Integration of ICT into an adult education program for indigenous communities

The case of Guainía, Colombia

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Forfatter

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Abstract

This study explores the integration of Information and Communication Technologies (ICTs) into adult education for indigenous people. It does so through the analysis of a case study that focuses on an adult education program implemented in Guainía, Colombia in 2013. The overarching purpose of this study is to provide a clear understanding of the participants' perceptions regarding ICTs integration into both their education and their communities. This study uses a qualitative research approach and methods in order to explore participants' views and experiences with the program. In doing so, findings are examined in light of Everett Roger's diffusion of innovation theory and Richard Ryan's and Edward Deci's concept of motivation in education.

This study has found that participants' perceive the integration of ICTs into the adult education program as innovative tools that positively enhance their teaching and learning processes. Consequently, this study reveals that both program's teachers and students view the use of ICTs in and outside the classroom as an innovation that promote interactive and dynamic classes. In addition, findings suggest that participants' perceptions of the integration and use of ICTs in the education program closely relates to their motivations to teach, study and learn. Also participants' perceive the integration of ICTs into the education program and their communities as an opportunity to access knowledge and information as well as to communicate with others and thereof enter the digital world.

Despite findings generally show that participants views are largely positive, there are also other conflicting aspects that reveal participants' negative perceptions. For instance, the ICT tools integrated in the program are considered as very difficult devices to handle by some of the participants, which considerably limit the use of these tools for their teaching and learning process. In addition, findings suggest that participants consider that the use of ICTs in their communities can involve extensive negative effects on their culture. Their concerns primarily include young community members who are continuously in contact with technologies (e.g. TV, internet, computers, tablets and video-games) and who no longer want to get involved in traditional and cultural activities within the communities.

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List of abbreviations

CONFITEA	International Conference on Adult Education
DANE	Departamento Administrativo Nacional de Estadistica (National Administrative Department of Statistics
EFA	Education For All goals (UNESCO)
FARC	Fuerzas Revolucionarias de Colombia (Revolutionary Armed Forces of Colombia)
ICT	Information and Communication Technology
ILO	International Labor Organization
MDG	Millennium Development Goals
MEN	Ministerio de Educación Nacional (Colombia Ministry of Education)
MOE	Ministry of Education
ONIC	Organización Indígena de Colombia (Colombian Indigenous Organization)
SEIP	Sistema Educativo Indígena Propio (“Own” Indigenous Education System)
SDT	Self-determination Theory
SINCHI	Instituto Amazónico de Investigaciones Científicas (Amazon Institute of Scientific Research)
UIE	UNESCO Institute for Education
UIL	UNESCO Institute for Lifelong Learning
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization

1 Introduction

The education provision for indigenous people seems to be one of the most notorious challenges for Latin-American governments (Schmelkes, 2011). Numerous studies have thoroughly documented a long history of exclusion and discrimination of poor people, especially against indigenous communities, which has resulted in highly unequal societies in Latin-American countries (UNDP, 2013). Product of discrimination and governmental neglect many indigenous people in the region have never attended school or were forced to drop-out at an early stage due to various reasons. Therefore, illiteracy figures among youth and adult people in these countries are high as recorded in the Global Monitoring report on Education For All (EFA) goals (UNESCO, 2013).

In recent decades, the discourse and research on indigenous education and literacy has gained increasing attention among the scholars who are interested in the indigenous people's educational needs. To name some of these studies, Schmelkes (2005), conducted a study on the inequality of primary education in rural areas in Mexico and in 2014 Schmelkes studied the higher education provision for indigenous people in Mexico as well. Similarly, Reimers (2000) gathered, in his book "Unequal schools, unequal chances", research studies of several authors in different countries in Latin America. For example, Winkler (2000) focused his study on education for disadvantaged rural and indigenous children in Latin America and the Caribbean. Schiefelbein (2000), worked on education and poverty in Chile and Sarmiento (2000), studied equity and education in Colombia. Researchers argue that, in recent years, indigenous education provision has switched from an assimilation approach that was widely practiced in countries such as Bolivia, Guatemala, Mexico and Colombia towards an approach that acknowledges indigenous cultures, languages and worldviews as key components of their education (Lopez & Küper, 2000, de Mejia, 1998).

According to UNESCO, literacy and adult learning play a very important role in the development of disadvantaged communities. Thus, education is believed to empower people and provide them with the skills to overcome poverty and forge better chances to improve their life conditions (UNESCO, 2015). Under this perspective, education for indigenous people, who live in poverty and have been deprived of their rights to land, health, and social services, may contribute to alleviate their condition and provide them with the necessary tools to strength their communities' development. On this issue, several researchers have

documented the nature and importance of education for indigenous people. Generally, those studies focus on the cultural and linguistic relevance that education should include when addressing indigenous communities. Thus, issues such as literacy in the indigenous languages (when these have an alphabet) and in the official language of the country, the strengthening of indigenous' identity and indigenous people's social and political participation are relevant in the agenda for education research and policy making (Cummins, 2009; Breidlid, 2013; Schmelkes, 2011; Garcia, 2009). As has been shortly described education for adults and youth, especially indigenous people, has been addressed as a priority by several researchers and has claimed more attention from governments and policy makers during the last decades in Latin-America. The core focus found in the literature relates to the indigenous' languages, ethnic identity and cultural and physical preservation (Schmelkes, 2011; de Mejia, 1998; López, 2014).

1.1 Indigenous and adult education in Colombia

In the Colombian context, the *National Political Constitution* of 1991 and the General Education Law 115 of 1994 recognize the multicultural and multilingual nature of the country's population and establish the legal framework and parameters for indigenous education. Policy regarding indigenous education in Colombia is also guided by international treaties such as the *International Labor Organization (*ILO) convention 169 (1989) on the rights of indigenous and tribal people. Hence, education programs for children, youth and adults are very important and aim to reach indigenous communities in the country. This not only includes the indigenous people who live in isolated rural regions and who have suffered from exclusion, marginalization, and poverty but also the ones who live in the outskirts of cities as a consequence of the internal armed conflict and forced displacement. The implementation of education programs for indigenous people is administered and funded by the education secretariats in the counties and municipalities and the Colombian Ministry of Education. Also, other actors such as civil organizations and non-governmental organizations develop, apply and fund education programmes for indigenous communities in the country (de Mejia & Montes, 2008).

In spite of the efforts made to reach the most vulnerable communities in the country, there are few adult education and literacy programs for out of school youth and adults in numerous regions within Colombia. This fact accounts for the percentage of illiterate people in the

country that approximates to 6% (UNESCO, 2015). An example of this situation is the Amazon region in Colombia, which is home to several indigenous communities who have inhabited the land for centuries. Although the Amazon region covers an important part of the national territory its population is amongst the most vulnerable and discriminated against in the country. For instance, the Guainía county located in the Amazon region bordering Brazil and Venezuela is home to approximately 12,000 indigenous people who are divided into 26 ethnic groups. However, the region is also characterized by a high rate of poverty (78.8%) and (17%) of illiteracy among its inhabitants (DANE, 2005).

Consequently, in 2013 the Ministry of education, the regional education secretariat and the local government in Guainía provided a formal adult education program for out-of-school youth and adults. This education program was developed and applied by the *Fundación Transformemos,* an organization from the civil society that has implemented literacy and adult education programs in approximately 25 sites in Colombia during the last nine years. The adult education program was built upon the results of an ethnographic study carried out in Guainía by the *Transformemos* foundation in 2012. The outcomes of this study were considered in order to adapt the curriculum according to the indigenous communities' needs and cultures (Transformemos, 2014). The program integrates four of the main indigenous languages spoken in the region and targets indigenous people between the ages of 13 and 60 years old who have dropped out of school or who never attended one. In addition, the program also integrates the use of technology devices as tools to mediate learning in and outside the classroom. All the students and teachers in the *Transformemos* program in Guainía were given digital tablets, which had software that integrates all the instructional tasks, topics, activities and exercises from the curriculum. Since there is very limited access to internet in the region, the software integrated in the tablets could be used off-line in and outside the classroom. The ICT integration in the adult education program granted national and international media attention since it is considered an innovation in the effort to provide education for indigenous communities in the country.

Considering the aforementioned integration of Information and communication technologies (ICT), this study is interested in exploring and understanding participants' perceptions on the integration of ICTs in the adult education program and their indigenous communities. During the last decades, the integration of ICT in education has developed a growing interest in international academic research. Some researchers believe that ICT influences the dynamics

of the educational processes in the classroom as well as in other settings of students' daily lives. Findings on the impacts of ICT in education are often mixed. While some studies report the positive impact of ICT practices in education because the use of ICTs are believed to enhance students' autonomous learning, increase motivation and promote social inclusion (Yelland, 2013; Warschauer. 2004). Other studies, however, struggle to identify positive effects of the ICT integration in the learning process and school related factors (Tinio, 2002; Warschauer, 2011). Unfortunately, little is known about the role of ICT integration on education for indigenous people in Colombia. Consequently, this study intends to examine the role of the ICT integration into the *Transformemos* adult education program implemented in Guainía. Specifically, this study will examine the participants' understandings and views regarding the role of ICT in their teaching and learning process and indigenous communities.

1.2 Aim of the study and research questions

The primary aim of this study is to understand and explore participants perceptions of the integration of ICTs into the adult education program carried out in Guainía. Specific attention will be given to the participants voices and understanding of the integration of ICTs into their education and into their indigenous communities.

In order to guide this study the following research questions are explored:

1. How do the program teachers and students perceive the role of ICT tools in their teaching and learning process?
2. What are the program teachers' and students' perceptions on the integration of the tablets in the indigenous communities?

1.3 Structure of the thesis

This thesis has seven chapters. Following this introduction, chapter two introduces the background information about the program and the Guainía region in Colombia. Chapter 3 explores the relevant literature for adult and ICT education as well as the context for education in Colombia. Chapter 4 provides an account of the study's analytical framework and theories. Chapter 5 will present the methodological aspects of this study while chapter 6 will explore the findings from this enquiry. Finally, chapter 7 provides a summary of the major findings, discussion of these and a final conclusion.

2 Contextual background

The sections that follow present a general overview of Guainía, Colombia, the region where the fieldwork for this study was conducted. Also, this chapter provides background information about the *Transformemos* foundation and its adult education program.

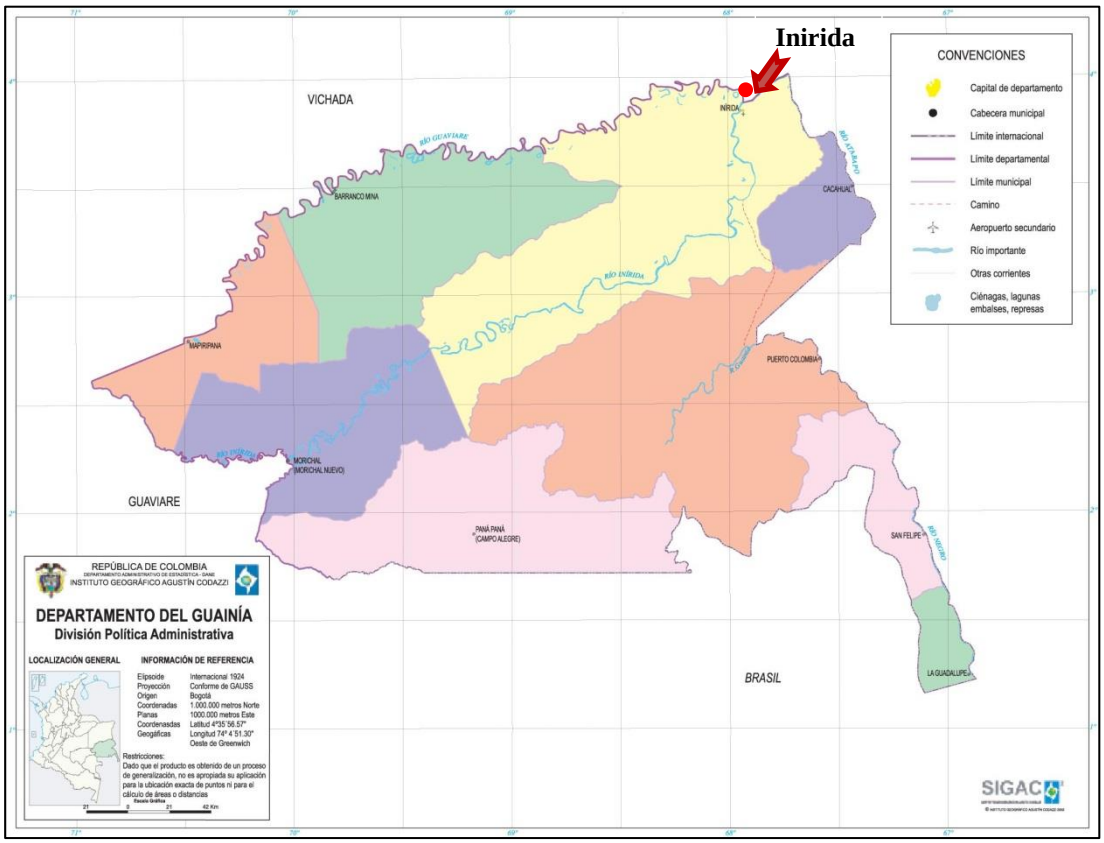
2.1 The Guainía region

The site for my study primarily focuses on Inirida and other small rural municipalities in the Guainía county in Colombia. Inirida is the capital city of Guainía (see figure 2,1) located in the south-east region of Colombia near the Venezuelan and Brazilian borders in the Amazon. Guainía is a relatively new territory. It was only officially recognized as a county in the national political constitution of 1991.

Throughout history, Guainía and more specifically, Inirida, have witnessed a wide range of boom and bust cycles in its socio-economical spheres. During the first part of the 20th century the economy was driven by the exploitation of rubber and later of gold. This situation promoted the mobilization of white/mestizo people from other regions in Colombia as well as foreigners to establish their economic and social lives in Guainía, taking advantage of the strategically border location of the region. To the aforementioned, the situation in Guainía was systematically aggravated, as it was for the rest of the country, by the internal armed conflict produced by the confrontation of illegal armed groups and the state military forces. By the late 1980's the department of Guainía, as many other surrounding regions in the south of Colombia, was dominated by the FARC guerrilla, fact which dramatically increased the violence in the municipalities and the rural areas, as well as the production of illicit narcotics (SINCHI, 2006).

According to the administrative department for national statistics (DANE), the population in Guainía was estimated to be about 40,203 inhabitants in 2013, with 69% inhabiting rural areas while a 30.9% inhabiting urban areas. Inirida, its capital and biggest municipality, has an approximate population of 19,096 inhabitants. According to the last population count carried out by DANE in 2005, approximately 64.9% of the population in Guainía is indigenous, which includes about 11,595 people. Hence, Guainía is one of the most multicultural and multilingual regions in Colombia.

Figure 2.1: Political map of Guainía and its location in Colombia



Source: Instituto geografico Agustin Codazzi

The indigenous people who inhabit Guainía are dispersed along the territory. These lands are highly rich in natural resources. Currently, there are several mineral exploitation projects in the area; however, there are also protected lands due to its unique biodiversity. Land roads and transportation routes in Guainía are scarce and impoverished. Therefore it is difficult to reach those indigenous villages and settlements that are spread along riversides and are deep in the forest. In total, there are 26 indigenous lands (reservations), which represent 65.20% of the total territory. There are numerous indigenous communities in Guainía; each one has its own languages, cultures and traditions. These factors account for the rich cultural and linguistic diversity in the region (DANE, 2007).

There are four main indigenous groups in Guainía: the *Curripaco, Piapoco, Puinave* and *Sikuani.* Although there are many more indigenous communities in the county, the aforementioned groups are the most numerous and representative in Guainía. Some of the indigenous communities who inhabit Guainía still follow their traditions, culture and livelihoods. For instance, indigenous groups have their own language, including written forms, which were introduced and structured by several evangelists such as Sophia Müller

during the first part of the XX century (SINCHI, 2006). Indigenous groups in Guainía also engage in fishing and hunting activities; typically, they own a land where they cultivate and process food. Some indigenous people participate in rituals, and hold religious beliefs and knowledge of traditional natural medicine. According to DANE, the *Curripaco* community is the biggest indigenous group in Guainía with 46.24% of the population, the second is the *Puinave* with 22.50%, the *Piapoco* is the third with 13.73% and the *Sikuani is the fourth* with 10% of the population in the county (DANE, 2005). The following table illustrates the indigenous population's percentages, their language roots and the countries they inhabit.

Table 2.1: Ethnic communities in Guainía

Ethnic group	Other names	Language root	Population	Percentage	Location
Curripaco	Kurripako	Arawak	7.827	46.24%	Col. – Brazil -Venezuela
Puinave	Wãnsüjüt	Puinave	3.741	22.50%	Colombia - Venezuela
Piapoco	Wenaiwika	Arawak	1187	13.73%	Colombia – Venezuela
Sikuani	Guahibo	Sikuani	778	10%	Colombia - Venezuela

Source: Information adapted from DANE 2005

Colonization and the sub-sequent rise of violence and displacement have had profound effects on the socio-cultural and economic well-being of indigenous people in Guainía. According to SINCHI (2006), in Guainía, some of the indigenous' languages, cultures and worldviews are still represented by the varied ethnic groups who inhabit the region. However, its existence is in imminent danger and requires the state to create better alternatives to protect them. In Colombia, the *National Political Constitution* of 1991 recognizes the indigenous peoples' rights and, among these, establishes the parameters for education for multiethnic and multilingual minorities in the country through the *ley general de educación 115* (General Education Law 115) and guiding documents such as the *SEIP* (Own Indigenous Education System), which will be explained further is chapter three.

Despite the status of Guainía as one of the most diverse and multicultural regions in the country, it is also one of the most vulnerable and underdeveloped regions, with high rates of poverty and illiteracy. According to a report produced by DANE in 2005, education figures in Guainía are low compared with the national percentage, and enrollment rates are very low as well. In Guainía only about 43.7% of the population have accessed and completed elementary education, with only 22.4% having accessed and completed secondary education. The levels

of desertion and illiteracy are very high; the illiteracy rate is above the two figures at 18.3% (DANE, 2005).

2.2 The interactive *"Tranformemos educando"* system

The foundation for social development *Transformemos* is a nonprofit civil society organization that was created in Colombia in 2006. The foundation's overall objective is to forge human and community development through educational provisions for disadvantaged people. Specifically, the foundation's aim is to provide education for youth and adults who, due to various reasons, dropped-out or never attended the formal education system. Consequently, the foundation seeks to empower people and provide them with tools to improve their life conditions through contextualized and relevant education. The *Transformemos educando* system bears in mind regional and cultural differences, and in doing so, the education programs are specifically structured according to the regions and communities where the program is implemented.

In addition, the *Transformemos* program also highlights the fundamental role of technology in education as a means to strengthen people's digital skills and therefore, their future opportunities. The foundation fosters the creation of interactive classrooms with different technological tools such as digital tablets, video-beams, computers and the use of internet when available. The *Transformemos* interactive system also includes off-line software, which includes audio-texts, videos, exercises, and program content. The foundation's objective is to engage communities into literacy and digital cultures simultaneously (Transformemos, n.d. (a))

The *Transformemos educando* system conveys pedagogical, contextual, digital and interactive components in the adult education programs. The foundation also identifies flexibility and quality of education as key elements for structuring the curriculums for adult education. Thus, before implementing the programs the foundation adjusts and structures each curriculum in accordance with the communities' and regions' specific needs. Therefore, the education is not only flexible but also meaningful for the program's students (Transformemos, n.d. (a)).

The *Transformemos educando* sytem is legally based on the *Decree-Law 3011* of 1997 (see further chapter three), which establishes the legislation and parameters for adult education in

the country (MEN, 1997). Consequently, the foundation offers interactive formal education systems for elementary education (literacy programs), basic secondary education and upper-secondary education, based on the official standards and curricular guidelines established by the national MoE. Therefore, the *Transformemos* programs not only aim to tackle the high illiteracy rates in Colombia, but also provide people with the necessary skills to finish high school and begin tertiary or vocational education (Transformemos, 2014).

In the past nine years, the *Transformemos* foundation has implemented adult education programs in approximately 25 different sites and has reached more than 300.000 people. Since its creation, the *Transformemos* foundation has worked to educate youth and adults for peace while fostering meaningful learning environments and social development for disadvantaged populations in Colombia. The foundation has been awarded with significant prizes over the years. For instance, in 2012 UNESCO awarded the foundation with the UNESCO-CONFUCIUS prize for literacy, which recognizes the activities of individuals and organizations who work on literacy programs, especially with rural adults and out-of-school youth around the world (Transformemos, n.d. (a)).

