table 10. Application dates of the DIS:

Intervention Type	Date	Number of beneficiaries taking the survey
Pre intervention application (first session)	January 27th 2017	10
Pre intervention application (second session)	January 28th 2017	11
Pre intervention application (third session)	February 3rd 2017	7
Immediate post intervention application	July 18th 2017	6
Six months after post intervention application	February 19th 2018	6

Note: Author's elaboration

Figure 94. Digital Inclusion Survey (DIS)



Hora de Inicio: _____:_____ **Encuesta de Inclusión Digital** Versión: 2.0 - 2016
[MES] de [año]

Folio [Unidad primaria] [Unidad secundaria] [Unidad terciaria] [R/U] [Tamaño]

1 2 3 4 5 6 7

Conteo de Rechazos

Nadie en casa 1 2 3 4 5 6 7 8 9 10+
Desocupada 1 2 3 4 5 6 7 8 9 10+
Negó Responder 1 2 3 4 5 6 7 8 9 10+

Residente Temporal 1 2 3 4 5 6 7 8 9 10+
Cortó entrevista 1 2 3 4 5 6 7 8 9 10+
Perfil Inadecuado 1 2 3 4 5 6 7 8 9 10+
Otros _____

Hola, buenos días. Mi nombre es Yolanda Martínez y soy una estudiante del Doctorado del programa de la Sociedad de Información y Conocimiento de la Universidad Abierta de Cataluña. Estoy realizando una encuesta acerca de la disponibilidad y el uso de tecnologías e información. Las respuestas permitirán comparar el nivel de inclusión digital en comunidades como en la que usted vive. Queremos pedirle que colabore con nosotros, dedicándonos unos minutos de su tiempo para hacerle unas preguntas.

I. PATRONES DE COMUNICACIÓN

(1.1) Para comunicarse con familiares o amigos que viven dentro y fuera de su comunidad con qué frecuencia utiliza:
(1.1_5)

	Mucho	Algo	Poco	Nada	NS	NC
el celular (1)	(1)	(2)	(3)	(4)	(8)	(9)
teléfono de línea fija (2)	(1)	(2)	(3)	(4)	(8)	(9)
Cartas (3)	(1)	(2)	(3)	(4)	(8)	(9)
Internet (4)	(1)	(2)	(3)	(4)	(8)	(9)
las visitas personales (5)	(1)	(2)	(3)	(4)	(8)	(9)

(1.2) ¿En los últimos seis meses ha hecho uso de...?
(1.2_4)

	Si	No	Depende (ESPONTÁNEA)	NS	NC	
Computadora (1)	(1)	(2)	(3)	(8)	(9)	
Tablet (2)	(1)	(2)	(3)	(8)	(9)	
Internet (3)	(1)	(2)	(3)	(8)	(9)	
Celular(4)	(1)	(2)	(3)	(8)	(9)	

(1.3) Con qué frecuencia recibe información a través de:
(1.3_9)

	Todos los días	Una o dos veces a la semana.	Una o dos veces al mes.	Rara vez	Nunca	NS	NC
Familiares o amigos	(1)	(2)	(3)	(4)	(5)	(8)	(9)
Reuniones de la comunidad	(1)	(2)	(3)	(4)	(5)	(8)	(9)
Periodico	(1)	(2)	(3)	(4)	(5)	(8)	(9)
Radio	(1)	(2)	(3)	(4)	(5)	(8)	(9)
Televisión	(1)	(2)	(3)	(4)	(5)	(8)	(9)
Teléfono/fax	(1)	(2)	(3)	(4)	(5)	(8)	(9)
Cartas	(1)	(2)	(3)	(4)	(5)	(8)	(9)
Internet	(1)	(2)	(3)	(4)	(5)	(8)	(9)
Celular	(1)	(2)	(3)	(4)	(5)	(8)	(9)

II. NECESIDADES DE INFORMACIÓN

(2.1) ¿Qué tipo de información necesita usted sobre los siguientes temas?
(2.1_12)

	Mucho	Algo	Poco	Nada	NS	NC	
Sobre educación	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre agricultura	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre leyes	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre salud	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre empleo	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre política local	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre precios de productos	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre fiestas y actividades religiosas	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre noticias y eventos locales	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre programas sociales como Prospera o el Seguro Popular	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre violencia de género	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre violencia doméstica	(1)	(2)	(3)	(4)	(8)	(9)	

(2.2) Y ¿qué tipo de información recibe usted?
(2.2_12)

	Mucho	Algo	Poco	Nada	NS	NC	
Sobre educación.	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre agricultura.	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre leyes.	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre salud.	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre empleo.	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre política local.	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre precios de productos.	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre fiestas y actividades religiosas.	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre noticias y eventos locales.	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre programas sociales como Prospera o el Seguro Social.	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre violencia de género.	(1)	(2)	(3)	(4)	(8)	(9)	
Sobre violencia doméstica.	(1)	(2)	(3)	(4)	(8)	(9)	

1

Note: Martínez, Y. (n. d.). Digital inclusion survey. The survey was applied three times: before the intervention, after finishing the courses and seven months after the intervention and it measured the degree of access to telecom services, digital capabilities, Internet/ICT usage & information needs, and socio-demographic data of the beneficiaries participating in this research study.

III. DISPONIBILIDAD Y ACCESO DE TICS

(3.1) Por favor, dígame si dispone de los siguientes bienes o servicios
(3.1_8)

	SÍ	No	NS	NC
radio (1)	(1)	(2)	(8)	(9)
línea telefónica fija (2)	(1)	(2)	(8)	(9)
televisor (3)	(1)	(2)	(8)	(9)
servicio de televisión de paga (4)	(1)	(2)	(8)	(9)
teléfono celular móvil (5)	(1)	(2)	(8)	(9)
(5b) Es un celular inteligente (Smartphone)	(1)	(2)	(8)	(9)

(3.2) En su caso ¿el celular se encuentra generalmente disponible para uso de cualquier integrante del hogar?

(3.3) Por favor, dígame si dispone de los siguientes bienes o servicios
(3.3_4)

	SÍ	No	NS	NC
computadora de escritorio (teclado, monitor y CPU se encuentran separados)? (1)	(1)	(2)	(8)	(9)
computadora portàtil (teclado, monitor y CPU se encuentran integrados físicamente)? (2)	(1)	(2)	(8)	(9)
Tablet (teclado y puntero virtuales, en la pantalla táctil? (3)	(1)	(2)	(8)	(9)
Conexión a Internet en el hogar? (4)	(1)	(2)	(8)	(9)

SI TODAS LAS RESPUESTAS SON CÓDIGO 2 PASE A LA PREGUNTA 3.5

(3.5) ¿Por qué no disponen de computadora o tablet?

Es muy caro 1
Falta de recursos económicos 2
No les interesa 3
No saben usarlo o desconocen su utilidad 4
No hay proveedor o infraestrctura en su localidad.... 5
NS 6
NC 7

(3.8) ¿Por qué no dispone de teléfono móvil (celular común o Smarthphone)?

Le resulta incostable (muy caro)..... 1
No lo necesita..... 2
No hay servicio en su localidad..... 3
Otra razón _____ 4

(3.6) ¿La computadora o tablet se encuentra generalmente disponible para uso de todos los integrantes del hogar?

Sí 1
No 2
NS 8
NC 9

SI LA RESPUESTA ES CÓDIGO 2 PASE A LA PREGUNTA 3.7

(3.7)¿Por qué no dispone de internet en el hogar?

Es muy caro 1
Falta de recursos económicos 2
No les interesa 3
No saben usarlo o desconocen su utilidad 4
No hay proveedor o infraestrctura en su localidad.... 5
NS 6
NC 7

SI LA RESPUESTA ES CÓDIGO 1 PASE A LA SUGUIENTE SECCIÓN

IV. CAPACIDADES INFORMATIVAS

(4.1) Por favor, dígame si usted conoce qué es..
(4.1_7)

	SÍ	No	NS	NC	
un procesador de texto como Word o Google docs?(6)	(1)	(2)	(8)	(9)	
el internet? (1) una página web? (2)	(1)	(2)	(8)	(9)	
las redes sociales como Facebook o Twitter? (3)	(1)	(2)	(8)	(9)	
un motor de búsqueda como Google o Yahoo? (4)	(1)	(2)	(8)	(9)	
servicios y trámites de gobierno (2)	(1)	(2)	(8)	(9)	

(4.2) ¿Cuán difícil le parece realizar las siguientes actividades por Internet?
(4.2_11)

	Mucho	Algo	Poco	Nada	NS	NC	
Mandar y recibir correos electrónicos	(1)	(2)	(3)	(4)	(8)	(9)	
Buscar información a través de un buscador	(1)	(2)	(3)	(4)	(8)	(9)	
Leer noticias	(1)	(2)	(3)	(4)	(8)	(9)	
Difundir/publicar información en redes sociales	(1)	(2)	(3)	(4)	(8)	(9)	
Participar en foros de discusión	(1)	(2)	(3)	(4)	(8)	(9)	
Tomar cursos por internet	(1)	(2)	(3)	(4)	(8)	(9)	
Buscar trabajo	(1)	(2)	(3)	(4)	(8)	(9)	
Realizar tramites o servicios del gobierno	(1)	(2)	(3)	(4)	(8)	(9)	
Realizar compras de productos o servicios	(1)	(2)	(3)	(4)	(8)	(9)	

V. APLICACIÓN DEL USO DE TICS

COMPUTADORA

(5.1) En los últimos seis meses, ¿usted utilizó la computadora?

Sí 1
No 2
NS 8
NC 9

SI LA RESPUESTA ES CÓDIGO 1 PASE A LA PREGUNTA 5.3

(5.2) ¿Por qué no utiliza la computadora?

No tiene acceso a una, aunque sabe utilizarla 1
No sabe utilizarla..... 2
No tiene necesidad de una 3
Desconoce su utilidad 4

PASE A LA PREGUNTA 5.7

(5.3)¿Con qué frecuencia hace uso de la computadora?

Diario 1
Al menos una vez a la semana 2
Al menos una vez al mes..... 3
Al menos una vez cada 6 meses..... 4
NS 8
NC 9

SI LA RESPUESTA ES CÓDIGO 2,3,4,5,8,9 PASE A LA PREGUNTA 5.5

(5.4) Generalmente ¿cuántas horas al día utiliza la computadora?

_____
N/C (99)

(5.5) ¿En qué lugar hace uso de la computadora.?