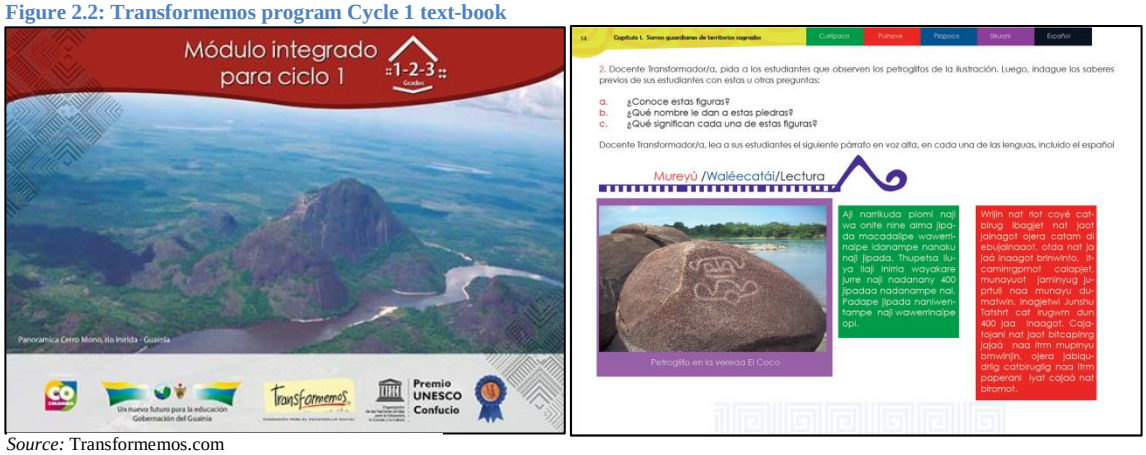
2.2.1 The "*Transformemos educando"* program in Guainía

As was previously mentioned, the *Transformemos* program highlights diversity and multiculturalism as fundamental components for the adult education programs. Each program aims to respect people's previous knowledge, motivation and worldviews in order to develop relevant and regionalized contents that allow students not only to access education and the digital world but also to feel represented and to learn in meaningful settings.

Following these principles, Guainía's government, the local education secretariat, the national MoE and other local stakeholders were actively involved in order to fund and support the *Tranformemos* adult education program for out-of-school youth and adults in the region. The program was free of charge for students and was fully funded by the national and regional government. As a first step, the foundation conducted an ethnographic study in the county, supported by secondary sources and information, in order to understand and identify characteristics of the population in Guainía. Based on the findings that were gathered, the adult education curriculum was adjusted and contextualized to the indigenous peoples' realities, livelihoods and environment. Language was a fundamental element for the program development in Guainía. Therefore, the curriculum and contents were entirely translated into

Curripaco, Piapoco, Puinave and Sikuani the main indigenous languages present in the region as well as Spanish. The regionalization of the program resulted in the creation of the books and software integrated into the tablet, which contains all the topics, objectives, interactive exercises, and videos (Transformemos, n.d. (b)). This is illustrated by the following image (figure 2.2) that shows the cover page for the cycle 1 text-book and an example of the exercises in the different languages.

Figure 2.2: Transformemos program Cycle 1 text-book



Source: Transformemos.com

A total of 144 teachers were hired to work with the *Transformemos* program. Many of the teachers were indigenous people from the same communities who previously finished upper secondary school while a few others were, at the time, working at local schools and had teaching education degrees. According to the foundation, teachers are fundamental for the learning process within the program since they facilitate and orient students in and outside the classroom. Hence, the foundation provided a training seminar where teachers were instructed on the pedagogical and practical characteristics of the program, including the use of the tablets and video beams. Each teacher and each student received the books and didactic tools, including a tablet with the education software integrated.

The program started in July 2013 and there were 3600 enrollments. This figure represented a 600% increase on the average enrollment level in Guainía at the time. The inauguration of the program and its massive enrollment was widely covered by local, national and international media. However, from the 3600 enrolled youth and adults there were 415 students who withdrew their enrollment, which left a total of 3185 students who started with the adult education program. From the 3185 students in the program, 2357 finished the cycle they enrolled for and were promoted to the next, whereas 728 students had failed. The following

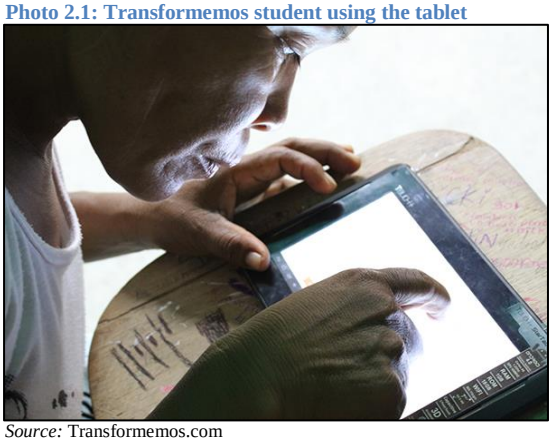
table provides detailed information on the number of students and the distribution of them according to the school level they belonged to (Transformemos, n.d. (b)).

Table 2.2: Students enrolled in the Transformemos Program

Cycle	Nº of students
Cycle 1 (1st and 2nd grades)	1010
Cycle 2 (3rd , 4th and 5th grade)	820
Cycle 3 (6th and 7th grade)	1000
Cycle 4 (8th and 9th grade)	443
Cycle 5 (10th grade)	270
Cycle 6 (11th grade)	57
Total	3600

Source: Information adapted from Transformemos, 2014

Photo 2.1: Transformemos student using the tablet



Source: Transformemos.com

The program's classes were conducted in official schools owned by the state with flexible schedules, mainly at night or during the weekends. The flexibility of the classes was dependent on students' time needs based on consensus agreement among the students and teachers. Each classroom had approximately 25 students per teacher. The groups were formed according to the students' school level that resulted in having students from the four different ethnic groups together in the same classroom. The program classrooms called "interactive classrooms" were equipped with a video-beam, the tablets and the text-books. Also, students could use the internet when it was available at the school.

Overall, the *Transformemos* program was a regional, contextualized and multilingual education system for out-of-school youth and adults in Guainía, which aimed to eradicate the high levels of illiteracy in the county and contribute to the community's development. However, the local government did not renew the contract with the *Transformemos* foundation for the following year, reason why the program was suspended in Guainía in 2014.

Photo 2.2. Transformemos students using the tablet

Source: Transformemos.com

Photo 2.3. Transformemos program's classroom

Source: Transformemos.com

3 Literature review

The following sections give an overview on the research field of ICT in education, emphasizing on current trends, challenges and critiques. Also, this section presents literature on adult education and indigenous education as a research field of policy makers and scholars. Ultimately, the components of this chapter aim to shed lights on these education perspectives within the Colombian context in order to better understand the dynamics and practices of ICT and adult education in the country.

3.1 Information and communication technology

Information and communication technology (ICT) is still recognized as a core trend that evolves endlessly and, inevitably, permeates our lives and societies. This apparent novelty could be attributed to the volatile and dynamic nature of ICT. Although the interest in and rise of technologies date back to many decades ago, for some scholars the process of development in communication and information is a phenomena present in societies from centuries ago (Freeman, 2007; Slevin, 2000; Shortis, 2001). The term ICT was introduced around 1992 when the use of electronic mails became accessible to the general public (Pelgrum and Law, 2003). The subsequent fast-paced development of ICTs has heavily influenced the way in which we live and communicate with others, becoming an essential tool for the distribution and creation of knowledge. The rapid and seemingly unstoppable development trend of technology fostered a communication revolution that has, undoubtedly, changed our perceptions and relations with the world (Bowman et al. 2005).

As a consequence, significant amounts of scholars have dedicated their work to explore and underpin the dynamics of ICT and its influence on human societies. In general, scholars refer to ICT as the technology that is used to manage information and assist its communication. In other words, the way in which information is controlled, processed, and otherwise distributed to the world (Webster, 2006). For early scholars such as Levinson (1984), ICT contributes to the growth and development of knowledge. In Levinson's understanding ICTs are human tangible creations that enhance cognitive processes, aiding humanity to grasp the external reality and therefore distribute it to others. Thus fostering the generation and spread of knowledge. Also, the term ICT encloses different devices and/or applications that aid in the

process of knowledge distribution and communication, for example, radio, TV, mobile/smart phones, satellites systems, software and hardware, among others (Singh and Raja, 2010).

Recently, there has been much more public awareness in regards to ICT and its implications in our daily lives. For instance, governments, private organizations and commercial firms have placed more attention on the development of technologies in order to control and handle the information and/or knowledge that is later diffused to the public (Singh and Raja, 2010). For instance, the International Communication Union, an agency of the United Nations specializing in information and communication technologies worldwide. ICTs have serious implications in the development of the world's economy, environment impact, cultural awareness, international relations and, ultimately, our daily lives (Finnegan, 1989). This also includes fundamental changes in the way in which we understand social and political institutions and how we relate and/or react to power forces by accessing and sharing knowledge. Most significantly of this study, ICTs have also permeated education in various ways, which will be explored further in the following section.

3.1.1 Information and communication technologies in education

The dynamics of globalization is closely related to the rapid evolution of the information and communication technologies in the world. For many scholars and stakeholders, the easy and interactive ways to access information (facilitated by communication technologies) represent an undeniable potential for education. Hence, ICT in education has become the core focus of attention for numerous educational researchers in the last decades, and still today, the field requires more debate and research in order to obtain the best results in benefit of educational change. Authors such as Warschauer (2011), discuss that the main objectives to integrate ICTs in the classroom are: the improvement of academic achievement, the facilitation of new kinds of 21st century learning and to promote education and social equity. Just like Warschauer, there are numerous authors interested in understanding the ways in which ICTs are integrated in the classroom, its effects on learning outcomes, development of learning materials, the structure of methods and pedagogies, and educational reforms (Beck and Jamissen, 2011; Carnoy, 1999; Tinio, 2002; Vasbø and Gudmundsdottir, 2014). Additionally, research interests also targets the critiques and limitations that can be attributed to ICT in education like the digital divide between the north and south (Watson, 2006; Yelland, 2013).

This section will therefore explore some of the core themes and constraints of the integration of ICTs in education.

It is interesting to see how, nowadays, the use of technologies in the classroom, especially computers, is more common and is often taken for granted. However, this technologized environment has not come to us without challenges. Even today there are many objections and issues to overcome and analyze. The integration of ICTs in the classroom has been widely studied; while for some researchers there exists a positive correlation between ICTs and quality of education for others this same assumption is difficult to confirm (Bottino, 2014; Blurton, 1999; Bitter and Legacy, 2008). For example, consider the computer and the World Wide Web as tools that are vastly used in schools around the world. Computers are machines that process and store big amounts of information that can be rapidly communicated and easily accessible (through the use of the internet) to others at considerable distances. Although these technologies are useful and innovative tools for learning, it is debatable that they guarantee quality of education (Carnoy, 1999; Pelgrum and Law, 2003; Tinio, 2002).

The use of technology in education has modified aspects such as pedagogy implementation, digital literacy, critical thinking skills, teachers' and students' roles in the classroom, professional development, and academic achievement, to name a few (Stahl, Koschmann, and Suthers, 2006). For example, ICTs are expected to promote autonomous learning spaces for students in the classroom and to enhance critical thinking among them. In such contexts, teachers should, therefore, play the role of "facilitators" of knowledge and locate the students in the center, fostering meaningful learning environments. As Hooper and Rieber pointed out *"The teacher's role is to establish a learning environment that supports and facilitates students as they construct and shape their own knowledge"* (Hooper and Rieber, 1995:157).

During recent times, curriculum and educational reforms have implemented digital competence and skills development in assessment and classroom practices (Ottestad, Kelentric and Gudmundsdottir, 2014). This fact assigns education the responsibility to prepare students for the technological developments of the 21st century, equipping them with digital literacy skills much needed for the "information age" (Castells, 2000; Easingwood and Gamble, 2001; Warschauer, 2011; Beck and Jamissen 2011).

ICTs are powerful tools that, when implemented correctly, can act as catalysts of educational reform. ICTs can improve access (for example distance education and lifelong learning) and quality of education through the use of electronic media that facilitates ways of knowledge acquisition, production and dissemination (Selinger, 2009; Vasbø and Gudmundsdottir, 2014). According to some authors, the use of ICTs in education is no longer optional as it was in the beginning (Cabrol and Severin, 2009). Therefore, it is argued that education needs to respond to the current demands of technology in classrooms and societies. Despite one cannot expect ICTs to be the remedy for the current challenges facing education around the world, especially in the global south, ICT in education is growingly seen as a catalyst for societies' development.

However, technology tools alone do not perform such wonders in education. It is a common myth to believe that computers, and other tools, improve the overall learning experience (Beck, 2011; Cabrol and Severin, 2009; Bitter and Legacy, 2008). However, school systems do not always respond fast to the technology advances and/or its implementation is deficient (Abbott, 2001). Research about ICT and its integration in education is significantly diverse, although there are numerous scholars who have successfully demonstrated positive effects of ICT in academic achievement and school experience there are others who have gained opposite results in their research (Bitter and Legacy, 2008).

For example, let us assume that the integration of ICTs in a given school is limited to the machines and software installation in the classroom and disregards the implementation of adequate methods, pedagogy and teacher training. Under such conditions, students' academic achievement and schooling experiences for both teachers and students can be negative, since the implementation fails to integrate the technological tools to the teaching and learning process and curriculum. If the aim is to achieve greater academic results with ICT integration in education, then students and teachers need to familiarize, embrace and actively use technology. Thus, reforms in the curriculum and teaching methods are required (Carnoy, 1999; Pelgrum and Law, 2003).

With the rapid development of ICT and its integration in education, the need for reforms in policy, improved curricula, teacher education, and pedagogical approaches are essential. These reforms should, undoubtedly, maximize the use of technology in the classroom in order to provide students with the skills needed in the workplace and life in the digital society (Cox

and Marshall, 2007; Tondeur et al., 2007; Plomp, Pelgrum and Law, 2006). Eevi Beck, a researcher from the educational department at university of Oslo, pointed out the importance of research on ICT in the education field, so policy makers and stakeholders have access to information that enable curricula development, pedagogical reforms and better implementation. In a similar way, Warschauer states that the integration of ICT in education is an important resource that can enhance the learning and teaching experience but, undoubtedly, the sole tools are not sufficient to achieve education quality. Much more is needed when integrating ICT in the classroom and curricula.

> *"Technology can play a vital role in promoting educational and social equity, if deployed as part of well-designed educational interventions. Providing equipment is an important part of this effort, but a small part. Most importance is to design an educational intervention that helps all students achieve excellence."* (Warschauer, 2011:29)

3.1.2 The digital divide

As was mentioned in the beginning of this section, ICT in education faces several challenges and constraints. The most known critic is the one called "digital divide" that is understood as the considerable imbalance that exists not only in the access to technology but also the use of it. Marginalized and poor sectors of the population have very little access to education and their chances to use digital media are significantly less than those in developed areas (Beck, 2004). The digital gap between rich and poor regions (including within countries and social groups) is alarming since it contributes to social and economic inequalities (Tinio, 2002; Gudmundsdottir and Jakobsdottir, 2011).

The digital divide and its impact in our societies is subject of investigation by numerous researchers who aim to understand the dynamics of ICT integration in education in developing countries, especially in education for disadvantaged groups. Michelle Selinger, for instance, argues that there are three main aspects to consider when implementing ICT education in developing countries: linguistic relevance, pedagogical transformation and technological considerations (which regards to costs and maintenance of equipment). Hence, sound policy development and planning are required so the divide can be bridged in sustainable and realistic ways (Selinger, 2009). Other studies conducted by Beck (2004), show evidence of digital divide in access and mediation between north and south, drawing examples from towns in Sweden and India. Victoria Tinio also identified the digital divide as

a gap that poses a great challenge for governments, scholars, policy makers and stakeholders. However, Tinio argues that ICT can also serve as alleviation for the increasing inequalities between rich and poor by providing education and opportunities to the most needed (Tinio, 2002).

3.1.3 ICT and education for Indigenous people

The unequal access to education and the use of ICT in schools by indigenous peoples is of interest for a large body of researchers, such as Salazar (2007), Giner (2007), Dyson (2004) and Clothey (2015). Despite the rapid development of ICTs, the digital divide has worsened fostering unequal access between different continents, regions and countries around the world. This fact is more evident in indigenous communities that already face all kinds of exclusion and marginalization (Rekhari, 2009). In most of the cases, indigenous people have limited access to services such as health and education, which often disregards their language, worldviews and traditions (Clothey, 2015).

There are numerous tensions and challenges that the ICTs in education for indigenous people have to face in both the policy and the implementation levels. In a study on ICT in education for indigenous communities in Mexico, Maria Casillas explains how access to equipment and connectivity in rural schools for indigenous people represents a challenge due to their remote locations. However, Casillas also asserts that providing these elements is not enough since issues such as language, worldviews and contexts have to be addressed before approaching the indigenous communities to ensure quality and relevance (Casillas, 2012).

Similarly, other studies in Australia, Africa and South America also reflect on the different impacts of ICTs in education for indigenous peoples. An effective implementation of technologies for indigenous education must be attended by curriculum reforms that allow cultural and linguistic relevance (Jorgensen, 2012; Goodwin, 2007; Salazar, 2007). The main concern and challenge still focuses on addressing the inequalities of access and lack of relevance of the integration of technologies in education for indigenous peoples (Dyson, 2004). Nevertheless, there is also a growing interest in the opportunities that the information technologies in education can provide to the indigenous communities. These opportunities represent a way to bridge the digital divide by empowering indigenous peoples in the use of technologies to communicate knowledge, thus, becoming part of the information society. Ultimately, ICT in education for indigenous people requires detailed and careful integration of

the cultures, languages and worldviews in the learning process. Thereby, ICTs in education have the potential to encourage indigenous peoples' participation in representing and transmitting their cultures and their own knowledge (Day and Grewan, 2006).

3.2 Adult education

The research field on education seems to recognize lifelong learning as a powerful catalyst for development in societies around the world, since education offers better opportunities for people to overcome poverty, inequalities and marginalization. Education for adults not only refers to the learning process that happens in the school boundaries but also an active process that develops through life experiences, including formal and informal settings where the person learns by interacting with the environment and others. In addition, adult education aims to eradicate illiteracy and promote the development of different competences such as numeracy, language, and citizenship values, among others. The Hamburg declaration on adult learning (UIE, 1997) defines adult education as:

> *"Adult education denotes the entire body of ongoing learning processes, formal or otherwise, whereby people regarded as adults by the society to which they belong develop their abilities, enrich their knowledge, and improve their technical or professional qualifications or turn them in a new direction to meet their own needs and those of their society. Adult learning encompasses both, formal and continuing education, non-formal learning and the spectrum of informal and incidental learning available in a multicultural learning society, where theory- and practice-based approaches are recognized."*

Nevertheless, the differences between the developed and developing countries are still wide. Although education is central concern and has been targeted as one of the Millennium Development Goals (MDGs), there are still an alarming number of illiterate people (youth and adults) who are marginalized from the education system, predominantly in the global south. Therefore, stronger focus on adult education at national and international levels has increased in order to create strategies to reduce these figures and offer education to the out-of-school youth and adults.

The international conference known as CONFITEA (International Conference on Adult Education) is a UNESCO's meeting point for international interest on lifelong learning. CONFITEA conveys international reports and benchmarks that aim to highlight the importance of adult learning, and to explore different aspects of education for adult people in

order to ensure equity and quality and to put adult education at the core for policy making and further research agendas (UIL, 2013). Adult education is much needed to equip people (predominantly the disadvantaged) with relevant competences, skills and knowledge they require to regain control of their lives, respond to their needs and ultimately overcome their impoverished living conditions. As Sylvia Schmelkes, a Mexican sociologist who conducts research on adult and indigenous education, states,

> *"If we believe education to be a factor in empowering individuals and collectives towards the improvement of their quality of life, the education of indigenous population of all age groups should no doubt become a priority. This of course includes, very importantly, adult education, because it is adults who can engage in transformation endeavors."* (Schmelkes, 2011:93)

Similarly, adult literacy and education is also one of the objectives of the Education for All (EFA) goals, a global commitment coordinated by UNESCO. The EFA global monitoring report of 2011 states that, *"improving adult literacy ought to be a leading priority on the international agenda. Literacy can empower people by increasing their self-esteem and creating opportunities to escape poverty."* (UNESCO, 2011). There are vast amount of people in the world today who left school at an early stage or who never accessed one.