(5.5_6)

	SÍ	No	NS	NC	
¿en el hogar? (1)	(1)	(2)	(8)	(9)	
¿en el trabajo? (2)	(1)	(2)	(8)	(9)	
¿en la escuela o institución educativa? (3)	(1)	(2)	(8)	(9)	
¿en un sitio público con costo? (4)	(1)	(2)	(8)	(9)	
¿en un sitio público sin costo? (5)	(1)	(2)	(8)	(9)	
¿en casa de otra persona ? (6)	(1)	(2)	(8)	(9)	

(5.6) ¿Cuáles son los usos que le ha dado a la computadora?

Para actividades laborales 1
Para labores escolares 2
Como medio de capacitación 3
Entretenimiento 4
Acceso a internet 5
Varias..... .6
Todas..... .7
NS 8
NC 9

INTERNET

(5.7) ¿Por qué no utiliza el Internet?

No tiene acceso, aunque sabe utilizarlo 1
No sabe utilizarlo 2
No tiene necesidad 3
Desconoce su utilidad 4

PASE A LA PREGUNTA 5.9

(5.9)¿Con qué frecuencia hace uso del Internet?

Diario 1
Al menos una vez a la semana 2
Al menos una vez al mes 3
Al menos una vez cada 6 meses..... 4
NS 8
NC 9

SI LA RESPUESTA ES CÓDIGO 2,3,4,5,8,9 PASE A LA PREGUNTA 5.11

(5.10) Generalmente ¿cuántas horas al día utiliza el Internet?

_____
N/C (99)

(5.11_1) ¿Qué equipos utilizó para conectarse al Internet...

(5.11_6)

	SÍ	No	NS	NC	
computadora de escritorio? (1)	(1)	(2)	(8)	(9)	
computadora portátil (laptop, notebook? (2) tablet)? (3)	(1)	(2)	(8)	(9)	
teléfono móvil intelignete (smartphone)? (4)	(1)	(2)	(8)	(9)	
televisión con algun dispositivo de acceso ainternet(Smart TV)? (5)	(1)	(2)	(8)	(9)	
consola de videojuegos? (6)	(1)	(2)	(8)	(9)	

(5.12) ¿Desde hace cuánto tiempo utiliza el Internet?

Menos de un año 1
Entre 1 y 2 años 2
Más de 2 años 3
NS 8
NC 9

(5.13_1)¿En qué lugares ha utilizado el Internet...

(5.13_6)

	SÍ	No	NS	NC	
en el hogar? (1)	(1)	(2)	(8)	(9)	
en el trabajo? (2)	(1)	(2)	(8)	(9)	
en la escuela o institución educativa? (3)	(1)	(2)	(8)	(9)	
en un sitio público con costo? (4)	(1)	(2)	(8)	(9)	
en un sitio público sin costo? (5)	(1)	(2)	(8)	(9)	
en casa de otra persona ? (6)	(1)	(2)	(8)	(9)	

(5.14_1) ¿En los últimos seis meses, ¿ha realizado en Internet actividades de...

(5.14_25)

	SÍ	No	NS	NC
enviar y recibir correos? (1)	(1)	(2)	(8)	(9)
conversaciones telefónicas por Internet (VOIP)? (2)	(1)	(2)	(8)	(9)
obtener información en general? (3)	(1)	(2)	(8)	(9)
para apoyar la educación? (4)	(1)	(2)	(8)	(9)
para entretenimiento (jugar en línea, descarga de juegos, música, multimedia, videos)? (5)	(1)	(2)	(8)	(9)
búsqueda de empleo? (6)	(1)	(2)	(8)	(9)
visitar sitios para adultos? (7)	(1)	(2)	(8)	(9)
para realizar operaciones bancarias en línea? (8)	(1)	(2)	(8)	(9)
para crear o visitar blogs? (9)	(1)	(2)	(8)	(9)
para mantener un sitio propio? (10)	(1)	(2)	(8)	(9)
para descargar software? (11)	(1)	(2)	(8)	(9)
para interactuar con el gobierno? (12)	(1)	(2)	(8)	(9)
para descargar formatos de gobierno? (13)	(1)	(2)	(8)	(9)
para llenar o enviar formatos de gobierno? (14)	(1)	(2)	(8)	(9)
para acceder a redes sociales? (15)	(1)	(2)	(8)	(9)
Facebook (15a)	(1)	(2)	(8)	(9)
Twitter (15b)	(1)	(2)	(8)	(9)
Instagram (15c)	(1)	(2)	(8)	(9)
enviar mensajes instantáneos (Whatsapp, Messenger, Skype, etc)? (16)	(1)	(2)	(8)	(9)
conseguir información sobre salud o sus servicios? (17)	(1)	(2)	(8)	(9)
ordenar o comprar productos? (18)	(1)	(2)	(8)	(9)
leer periódicos, revistas o libros? (19)	(1)	(2)	(8)	(9)
para acceder a contenidos audivisuales que requieren pago (Netflix, Clarovideo, iTunes, Movies)? (20)	(1)	(2)	(8)	(9)
para acceder a contenidos audiovisuales que no requieran pago (Youtube, Vimeo, Megavideo, Google video)? (21)	(1)	(2)	(8)	(9)
acceder a contenidos de audio (Spotify, Google music, etcétera)? (22)	(1)	(2)	(8)	(9)

(5.15) En los últimos doce meses, ¿ha realizado compras o pagos por el Internet?