Education is essential for people to meet their basic needs and acquire skills to succeed in the work place; literacy and numeracy are fundamental to economic growth (UNESCO, 2013). Although adult education and literacy is a main concern for international organizations such as UNESCO, the general overview on literacy rates is still low and did not meet the EFA goals set for 2015, which requires greater efforts by governments and organizations involved. *"Literacy is fundamental for participating in society. However, the goal of halving global illiteracy rates by 2015 has been missed."* (UNESCO, 2015). Under these conditions it is not only important but also necessary to provide the youth and adults with opportunities for quality education that improves their conditions in society and the work place (Lawrence, 1998; Kerre, 1998).

3.3 Education in the Colombian context

This section will present an overview on the characteristics and legislation found in the literature in regards to adult education and ICT in education in Colombia. This section will

also make use of the statement provided by the Ministry of Education in regards to education for indigenous people, which was part of the data gathered during the fieldwork.

Education in Colombia is ruled by the General Education Law 115 of 1994, which is the legal framework for education in the country. This law follows the national constitution of 1991 that claims that education is a fundamental right for all citizens: *"Education is an individual right and a public service that has social function; through this, individuals seek access to knowledge, science, technology and other benefits and cultural values."* (National Constitution, 1991: article 67). Following the mandates of law 115 of 1994, education was decentralized in Colombia. This strategy was implemented in order to improve educational services and access in an attempt to reduce poverty and to tackle profound inequalities among the population. This resulted in the responsibility of planning and administering education at the local level controlled by education secretariats in each county and municipality. However, the general regulations and some funding are coordinated by the central government (Vargas and Sarmiento, 1997; Di Gropello, 1999; Ramirez et. al, 2014). Nevertheless, issues of access, quality and equity in education remain at the core and still represent a big challenge for national and local governments.

The following sections will review the Colombian education system in regards to ICT, adult and literacy education as well as the normativity of indigenous education in the country.

3.3.1 ICT in education in Colombia

The National Constitution of 1991 promotes the active use of information and communication technologies in education as strategies to bridge the economic, social and digital gaps in society. The legislation on ICT in education is specifically determined by the *ley general de educación 115* (General Law 115) established in 1994. Article 5 in paragraph 13 resolves that education should integrate and promote the use of technologies as a means to create, learn, investigate and improve learning processes in the classroom, which can ultimately foster student's involvement in a productive society. Similarly, the *General Law of Education 115* establishes in its article 23 the fundamental and mandatory use of ICT in education by integrating it into the curriculum and pedagogies in order to achieve access and quality of education (MEN, 1994).

The Ministry of Education in Colombia also relies on the *Plan Decenal de Educación* 2006 - 2016 (ten-year plan of education) as a framework for ICT in education. This present ten-year plan emphasizes on the pedagogical transformation and active use of information and communication technologies in education. This plan not only includes the technological infrastructure for schools and the strengthening of pedagogical processes that facilitate teaching and learning practices, but also highlights the importance of teacher education in regards to the use of ICT and pedagogical innovation in the classroom (MEN, 2006).

Consequently, during recent years there has been a growing interest in developing educational programs that aim to integrate ICT into different levels in formal and non-formal education in urban and rural settings. These programs and efforts have been led by several stakeholders such as the Ministry of Education, the regional secretariats, teachers, national and international organizations, among others. For instance, the programs *Computers for Education*, which is an inter-institutional program coordinated by the Colombian Ministry of Education (MoE), aims to make sure computers form part of the official formal education institutions in urban and rural areas in order to promote access, ownership and usage of technologies. Its aim is to provide development opportunities for the disadvantaged. An evaluation conducted on the program in 2009 showed that the program increases the number of computers in the schools and increases students' usage of technology. However, there was little effect on students' test scores and other factors such as perceptions of school and hours of study, since it focused on the hardware incorporation into the schools but failed to integrate the computers use in the educational process (Barrera and Linden, 2009).

Nevertheless, there are also other programs that are run at local levels that aim to promote a digital society and to bridge the digital gaps in rural and urban areas in Colombia. Programs and practices of this nature intend not only to endow schools with ICT tools and software to teach and learn but also to integrate innovative pedagogies that facilitate meaningful learning experiences for the students (Palacios, 2009). The ultimate goal of the integration of ICT in education for students in rural and poor areas is to develop digital skills and promote the use of the internet in order to improve students' livelihoods and future opportunities.

ICT in education in the Colombian context is a current concern for policy makers and stakeholders. The general aim is to include and promote the use of technologies at all levels of education; this covers formal and non-formal education, early childhood, elementary, secondary, tertiary and adult education. Therefore, the education sector should strengthen the

teaching profession, technological infrastructure, pedagogies, investigation and interaction in the classroom through the use of ICTs that are expected to improve learning quality, access and outcomes (MEN, 2013).

3.3.2 Adult education in Colombia

Education for adults and out-of-school youth represents an enormous challenge for the national government. In 2012, the percentage of literate people in Colombia was 94%, and an approximate 6% were illiterate. This is equivalent to approximately 2.000,000 illiterate people in the country (UNESCO, 2015). Typically, people who are illiterate belong to disadvantaged social groups such as indigenous, black minorities, farmers, and internally displaced people who never accessed the formal education system or, in other cases, who dropped out of school at an early stage. As a consequence, the government has implemented several adult education programs such as the *National Literacy and Adult Education Program for Youth and Adults* in order to improve access and funding of adult education and learning.

The *National Constitution of 1991* establishes education as a fundamental right for all, including minorities and people with disabilities. Specially, adult education is legally supported by *General Law 115* that describes adult education as *"the education provided for people who are older than the age for the regular education system and who want to start, complete or validate their education."* (MEN, 1994:Chaper2:Art.50). This learning process aims primarily to eliminate illiteracy, to reinforce knowledge and to develop economic, social, and cultural capacities.

The main legal framework for adult education and learning in Colombia is the *Decree-Law 3011* of 1997. This decree identifies adult education as a public service that provides people with the opportunity to re-enter the education system. Hence, adult education is the group of schooling activities available for people above 13 years old and who for diverse reasons did not study or who dropped out early. Similarly, the *Decree-Law 3011* of 1997 states that access to this adult education should not consider personal conditions, ethnicity, religious beliefs and ideologies. The aim is to provide people with opportunities to overcome their living conditions by enhancing different practical skills that can be used in the work place or in future life experiences (MEN, 1997).

Adult education and learning includes literacy programs, basic and high school education, and non-formal and formal education programs. The adult education system is organized by the municipal and regional secretariats. Adult education programs are implemented in blended learning or distance education, carried out on Saturdays, Sundays or in the evenings at the official institutions available. Adult education levels are called *Special Integrated School Cycles* that relate to the formal education school grades and levels. These cycles are formed of at least two school grades, which last for a year and lead to the certification of elementary, basic and secondary education (see table 3.1).

Table 3.1: Structure of the formal adult education system in Colombia.

Special integrated school cycles	Education levels	Duration	Certificate
Cycle 1 (1st and 2nd grades)	Elementary education	1 Year	
Cycle 2 (3rd, 4th and 5th grades)	Elementary education	1 Year	Elementary education
Cycle 3 (6th and 7th grades)	Basic secondary education	1 Year	
Cycle 4 (8th and 9th grades)	Basic secondary education	1 Year	Basic secondary education
Cycle 5 (10th and 11th grade)	Upper secondary education	1 Year	High school education

Source: Information adapted from Men, 1997

The *Decree-Law 3011* emphasizes on the relevance and flexibility of education for adult people. Besides literacy and numeracy, adult education also aims to instruct people on the participation and their active roles as members of society. This learning process bears in mind the socio-cultural conditions of the population for a contextualized and effective participation in social settings. As has been mentioned earlier, indigenous people are part of social minorities that have been systematically deprived from formal education programs and whose needs are yet to be met by the national and local governments. Although, the policies and programs are established, the recent reports from Colombia to the Education For All (EFA) Global Monitoring report in 2015 show little improvement in the elimination of illiteracy.

3.3.3 Indigenous education in Colombia

The education for indigenous people in Colombia is based on articles 7 and 10 of the *National Political Constitution* of 1991. These articles refer to the recognition of the country as a

multicultural and multilingual nation that requires pertinent education for all the different ethnic and minority groups in the country. The *ley general de educación 115* (General Education Law 115) emphasizes on the territorial public policies that recognize intercultural and language relevance as fundamental for indigenous education. This aims to establish communitarian and intercultural ethno-education systems that can be administered by the indigenous communities in their territories. The legislation on indigenous education in Colombia also follows international treaties such as the International Labor Organization (ILO) convention 169, which is an international legal instrument that deals with indigenous and tribal people's rights. Following this treaty's guidelines, the Colombian MoE has implemented different policies and education programs with the active participation of ethnic communities. These projects aim to improve quality, and relevance of education for indigenous people (MEN, 2014).

In addition, the MoE together with different indigenous group leaders and representatives have been working during the last seven years on a guiding document called *Sistema Educativo Indigena Propio SEIP* (Indigenous "Own" Education System). Although, SEIP has not reached a legal status yet, it is a framework that aims to improve the relevance of education for indigenous groups in terms of their cultural and spiritual values, as well as their worldviews and languages. This document seeks to enhance the cultural survival of Colombian ethnic tribes. The SEIP includes three core components of education for indigenous people: politic, pedagogic and administrative organization. The aim is to highlight the indigenous people's right to administer and provide their own education to the people in their constituted territories.

Although, indigenous education is stipulated in several national and international legal frameworks, there are still several challenges for the implementation of programs and the legalization of guiding documents such as SEIP. Issues such as infrastructure, curriculum, teacher education and standardization represent some of the constraints for indigenous education provision in Colombia (MEN, 2014).

4 Analytical framework

The following chapter presents the theoretical frameworks used to analyze and understand the findings yielded by this study. Section 4.1 focuses on the diffusion of innovation theory conveyed by Rogers, (2003). A special emphasis will be drawn on the *attributes of innovations*, which constitute the focus of data analysis. This study's findings have also dictated the need to involve a second theory to support the analysis of data. Hence, section 4.2 will account for the understanding of motivation in education and self-determination theory primarily based on Richard Ryan and Edward Deci (2000a; 2000b). Figure 4.1 summarizes the theories and concepts used as units of analysis in this study.

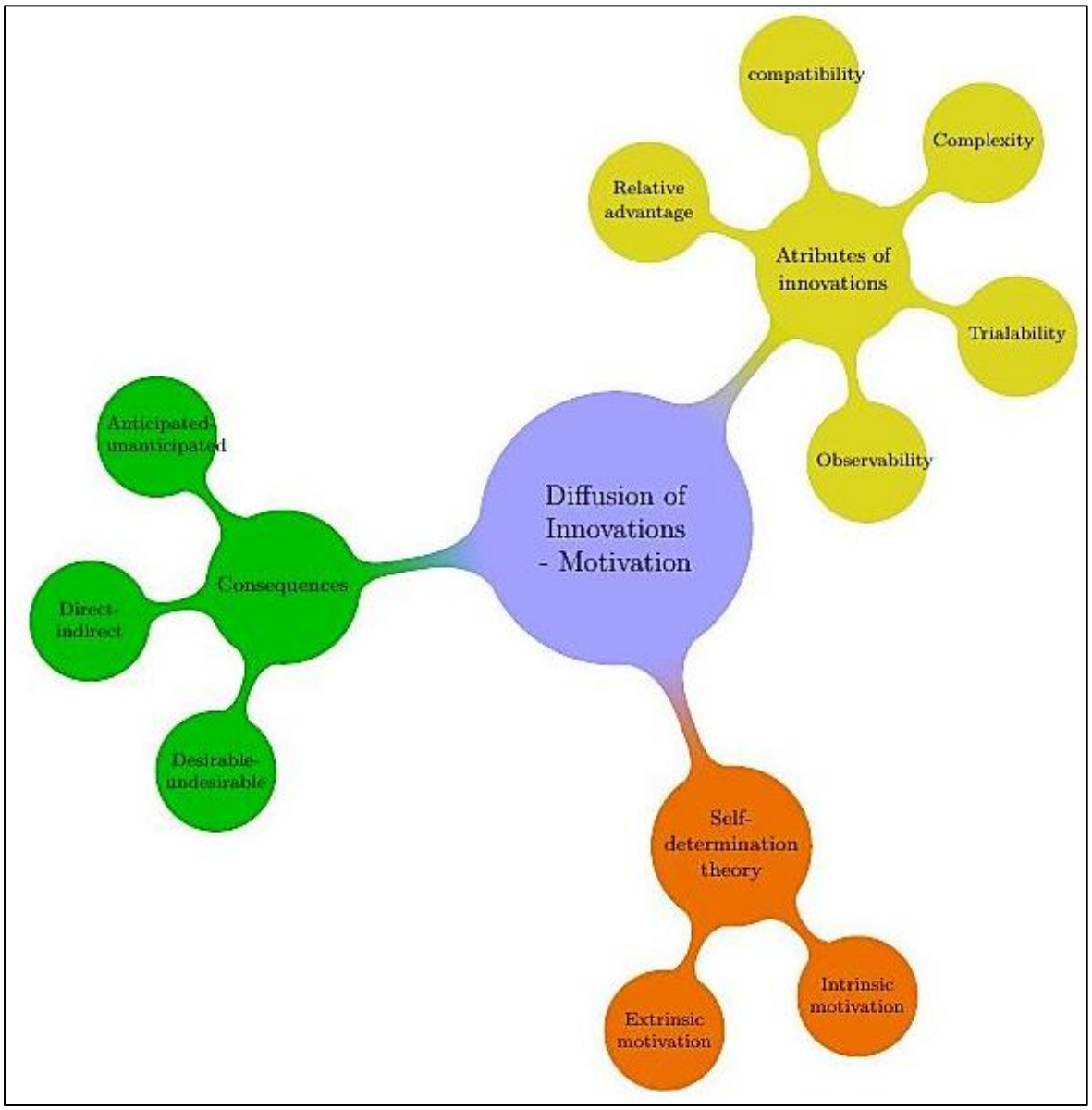


Figure 4.1. Analytical framework for understanding ICT tools integration in the adult education program for indigenous people in Guainía

4.1 Diffusion of innovations theory

The constant change and evolution of technologies and innovations that we face in present times seems endless, and it has been a key aspect on development patterns in our societies for centuries. These innovations and the way in which individuals include them into all aspects of life are large and diverse. The conceptualization conveyed by Rogers (2003) describes and simplifies the understanding of when, how, why and under which circumstances these innovations are adopted and/or rejected by communities and individuals. Also, it is useful to underpin innovations' challenges and limitations to adoption. This knowledge is relevant for the cost-effective planning and creation of new technologies and innovation initiatives that can serve the needs of the global south in the process of achieving development for all. ICTs integration into the adult education program was considered an innovation of the education provision for indigenous people in Guainía. Thus, diffusion of innovations theory assisted in the analysis of participants' perceptions of the innovation on both the adult education program and the indigenous communities.

4.1.1 Understanding diffusion of innovations

In order to understand the concept of innovation and avoid confusion it is wise to start by analyzing its origins and the process an idea needs to undergo to later become an innovation. The creation of an innovation is a process that commonly involves some stages. First of all, a necessity or a problem is identified; this serves as stimuli for further research in order to design and develop an innovation that helps solve the problem or need. Later, commercialization activities take place so the innovation is diffused and adopted. The last stage refers to the consequences this innovation could bring to the individuals or societies who adopted it (Rogers, 2003). According to Rogers, these stages do not always rule all the innovations or technologies, and do not necessarily follow that specific order.

New ideas need to be observed by people, who may adopt them, as *new* in order to be considered innovations. *"An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption."* (Rogers, 2003:12). Commonly, individuals and members of a particular society face an initial period of uncertainty about the innovation, not being sure about its functioning or how it could affect them. This process influences the decision making on whether to adopt the innovation or not. Rogers also argues that a person's

experiences with a certain innovation will influence his/her perceptions about future innovations on the same field. This is the reason why innovations heavily rely on diffusion processes that promote and disseminate information about the new idea, its cause-effects and advantages. Thus, uncertainty about the innovation decreases and potential adopters can make their choices.

The diffusion process is the main key to the innovation's adoption because it is through this communication that individuals spread and exchange information about the new idea to others. In Rogers's theory, the diffusion process can be spontaneous and unplanned but also directed and managed towards an effective spreading of knowledge. Diffusion is described as *"the process in which an innovation is communicated through certain channels over time among the members of a social system."* (Rogers, 2003:5). Through diffusion, new ideas get transmitted using different channels of communication, it is time-bounded and intended for individuals in specific contexts. The communication of new ideas among participants ensures the spread of information about the innovation and promotes mutual understanding about it. Thus, reducing unpredictability about the innovation and facilitating its adoption or its rejection.

Consequently, fostering adoption decisions in individuals and societies is an important task for the integration of innovations in our societies. These innovation decisions involve a series of choices and actions which are: knowledge, persuasion, decision, implementation and confirmation. According to Rogers, the decision to adopt innovations is,

> *"the process through which an individual, (or other decision-making unit) passes from gaining knowledge of an innovation, to forming an attitude towards the innovation, to making a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision."* (Rogers, 2003:168)

Knowledge encompasses familiarity with the innovation, how it should be used and that which are its basic functions. The persuasion stage develops when potential adopters can form a positive or negative perception about the innovation through experience to later put in in use with the implementation stage. Confirmation refers to the perceived outcome individuals draw after adopting the innovation. In addition, innovation adoption or rejection is dictated by three types of innovation decisions: optional, collective or authority innovation-decisions (Rogers, 2003).

Considering the aforementioned processes, individuals and social systems make adoption (or rejection) decisions. Based on the differences among decisions made by the individuals, Rogers develops a categorization of adopters. According to him, there are five adopter categories that directly relate to the innovation and the way in which individuals in a social system adopt them along time: innovators, early adopters, early majority, late majority and laggards (Rogers, 2003).

Once adoption decisions are made and implemented, consequences of the innovation adoption or rejection can arise. These innovation consequences are related to the changes that may or may not occur to the individuals or social groups who adopted or rejected the new idea. *"Consequences are the changes that occur to an individual or a social system as a result of the adoption or rejection of an innovation."* (Rogers, 2003:436). Rogers asserts that it is difficult to predict how and when these consequences will happen. This is somewhat "*unpredictable"* and it is based on how the innovation affects the adopters. In addition, these consequences can also affect the rejecters since the adopters may benefit from the innovation and the rejecters do not, hence widening inequalities. For the diffusion of innovations theory, consequences are categorized in several aspects that range from desirable and undesirable to direct/indirect and anticipated/unanticipated consequences. According to Rogers, *"Desirable consequences are the functional or dysfunctional effects of an innovation affect to and individual or to a social system. Undesirable consequences are the dysfunctional effects of an innovation to an individual or to a social system."* (Rogers, 2003:442)

The immediate response to an innovation that changes the individuals in a social group is known as *direct* consequences. While the impacts of these direct consequences on people (or societies) are known as *indirect* consequences. When innovations are adopted by individuals, they have expectations about the innovation effects on themselves or their social systems, these are called *anticipated* consequences. And the *unanticipated* are the consequences of the innovation adoption that the members of the society did not expect or recognized before adoption and implementation (Rogers, 2003). Although, innovations are potential social change agents, positive but also negative outcomes should be expected when adopted or rejected. Therefore, strategies that reduce inequalities, socioeconomic gaps and the digital divide, among others, are in much need.

4.1.2 Attributes of innovations

Everett Rogers identified five perceptual characteristics of innovations and labeled them *attributes,* which are adopters' perceptions about innovations. According to Rogers, these five attributes influence a person's decision to adopt or reject an innovation since, as stated by him, *"these characteristics predict the rate of adoption*." (Rogers, 2003:219). The rates of adoption are figures that indicate the speed in which an innovation is adopted by counting the number of individuals who use the innovation in a given period of time. Therefore, attributes of innovation are vital to determine the ways in which individuals perceive the new ideas and put them in use. In Rogers' words *"Innovations that are perceived by individuals as having greater relative advantage, compatibility, trialability, and observability and less complexity will be adopted more rapidly than others innovations."* (Rogers, 2003:16). The following section will present these five attributes of innovations in detail.