Sí 1
No 2
NS 8
NC 9

SI LA RESPUESTA ES CÓDIGO 2 PASE A LA PREGUNTA 5.17

(5.16_1) ¿Los pagos que ha realizado por Internet son...

(5.16_5)

	SÍ	No	NS	NC	
servicios bancarios y financieros (1)	(1)	(2)	(8)	(9)	
servicios y trámites de gobierno (2)	(1)	(2)	(8)	(9)	
servicios educativos (3)	(1)	(2)	(8)	(9)	
bienes o servicios para el hogar (4)	(1)	(2)	(8)	(9)	
bienes o servicios personales (5)	(1)	(2)	(8)	(9)	

(5.17) ¿Cuál cree usted que es el nivel de conocimiento en el uso del Internet?
Básico.....1
Medio 2
Avanzado 3

(5.18) ¿Cuán importante es para usted capacitarse más en el uso del Internet?

Muy importante.....1
Algo importante.....2
Nada importante 3

TELEFONÍA CELULAR

(5.7) En los última semana, ¿usted ha utilizado el celular en este hogar o fuera de él?

Sí 1
No 2
NS 8
NC 9

SI LA RESPUESTA ES CÓDIGO 2, PASE A LA SIGUIENTE SECCIÓN

(5.20)¿Con qué frecuencia utiliza el teléfono móvil para hacer o recibir llamadas?

Diario 1
Al menos una vez a la semana 2
Al menos una vez al mes 3
Al menos una vez cada 6 meses..... 4
Al menos una vez cada año 5
NS 8
NC 9

(5.21) ¿Qué tipo de teléfonía de celular tiene...

recarga de tiempo aire (prepago).....1
plan tarifario (pospago).....2
NS 8
NC 9

(5.22) ¿Cuál es su gasto promedio al mes en celular?

_____
N/C (99)

(5.23) ¿Se conecta a Internet por medio de su teléfono inteligente (Smartphone)?

Si 1
No 2
NS 8
NC 9

SI LA RESPUESTA ES CÓDIGO PASE A LA SECCIÓN VI.

(5.24) ¿De qué manera se conecta a Internet con su teléfono inteligente (Smartphone)?

Mediante red celular 1
Mediante Wifi 2
NS 8
NC 9

SI LA RESPUESTA ES CÓDIGO PASE A LA SECCIÓN VI.

(5.25)En los últimos doce meses, ¿con que frecuencia hace uso de Internet con su teléfono celular?

Diario 1
Al menos una vez a la semana 2
Al menos una vez al mes 3
Al menos una vez cada 6 meses..... 4
Al menos una vez cada año 5
NS 8
NC 9

VI. TICS PARA EL DESARROLLO

(6.1) ¿Cuán útil piensa usted es el uso del Internet para su desarrollo/mejorar su vida?

Mucho 1
Algo 2
Poco.....3
Nada 4
NS 8
NC 9

(6.3_1)¿Qué tan de acuerdo o en desacuerdo está con que el Internet...(LEA OPCIONES): muy de acuerdo, algo de acuerdo, algo en desacuerdo o muy en desacuerdo?
(6.3_18)

	Muy de acuerdo	Algo de acuerdo	Algo en desacuerdo	Muy en desacuerdo	NS	NC	
Permite conocer mejor lo que pasa en el mundo (1).	(1)	(2)	(3)	(4)	(8)	(9)	
Permite tener acceso a educación (2).	(1)	(2)	(3)	(4)	(8)	(9)	
Permite tener acceso a servicios de salud (3).	(1)	(2)	(3)	(4)	(8)	(9)	
Permite tener acceso a información sobre el mercado y precios (4).	(1)	(2)	(3)	(4)	(8)	(9)	
Permite menos necesidad de realizar viajes (menor costo de transporte y pérdida de tiempo) (5).	(1)	(2)	(3)	(4)	(8)	(9)	
Permite comunicarse mejor con familiares y amigos (6).	(1)	(2)	(3)	(4)	(8)	(9)	
Permite encontrar mayores oportunidades de trabajo (7).	(1)	(2)	(3)	(4)	(8)	(9)	
Permite realizar mejor su trabajo (8).	(1)	(2)	(3)	(4)	(8)	(9)	
Permite conocer mejor sus derechos (9).	(1)	(2)	(3)	(4)	(8)	(9)	
Permite tener mayor información sobre la toma de decisiones del gobierno (10).	(1)	(2)	(3)	(4)	(8)	(9)	
Puede mejorar la realización de tramites y servicios con el gobierno (11).	(1)	(2)	(3)	(4)	(8)	(9)	
Permite conocer sobre proyectos sociales (12).	(1)	(2)	(3)	(4)	(8)	(9)	
Permite conocer sobre programas de ayuda del gobierno (13).	(1)	(2)	(3)	(4)	(8)	(9)	
Permite sentirse menos aislado de lo que pasa en México (15).	(1)	(2)	(3)	(4)	(8)	(9)	
Permite mejorar su calidad de vida o vivir mejor (16).	(1)	(2)	(3)	(4)	(8)	(9)	
Permite fortalecer su identidad cultural (17).	(1)	(2)	(3)	(4)	(8)	(9)	
Permite sentirme orgulloso de saber usar el internet (18).	(1)	(2)	(3)	(4)	(8)	(9)	

(6.4)¿Piensa que el Internet puede mejorar las relaciones entre los ciudadanos y el gobierno?
1. Sí;
2. No.

VI. DATOS SOCIOECODEMOGRÁFICOS

Y ya para terminar, me gustaría hacerle unas preguntas sencillas sobre sus carectarísticas personales, con fines exclusivamente estadísticos.

(6.1) Sexo (ANOTE SIN PREGUNTAR)
- Hombre 1
- Mujer 2

(6.2) ¿Cuántos años cumplidos tiene usted?

_____ N/C (99)

(6.3) ¿Hasta qué año escolar estudió usted (grado máximo)?
(6.3_8)
Años Total _____ (USAR TABLA A CONTINUACIÓN PARA CÓDIGO)

	1°	2°	3°	4°	5°	6°
Ninguno	(0)					
Primaria	(1)	(2)	(3)	(4)	(5)	(6)
Secundaria	(7)	(8)	(9)			
Bachillerato/Preparatoria o carrera técnica	(10)	(11)	(12)			
Universidad	(13)	(14)	(15)	(16)	(17)	(18+)
Postgrado	(17)	(18)	(19)	(20+)		
NS	(98)					
NC	(99)					

(6.13) ¿Cuál fue su actividad principal la semana pasada?
- Trabajó 1
- Tiene trabajo, pero no trabajó (por vacaciones, Incapacidad o enfermedad) 2
- Hogar 3
- Estudiante 4
- Jubilado o Pensionado 5
- Desempleado (no trabajó pero buscó trabajo) 6
- Está incapacitado permanentemente 7
- Otro 8
- NS 8
- NC 9

(6.14) ¿A qué tipo de actividad se dedica la institución o empresa donde usted trabaja... (LEA OPCIONES 1 A 7)?
- Agricultura 1
- Pesca, ganadería, silvicultura, etc 2
- Industrias (todo tipo) 3
- Comercio (todo tipo) 4
- Construcción 5
- Educación 6
- Servicios (no incluye comercio) 7
- Otros 8
- NS 98
- NC 99

(6.15) ¿Como cuántos focos tienen en su casa?

ANOTAR | | | 98 = NS/NC

(6.16) Sumando los ingresos mensuales de todas las personas que trabajan en su casa, ¿cuáles serían los ingresos familiares totales? (MUESTRE TARJETA 10)
- Ningún ingreso 1
- Menos de $800 2
- Entre $801-$1,600 3
- $1,601-$2,400 4
- $2,401-$3,200 5
- $3,201-$4,000 6
- $4,001-$5,400 7
- $5,401-$6,800 8
- $6,801-$10,000 9
- $10,001-$13,500 10
- Más de $13,500 11
- NS 98
- NC 99

(6.17) Con el total del ingreso familiar, diría usted que... (LEA OPCIONES Y MARQUE UNA RESPUESTA)
- Les alcanza bien y pueden ahorrar 1
- Les alcanza justo, sin grandes dificultades 2
- No les alcanza y tienen dificultades 3
- No les alcanza y tienen grandes dificultades 4
- NS 8
- NC 9

(6.18) ¿Cómo cuánto dinero ahorra usted cada mes..?
- Ningún ingreso 1
- Menos de $100 2
- Entre $101-$200 3
- $201-$300 4
- $301-$400 5
- $401-$500 6
- $501-$600 7
- $601-$700 8
- $701-$800 9
- $801-$900 10
- $1000-$2000 11
- Más de $2000 12
- NS 98
- NC 99

(6.19) ¿Al recibir su ingreso usted planifica el gasto en el hogar?
- Sí 1
- No 2
- NS 8
- NC 9

Estas son todas las preguntas que tengo. Muchísimas gracias por su colaboración. (ENCUESTADOR ENTREGAR CONSTANCIA)

Hora terminó: _____ : _____

Con la finalidad de supervisar la encuesta le pediría, por favor, los siguientes datos:

Nombre del entrevistado: _____

Dirección del entrevistado: _____

Teléfono del entrevistado: _____

Nombre del encuestador: _____

Edad del encuestador: _____

Sexo del encuestador:
- Hombre 1
- Mujer 2

ENCUESTADOR: ANOTE LA SIGUIENTE INFORMACIÓN

(X1) En general, durante la encuesta, ¿qué tan interesando estuvo el encuestado?
- Mucho 1
- Algo 2
- Poco 3
- Nada 4
- NS 8
- NC 9

(X2) ¿Hubo otra persona presente durante la entrevista?
- Sí 1
- No 2
- NS 8
- NC 9

Annex E - Focus group guidelines

Session before policy intervention on January 2017

General objective: In this session I sought to explore and analyzed general knowledge on digital technologies of women participants. Their motivations to participate in the Program, if and how they apply ICT in their daily life and what were their expectations of the learning experience.

Focus group guide

- Welcome remarks and authorization for taking video during the session
- Researcher presentation
- Objective of the focus group session
- Guiding questions
    - What is digital technology?
    - How do you use digital technologies in your home?
    - How do you use digital technologies in your work?
    - Can you imagine for a second how your life will be without technology?
    - When you were invited to participate in the program, did you comment in your home about this invitation?
    - What do you expect to learn from the PMC courses?
    - How would you use what you learned?