4.1.2.1 Relative advantage

Rogers defines the characteristic of relative advantage as *"the degree to which an innovation is perceived as being better that the idea it supersedes."* (Rogers, 2003:229). Relative advantage is an important factor for adopters, and thus strongly affects the adoption decision. Advantages can be based on economic and/or social grounds, but adopters can consider other indicators as advantageous as well, such as convenience and satisfaction. This depends on the nature of the innovation and its perceived superiority from previous innovations. Within the economic factor the initial costs of innovation play a decisive role in the decisions to adopt or reject it. Generally, the rates of adoption are highly influenced by the shifting of costs of the innovations since prices can be high in the beginning and later decrease considerably over the course of the diffusion process. Gradually lowering prices of innovations through the commercialization period potentially promote adoption rates mainly among the early and late majority adopters (Rogers, 2003).

On the other hand, relative advantage is also associated with the social status and social recognition of individuals and societies. Hence, the rate of adoption is closely related to the degree in which individuals perceive the innovation as socially beneficial. Rogers suggests that an innovation could be adopted by members of a given society in order to gratify one's desire to gain a social status. This means that by adopting a certain innovation the individual could enjoy a reputable status in his/her specific social setting. Cleary, some individuals are

more motivated to achieve this status than others, however, Rogers argues that these advantages are more commonly experienced by innovators or early adopters as opposed to the late majority or laggard adopters (Rogers, 2003).

Very often, potential adopters are interested in verifying how an innovation is better than the existing one and how the adopting decision will affect their economic and social status. The diffusion process facilitates this by exchanging information about the innovation's characteristics and perceived benefits. *"The greater the perceived relative advantage of an innovation, the more rapid its rate of adoption will be."* (Rogers, 2003:15). Consequently, the relative advantages perceived and exchanged by individuals are strongly related to the innovation's rate of adoption. On the contrary, when relative advantages are not clear and potential adopters find it difficult to perceive an innovation's benefits, its rate of adoption is slow (Rogers, 2003).

4.1.2.2 Compatibility

The societies (and individuals) where innovations are expected to be adopted are social units with specific values, moral norms, rules and needs. On account of this, innovations depend on their correspondence with the aforementioned in order to reach positive rates of adoption. Rogers defined compatibility as *"the degree to which an innovation is perceived as consistent with the existing values, past experiences and needs of potential adopters."* (Rogers, 2003:240). So, when an innovation is adaptable and close to the individuals' reality and social values he or she is less hesitant to adoption. Thus, becoming more familiar with the innovation and prompting positive information exchange with others in the society. Value systems are tightly held in societies and are disinclined to rapid changes; this is the reason why innovations that are incongruous with existing norms experience slow rates of adoption. As Rogers put it *"An idea that is incompatible with the values and norms of a social system will not be adopted as rapidly as an innovation that is compatible."* (Rogers, 2003:15).

According to Rogers, there are three main aspects that innovations can be compatible or incompatible with: socio-cultural values and beliefs, previously introduced ideas, and client needs for the innovation. The first aspect refers to the compatibility or incompatibility of a certain innovation with societies' cultural values and beliefs. Some social systems are very fond of their traditions, habits that are strongly tied to their culture and ways of life. When

new ideas are counter to individuals' values and traditions their rate of adoption can be blocked or delayed. In some cases, innovations are designed to be used in a particular society bearing in mind its culture and beliefs, a fact that eases the adoption process. However, these innovations can also be spread to other cultures where adoption could be counter-productive since it is incompatible with their values, cultural beliefs or extremely sensitive norms. Hence, to adopt an innovation that is incompatible represents a risk to end traditions and may lead to new social constraints (Rogers, 2003).

The second aspect of compatibility of innovations is the relationship between the new idea and previous innovations. Innovations' rates of adoption are highly dependent on the compatibility they have with ideas implemented in the past. Rogers asserts that old ideas are the ones that individuals use to give meaning to new ideas and establish familiar connections with them. When a potential adopter is familiarized with a new idea based on his/her knowledge of previous similar innovations, the probability of adopting such innovation is higher. Therefore, if an individual had a negative experience with previous ideas, the adoption of new innovations is reasonably lower. Interestingly, the apparent compatibility of an innovation with the idea it supersedes can also lead to the incorrect use of the innovation, since adopters could follow the previous practices and functions.

The last factor that indicates the compatibility of an innovation in a society or for an individual is the compatibility with needs. This factor relates to the capability of an innovation to address an existing need. The recognition of needs in social groups or individuals is a task that innovators undertake in order to assess (and sometimes create) their needs accurately. *"Potential adopters may not recognize that they have a need for an innovation until they become aware of the new idea or its consequences."* (Rogers, 2003:246). Innovations can be compatible to the extent that they are able to meet adopters' needs.

4.1.2.3 Complexity

The complexity attribute refers to the difficulties that potential adopters may find when using an innovation. These perceived complexities greatly affect an innovation's rate of adoption, since individuals are not familiar with the functioning of the new idea and may not understand its meaning or goal. In this case, adopters can be puzzled and frustrated since the innovation does not provide a user friendly approach for them. Rogers defines complexity as *"the degree*

to which an innovation is perceived as difficult to understand and use." (Rogers, 2003:16). Innovations experience higher rates of adoption when they appear easy to operate and comprehend by the majority of members in a society as opposed to those new ideas that seem difficult to use and require the adopters to acquire new sets of skills.

4.1.2.4 Trialability

Trialability has to do with the availability of innovations to be experimented with by potential adopters. An innovation that is accessible and that can be tried by individuals has higher and faster rates of adoption. Rogers explains this attribute as *"an innovation that is trialable represents less uncertainty to the individual who is considering it for adoption, as it is possible to learn by doing."* (Rogers, 2003:16). Individuals can create meanings of an innovation when they are allowed to use and manipulate it; learning how it works and in what ways it is useful for oneself increases the possibilities for its adoption and diffusion. Besides favoring rates of adoption, trialability, according to Rogers, also benefits the diffusion process since individuals can easily pass on information to peers about the innovation. Thus, promoting others to adopt the new idea based on their personal experiences.

4.1.2.5 Observability

The last attribute of innovations identified by Rogers refers to the extent in which innovations' outcomes are visible and evident to others. The rate of adoption of an innovation can be enhanced by the results that individuals can perceive from others' previous use of the innovation. If an individual is considering whether or not to adopt a new idea, the results that he or she can observe from others' adoption of the innovation influences their own adoption decision process. Rogers said *"the easier it is for individuals to see the results of an innovation, the more likely they are to adopt."* (Rogers, 2003:16). This observability attribute enables discussions with others (relatives, peers or friends) about the innovation that strengthens the diffusion process, promotes assessment of the innovation and, ultimately, increases its adoption.

4.2 Motivation

The concept of motivation was constantly highlighted during the interviews and direct interaction with the participants of this study. Therefore, it is important to provide and

understand the basic definitions and approaches to motivation, especially in regards to education.

Motivation is a term that has caused numerous discussions and research in order to explore what motivates people and how motivation influences people's actions. These questions have puzzled scholars along the years. Some of the classic approaches to explore motivation are: attribution theory, goal theory, performance models, intelligence and self-worth, and self-determination theory, to name a few (Molden and Dweck, 2000; Butler, 2000).

Motivation is a heterogeneous and complex term to define. For instance, Pintrich and Schunk define the term as follows: *"Motivation refers to the process whereby goal-directed activity is instigated and sustained."* (Pintrich and Schunk, 2002:49). In this definition, the authors understand motivation as a process that individuals undertake rather than a product of their interactions with activities. Under this perspective, motivation is not directly visible but it is perceivable through the individual's behaviors, persistence and disposition towards the task. Therefore, motivation demands the individual to perform both physical and mental actions. The former involves persistence, movement and effort actions and the latter requires organizing, monitoring and rehearsing actions, among others. These actions are also associated with long or short term goals that provide the individual with the will and desire to perform a particular activity (Pintrich and Schunk, 2002).

Other authors, such as Ryan and Deci (2000a:54), express that *"to be motivated means to be moved to do something. "A person who feels no impetus or inspiration to act is thus characterized as unmotivated, whereas someone who is energized or activated toward an end is considered motivated."* In this interpretation of motivation, there is a focus on the actions and specific characteristics that an individual should acquaint to be identified as motivated. Motivation is not regarded and experienced in the same degree and in the same way by all people; since there are different kinds (levels and goals) of motivation based on the particularities of individuals. Motivation keeps a close relationship with learning and performance, playing a very important role in education. Hence, there is research that extensively focuses on students' motivation, performance and the different strategies that can be implemented in the classroom by teachers and educators. Pintrich and Schunk stated that:

> *"Motivation affects all classroom activities because it can influence learning of new behaviors and performance of previously learned behaviors. Learning and performance are related in a reciprocal fashion to motivation because what one does and learns influences one's subsequent task motivation." (*Pintrich and Schunk, 2002:49)

Ultimately, motivation is understood as an efficient resource to reach goals, which are performed by individuals in varied contexts (Csikszentmihalyi, 2014). In order to better understand motivation and how it relates to education, I will explore the self-determination theory in the next section.

4.2.1 Self- determination theory

Self-determination is a theory of motivation developed by Richard Ryan, Edward Deci and their colleagues at the University of Rochester. Hence, this theory is also known as the "Rochester school" approach to motivation. According to Ryan and Deci *"self-determination theory assumes that humans have inherent propensities to be intrinsically motivated, to assimilate their social and physical worlds, to integrate external regulation into self-regulations and in so doing integrate themselves into a larger social whole."* (Ryan and Deci, 2000b:14). Although this understanding of motivation has been studied by others theorists, Ryan and Deci assert that individuals experience different types of motivation that drive their actions and desire to fulfill their psychological needs. Furthermore, self-determination theory understands motivation as a process that uses one's will and determination to perform a particular activity (Ryan and Deci, 2000b).

According to the self-determination theory human beings have three basic innate psychological needs that are present from the moment of birth and evolve with the development process over the years. These needs guide human behaviors and shape the degree and extent of motivation a person experiences while performing different activities: competence, autonomy and relatedness needs. Competence relates to the individual's need to feel able and competent of his/her actions as members of social groups. Autonomy has to do with the sense of self control and agency that a person perceives over him/herself. Finally, relatedness involves the human need to feel part of a group, to belong and be regarded as an important part of society (Pintrich and Schunk, 2002). Considering the human needs aforementioned, self-determination theory (SDT) asserts that humans experience two types of motivations that are driven by intrinsic and extrinsic factors.

4.2.2 Intrinsic motivation

Intrinsic motivation is present in human development from birth and is evident in the inquisitive, playful, curious and explorative nature of human beings (Ryan and Deci, 2000a). In general, authors identify intrinsic motivation as the will of a person to perform an activity for their own benefit, enjoyment, satisfaction, and interest (Csikszentmihalyi, 2014; Pintrich and Schunk, 2002). People's actions are driven by intrinsic motivation when they are based on an inner drive to engage in activities disregarding external rewards or outcomes; this is a positive type of motivation that is likely to be sustained for long periods of time (Hidi, 2000; Levesque et al., 2010). Similarly, Ryan and Deci explain:

> *"Intrinsic motivation is the doing of an activity for its inherent satisfactions rather than for some separable consequence, when intrinsically motivated a person is moved to act for the fun or challenge entailed rather than because of the external pros, pressures or rewards."* (Ryan and Deci, 2000a:56)

Intrinsic motivation is the most autonomous (self-determined) type of motivation because it underlines actions performed purely for the enjoyment and positive experiences gained from the activities themselves. Therefore, intrinsic motivation is a key element of the social, physical and cognitive development of people since personal interest and goals are the driving force that shape one's skills and knowledge about the world.

Environmental and social factors are important to the development of intrinsic motivation in human beings, since these factors can either diminish or promote motivation in individuals (Ryan and Deci, 2000a). For instance, there are positive and/or negative performance feedback of external social factors that, undeniably, could strengthen or hinder a person's intrinsic motivation.

> *"Self-determination theory suggests that classroom and home environments can facilitate or forestall intrinsic motivation by supporting versus thwarting the needs for autonomy and competence. However, it is critical to remember that intrinsic motivation will occur only for activities that hold interest for an individual."* (Ryan and Deci, 2000a:59)

Considering the aforementioned, intrinsic motivation seems to hold an important role in education. Students who are intrinsically motivated have more chances to enjoy the learning activity, since it becomes the central focus of attention (Csikszentmihalyi, 2014; Sansone and

Smith, 2000). Hence, favoring intrinsic motivation in the classroom can be a positive strategy for the learning and teaching practices. Ryan and Deci state that persons driven by intrinsic motivations are more autonomous and perform activities to satisfy the personal psychological needs of competence, autonomy and relatedness. Individuals are free to decide whether or not to perform certain actions based on their own preferences and needs. But when activities are performed for their own sake, students can reveal their potentials and experience autonomy and well-being while learning.

4.2.3 Extrinsic motivation

On the other hand, extrinsic motivation refers to the activities that are performed in order to obtain external rewards and heavily relies on external stimuli, it is defined as:

> *"Motivation to engage in an activity as a means to an end. Individuals who are extrinsically motivated work on tasks because they believe that participation will result in desirable outcomes such as reward, teacher praise or avoidance of punishment."* (Pintrich and Schunk, 2002:245)

Intrinsic and extrinsic motivation both depend on time and context. An individual can experience both types of motivation at different scales in different periods of time. Just like with intrinsic, extrinsic motivation is varied and complex. Extrinsic motivation is driven by goals and desires based on something external to the activity and the individual. It is often understood as the means to gain something that is valuable for the person who performs the activity. The contrast of extrinsic motivation with intrinsic motivation is classically portrayed in the literature as a moderate kind of motivation that lacks the personal interest, empowerment and will to perform activities (Levesque et al., 2010).

According to Ryan and Deci (2000a), students can either engage in activities in the classroom with resentment or boredom because the activity is not interesting for them but they must perform it, so the action is forced from the external environment. Or students can act with willingness and enjoyment because they have adapted and accepted the activity as a valuable and useful task to perform, so the action becomes an extrinsic goal understood as a means to gain something (Ryan and Deci, 2000a). This understanding of extrinsic motivation is useful to the education process by promoting the creation of classroom strategies than can engage students and teachers in doing activities that benefit their teaching-learning processes.

Motivation and its different approaches, including self-determination theory, seem to be vital in understanding behavior in classrooms and education practices. To enhance the learning process and classroom interactions by increasing students' and teachers' motivation can facilitate performance and achievement. The self-determination theory provides intrinsic and extrinsic motivation as approaches to underpin the reasons and means through which students and teachers behave and perform activities in order to learn and achieve goals. Intrinsic motivated behaviors are the ones driven by personal interest regardless of rewards or external constraints. Whereas the extrinsic motivated behaviors are the actions in which individuals engage in order to obtain a separate outcome or consequence.

5 Research methodology

The aim of the present chapter is to discuss the methods applied in this study. This chapter will start by presenting the main characteristics of qualitative and quantitative research methods in social science research, followed by the rationale behind this study's choice of research design, research strategy, methods and instruments to collect and analyze data. In the second part, a detailed description of the research site will be provided as well as information on sampling and fieldwork in Guainía in south-west Colombia. This chapter concludes by describing the procedures for data analysis as well as the ethical considerations and validity of this study.

5.1 Social science research

There are two major approaches in social science research, quantitative and qualitative designs. Social scientists have had long standing debates on the differences, similarities, advantages and disadvantages of these designs subscribing to one or the other research traditions. The mixed method approach is often used to combine both quantitative and qualitative methods (Bryman, 2012). Researchers' choices of one of the mentioned approaches heavily rely on the study's topic of interest and the knowledge that it aims to acquire and/or produce. Each design holds a particular set of philosophical assumptions and paradigms that support researchers in approaching and studying the social world under investigation (Burrell & Morgan, 1985; Bryman, 2012; Creswell, 2009).

Quantitative design is generally related to positivism that pertains to the objectivist ontological position to social science. Positivism promotes the use of natural science methods such as experiments and surveys to study the social world and its reality. This aims to establish hypothesis than can be tested by the gathered data. Under these premises, positivism understands the social world and reality as a discrete object independent and is external of the social actors. Quantitative design emphasizes in the quantification and production of numeric and generalizable outcomes to an extensive population from a limited sample by using a deductive approach (Bryman, 2012: Burrell & Morgan 1985; Creswell, 2009).

By contrast, qualitative design has its origins on the subjective ontological position to social science from which the interpretive paradigm derives from. The interpretive perspective

views the study of individuals and the institutions as fundamentally different from the natural sciences. From this paradigm the social world and realities are relativistic and do not exist independently of the individuals, since the social world is essentially created by them. As Burrell & Morgan described *"Interpretive sociology is concerned with understanding the essence of the everyday world."* (Burrel & Morgan, 1985:31). Hence, qualitative design predominantly emphasizes that the social world can only be studied and understood from the points of view of the individuals who are directly involved. In order to produce thick and rich descriptions of the social phenomena, the qualitative research design employs methods that elucidate the participants own words and experiences using an inductive approach (Creswell, 2012; Creswell, 2003; Bryman, 2012; Crotty, 1998; Silverman, 2005).

The primary aim of the qualitative researcher is to make sense of the social phenomena of interest by exploring the participants' meanings, experiences and worldviews. The researcher keeps close distance with the reality of the participants relying mainly on their voices and perceptions in order to understand the social world under investigation. Within this design, the researcher is the main source of data collection and interpretations. This fact entails the researcher to accept his/her values and biases and the legitimacy of the information provided by participants in the field, to do so, the researcher should faithfully report the realities under study (Bryman, 2012; Creswell, 2003; Patton, 2002).

This study applies a qualitative research design to explore the participants' perceptions on the integration of ICT into their education and communities. In the following section a detailed explanation on this design decision will be presented.

5.2 Rationale for choosing the qualitative research approach

Qualitative approaches primarily seek deeper understandings of the social world through the meanings of people. This paradigm constitutes the most appropriate approach to shape this study and to link it to the desired outcomes. A qualitative design is employed for the development of this study since it allows for an exploration of the participants' constructs and perceptions of the ICT tools' integration into the adult education program in and outside the classroom as well as in their communities.

The attributes of a qualitative design allow the researcher to study the issues of interest in depth and detail as well as study relevant issues and/or different phenomena in the social world. To do this, the researcher approaches the field without constrained preconceptions of categories and theories, thus, facilitating the natural unraveling of the phenomenon of interest. The qualitative researcher is prompted to observe and interview individuals in the real world, with conditions and spaces comfortable and familiar to the participants. Hence, the qualitative design avoids manipulating the phenomena's settings and characteristics; the aim is to study the phenomena in the context through the participants' own views and concepts. Consequently, the qualitative design advocates for the researcher to adopt pupil's perspectives who can later explain the facts about the phenomena from the participant's points of view and voices (Patton, 2002; Creswell, 1998).

Considering the aforementioned characteristics, the present study adopts a qualitative approach because it helps me to better understand the perceptions and views of several stake holders, including students and teachers, regarding the integration of ICT tools in the adult education program and subsequently in their communities. Hence, a detailed view of the participants' experiences and perceptions can be explored in their own communities, where I can carefully listen to what people say and interact face to face with the participants in order to obtain first-hand information.

5.3 Research design

To conduct this research, I used a case study design. As described by Stake (1995:xi) *"A case study is expected to catch the complexity of a single case."* This research design entails an extensive and detailed exploration and analysis on the case (or multiple cases) under investigation. A case study involves several methods of data collection that are most commonly used in the qualitative inquiry, such as, participant observations and unstructured interviewing. These methods are often used in the field in order to generate thick and detailed information from the case within its setting (Bryman, 2012; Stake, 1995; Creswell, 1998; Yin, 1994). In order to construct a richer, more nuanced, picture of the reality in Guainía with the Transformemos program, a case study was appropriate for investigating and understanding participants' views and perceptions about the integration of the tablets and video-beams within the school and in their communities. To do so, different approaches to data collection and analysis were applied in order to learn as much as possible from this particular case.

In order to understand case study design it is important to note that this approach holds a long and notable history among different social science disciplines. This fact has encouraged scholars interested in this design to debate the definition of a case study and how or why it should be used. Nowadays, researches can utilize a variety of approaches and methods to develop a case study. For instance, Yin (1994) is one of the scholars that provides a comprehensive set of approaches to the design, elucidates issues of prejudice and misuse. Yin (1994) clarifies that contrary to earlier popular beliefs, case studies are not unique to qualitative research; instead case studies can also be used for quantitative and mixed methods. According to Yin, a case study is not only an empirical inquiry that aims to explore current phenomena within its context but also an inquiry that requires different sources of information for further triangulation in the analysis process aiming to achieve enriched and sufficient data. Hence a case study is, according to Yin (1994), a comprehensive research strategy that comprises approaches to data collection and also to data analysis of the phenomena of interest.

Similarly, Stake (1995) advocates for the correct use and understanding of the case study design. According to Stake, the social world is rich in phenomena that can be addressed as cases in agreement with researcher's interests. For instance, in the education field, people and programs can become unique cases of study, regardless of how similar or different they are. Stake (1995:1) states that *"We are interested in these cases for both their uniqueness and commonalities. We seek to understand them. We would like to hear their stories"*. When the case is given and the researcher builds up an interest on it, the case study design adopts an intrinsic interest characteristic (Stake 1995). Furthermore, Yin (1994) indicates that a case study is used when there is a need to understand a real life case within set boundaries. These boundaries include contextual conditions that are relevant to the phenomena, as was carried out by the present study in the particular case in Guainía, Colombia.

5.4 Research site

The research site of this study is located in the Guainía county in the south-east of Colombia. This is a vast territory that enjoys rich natural resources and biodiversity. Guainía holds a special meaning in a local ethnic language that stands that the word Guainía means "tierra de muchas aguas", which translates to "land of abundant waters". This epithet is well deserved

since there are several rivers that cross along the lands and have served throughout the history in the region as a source of economic revenue and transportation for inhabitants and visitors as well. The majority of the fieldwork was conducted in Guainía's capital city, Inirida. This is a relatively small city located by the shore of a river of the same name, river that connects Inirida with other settlements and towns in the region, and well as with neighboring Venezuela.

As stated before in chapter two, the Guainía region enjoys a multicultural and multilingual human diversity. There are many indigenous settlements all along the Guainía region. However, one of the biggest indigenous reservations in the region is located in its capital, Inirida, and is called "El Pajuil". Among the most representative groups in El Pajuil there are the Curripaco, Puinave, Sikuani and Piapoco ethnic groups. Nevertheless, there are also some other ethnic groups who inhabit El pajuil, and Guainía in general, but they have considerably fewer members.

My research site focused in El Pajuil in Inirida and also in two other indigenous settlements in rural areas in Guainía. As stated in chapter two, the Transformemos program was carried out in the Guainía county; this included, Inirida as well as several other indigenous settlements in rural and remote areas. The 10 teachers that participated in my study were contacted and interviewed in Inirida. These 10 teachers were recruited by the foundation's gate keeper and all of them were trained on the program's structure, curriculum, pedagogical components and the ICT tools integration. From the 10 interviewed teachers, only 4 had previous teaching experience at local public schools and had teaching degrees. The other 6 program teachers were high-school graduates and had no previous teaching experience. Two of the teachers identified themselves as white/mestizo and the other eight affiliated with different indigenous communities.

The 18 students who participated in this study belong to different indigenous ethnic groups (Curripaco, Puinave, Piapoco and Sikuani). They started, followed and/or completed an education level with the Transformemos program. From the 18 students, 2 were illiterate adults who never attended school before. They were therefore, enrolled and started at cycle number 1 with the Transformemos program. Other 5 students were enrolled to follow an elementary school grade. These students, in most of the cases, dropped out at an early age due to economic or gender related issues. Finally, the last 11 students were completing a grade in

high school level with the Transformemos program. Particularly, these students could not access high school education due to economic or geographical reasons, because there were no secondary education options for them at the moment. I interviewed students between the ages of 18 and 65 years old.

5.5 Sampling

Sampling of participants in this study was a challenge for me in the beginning. I was aware that the Transformemos program in Guainía was temporarily halted. To contact the participants in the field represented a difficult task due to the amount of stakeholders involved and the size of the research site. Consequently, as a way to ease the sampling process, I utilized purposive sampling technique, selecting information rich cases to study the phenomena in depth. This study used three types of purposive samples identified by Patton, 2002 as "*Maximum variation sampling (heterogeneity)"*, "*typical case sampling"* and *"snowball sampling"*. The first sampling strategy, *maximum variation sampling*, advocates for obtaining and depicting a central theme or core idea across several variations. The aim of this is to acquire detailed descriptions of each case and to establish shared patterns across cases. The participants in this study included different stakeholders, such as foundation representatives, program coordinators, officials, and program teachers and students (table 5.1). This strategy allowed me to sample participants that were relevant to address the guiding research questions.

Table 5.1. Research participants

Site	Indigenous Teachers	Mestizo Teachers	Students	Indigenous leaders	Transf. staff	MoE officials	Total
Pajuil/Inirida	7	2	6	2	1	0	18
Coco nuevo	0	0	4	0	0	0	4
Caranacoa	1	0	8	0	0	0	9
Bogota	0	0	0	0	1	1	2
Total	8	2	18	2	2	1	**33**

Patton (2002) describes the *typical case sampling* as beneficial *"in describing a culture or program to people not familiar with the setting studied…These cases are selected with the cooperation of key informants such as program staff."* (Patton, 2002:236). Considering the entire Transformemos program, the indigenous communities and other program participants as the unit of analysis for this study, it was necessary to be assisted by knowledgeable program staff that were capable of pointing out typical cases in the population. This

technique was specifically used to sample program teachers. With the assistance of the foundations' gate keeper I could reach several program teachers who willingly participated and shared their experiences with me.

To sample program students I used a *"snowball sampling"* strategy. The aim of this strategy was to locate cases with information-rich participants. Bryman (2012) points out that with this approach to sampling *"the researcher makes initial contact with a small group of people who are relevant to the research topic and then uses these to establish contacts with others."* (Bryman, 2012:202). With the snowball sampling strategy I could access a wider amount of students who have previously participated in the Transformemos program and who represented a varied sample of educational level, age and gender. After identifying few students that were known in the community and who could help spread the information about my study to their peers, it was possible to contact many more students.

5.6 Data collection methods

This study made use of different data collection methods in order to gather the necessary data to answer the guiding research questions and to understand the phenomena of interest. Thus, this study used: semi-structured interviews, document analysis and participant observation as well as informal conversations in the field. I will present a more detailed explanation below.

5.6.1 Semi-structured interviews

Considering the aim of this study, I identified semi-structured interviews as the best method to collect data during the fieldwork. These interviews provided insight into issues that are not easily observable in the setting, such as participants' perceptions, experiences, feelings and knowledge. Semi-structured interviews encourage participants to freely communicate in their own words, and share their personal experiences and perspectives. The purpose of qualitative interviewing is, as Patton (2002) describes, *"to capture how those being interviewed view their world, to learn terminology and judgements, and to capture the complexities of their individual perceptions and experiences."* (Patton, 2002:348). Collecting data through semi-structured interviews supposes a flexible process in which the interviewee should feel comfortable and willing to express their ideas and understandings. The aim is to provide information into how participants experience and view their reality, patterns and lived events (Bryman, 2012:471).

Before conducting the fieldwork, the semi-structured interview guides were prepared bearing in mind the topics of interest and wording of the interview questions to address the different participants. The semi-structured interviews were first conducted with the program teachers and students, and finally I conducted interviews with the indigenous leaders and the foundation's local official. The purpose of conducting the interviews with a bottom-up approach was to allow me to become more familiar with the program structures, the participant's environment, culture, languages and realities before proceeding to interview government officials and program developers outside the field, in Bogota.

5.6.2 Document analysis

Document analysis refers to the sources of data available to the researcher that have not been produced specifically for social research purposes. More so, document analysis can be used to ensure validity and provide evidence from different sources (Bryman, 2012). In this study, important documents were analyzed to understand the policies and strategies proposed by the government in regards to education for adults and indigenous communities, as well as the current guidelines for ICT education in the country. In particular the SEIP document produced by the national MoE and the ONIC on the strategies and implementation of indigenous education policies.

I also analyzed other official documents produced by private sources. The Transformemos foundation provided several documents on the characteristics of the program implemented in Guainía, which provided important information of the context and the experience with the program in this region. In addition, I also analyzed mass-media outputs and virtual documents, such as local and national newspapers, TV journalists' reports and online videos among others.

5.6.3 Other methods

This study also made use of observations and informal conversations with participants. According to Bryman (2012), unstructured observations are commonly used in qualitative research. The aim is to immerse oneself in the participants' social setting, in order to observe people's behaviors and interactions with others.

Personal observation was used when visiting the communities in Inirida and in two other rural villages (Coco Nuevo and Caranacoa). In particular, I focused observations on the participants' home environment and settlement facilities such as, meeting places, local schools and transportation. Especially in Inirida, I conducted unstructured observations in the surroundings of the main governmental building where some students and/or their relatives used the tablet to connect to the wireless internet service. Information gathered during these observations was also written down on a fieldwork journal kept to help organize the incoming ideas and new knowledge acquired.

Informal conversations took place with participants after the formal interview was conducted. Generally, participants followed up on the statements that they explained during the recorded interview. However, at times, this information included more details on the issues explored, when participants seemed to feel more relaxed about my presence and started remembering and sharing different events they experienced during the program. This collected data was also included in the fieldwork journal that assisted in the general analysis of this study.

5.7 Data analysis procedures

Yin (1994:109) describes the data analysis as *"examining, categorizing, tabulating, or otherwise recombining the evidence to address the initial propositions of a study."* In this study, the data analysis started with transcribing and translating the recorded interviews from Spanish to English, followed by coding and then categorizing the data.

I first organized and divided the information into informant categories, prioritizing teachers' and student's data. I used the HyperTranscribe software in order to facilitate the transcription process. In fact, this process was substantially time consuming since a word-for-word approach to transcription was adopted; this resulted in a vast amount of information that, at times, was not relevant for the purpose of this study. Therefore, the last part of the transcription process adopted a deductive approach where I transcribed and later translated relevant information. Once the transcriptions were completed I transferred all the written information to the HyperResearch software program, which facilitated the analytical processes by building codes, categories, maps and identifying relationships and patterns in the data.

The units of analysis were structured in order to answer the two guiding questions proposed for this study, each unit focuses on addressing teachers and students perceptions separately. Themes concerning innovation, motivation, teaching and learning roles and tensions were selected for further analysis.

5.8 Validity and reliability

The quality of a research project is often measured by criteria such as validity and reliability. In recent decades, validity in qualitative research has been the focus of debates and different approaches to it have been established. In this long path, there are many researchers and theorists who aim to address issues of validity in the research of social phenomena. For instance, Bryman (2012) states that validity and reliability are common criteria to evaluate social research *"Reliability is concerned with the question whether the results of a study are repeatable… Validity is concerned with the integrity of the conclusions that are generated from a piece of research."* (Bryman, 2012:47). However, in the quest to produce accurate, truthful and credible representations of the social world, two different approaches to validity have entered the discussion among qualitative researchers, these are "transformational validity" and "transactional validity" (Cho and Trent, 2006).

The transformational approach understands validity as a process that not only relies on different methods and techniques to collect and triangulate data. Instead, for the majority of the transformational theorists, validity can be obtained by the results of actions that are the researcher performs during the research process, and more importantly when speaking to with the participants (Seale, 1999). Thus, to obtain validity that the researcher needs to be aware of the phenomena and to be an accurate learner of the real environment and daily lives of the participants. Transformational validity is understood by Cho and Trent as "*a progressive, emancipatory process leading towards social change that is to be achieved by the research endeavor itself… involves a deeper-self-reflective, empathetic understanding of the researcher while working with the researched"* (Cho and Trent, 2006:322). On the other hand the transactional validity approach deals with the use of different techniques, methods and strategies to achieve a truthful and credible picture of the reality under investigation. Often, these strategies convey reliability procedures and triangulation of data sources. Issues of credibility, generalizability, quality and trustworthiness are of concern to different theorists

that aim to validate qualitative research (Lincon and Guba, 2000; Creswell, 2009; Silverman, 2005).

In the purpose of ensuring validity and credibility, this study adopted a transactional validity approach, which aimed to seek truthful results by means of triangulating the different sources of data as well as obtaining thick descriptions on how the participants interpret, live and understand the phenomena under investigation. Triangulation was systematically used to corroborate findings using different sources of data (interviews, document analysis, fieldwork notes etc.). For example participants' semi-structured interviews were triangulated with data from document analysis and the unstructured observations from the field. My aim was also to triangulate descriptive data from the fieldwork as accurately as possible. Therefore, I kept complete records of all the process in Guainía using fieldwork notes, interview transcripts, and observations, among others. Also, I took several steps in the field to gain credibility from the participants and institutions. For example, providing the letter of presentation of the University of Oslo and research proposal helped establish credibility. In the fieldwork, the guarantee of anonymity and the emphasis on oral and written consent was also followed in order to gain participants' trust. Although this study focuses on a particular site and builds on a unique interpretation of a single case, some of the key findings might be replicated to other cases in order to improve the quality of adult education programs for indigenous people.

5.9 Fieldwork

Before starting the fieldwork in Colombia, and while I was still settled in Oslo completing the research proposal, I started contacting the Transformemos foundation director in order to gain access to information about the program in Guainía. To my surprise, the program contract was recently finished and was waiting for a renewal process from the local government. With the probable perspective that the program could run again any moment, I left for Colombia. I conducted the fieldwork from September to November 2014. Before starting the fieldwork in in Guainía, I visited the Transformemos foundation premises in Bogota. There, the directives and pedagogical team carefully listened to my study's purposes and rationale; they seemed rather receptive and supportive. During my visit, the pedagogical team who developed the adult education program in Guainía, presented the program characteristics, theoretical and practical grounds. By that time, the program in Guainía was still stopped and there was a general concern about access to participants. This is because the program was not running at

the moment and it was likely that the teachers and students were spread all around the urban and rural areas in Guainía, which was a challenge for approaching participants in the field. Therefore, a gate keeper was needed in order to make the first connections with participants.

Once everything was set in Bogota, I travelled to Inirida, Guainía by the end of September 2014. The foundation's gate keeper assisted me in the process of contacting program teachers and students. Contrary to the previously mentioned concern about the difficulties I might have experienced in the field to contact and access participants, the process of approaching them was rather easy. In general, all the teachers who participated in this study were very open and interested in the program and its possible restart. After the interviews with program teachers were completed, I proceeded to contact, through a snowball method, the program's students. Once I approached a few students, I identified the people who could assist me in spreading the information about my study efficiently. This is how I could access a considerable number of informants who were truly interested in participating and sharing their experiences and sentiments about the program. During my stay in the field, I visited several indigenous communities' settlements around the region where the Transformemos program was implemented, including a community who inhabit a protected land two hours away from Inirida by a watercraft. Towards the end of the fieldwork I could access information, documents and interviews with indigenous leaders and governmental officials.

The last steps in the fieldwork were taken in Bogota, where I contacted an official representative from the national MoE. Although I collected important information and official documents from a MoE representative, the permission to record the meeting was denied in two occasions regardless of my formal written requests to which the MoE offered written rejections. Finally, I visited the Transformemos foundation once again and conducted a formal interview with one member of the pedagogical team, which elucidated several questions regarding the program characteristics that appeared during the fieldwork in Guainía.

5.10 Ethical considerations

The ethical dimension to research is an important component of the social research since it specifically elaborates on the lives and activities of people. It is very important to offer guarantees to the participants in order to protect their identities, their positions, and their physical and mental well-being. The persons and their knowledge are focus of attention in the

conduct of research, thus, researchers should consider ethical issues in their studies. Therefore, Dowling and Brown expressed *"research should be design, reviewed and undertaken to ensure integrity and quality, also research subjects must be informed fully about the purpose, methods and intended possible uses of the research."* (Dowling and Brown, 2010:35). Additionally, participants must be provided with full anonymity and participate in the research voluntarily.

Before conducting the fieldwork, this research study was registered in the Norwegian Social Science Data (NSD) and an acceptance was obtained. As was stated before, my first approach to the fieldwork was with the Transformemos foundation where I submitted the research project and the letter of introduction from the University of Oslo. During this meeting an oral consent was given in order to use the name of the organization, the program and the region where it was applied. Although, personal names from staff remained anonymous, the use of their status names, such as, program coordinators, program developers and governmental officials were allowed. Before conducting the interviews in the field in Guainía, all the participants, without exceptions, gave their oral and written consent to be interviewed. There was no need to obtain parents consents since all the participants were adults. The tape recorder was used only with the oral consent of the participants and when the consent was not given, only notes were taken. In all the cases, the names assigned to the teachers, students and leaders who participated in this study were fictitious. After the thesis has been submitted and defended, a copy will be provided to the Transformemos foundation.

In general, I consider that the methods applied in this study comfortably fit the concrete phenomena of interest. Also, the data gathered is valid and reliable to address the two research questions proposed. The findings, the analysis and the conclusion will be presented in the following chapters.

6 Findings

This chapter presents the findings obtained during the fieldwork in Guainía. As previously illustrated, the data was collected with semi-structured interviews conducted with three groups of stakeholders: program teachers, students and indigenous leaders. The findings were also supported by interviews with the program developers, government officials, observations, and fieldnotes. The primary aim of this chapter is to illustrate the major findings obtained from the fieldwork in regards to the guiding research questions developed for this study. Therefore, there are two sections within this chapter that aim to explore the program's teachers' and students' perceptions on the ICT tools integration in their education and communities.

Section one begins with examining participants' perspectives about the role of the tablets and video-beams in their teaching and learning processes in and outside the classroom. Section two presents findings on the program teachers' and students' perceptions of the integration of the tablets as an "innovation – modernity" in their communities. This section will focus on research question number two. Furthermore, for clarity purposes, the perspectives and experiences of teachers and students are presented separately.

Research question 1

How do the program teachers and students perceive the role of ICT tools in their teaching and learning process?

6.1 Teacher interviews

During the field work I conducted semi-structured interviews with 10 teachers who participated in the *Transformemos* adult education program in Guainía. The following are the themes that emerged frequently in their interviews when asked about the role that the ICT tools played in their teaching processes and experiences with the program. All the names given to the teachers are of indigenous origin; they are also fictitious and aim to protect participant's identities.

6.1.1 Motivation

Motivation was one of the concepts that emerged most often in the teachers' interviews. The concept of motivation, as was stated in chapter four, is very broad. For this study, motivation is understood as the desire that drives people to do something. Hence, this section presents the ways in which teachers perceived and experienced motivation in regards to the integration of the tablets and video-beams in the adult education program.

In almost all the cases, teachers assigned a very important role to the tablets and video-beams integrated in the program to the motivation students had to enroll and study. This perception shared by the teachers relates to the massive enrolment figures at the beginning of the program. This was clearly illustrated by the teacher Catalina. She highlighted that the tablets were new to her students and that her students had not used tablets previously. Furthermore, she commented that, in some cases, students were merely interested in owning a tablet instead of the education program. That is, she considered that some of the students were only motivated to enroll in the program in order to obtain a tablet. Therefore, it is arguable that the tablets were instrumental rewards that triggered student's *extrinsic motivation* to enroll and study. Catalina stated,

> *"Not everybody had a tablet prior to starting in the program, so, when it was announced that the tablets were going to be given to each enrolled student, obviously, everybody was encouraged to participate… Therefore the tablet was a huge motivation for them to study again after so many years."*

Nevertheless, Catalina proceeded to explain that, in most of the cases, program students were truly interested in studying and regarded the tablet integration only as a value added to their learning process. Similarly, other interviewed teachers expressed their own perceptions about student's motivation. For example, Kìve, a teacher in the program, offered the following insight when asked about the motivation that could have driven his students to enroll and subsequently study with the program:

> *"Many of the students enrolled because they wanted to see, experience and own a technological device. But, when they found out that the tablets had software with lessons, videos and their own languages they realized that the tablet was a great tool for them to learn. I consider that the tablet, as a tool to teach, was successful. It wouldn't have been the same without the tablet."*

In these statements, Catalina and Kìve identified that the tablets were, at least initially, the main and only *extrinsic motivation* for some students to enroll in the program. However, both

teachers, especially Kìve, reflected on how the motivation that drove students to enroll might have shifted from merely owning a tablet, an external reward, to regarding the benefits that these ICT tools could offer to their learning processes in the classroom and at home. This finding closely relates to *extrinsic motivation* explained in chapter four. Although students recognized the tablets integration in the program as a powerful motivation to study again in an early stage, the interviewed teachers also considered that their students were somewhat more autonomous and *self-determined.* Hence, they identified the personal importance of learning, and thus accepted the program (and the tablets) as a relevant means to achieve their own personal goals. The aforementioned is evident when Kìve followed his statement by pointing out that, after some time, students learned more about the tablets and got more engaged in using them for their learning process. According to teacher's perceptions, the tablets were tools that motivated students not only to enroll in the program but also to start, attend and continue their education.