Session after policy intervention on July 2017

General objective: In this session I sought to analyze the level of learning and acquisition within the participants as well as any modifications in their perceptions. Also, to explore and describe how women participants assessed their learning experience and to perform a brainstorming activity over the future influence of ICT adoption in their daily lives.

Focus group guide

- Welcome remarks and authorization for taking video during the session
- Researcher presentation
- Objective of the focus group session
- Guiding topics
    - Initial perceptions review of learning experience
    - Review of the first session's findings
    - "Compare and contrast" dynamic
    - Evaluation of the content of the courses
        - What information, knowledge, or competences was more useful to them?

    - Future prospective
  - New potential uses
    - Information availability
    - Government services
    - Education
    - Personal finances

Session seven months after the policy intervention on February 2018

General objective: In this session I sought to explore to what extent did the acquired skills were incorporated within the daily lives of the participants and how that incorporation allowed for better development opportunities.

Focus group guide

- Welcome remarks and authorization for taking video during the session
- Researcher presentation
- Objective of the focus group session
- Guiding topics
  - Initial perceptions review
  - General assessment discussion
  - ICT involvement in daily life
    Advantages and disadvantages
    Retrospective analysis
    Comparison between initial responses and those at the end of the PMC program

Annex F - Facilitator interview guide

General objective: the purpose of this session was to explore and describe the facilitator´s experience with the Program.

- Welcome remarks and authorization for taking video during the session
- Researcher presentation
- Objective of the interview session
- Guiding questions
    - What is your complete name?
    - What is your profession?
    - What do you do as a PMC facilitator?
    - How did you become a PMC facilitator?
    - Did you notice any difference between your work with regular PMC attendees and the *PROSPERA* participants?
    - In your experience as a learning facilitator, what is the best mechanism to develop digital skills in population groups with the characteristics of *PROSPERA*?
    - What is the best way to incorporate women from the *PROSPERA* program to the PMC Community?
    - If we want to scale the program shall we have a special preparation track for the facilitators of these groups?
    - From women participants that were able to finish the courses what was in your opinion the most important factor for continuing with the courses?
    - What motivated you the most? And what can we do better in the PMC Program to attract talent as facilitators?

Annex G – Competence grid of the PM Courses

The following tables described the competence grids used by the facilitator of the courses to assess learning of women participants in this research.

Table 11. Getting to know the computer, course description and competence grid.

Getting to know the computer: This course trained for basic computer use that facilitates everyday life processes with the use of common everyday programs.

Competence Group	Competence	Excellent (40 points)	Moderated (20 points)	Moderated (20 points)	Not acceptable (10 points)
Technology; Social Impact	Authenticate quickly and safely.	Identifies secure password elements to create one and memorizes it. Creates a username and safely authenticates in a computer.	Identifies secure password elements to create one. Creates a username and safely authenticates in a computer.	Identifies secure password elements. Creates a username and safely authenticates in a computer.	Identifies password elements.
Technology	Use the computer's hardware to manage its programs and applications	Recognizes a computer´s parts (hardware) and its programs (software). Recognizes the in and out hardware. Executes the proper functions of the mouse three buttons. Uses the keyboard to introduce alphanumeric information in the computer.	Recognizes a computer's parts (hardware) and its programs (software). Recognizes the input and output hardware. Executes the proper functions of the mouse three buttons.	Recognizes a computer's parts (hardware) and its programs (software). Executes the proper functions of the mouse three buttons.	Recognizes a computer's parts (hardware) and its programs (software).

Technology	Manages the principal components of the computer's operating system and organize the information in folders.	Recognizes the computer´s software. Differentiates the more utilized operative systems by basic level users. Recognizes the parts of the graphical user interface. Organizes files and folders in the computer. Creates files in the computer.	Recognizes the computer´s software. Differentiates the more utilized operative systems by basic level users. Recognizes the parts of the graphical user interface. Organizes files and folders in the computer.	Recognizes the computer´s software. Differentiates the more utilized operative systems by basic level users. Recognizes the parts of the graphical user interface.	Recognizes the computer´s software. Differentiates the more utilized operative systems by basic level users.
Information	Search and select information from Internet	Identifies the internet and its principal characteristics. Uses the parts and functions of browsers. Uses a browser to browse and find information on the Web. Applies basic security measures when browsing the Internet.	Identifies the internet and its principal characteristics. Uses the parts and functions of browsers. Uses a browser to browse and find information on the Web.	Identifies the internet and its principal characteristics. Uses the parts and functions of browsers.	Identifies the internet and its principal characteristics.

Note: PMC´s elaboration.

Table 12. Getting to know the Internet, course description and competence grid.

Getting to know the Internet: This course aimed to discover some of the data or services that the Internet provides that meet several needs.