Besides the novelty that the ICT tools represented for the participants and the influence they had in their motivation to study, there is also another factor that was constantly pointed out by many teachers during the interviews. This is related to the lack of education opportunities for the out-of-school and illiterate adults in the region. In fact, as stated in chapter two, the illiterate levels in Guainía are amongst the highest in Colombia, around 18% (Dane, 2005). These teachers attributed the high enrollment rate and motivation to study in the program to not only the tablets but also to the students' perception of the program as the only opportunity they had to start and/or complete primary or secondary school at the moment. For example, the following teachers believed that many students were very highly motivated to start and/or complete their education. This represents another example of *extrinsic motivation*. The teacher Aine expressed:

> *"There are people who really used the tablets in the program to help and surpass themselves… The students were happy to be in class, because they never had the chance to study before."*

Accordingly Ùuni, a program teacher, stated that:

> "*Students were very interested in and motivated to attend classes and learn. It was marvelous. They never missed a class, no matter the rain or the tiredness. Some of them work all day. Some of my students have small kids and work really hard all day*

> *long. They were eager to learn and use the tablet, which was evident. It was a beautiful experience."*

In a similar way, the program teacher Waù mentioned that his students were visibly motivated towards the tablet, but also towards the program. In his interview, Waù shared similar perceptions with the teachers Aine and Ùuni about the opportunity the program represented for the indigenous adults to access education. Waù was reiterative in mentioning the lack of adult education programs in the region explaining that adults had no chance to continue their education process after elementary school due to lack of comprehensive high-school programs that allowed them to study and work at the same time. The following statement illustrates Waù's thoughts about the *extrinsic motivation* that he perceived from his students in class. He refered to a professionalization process, which relates to the desire of some of his students to finish high school and start vocational education, and/or, if possible, follow a professional career at universities in the capital or other big cities in Colombia. Therefore, Waù's students' motivations are based on the extrinsic form of motivation explained by Ryan and Deci (2000a). This is because they assimilated and internalized education as the means to achieve future personal goals. Waù stated:

> "*Many of the students were very motivated, they participated a lot. I think they were motivated to continue their education, get more knowledge and graduate. Perhaps start a professionalization process."*

In these statements, Aine, Ùuni and Waù highlighted the opportunity to study with the program as an *extrinsic motivation* for students to enroll, follow the classes and do great efforts to succeed and reach personal goals, because many of the program students could not continue their education process before and consequently dropped out. In the interview with Aine and Ùuni, they mentioned that their students were adults who had to quit school at a very young age due to economic issues and/or lack of schools in the rural communities where they used to live. Findings show that, for almost all the teachers, the Transformemos program and its ICT tools integration were highly motivational for the indigenous adults who participated in it.

On the other hand, teachers also reflected on their own motivation and experiences with the program. These teachers expressed that, using a technological tool, such as the tablet, for the first time (in and outside the classroom) exhorted them to look for information to plan their

classes and to learn more from the tablet and its contents. For instance, a few teachers added that thanks to the tablets they learned new things while planning classes, since they went to the school or to the main governmental building to access the free Wi-Fi. Almost all the interviewed teachers expressed that they felt motivated to work thoroughly on class planning and used the tablet to access the internet and gathered complementary tools to teach, like documentaries, videos, readings, newspapers, songs, pictures and more. In their perceptions, teachers expressed how they enjoyed using the tablets as tools that facilitated their teaching practice. Therefore, some interviewed teachers were *intrinsically motivated* to use the tablets in and outside the classroom. For example, Rosa, another program teacher, expressed:

> "*The tablets motivated all of us. I liked it a lot. I also felt highly motivated. I was motivated to make students' learning experiences easy and enjoyable. For example, some things that were not mentioned in the modules* [on the tablet]. *I went to the internet and looked for it. I was motivated to look for more information and tools."*

Rosa eloquently expressed how she felt motivated to do more research on the topics for her class. This means she wanted to make the best out of the tablet as a tool to teach. She expressed her desire to use the tablet to access other resources, such as videos, online examples and activities to help students understand the topics better. In Rosa's case, the motivation she experienced represented *intrinsic and extrinsic factors*. On one hand, she truly enjoyed the use of the tablet to perform different school related activities; while on the other hand, she also engaged in using the tablet as a tool to gain an external outcome: students improved understanding of the topics in her class.

In general terms, my findings show that the teachers identified the integration of ICT and the program itself as motivating factors for students and for themselves. This includes teacher's *intrinsic and extrinsic motivations* and also the perceptions they had regarding their students' own motivations in and outside the classroom.

6.1.2 ICT tools' role in teaching.

The roles that the ICT tools integrated in the program, tablets and video-beams, played in and outside the classroom, were frequently emphasized by the interviewed teachers. The most common roles assigned to the tablets included: tablets fostered interactive and dynamic classes, increased access to resources and, in some cases, enhanced the teacher's role and interaction with his/her students in the classroom.

The present study suggests that for almost all the teachers the use of the tablets and video beams were valuable and beneficial for the students' learning processes and for their own teaching experiences. All of the interviewed teachers expressed that the use of these technologies facilitated dynamic, enjoyable and interesting classes for the parties involved. This means that, by using the videos to complement the topics, listening to the audios in their mother tongues, working on the interactive exercises together and, sometimes, engaging in searching for information on the web fostered a dynamic environment in class. Findings show that teachers perceived the tablets integration in the classroom as *advantageous* for the teaching-learning process. To this regard, some teachers emphasized on the activities developed through the tablet that added dynamism to their classes. For instance, throughout the conversation with the teacher Pablo it became clear that he regarded the tablet as a tool that allowed students to better understand through the use of the videos, the audios and contextualized examples. Pablo stated:

> *"It was a very pleasant experience to work with adults, they show interest to learn and they all were highly curious and motivated about the tablets. This motivation lasted all the time. It was fantastic! They completed all the exercises and watched the videos in the tablet during class and very often I needed to ask the next teacher for some time from his/her class, because the students wanted to show what they did on the tablet to everybody."*

Pablo claimed that the novelty of the tablets was a great learning tool for his students. For example, he indicated that his students were highly engaged in using the tablet's software and were actively involved in the class development. Findings indicate that the majority of the interviewed teachers perceived the tablets as tools that could foster participation among the students due to the novelty and the interactive activities that the tablets provided in the classes. This teacher's perception is also linked to the idea that the tablets helped create a ludic and visually rich environment for all in the classroom. In most cases, the teachers attributed these perceptions to the videos that contained different and varied topics in relation to the subjects that were being taught. Thereby, videos were used to visually extend the topics that were being studied by providing students with detailed and complementary information. The following statement by the teacher Uùni suggests her positive perceptions on the use of the tablets, and the role they played among her students in the classroom. She repeatedly said that students in her class were eager to learn and were very curious to read and learn more. Uùni expressed:

> *"The classes were not like before, where the teacher is in front and only talks. They* [students] *developed the class; they read from their tablets and completed the exercises. Everybody participated, and helped one another. Every student from different ethnic groups contributed with their own opinions."*

Uùni's perceptions drew a comparison between the traditional way of teaching and using ICT tools to teach and learn. According to Uùni, students were actively involved in the classes, using the tablets, participating, creating, and collaborating with others, as opposed to the traditional teacher centered approach, where attention is predominantly focused on the teacher. These thoughts shared by the interviewed teachers suggest that they not only considered the ICT tools integrated in the program as advantageous for the learning process, but also as innovations that proved to be better than the traditional teaching approaches.

Interestingly, some other teachers pointed out that the indigenous languages and the contextualization integrated in the software were also factors that contributed to dynamic classes. This is because students felt culturally identified and could easily relate to what was being explained. Thus, the innovations (program contextualization and language integration) were perceived as *compatible* with previous practices, community values and culture, which directly relates to the *compatible* attribute of innovations conveyed by Rogers (2003). Furthermore, teachers stated that the ICT tools integration in the program engaged students to be part of the digital world. This is because, as stated before, for the majority of the students, this was the first time they accessed technology. More importantly, a few teachers argued that this introduction into the digital world allowed some of the students to get in touch with information and to be more familiar with technological devices, software programs, and different applications, like cameras and voice recorders. The ICT tools, especially the tablets fostered the *trialability* attribute of innovations among students, who could explore the functioning and characteristics of the device. As a result, user's experiences were observable to others thus prompting diffusion of the innovation. To this regard, the teacher Rosa stated:

> *"The tablets and video beams were very important tools in the program because they connected the students to the technology use. Also these tools fostered more ludic and fun classes."*

Rosa identified the role of the tablet in her classes as a tool to welcome students into technology and as a way to create enjoyable collaborative environments in class. Rosa's statement shows her positive thoughts about bringing technology to the students and

welcomed it into her classroom to enhance her teaching experience. Additionally, in interviews with some other teachers it was evident that tablets were also assigned a "teacher role" in the program, this is because, according to these teachers, students could just access knowledge by turning their tablets on and they were just a few "clicks" away from accessing knowledge. In the interview with the teacher Guarirom, he suggested that these aspects fostered and extended the learning time for his students, because his students could, at any moment and from anywhere, continue learning with the tablets. Guarirom stated:

> *"The tablet is a very complete didactic tool. I would even say it can be a teacher replacement, because many students could study alone… sometimes students went working at their parcels for weeks, they just took the tablet and studied there. When those students came back to class they knew the topics and had all the tasks done."*

Guarirom specifically pointed out the flexibility nature of the tablets because they could be used anywhere, from inside the classroom to the plots of land where most students needed to go and work for several weeks; this is also considered to be a *relative advantage* of the innovation. In his statement Guarirom perceived the flexibility offered by the tablet as an advantage for students who could extend their learning times by carrying their tablets everywhere they needed to go.

In contrast with the previous statements, there were other teachers who stated that, although they perceived the ICT tools integration in their classes as positive and useful tools, these tools were not the only factors making their classes productive and enjoyable. These teachers found it particularly advantageous to use other tools, such as the program book, the blackboard and even the environment to complement and better illustrate the topics in their classes. For instance, during her interview, the teacher Catalina claimed that, sometimes, the traditional way of teaching worked best to increase learning. She highlighted that by using other tools and methods her students could understand the topics more easily. However, Catalina also suggested that the tablets were useful tools that helped students to visualize the ideas and to learn from several other sources, on the software or the internet, but the tablets, according to her, were not exclusive to enhancing the teaching-learning processes. Catalina commented:

> *"Not everything was the tablet; it was indeed, a good tool. But our own interactions in class were also important. The exercises on the blackboard, to review the topics, to give examples, to consult in the books, that way they understood best."*

Similarly, Nibda, a program teacher whose students were illiterate senior citizens, expressed that the use of the tablets in her class fostered interactive and enjoyable environments. For instance, she stated that in many cases they used the tablets and video-beams to contextualize a topic or to make simple mathematical exercises. Nonetheless, Nibda also reflected on the limitations she encountered when using the tablets in her classes. This is because almost all her students lacked the skills to handle the device. Besides, Nibda also had little experience at handling the tablet, which related to the *complexity* attribute of innovations. Considering the difficulties she encountered when using the tablet with her students, she used other tools (such as elements from the environment: stones, leaves, sticks, local food, art crafts etc.,) to teach in and outside the classroom. Nibda expressed:

> *"The first days were difficult; they* [students] *never went to school… They did not know how to read or write, we used the tablet because there were some figures for them to trace and then the vowels and so on… they learned little by little how to use the tablets, how to turn it on and off. We also had a notebook to write on; but we mostly used sticks and leaves too."*

Findings suggest that, in general, teachers perceived the ICT tools integration in the program as advantages of the innovation finding it compatible with the community's values and cultures. Tablets were assigned roles as advantageous tools that could be used in and outside the classroom to facilitate learning and to foster dynamic and participatory classes. Findings also show that teachers viewed the tablets and video-beams as a way to access online and software based resources that were very useful in class. However, in some cases, the use of other learning tools, methods and teaching styles prevailed and also gained an important role in the teaching and learning processes, due to the perceived *complexity* of the ICT tools in the classroom.

6.1.3 Challenges

So far, findings show that, in general, the interviewed teachers held positive perceptions about the roles that the ICT tools played in and outside the classroom. However, this section will explore the findings that suggest constraints in the ICT integration into the adult education program in Guainía according to the teachers who participated in this study.

The innovation perception teachers attributed to the tablets and video-beams as technological devices as well as tools to teach and learn in the program, triggered an interesting issue that

was discussed during the interviews. How familiarized were the teachers with the ICT tools integrated in the program? And how did they use them in their classes? To this regard, several teachers expressed having difficulties when using the tablets or that their students faced several challenges while learning the basics on how to handle the device. This is because none of the teachers, except one, were familiar with tablets or video-beams before they started to work as teachers in the program. Consequently, all the teachers acknowledged that, before the program, they had no experience at using tablets, video-beams or any other similar ICT tool in their classes.

When asked about their perceptions on the ICT tools integrated in the program, the teacher Uùni stated that she had no previous experience with technology for teaching while the teacher Pablo indicated that he had a tablet at home but never used it for teaching before. In these two interviews the teachers explained that they felt somehow afraid to use the device in classroom. This is because, at times there where difficulties while setting up the video-beams and/or because they were scared to break the tablets. Uùni said:

> *"That type of technology has never been brought to the schools here before… I have not had any experience with ICT in my classrooms… When the tablet-computers were given to us, I thought: oh no! And now, how am I supposed to use this to teach? I have never touched a device like this one before."*

Pablo extended on this perception by saying:

> *"To be honest, I felt a bit scared in the beginning. I have not used ICT in any of my classes at the school before. I have a tablet at home and sometimes I use it to teach my kids, but never at work and never to teach adult people… It was a challenge, but I like challenges."*

The previous perceptions underline their lack of experience at teaching using technology before the program; they were not familiar with the device. Furthermore, both teachers expressed feeling afraid when first introduced to the tablets, this means that, initially, teachers did not feel confident using the tablets and were afraid of damaging the device. In addition, Pablo also perceived that his students were somehow challenged when using the tablets in the beginning of the program. This is because students were afraid to do something wrong and/or misuse the tablets. Pablo said:

> "*Program students were encouraged to familiarize with the tablets, not to be afraid of it. Because this happened very often. Some of them were afraid to damage something."*

When asked about how they perceived students' first contact with the tablets, almost all teachers reported that their students had difficulties while getting familiarized with the device. Nibda stated that some of her students, mainly the older ones, experienced more difficulties than the younger ones. Thus, the tablets and video beams were perceived as difficult and *complex* devices to use. Nibda assigned this phenomena to the fact that her senior citizens students had very limited contact with technology before.

The interviewed teachers acknowledged the challenges they initially faced when using the tablets and the video-beams. However, the teachers explained that their doubts and fears were present only during the beginning of the process with the program. The teachers stated that they found help and guidance through a training week offered by the Transformemos foundation, which they all attended. The general view of the training period seemed to reflect on the participants' better understanding, not only of the tablet-computers and video beams, but also on the program's structure and objectives as well. For instance, Aìne and Catalina commented on their perceptions about the training time with Transformemos foundation. In both cases, these teachers expressed that they were not familiar with the tablets and the video-beams, but they benefited from training, Aìne said:

> *"It was the first time the program was carried out here; we were offered training to learn all about the program. We also learned how to use the tablets and the methodologies we needed to know to start working. It was very good."*

Catalina added:

> *"During the training we were taught many things about the tablet-computers, how to turn it on and off, what were the components of it and how to use the modules and programs… it was the first time I ever "touched" a tablet, and after that we all went teaching in classes with the video beams, tablets and books."*

The aforementioned perceptions about the ICT tools integration in the adult education program relates to Rogers's Complexity attribute of innovation, which states that "Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use" (Rogers, 2003:257). Findings show that using the tablets and video-beams in and outside the classroom was challenging and somehow difficult to use for the

teachers and students who lacked experience with ICT tools. In most of the cases the students who had more difficulties were older adults who were no familiarized with similar devices.

Despite that many of the teachers used ICT in the classroom and said that it contributed to class development by improving students' motivations and interests, a few of them claimed that due to the students' and their own lack of knowledge on how to use the tablets they did not use it as much in the classroom. This can be considered as a partial rejection of the innovation due to its complexity. However, data also shows that time and practice with the tablets and the video-beams allowed teachers to gradually feel more comfortable with the use of these devices in the classroom. Also, they could perceive somewhat similar results on their students.

6.2 Students' interviews

The following section presents the major findings in relation to the students' perceptions about the role ICT tools in their learning process during the program. The reported data includes the 18 program students' interviews conducted during the fieldwork. Names given to the students are fictitious.

6.2.1 Motivation

After conducting the first few interviews with students it became apparent that motivation was constantly mentioned by almost all the participants. Motivation engages individuals in performing different activities based on factors that can be intrinsic or extrinsic. Considering the aforementioned definition, this section will explore students' perceptions about motivation and its interrelations with the ICT tools integrated in the program.

For nearly all the interviewed students, the tablets and the video-beams played an important role for their motivation to study within the Transformemos program. Many of the students identified the tablets as extrinsic motivating factors for adults to study after many years of no schooling. However, almost all the students also reported that the program participants felt highly motivated by the program because they regarded it as an opportunity to study again. It is worth noting that adult education programs are very limited in the region, and that in most cases, indigenous adults find it difficult to access these few programs due to economic, geographical, cultural and/or linguistic reasons, among others. In fact, 11 of the 18

interviewees stated that the possibility to study again, learn and graduate from elementary or high school were their main objectives and that, the Transformemos program worked as the means to achieve these goals. Thus, the adult education program was perceived as an *extrinsic motivational* factor for students to enroll and study again in order to achieve an external reward.

To this regard, Monuka, a middle age program student, expressed these sentiments all through her interview. Monuka had to drop out when she finished elementary school at age 12 because her parents could no longer afford to send her to the boarding school in Inirida. She said:

> *"I felt very good. All I wanted was to study. I never finished my studies. I always thought: how can I continue studying? But I did not know where. I had the chance to study in the town* [Inirida] *but I could not, I did not have the money. Later I got the opportunity with this program* [Transformemos program]. *Truth be told, It was a very beautiful experience, I could study again, I remembered things I learned before when I was little. I was 12 when I had to drop out my studies."*

Similarly, Isana, a young woman who studied 7th grade within the program, stated:

> *"I think it was a very good program. When they announced the program in the community I immediately enrolled because this is an opportunity I have been waiting for long. There is a program for adults in the town, but it is very difficult for me, due to its schedules and I do not have resources to pay for it. This program* [Transformemos program] *was very motivating because it integrated technology and the indigenous cultures and languages. I was very happy, I felt like a teenager."*

As was just illustrated in the previous statements by Monuka and Isana, it is apparent that the program was welcomed by the students who regarded it as an opportunity to study. Interestingly, comments from these and other students along with their interviews pointed out the program and the tablets as a combination that was highly motivating for people in the community. This means that the ICT tools and the program contextualization played important roles in motivating students to enroll and actively participate in this adult education program. Additionally, some students also claimed that the tablets were the main motivation that drove many people to enroll, in some cases, students attended and continued their learning process after receiving the tablets, while in other cases, some other students did not attend anymore. The following statements by Draco and Sepori, students who followed elementary level with the program, suggest that some students perceived the tablets as the sole instrumental external motivation to enroll in the program. However these comments seem to

be in line with previous perceptions of the program as the only alternative they had to access education. Draco explained:

> *"I only studied for two months* [in the Transformemos program]. *I enrolled to see the tablets. I believe the tablets were great motivation for people to enroll. Well, some of them really wanted to study. But others just got the tablet and never came back."*

In the same way Sepori commented:

> *"I think that the tablets motivated many people a lot. Many of them only enrolled in the program in order to get the tablet and experience technology. However, other students were very motivated; they were interested in studying again. Many of us had to drop out after elementary school. And we cannot go to the town* [Inirida], *we do not have the money for that."*

Furthermore, for other students, such as Ducjin, who was a secondary school student with the program and who is an elder leader in his community, the tablets and video- beams were tools that contributed to having more enjoyable classes. These aspects motivated him to attend classes and participate in the program. Ducjin reported that the use of these tools encouraged many students, some of his classmates and relatives, to enroll in the program and continue or start their education. He believed that the tablets and video-beams were beneficial tools that enabled the learning process to be easier and enjoyable, this is, visual aids, different types of sources, the internet, videos and so on. In addition, he suggested that technological devices such as the tablets represent an important source of motivation on its own, because, the devices are new, and people are always curious and feel drawn to novelty. Ducjin said:

> *"Of course tablets motivated us! Because, as I was telling you, technology is novelty, people like the "new". It [*the tablet] *has all the things for you to learn. You can even plug it to a screen or use the video-beam, you can see the videos, the exercises there, it is fun, it is new and it is easier."*

The present study indicates that the tablets and video beams played an important role in motivating the out of school and/or illiterate adults in the region to study with the *Transformemos* program. Although students acknowledged that many others enrolled merely to obtain the tablet, they also were emphatic in highlighting the attributes that the tablets and video-beams had in the classes and in their learning processes and experiences; characteristics that attracted attention and encouraged participation. Findings in this study show that the program and the ICT tools integrated in it were regarded as *extrinsic motivational* factors by

students. In some cases the tablets were perceived as innovative instruments that motivated students to enroll while other students felt motivated not only because of an extrinsic reward or outcome, but also because students engaged in a conscious value process of the learning activity as the means to achieve personal goals.

6.2.2 ITC tools' role in learning

The use of ICT tools in the classroom was a new experience for all the students who participated in this study. From the interviewed students, 14 had previously studied at different school levels and in different rural or urban schools, most of them dropped out due to diverse reasons. The other 4 students were illiterate and never attended formal education.

Almost all of the students pointed out that the tablets were innovative tools that, when used in or outside the classrooms, enhanced their learning experience. This means that the environment in the class was more enjoyable, engaging and active when the tablets were used. When asked about what exactly created this environment in class, many students suggested that the visual aids and resources, such as the videos included in the software or downloaded from the internet, online exercises and pictures, engaged their attention and made the learning process faster and easier. These perceptions were not exclusive to the use of the tablets during the classes, nearly all the students commented that doing homework and preparing for classes were enjoyable and easy activities to develop with the tablet outside the school premises as well. To illustrate further the aforementioned, Adirini, a young adult student, stated:

> *"The tablets were very helpful for us to understand everything better. The tablet had all the topics from the books, but also videos and exercises. The tablet guided us. The classes were fun; we learned how to manipulate this device* [tablet]. *The videos were clear and interesting, I remember once we had to use the tablet to make a video about the process we follow to make yucca* [cassava]. *It was fantastic. I made the video on my own and showed it in class. It was easier to explain, I liked it a lot."*

In a similar way, Towa, a first grade student in the program, commented:

> *"During the classes I learned how to turn the tablet on and off. We also learned how to write our names, how to add and subtract, all that using the tablets. The tablets had videos with addition and subtraction exercises. Sometimes we had homework and I did not remember how to solve the subtractions, so I watched the examples in the videos and I remembered. It was easier. The videos were like teachers at home, they were an important tool for my learning process."*

Both of these students agreed that the tablet and its components (videos, exercises, and examples) facilitated their learning process in and outside the classroom. The tablets enabled students to better understand and enjoy the classes and the study related activities, such as homework, reviews and tasks, in other locations outside the school. As was illustrated by Towa, using the tablet to access the exercises and explanations in the videos was a resource she used when doing her homework, she also claimed that the tablet was almost like having the teacher at home, since she could resort to it any time she experienced difficulties with her tasks. Furthermore, a few other students perceived the tablets as faster alternatives to traditional learning tools, such as books, paper, pencils, markers, etc. That is, students found the tablets to be more useful and enjoyable because it allowed them to use other software and/or programs to make presentations, to take and store notes, to make and edit videos, among others. Thus, students perceived the ICT tools integrated in the program as advantageous innovations that exceeded previous teaching practices.

In addition to the aforementioned perceived attribute of the innovation, findings also suggest that tablets were recognized as the means to access resources to develop the classes or complete tasks at home. For many students, tablets enabled them to access knowledge and to do research in any topic they were interested in. These students repeatedly mentioned that they used the tablets to access the internet and work on presentations for the classes. However, online activities were not available in the communities because they did not have internet service at that time. This fact limited the use of the tablets to connect to the internet only to the times when students could attend school or a free Wi-Fi service around the main governmental building in Inirida.

During the interview with Kaali and Isana, middle age students in the program, it was apparent that they held a positive perception about the role of the tablet in the development of the classes and the different activities they needed to do in connection with them outside the classroom. That is, tablets were tools that enabled students' use of different on-line and off-line resources that facilitated their learning activities and processes in the program. For instance, Kaali stated:

> *"For me it was a good tool. It worked for researching and remembering. In my case, I remembered some of the things I learned at school more than 30 years ago. Through the Tablet I could study and learn new things as well as remembering the others that were taught to me before. To study with the Tablet is easier, the teacher and the other*

> *students seemed happy to be using that tool to learn. For example in mathematics I learned new things and I practiced them with the tablet at home."*

Similarly Isana commented:

> *"In the beginning we learned the basic things about the tablets, after some time we needed to use them to make presentations and homework for the classes. For example, once we had to present a topic for the biology class and we created slides in the tablets with images and pictures we took with the tablet's camera. It was beneficial to know more about the programs* [software]. *I could not imagine the amount of amazing things you can do with such a small device* [tablet]."

Kaali and Isana, among other students, shared a similar view about the tablet's role in their learning process. Their perceptions mainly focus on the use of this ICT tool in different contexts than school with teachers and classmates, when students needed to do activities and to explore the tablets on their own. In the examples shown above, both students claimed that the tablets played an important role as tools through which information and knowledge could be accessed easier and faster. When I asked these students about how they would have done such homework or activities without the tablets, they seemed to reflect on the difficulties they could have encountered. This is, according to them, because accessing the needed information to develop these kinds of activities would have been more difficult, as well as time consuming, to find in the books and to later write it down on posters or handwritten papers.

To the same extent Isana enthusiastically explained the way in which she used her tablet in the classroom and at home. By the time the interview was held, she still had the tablet and used it sometimes to help her older son, a young boy who studies in the local high school, to access the internet and gather information for his homework and tasks. By doing this, she reported that she had acquired more skills on manipulating the tablet and had learned more things about computers and the internet. Through practicing and frequently using the tablet, this student reported that she gained skills on how to manage different software programs in the tablet and was able to access knowledge of diverse topics of her interest like online newspapers, libraries or dictionaries.

A particular perception that some students identified as important was the role of the tablets as student's autonomous work promoters in and outside the classroom. Siare, one of the interviewed program students said:

> *"Working with the tablets was a very nice experience, for example to use the camera to make videos, etc. My parents and I gathered together and studied, even if we did not have homework, we liked to review the topics, to listen to the audios and to learn more. With the tablet it was possible."*

In his statement Siare agreed with other students who described similar situations in which they used the tablet and the modules in the software to study on their own and to review the topics seen during the classes. A similar perception was offered by other students such as Isana and Aina. Isana previously stated that she autonomously used the tablet to review the topics for which she needed some practice and also accessed the internet, when she could, to look for information on topics of her own interest or to help her son with his tasks and homework. For instance, Aina stated:

> *"When I was at home, I took the tablet and started studying everything on my own, I just accessed the videos, the modules and the chapters, I studied alone because I knew I needed to review everything to understand better."*

In her statement Aina suggested that she studied independently on the topics she needed more practice with. When I asked her if there were extra topics or exercises she looked for on the internet, she explained that she needed some more time to understand mathematical problems, and for that reason she went to the school and accessed the internet through the tablet to look for more exercises and pages that she could study with.

In general, findings in this study indicate that students held positive perceptions about the ICT tools integrated in the program. The interviewed students emphasized on the tablets as these were the tools they had more contact with and used during and after the program. The roles students assigned to the tablets in their learning process specifically focus on the tablets' instrumental utility as source of materials, information and knowledge. Students also identified the tablets as tools that enhanced enjoyable and interactive environments in class as well as promoters of autonomous work outside the classroom context. In general, students' views about the ICT tools' roles in their learning process are evidently positive and widely regarded as *advantages* of the integration of ICT tools as an innovation in the program.

Students also identified the other *attributes of innovations: compatibility*, *trialability* and *observability* included in Rogers' theory. Students seemed to regard the ICT tools, especially the tablets, as *compatible* with their interests and values. This has to do with the software's

contextualization and the integrated languages because students felt identified and could easily relate to the way in which topics were presented and explained in their mother tongue. Also, the fact that students could use the tablets in and outside the classroom allowed them to experiment with it, learning on their own how to manage the device and access information of their interests, this feature relates to the *trialability* attribute of innovations. In addition, students could also observe others experiences and scholarly practices with the tablets that facilitated the diffusion process, which accounts for the *observability* attribute of innovation. Therefore, these perceived characteristics were positively related to the student's adoption of the ICT tools, especially the tablets, in their learning process.

6.2.3 Challenges

While conducting the interviews and informal conversations with students, it was apparent that the novelty of the tablets posed an important challenge for them. These students' perceptions can be related to Rogers' attribute of *complexity* that is described as: *"the degree to which an innovation is perceived as relatively difficult to understand and use… for some new ideas complexity is a very important barrier to adoption."* (Rogers, 2003:257). Consequently, this section will focus on the students' perceptions about the difficulties they faced with the tablets during the program.

From all the interviewed students only one commented that he had previously used a tablet on one occasion in the past, while for the other 17 students the tablets were new and they did not report previous use of tablets or computers before the *Transformemos* program. Hence, the majority of the students concurred that learning how to use the tablets (software, programs, applications, and internet) was difficult and these difficulties challenged them in the beginning, during and/or even after the program. For example, student Adrini said:

> *"It was a bit difficult in the beginning, to handle the tablets with the fingers, there is so much information and I got lost. It was something I have never seen; never before in my life have I handled a tablet or a computer. Other classmates, the older ones, for example, they had lots of difficulties. They did not even use the tablets because they did not understand how to handle it. They said they could not understand the tablet's system. We had a teacher who explained everything and tried to teach them, but it was extremely difficult for them* [older adult students]*."*

In the previous statement Adirini acknowledged that to learn how to use the tablet was challenging for him in the beginning of the program. However, later in the interview he said

that after some time practicing and using the tablet more often (at school and at home) he could understand better and it was not as difficult as before. Adirini, and many other students, referred to the diverse difficulties that older adult students faced while learning how to use the tablets. In fact, many of these adult students never really learned how to use the tablets and simply did not use them at all, which means they rejected the innovation. These students uniquely used the tablets in the classroom where the teacher or other classmates could orient them. To this particular perception, Kaali specifically emphasized the challenges he faced when first introduced with the tablet in the program. For Kaali, learning how to use the tablet was very difficult, he indicated that up until our interview, he did not think he truly knew how to use it. He stated that:

> *"To use the tablet is complicated, hard for me. I have never used a tablet, even until today I have not learned how to use it completely. In the beginning of the classes I was wondering many things, for example: How would this be? How do you use it? Who is going to teach me? But well, after some time the teacher explained how to use it, the basic things, and tips and so on. To learn how to use the tablet, to turn it on and off, how to access the modules, how to navigate, was a very hard time for me before I got a bit more familiarized with it."*

Similarly, Woyotec, a program student, added to the previous perception by stating that:

> *"I have never used computers, tablets or anything like that before. So I do not understand so much how to handle that device. It was hard. We did not study here in the town, no no! When we studied long ago in the community, down the river, far from here, we hardly had chalk and black board in the school."*

These statements by Kaali and Woyotec suggest that using the tablet was a challenge for them. In both cases, this was because they had very limited contact with this kind of technological devices before. They perceived the tablets as very complex tools to understand and use. In the case of Woyotec, he studied a few elementary school grades long ago when he was a kid. He reported that he had many difficulties to understand how to use the tablet because it was new to him, and he did not understand much about new technologies. He rather viewed the tablet as a tool that the teacher could use to explain things better; he said he enjoyed classes but that doing homework alone at home posed a great challenge for him, he preferred to wait until they had the next class so the teacher could explain a bit more about how to do it. Apart from these two participants there were several other students who claimed that learning to use the tablets was a difficult task. Most of the times the interviewees

identified the older adult students as the most challenged ones in the classrooms, this is because, these group of students had less experience with technology, they were less familiarized with ICT tools and had few schooling years before.

Furthermore, some other students commented that the initial contact with the tablets in the classroom was difficult because they had little knowledge of the tablets' functions and systems. In spite of these challenges, students stated that after some time, when they were more familiarized with using the tablets at school and at home, the difficulties slowly faded away. That is, in the beginning of the program when the tablets were new and many of the students did not know much about them, it was challenging for them to learn how to use them. However, some more practice and time was needed for them to become familiar with the device and overcome these barriers easier. This is the case of Sepori who commented that learning how to access the information in the tablet and learning all the steps to connect to the internet or using the applications in the tablet was difficult and took her some time and practice to handle. Sepori stated this:

> *"It was difficult because I never handled a tablet before, we never had one. We had a teacher who explained how to use it. It was complicated in the beginning, but later it became easier to handle the tablets. It was especially difficult for the older ones; they needed more time to learn."*

In her statement Sepori proceeded to explain how learning to use the tablet was difficult for the students, mainly for the older adults in her class who needed more time and orientation from the teacher or other classmates. The same opinion was forwarded by other interviewed students who agreed with Sepori. Apparently, younger adults and adolescent students did face difficulties in the beginning but they reported having overcome it with time and practice. These younger students had, in general, some level of previous education and were more familiarized with the technology through contact with television and mobile phones among others. This is the case of Siare, a young adult student who commented:

> *"Using the tablet was fine, I did not know how to use one before, I just used a smartphone before, a normal one, not so "fancy", and they work similarly. I think it was easy to learn how to use it. I felt good. But for some people, for example my parents, it was very difficult to use them* [tablets]*, they learned the basic things but no more."*

In a similar way, Kwai, who was the only student who stated having used a tablet before the program commented:

> *"I actually used a tablet before when I studied. So, it was not difficult for me, it is very easy to use. However, for other classmates it was difficult to learn how to use them. The teacher asked me to explain and help them."*

These perceptions by Siare and Kwai show how they identified the challenges that using the tablets posed to their classmates, mainly older adults whose previous contact with technology and ICT tools was very limited. Nevertheless, these two students reported that learning how to use the tablets was not considered as a challenge by them, because they had previous experience with tablets, in the case of Kwai and with a smartphone in Siare's case.

Findings in this study indicate that students perceived the use of ICT tools, specifically the tablets, as complex and challenging. Although two students reported that learning how to use the tablets was not that difficult, the majority of the other interviewed students claimed that they experienced many more difficulties while familiarizing and learning to use these devices. Especially the older adult students who were identified as the most challenged ones in the learning process due to their lack of skills and experience with ICT tools. This means, some adult students needed more time to get familiarized with the device as well as they required more detailed explanation from the teachers or other classmates on the correct use and functioning of the tablets. The mentioned *complexity* attribute given to the tablets limited to a great extent, if not completely, the adoption of these devices by older adult students in their learning processes with the program.

Research question 2

What are the program's teachers' and students' perceptions on the integration of the tablets in the indigenous communities?

6.3 Teachers' interviews

6.3.1 Innovation

The *Transformemos* adult education program attracted local and national media attention, which highlighted the program as a pioneer in ICT integration in education for indigenous

adults in Guainía. For nearly all of the interviewed teachers the tablets were innovations to the indigenous education and communities. Almost all the teachers stated that the tablets allowed access to information and promoted a general sense of "advance" in the community. This means that, by using the tablets as a tool to access the internet and the software, people in the communities could access information and could communicate with others from a distance. Although internet in the communities is limited and the first few receptions towers were just being built by the time I conducted the fieldwork, teachers expressed that their students and the students' families could, at times, connect to the internet and access information or communicate with relatives who live far away.

Furthermore, a few teachers also stated that the use of tablets in the community fostered access to the digital world, an opportunity that the indigenous communities did not have before since they could not afford to obtain a device, such as the tablets, computers or smart phones. For example in the interview with Guarirom, he described how his students and their families showed interest in discovering the uses of the tablet and in many occasions gathered together to look for information and discover more features in the device. Guarirom's statement suggests that people in the community were evidently curious and engaged in knowing more about the tablets, the internet and all the information they could access with it. Guarirom stated:

> *"They wanted to know more about the letters, more about science, more about that culture that is not ours. What we call the western culture… The dream would be to bring technology for the* [Indigenous] *communities and use it to teach and spread knowledge; it is our right, isn't it? This does not mean we want to terminate our culture but a way to advance."*

In his statement we can see how Guarirom claimed that technology was welcomed by members in the community, who were eager to know more about other cultures and perhaps also show theirs to others. He also added the importance of integrating ICT tools in the development of education and knowledge creation about his indigenous community. However, he acknowledged the risk that ICT is believed to have for indigenous communities, such us terminating their cultures and beliefs. During his interview, Guarirom explained that inside the communities they held meetings where they discussed their closeness to the western culture and the way in which this relationship could affect their worldviews and cultures. He identified himself as an open-minded person who is eager to learn more from other cultures

and to show his own, therefore people from outside their communities can learn to value and respect it. Guarirom identified the tablet integration as an innovation tool for communities to advance and promote consciousness towards their worldviews, survival and rights.

In the same way, the teachers Tase and Uùni also stressed the important role of the tablet in the indigenous communities. First, Tase situated technology as a source of many advantages that can foster communication and information access for the indigenous peoples. He said:

> "*Technologies are needed in the community because we need to keep updated. We can use technology not only to communicate and keep contact with others outside, but also to be updated and access knowledge. For example, if you are sick, you can access the internet and see if you look for the remedies, maybe plants' names and see which one cures you. We can use that* [Technology] *in our daily lives."*

Similarly, in her statement, Uùni emphasized the importance of knowledge access for the indigenous communities, she identified the tablets in the program as tools that allowed students to learn and to be aware of their rights as indigenous communities and that by obtaining this knowledge students and their families could aim to collaborate in their development as individuals and as members of a community. Uùni stated:

> *"There were tools in the program that gave students* [youth and adults] *the opportunity to share with the families and regard their realities… students told me they could learn about their rights, access knowledge and maybe help constructing their communities."*

Nevertheless, a few teachers showed their concern in regards to some constraints that could rise from the use of technology in the communities. Specifically these teachers referred to the extensive effects that innovations and technologies may have in the midst of the communities. For instance, teacher Kive expressed that young people in his community are no longer interested in learning from the elders and following traditions, because, according to him, there were other fundamental interests that young people prefer to follow; these are the internet, television, movies and so forth. In general, Kive held a positive perception in regards to the integration of technology tools, such as the tablets. However, he was concerned about the influences these innovations could bring to his community. During the interview, Kive claimed that indigenous communities need to be oriented towards an adequate use of technologies, so they can protect and thus preserve their traditions and cultures. Kive stated:

> *"The young ones are influenced by the movies, the TV and so on. They use earrings, smoke cigarettes. Everyday fewer and fewer young indigenous boys and girls want to do or to learn anything from their cultures, they do not know how to fish, hunt or cook cassava."*

As the findings indicate, it was evident that teachers believed that the tablets engaged indigenous' communities' members to be involved in the use of technology devices and to access information. To keep updated, to learn and to communicate are regarded by the teachers as progress factors proper to the innovation that could benefit the dynamics in the indigenous communities. It was evident that the interviewed teachers perceived the tablets and the use of internet and other ICT tools in the communities as *advantageous* and *desirable* not only for the community to engage in the digital world bridging the digital divide but also as a way to promote knowledge about their cultures and opening opportunities to learn from others. However, for some of the teachers, mainly the indigenous teachers, these technological devices can also have negative influences in the communities, since the innovations could not be *compatible* with the society values and norms that can prompt *undesired* and *indirect consequences*. Thus, these types of innovations should encompass thorough and culturally relevant orientations for the members in the communities.