	Competence	**Excellent (40 points)**	**Satisfactory (30 points)**	**Moderated (20 points)**	**Not acceptable (10 points)**
Information	Finds useful information to cover daily needs on the Internet.	Applies search filters. Uses different browsers. Does internal search. Evaluates the found information with her criteria. Compares online sites to pick the most appropriate.	Applies search filters. Evaluates the found information with her criteria. Compares online sites to pick the most appropriate.	Achieves a simple search with no filters. Evaluates the found information with her criteria.	Achieves a simple search with no filters.
Social Impact	Protects her computer and personal data when using the Internet.	Downloads file from an official internet service provider site. Checks that the official internet service provider site has a https protocol or a security lock. Avoided banners, deceitful publicity, content sites and P2P sites.	Downloads file from an official internet service provider site. Avoided banners, deceitful publicity, content sites and P2P sites.	Downloads file from a content site. Checks that the site has a https protocol or a security lock. Avoided banners, deceitful publicity, content sites and P2P sites.	Downloads file from a content or a P2P site. Clicks on banners or deceitful publicity.
Information; Communication	Communicates with one person or several people through email, using tags and other functions.	Creates an email account with an easy to remember name. Sends an email to a contact. Copies another contact when sending the email. Sends an email with a blind carbon copy (hidden copy) to a contact. Writes a draft.	Creates an email account. Sends an email to a contact. Writes a draft.	Creates an email account. Sends an email to a contact.	Creates an email account with a difficult to remember name. Sends an email to a contact.

Communication; Social impact	Communicates safely with one person or several people in real time.	Participates in a chat conversation with a contact and then with several. Participated in a video chat. Revises the chat on her email. Visited an online information page in real time.	Participates in a chat conversation with a contact. Participated in a video chat. Revises the chat on her email. Visited an online information page in real time.	Participates in a chat conversation with a contact. Revises the chat on her email. Visited an online information page in real time.	Participates in a chat conversation with a contact.
Information; Communication	Use videos, maps, translate and online formalities (paperwork) to facilitate her daily living	Locates videos and administrates her YouTube account. Used map, satellite, street viewer and zoom Google Maps functions. Traces arrival routes. Translates a foreign language web page using translator and text. Located the formalities sites with the browser. Checked on the security indicators of the site. Selects personal information to share on formalities forms.	Locates videos and administrates her YouTube account. Used map, satellite, street viewer and zoom Google Maps functions. Traces arrival routes. Translates a foreign language web page. Located the formalities sites with the browser. Checked on the security indicators of the site. Selects personal information to share on formalities forms.	Locates videos and marks them as favorites. Used map, satellite, street viewer and zoom Google Maps functions. Traces arrival routes. Translates a foreign language web page. Located the formalities sites with the browser. Checked on the security indicators of the site. Selects personal information to share on formalities forms.	Locates videos on YouTube. Used map, satellite, street viewer and zoom Google Maps functions. Translates a foreign language web page. Located the formalities sites with the browser. Checked on the security indicators of the site.

Note: PMC´s elaboration.

Table 13. Getting to know Office, course description and competence grid.

Getting to Know Office: This course aimed at developing initial skills for the use of office software, such as word processors, spreadsheets, presentations, and drawing editors.

Competence Group	Excellent (40 points)	Satisfactory (30 points)	Moderated (20 points)	Not acceptable (10 points)
Elaborate documents using a word processor.	Open a word processing document. Save the file in different storage units. Edit text formatting styles. Format the font, color and text alignment. Insert and delete tables. Use bullets and numbering. Sets the orientation and document size. Use the copy, cut and paste commands. Use undo and redo commands. Use the spell checker.	Open a word processing document. Save the file in different storage units. Edit text formatting styles. Format the font, color and text alignment. Insert and delete tables, Use bullets and numbering. Sets the orientation and size of the document.	Open a word processing document. Save the file in different storage units. Edit text formatting styles. Format the font, color and text alignment.	Open a word processing document. Edit text formatting styles.
Prepares data books through the use of spreadsheets.	Open a spreadsheet. Save the file in different storage units. Identifies the cells, columns and rows of a spreadsheet. Edit the data in a cell. Use the copy, cut and paste commands. Use undo and redo commands. Establish different data formats to the cells. Uses functions of addition, subtraction, multiplication and division.	Open a spreadsheet. Save the file in different storage units. Identifies the cells, columns and rows of a spreadsheet. Edit the data in a cell. Use the copy, cut and paste commands. Use undo and redo commands. It establishes different data formats to the cells.	Open a spreadsheet. Save the file in different storage units. Identifies the cells, columns and rows of a spreadsheet. Edit the data in a cell.	Open a spreadsheet. Identifies the cells, columns and rows of a spreadsheet. Edit the data in a cell.

Elaborate graphical presentations using computer tools	Open a presentation file Save the file in different storage units. Edit text formatting styles. Use predesigned templates. Insert, double, move and delete slides. Insert figures. Insert graphic elements. Set animations and transitions. Displays the full screen presentation. Use the copy, cut and paste commands. Use undo and redo commands.	Open a presentation file Save the file in different storage units. Edit text formatting styles. Use predesigned templates. Insert, double, move and delete slides. Insert figures. Insert graphic elements. Set animations and transitions.	Open a presentation file. Save the file in different storage units. Use predesigned templates. Insert figures. Insert graphic elements. Set animations and transitions	Open a presentation file. Save the file in different storage units. Use predesigned templates. Insert figures.

Note: PMC´s elaboration.

Table 14. Exploring the Internet, course description and competence grid.

Exploring the Internet: This course aimed at developing cyber cultural skills to communicate with others by creating and publishing multimedia content on social networks and blogs.

Competence group	Competence	Excellent (40 points)	Satisfactory (30 points)	Moderated (20 points)	Not acceptable (10 points)
Information; Communication.	Defines situation or problem.	Poses hypothesis for problem causes and solutions.	Analyzes the causes and exemplifies cases which witness the problem.	Describes generally the problem characteristics.	Reproduces classmates´ posing of the problem.
Information; Communication.	Investigates.	Analyzes, processes and communicates information or data.	Summaries the information and communicates it adequately.	Identifies and communicates the information and data adequately.	Searches and uses the information without processing or analyzing it.
Information; Communication.	Plans action or solution.	Organizes and integrates classmates' ideas into a global plan.	Participates in the planning, complementing classmates' ideas.	Plans activities following classmates' proposals.	Has limited elements to plan solutions.
Information; Communication; Technology.	Executes the plan.	Applies plans and programs adequately and understands its functioning to solve a task.	Manipulates tools and programs in a systematic fashion and partially understands its functioning to solve a task.	Basic use of tools and programs in a procedural fashion to solve a task.	Imitates the use of tools and programs in a basic fashion without understanding its functioning and without solving a task.
Information; Communication; Technologies; Social impact.	Manages knowledge	Integrates previous knowledge and incorporates new one to generate solutions in new contexts.	Incorporates some previous knowledge with some new one to generate solutions in new contexts.	Recovers some previous knowledge to generate solutions in familiar contexts.	Recognizes some knowledge but does not apply it in any context.
Information; Communication.	Builds knowledge with others	Collaborates and leads the project. Interacts	Cooperates with others in most activities.	Moderately participates in group activities	Works individually most of the time.

		and gives feedback to classmates´ participation. Communicates adequately.	Generates work proposals. Establishes communication correctly,	when instructed to do so. Establishes a limited communication with classmates according to interaction with classmates.	Achieves some tasks even when being precisely instructed to do so.

Note: PMC´s elaboration.

Table 15. Personal Finance, course description and competence grid

Personal Finance: This course aimed at exploring personal financial goals by organizing income flows in a monthly budget, establishing savings and investment strategies, and identifying their borrowing capacity to achieve those goals.

Competence group	Competence	Excellent (40 points)	Satisfactory (30 points)	Moderated (20 points)	Not acceptable (10 points)
Information; Communication.	Poses financial goals.	Designs financial goals with deadlines, in a realistic, clear, precise, and reachable fashion.	Builds on the financial goals in a realistic, clear, precise and reachable fashion.	Highlights the drafting of the realistic, clear, precise and reachable financial goals.	Expresses the financial goals in realistic and clear fashion.
Information; Communication.	Creates a monthly budget.	Organizes the monthly budget with an established deadline; correctly classifies in fixed and variable both income and expenses; identifies a monthly available quantity to attain financial goals.	Produces the monthly budget with a deadline; correctly classifies in fixed and variable both income and expenses.	Classifies in the monthly budget both income and expenses in a general fashion, with an amount available to achieve financial goals.	Describes both income and expenses in the monthly budget in general terms.
Information; Communication.	Identifies a savings strategy.	Establishes a savings strategy with a deadline and considers the current savings amount plus the	Produces a savings strategy that considers the current savings amount plus the amount	Distinguishes a savings strategy that considers only the current savings amount and a savings	Expresses an investment strategy that only considers actual savings amount.

		amount that will be saved if unnecessary expenses are cut.	that will be saved if unnecessary expenses are cut.	deadline to attain financial goals.	
Information; Communication.	Identifies an investment's strategy.	Establishes an investment strategy considering: a deadline. the investment amount, the profit calculation and the total amount at the end of the investment (investment + profit).	Produces an investment strategy that considers a deadline, the investment and the profit calculation.	Distinguishes an investment strategy with a deadline and the investment amount.	Expresses an investment strategy that considers only the investment amount.
Information; Communication.	Analyzes a convenient credit and existent and current debt payments.	Establishes debt capacity considering: convenient type of credit, credit amount, payoff deadline, interest rate and the total credit cost.	Calculates debt capacity considering: convenient type of credit, credit amount, payoff deadline, interest rate.	Distinguishes debt capacity with a convenient type of credit, credit amount, payoff deadline.	Describes her debt capacity with a convenient type of credit, credit amount.
Information; Communication; Technology.	Manages knowledge.	Builds a financial map using technological capacities.	Produces a financial map using technological capacities frequently.	Orders a financial map using technological capacities sometimes.	Orders a financial map without using technological capacities.
Information; Communication; Social impact.	Builds knowledge with others.	Always participates actively in group practices.	Frequently participates actively in group practices.	Sometimes participates actively in group practices.	Almost never participates actively in group practices.
Information; Communication; Social impact.		Always proposes pertinent knowledge to the group.	Frequently shows proof of pertinent knowledge to the group.	Sometimes explains pertinent knowledge to the group.	Almost never exposes pertinent knowledge to the group.

Note: PMC´s elaboration.

Annex H – Digital skill example

Figure 95. PowerPoint presentation of the topic « La Violencia » (The violence).

Note: Power Point: La Violencia. Elaborated in the program by a participant. Example of digital competency created during the course.