6.4 Students' interviews

6.4.1 The tablets and family's interactions.

The way in which families interacted around the integration of the tablets to their daily lives was perceived by some of the participants as one of the most notorious changes the innovation brought to their indigenous communities. During the interviews with some of the students they repeatedly pointed out that using the tablets engaged families to come together and discuss, learn and explore with the device. In most of the cases, students mentioned that their children, who attended the local high school and had more contact with technology, were very interested in helping them to understand the use of the tablets and prompted the families to gather and look for information in the software, take pictures, make videos and access the internet, when possible.

An example of the aforementioned is Kalia, a program student, who emphasized during her interview that her children and husband used to gather around the tablet to learn how to use it and explore with it. For Kalia, using the tablet at home was an opportunity to reunite with her

family and engage her kids to look for information, to do their homework and to learn new things. She stressed that her daughter taught her how to use the tablet, and that, with time and practice she could handle the tablet alone since she did not use it as much before due to the difficulties she faced during the first weeks in the program. She commented:

> *"In the beginning I only used the tablet in the classroom, but later, we started using it more and more at home. If I had homework or if we wanted to look for something, my older daughter, who knows more about how to use the tablet, and my other sons and husband, we sat down together to see, to learn and sometimes we used the camera. We did my homework and theirs too; we all learned new things. It was a family time."*

Giving further support to this perspective, Ducjin concurred with Kalia in regards to the tablets' role in their families' interactions. He stated:

> *"The experience with the tablet was very nice. I can say I have more experience and knowledge now; I studied one high-school level more. I think I influenced my kids in that way, I told them I was an example; we cannot look back in time, we have to see into the future and think that it is possible… When in my entire life would have I imagined I could study again and with technology? Never! But I tried and I learned. The tablets were a bit difficult to use, but we gathered and my sons helped."*

For Ducjin studying in the program and learning how to use the tablets was very important and an example for his children and grandchildren, this is because he faced several challenges to understand the use of the tablets and attending school again after many years of not following formal education. He regarded his efforts as examples he transmitted to the younger generations of his family. Ducjin also commented that he gathered with his family and discussed the use of the tablets; some of his sons explained other functions of the tablets and helped him with homework when needed.

6.4.2 Communication and information access.

Another aspect that was frequently mentioned by the interviewed students in relation to the tablets integration in their communities deals with the communication and information access they obtained by using the tablets in their daily lives. For almost all the students I interviewed the tablets served as a tool to access information easily, more so, these students reflected on the benefits they got from the tablets as a means of communication with others in the region, the country or the world. During the fieldwork time some few wireless internet towers were being implemented in some communities. This fact allowed students to use their tablets to

access and explore the internet. For four of the interviewed students communication and information access was continuously mentioned and emphasizing on the facility to use the tablet as the mean to access information at any given time.

For instance, Kaali repeatedly identified the tablets as very useful tools that served not only for learning purposes with the program at school, but also as the means through which big amounts of information could be obtained. He also highlighted the tablets as facilitators of communication with others, through the use of e-mails, photographs, social media webpages, and online calling software among others. Kaali commented the:

> *"The tablets in my community, well, let me see. I consider that the tablets are very useful tools for us nowadays. Tablets can be used to find anything you want to know about, you connect to the internet and that is it. Also, we can communicate with many people anywhere in the world by using that small device. We could even use the tablets to spread knowledge about our cultures, our worldviews, our art crafts, our communities."*

In the last part of his statement Kaali mentioned that the tablets allowed the communities to show and spread knowledge about themselves. When asked about to extend on this issue during an informal conversation, Kaali proceeded to explain that he was always in favor of letting the world know about his ethnic group because by communicating, showing and teaching others about their cultures and communities they could be recognized and identified as people who still inhabit the lands and who still keep the language, customs and rites that their ancestors established long ago. Furthermore, he added that, through the tablets they could, perhaps, also commercialize their products and increase interest in the communities, their needs and their rights.

Among other students who shared similar perceptions like the presented above by Kaali, there was Isana. As explained before, Isana's older son mentored her while learning how to use the tablet, and they both engaged in looking for information, doing homework and accessing the internet. During the conversation with Isana, she often reflected on the importance that technology devices such as the tablet had in the communities. She claimed that the tablets allowed people to open their eyes to what is currently happening around them since her community has been isolated and access to information or communication with others outside was very limited. She believed the tablets were tools that, together with the internet, enabled her to access information and to communicate with others in an easy and fast way. Isana said:

"This program and the tablets were something impressive. We were not so good in technology here in the community, so this was something new, we could open our eyes to all this. I still have my tablet, even when the program is over, I still use it, I go with my son to the tower and connect to the internet and it is very nice. I can look for any kind of information and I can talk to my friends who live in the capital, all that can be done in the same day, not moving from where I am. I still need to learn more about the tablets and how to use many more things in the internet, but I will practice."

6.4.3 **Tensions**

The last theme that was most frequently highlighted by several of the interviewed students regards constraints that were identified by them as characteristics of the integration of new technologies, in this case the tablets, in the midst of their communities. In fact, five of the interviewed students expressed their concerns towards the extensive influence that the integration of technological devices can have on the young members in their communities. However, their perceptions were not exclusively focused on the use of the tablets that were integrated by the program, but rather to the influences that the movies, video-games, computers and the internet can have in their communities. In order to better illustrate the mentioned issues, statements from the interviews with Kaali and Ducjin will be examined below. In the case of Kaali, he mentioned:

"I think that it [tablet] *is a an easy way to communicate, on one hand it is good and on the other hand it is something that in the long run will affect our culture a lot. Because nowadays youth, according to my analysis, have stopped doing and practicing our culture. They seem to be more focused on technology, fashion and every new thing that comes with it, therefore, they are forgetting things from our cultures because of technology. Now we have internet in the community, young ones prefer to be connected than to learn our chores. So, this is why I say technology is good because we can communicate fast and easy with others, it can be used to learn more, you just take the tablet, write a word and knowledge comes to you. But there is also a bad side of it; it distracts young ones from what they should be learning with us, the older ones."*

As the previous quote stated, in Kaali's eyes, the technology that was integrated into his community was undeniably important and useful for communication and information purposes. During the interview with Kaali it became clear that he perceived the tablets as tools that benefited his learning process. He highlighted features such as: easy access to information, connecting to the rest of the world through the internet and so on. The tablets also offered the possibility to show and spread knowledge about their cultures and

communities. Nevertheless, Kaali was also very critical of the technology integration in his community. His concerns resided in the lack of interest that the young members of his community show towards the different activities that pertain to their culture and customs. Kaali claimed that connecting to the internet using the tablets, telephones and any other technological devices diverted these young indigenous members from the chores that should be performed inside the communities. For Kaali, the knowledge that elder members can transmit to the younger generations are extremely important to the equilibrium of their societies and, more importantly, to the maintenance of their worldviews, languages and thereof their cultures.

Ducjin held a similar view in regards to the tensions that the tablet integration, among other technologies such as: TV, computers and wireless internet towers, brought to his community. He stated:

> *"The influences of the tablets in the communities are varied. I mean, on one side technology is good, you see we learned from the tablets, we learned connecting to the internet and searching for information, we can communicate. But, on the other hand, it can also be a bad influence. For example the youth here in the community, they used the tablets and went to the towers to connect to the internet, not to study, but to do bad things, downloaded things that are not proper to our cultures and beliefs; our cultures are more calmed and connected to the nature. Technology is no culture for us; culture for us is to sing, to fish, our dresses and art crafts, to dance and to hunt. Those are the bad uses of technology that we see now in the communities. However technology cannot be stopped, those devices are made by the "whites"; all we can do is to get familiarized with them and teach everybody to use them in a good way."*

In the previous statement, Ducjin drew a general concern that was also shared by few other students I interviewed for this study. This concern deals with the incorrect use of ICT tools, (the internet, the tablets, mobile phones, etc.) that have been integrated in the communities during the last few years. Although Ducjin perceived the tablets' integration in his community as positive, it seems that he also identified the inappropriate use of these devices as a source of negative influence community's members. These mentioned aspects were frequently highlighted by Ducjin during our conversation, he stressed the significance of the customs and traditions that identify his culture and that might be at risk with the integration of other ideas into the communities. Interestingly, he also added that technology will continue its wronging path and that, to his understanding, the wisest thing that his community could do was to learn

the positive things that technology provides and to instruct people on the proper use of it inside the communities.

The integration of the tablets, as findings have indicated, was in broadly regarded as positive and useful to the student's learning process and to the communities' information and communication access. In addition, tablets were believed to foster familiar bonds. However, findings suggest that students identified two sides of the integration of the tablets, and other technology devices, in their communities.

One side recognized access to information, knowledge and communication as positive characteristics that technology offered people in the communities, what Rogers defines as *desirable consequences.* In the other hand, the other side was perceived by some of the students as negative influences for the members in their communities and a threat to their culture maintenance, *undesirable* and *indirect consequences.* The aforementioned perceptions can also be linked to Rogers' attribute of innovation of *compatibility* of values and beliefs, Rogers (2003:16) described it as: *"compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters… an innovation's incompatibility with cultural values can block its adoption."* This means that the incorrect use that some people in the communities made of the tablets and the internet was regarded as incompatible with the established and practiced values and beliefs. This resulted in undesirable consequences of the use of these types of innovations as was reported by the quoted students. Nevertheless, these perceptions did not limit the rate of adoption that tablets obtained among people in the communities within the program and in other community contexts.

So far, I have presented the participants' perceptions on the integration of ICTs into their education and communities. The following chapter will provide the analysis and discussion of these findings in light of this study's analytical framework and theories.

7 Discussion and conclusion

The following chapter will present a general discussion on the most predominant tendencies of this study's findings. The research questions will be revisited in light of the analytical framework in order to provide concluding explanations of the study's findings. Section 7.1 focuses on the discussion about research question one: how do the program teachers and students perceive the role of ICT tools in their teaching and learning process? Section 7.2 provides the discussion in relation to research question two: What are the program's teachers' and students' perceptions on the integration of the tablets in the indigenous communities? The teachers' perceptions will be discussed along with the students' views in order to analyze possible similarities and/or differences.

7.1 The role of ICT in teaching and learning

7.1.1 Understanding participants' perceptions

One of the central aims of this study is to understand how teachers perceive the integration of ICT tools into the adult education program for indigenous people in Guainía. Specifically, this section focuses on the findings that illustrate the participants' perceptions on the ICT tools role in their teaching and learning process. To examine these results, Everett Roger's *Diffusion of innovations* theory was used emphasizing on the *attributes of innovations*. Thus, findings show the aspects of the ICTs (i.e. tablets, software and video-beams) integrated into the program that participants identify as relevant attributes on the innovation. Furthermore, the results of this study reflect heavily on the concept of *motivation* as one of the most relevant aspects of the ICT tools in the participants' teaching and learning experiences.

Motivation

Findings show a strong pattern, on both, teachers' and students' perceptions of the fundamental role of the ICTs as key promoters of *motivation* within the program. The factors that seem to have been influencing the way teachers and students conceptualize and understand *motivation* are analyzed in light of Richard Ryan and Edward Deci's self-determination theory and the concepts of *intrinsic and extrinsic* motivation.

Extrinsic motivation factors

One of the factors in which teachers and students hold similar perceptions is the idea that the ICTs, mainly the tablets, are tools that played a fundamental role on the motivation many students had to enroll and then study with the program. This suggests that the tablets are perceived equally by the teachers and students as *external rewards* for the program participants. Hence, Ryan and Deci's *extrinsic motivation* concept applies to this understanding because tablets are considered external instrumental rewards that triggered students' motivation to engage in the educational program.

Nevertheless, findings also suggest that after the initial perception of the tablet as an external reward, teachers and students also identified another major factor that may have driven students' motivation to take part in the adult education program as well. This factor is related to the fact that there are very few education opportunities for indigenous people in the region. Thus, students view the program and the ICT tools integrated in it as their only chance to study and complete secondary education. Consequently, external outcomes such as graduating from high school, accessing tertiary education and/or enhancing work opportunities in the future are external rewards considered by the students that are their *extrinsic* motivation to study in the program. However, findings do not clearly support that this motivation is uniquely related to the integration of ICTs. This may indicate that if the program did not integrate the technological tools students may have been still equally motivated to enroll and study.

Furthermore, findings from the teacher's data suggest that ICT tools are widely considered to be innovative instruments that extrinsically motivate teachers. Teachers' motivation linked to ICT particularly includes accessing information, complementing topics, and planning and organizing classes. As the majority of the interviewed teachers were not previously familiar with any of the digital devices, it can be argued that teachers were extrinsically motivated to use the ICTs (i.e. tablets, software, audio-texts, the video-beams and the internet) in order to learn how to properly handle the devices as well as use them in planning and later teaching. Teachers in this study view the ICTs as tools that made their teaching process easier and also motivating.

On the other hand, student's perceptions indicate that the contextualization and indigenous language integration in the program (books, software, and curriculum) is also a factor that positively related to their extrinsic motivation to study. This is mainly due to the fact that

because they feel acknowledged and can easily relate to the topics in the program. However, this is not solely related to the ICT integration because the contextualization was also covered in other learning tools, such as the books, the curriculum, and the languages spoken in the classroom. Similarly, findings in the students' data appear to show that ICTs are perceived as tools that enhance fun and dynamic activities in the classroom. Therefore, student's motivation was partly driven by the use of the tablets, video-beams and the internet (when available) in and outside the classroom. According to the students in the study, the classes were more interactive, interesting and enjoyable when technology tools were used in the classroom. Findings show that students perceive the use of the ICT tools as a novelty that offer a dynamic environment in class where they feel very motivated to assist, participate and learn. Thus, the enjoyment of classes and the perceived interactivity may have fostered students' *extrinsic* motivation to participate in the adult education program.

Intrinsic motivation

In regards to the *intrinsic motivation,* which refers to the personal will to engage in certain activities (Ryan and Deci, 2000a), findings suggest that many of the interviewed teachers truly enjoyed using the tablets, the software's interactive exercises, the video beams, and the internet to plan classes and to teach. Therefore, teachers seem to perceive the use of ICTs as a pleasant activity from which they can learn and enjoy while working. As opposed to the teacher's perceptions of *intrinsic* motivation, findings reveal that students focus more on the external outcomes of the use of technology in the program rather than their own personal enjoyment and satisfaction. Hence student's views on the concept of motivation are only based on the *extrinsic* type of motivation as was presented in the last section.

Attributes of innovations

In order to understand the views and perceptions about the ICT integration in the program, the analysis of the findings was guided by Rogers' *diffusion of innovations* theory, and more specifically the concepts of *relative advantage, compatibility, trialability, observability and complexity,* which are the different kinds of attributes individuals assign the innovations. Findings tend to show that the *relative advantage* attribute is the category that was most often referred to by the interviewed teachers and students. This means that they identify several factors that indicate that ICTs were somewhat advantageous for their classes and their learning and teaching processes. The following factors show a continuous trend in the findings in regards to relative advantage: a) improved class environment, b) differences from

traditional education, and c) the digital world / access to information and communication technologies. These factors and the ones related to the other attributes of innovation will be discussed below.

Relative advantage

Findings imply that teachers and students identify three main characteristics of the use of ICTs in the program that seem to be advantageous for the teaching and learning process. Both, teachers and students hold similar perceptions about this issue and seem to reflect mainly on the general use of the tablets and video-beams in the classroom, rather than the different specific learning activities that may have been implemented with the tablet (and ICTs).

The first factor is repetitive and clear in the findings and is the one that relates the most to the learning process in the classroom. That is, the tablets, the videos, audio-text, the use of internet and video-beams have a positive impact on the overall classroom environment. Students and teachers perceive that when there is an integration of visual enhanced activities and presentation of the contents using ICTs, classes are more fun and engaging resulting in a more pleasant learning experience where students find it easier to understand the topics presented. The participants perceive the use of tablets and video-beams in the program as tools that improve the classroom environment by promoting autonomous work, active participation and easier understanding of topics taught. This conceptualization relate to the *relative advantage* attribute of innovation since the ICTs are perceived as being beneficial for the learning process within the program.

In line with the mentioned finding, the second factor shared by students' and teachers' is the perception of the ICTs as better tools to teach and learn from than tools used by traditional education. According to Rogers (2003), the attribute of *relative advantage* has to do with the perceived benefits of innovations, but also with the overall perception that the innovation is better than the one it substitutes. Therefore, findings suggest that the use of these technology devices in the program is viewed by the participants as beneficial and a better choice for their teaching and learning experience.

The third and last factor regarding the *relative advantage* category has to do with the access to ICTs and the integration of the students and teachers into the digital world. Both students and teachers view the use of ICTs, especially the tablet and the internet, as tools that enhance their access to knowledge, information, teaching / learning resources, and thereof the digital world. Findings show that to introduce students into the digital culture is considered to be a very

important advantage of the ICT integration in the adult education program. Partly because it provided each student with a free of charge digital tablet (which otherwise students might not have been able to acquire) that participants could use offline or connect to the internet when available. To be part of the digital world and to improve digital skills is widely recognized by participants in this study as one of the major advantages of the program. In the case that the program did not integrate the ICTs, the mentioned factor of introduction to the digital world may not have been possible, since the local schools (where the classes were held) have few ICT tools and these might not have been possible to use by the program's students.

Compatibility

The attribute of *compatibility* as stated by Rogers refers to *"the degree in which an innovation is perceived as being consistent with the exiting values, past experiences, and needs of the potential adopters."* (Rogers, 2003:15). On the issue of compatibility, findings indicate that teachers and students perceive the software and content of the program integrated in the tablets as *compatible* with their culture and experiences. The students and teachers feel identified and represented in the contextualization and the indigenous language integration in the tablet's software, videos, audio-text, pictures and topics. It is possible that these two characteristics positively influence the classes and school related activities since these are perceived as consistent and relevant for the participants.

Trialability

Findings show that teachers and students consider that *handling* the tablets is a fundamental positive characteristic of the ICTs integrated in the program. The attribute of *trialability* is understood as the chances potential adopters have to use and try an innovation; this process reduces uncertainty and promotes the adoption of innovations (Rogers, 2003). One can argue that the *trialability* attribute perceived by the participants in this study relates to the concept of flexibility that is conceptualized as the possibility for students (and teachers) to use the tablets in and outside the classroom, at home, or at work at any given time. Flexibility is, thus, considered to be an advantage of *using* the tablet to learn since many of the students had to work for long periods of time and could not attend classes regularly, instead, they could access the tablet and the software and study.

Observability

According to Rogers, observability relates to *"the degree in which the results of an innovation are visible to others."* (Rogers, 2003:16). In this context, findings suggest that the *observability* attribute of innovation is perceived by the students and teachers as a beneficial

characteristic of the tablets. Students can share and compare experiences with others (i.e. family, friends, and neighbors), who may or may not be part of the program, in regards to the tablets' contents and functions. Thus, participants view the tablets as tools they could use at home with family and others to share knowledge and work on tasks together.

The findings on the attributes that teachers and students assign to the ICTs integrated into the program show a clear focus on the operational use of the tablets and its relation to the classroom environment in general. This is because the tablets were the ICT tools that participants had more contact with during and after the program. Albeit, it is important to note that there is no significant evidence that indicate a positive and/or negative impact of the integration of the tablets and ICTs on the cognitive processes of the participants within the program.

Complexity

So far, findings generally reveal positive perceptions towards the integration of the ICTs into the adult education program. However, there is evidence of constraints that teachers and students identify as limitations of the use of the tablets and other technological devices in and outside the classroom. These challenges are classified in the *complexity* attribute of innovation that refers to the degree in which people perceive the innovation as to be difficult to use and to understand. When innovations are difficult to use, the adopters, in this case the students and teachers need to develop new sets of skills and understandings specific to the functioning of the innovation, which can generally pose difficulties into the adoption of it (Rogers, 2003).

Although findings seem to indicate that teachers hold positive views of the ICTs (especially the tablets) integration into the program, it is also apparent that there were several challenges of this integration into the classroom with students. Accordingly, it became clear that these constraints related to the students' and teacher's lack of knowledge of technological devices. The interviewed teachers had very limited previous experience teaching with technology, which may have hindered their performance in class. Findings indicate that, according to the teachers, there were challenges in the classroom because the students had no previous contact with technology and were anxious to use the tablets. These constraints were mostly experienced by the older students in the program due to their limited skills to manage the tablet. In fact, findings show that some of the teachers opted not to use the tablets to teach their classes and resorted to more traditional ways of teaching.

Findings show very similar patterns in regards to the *complexity* attribute of innovation in both, teachers' and students' perceptions. It is evident that all the participants in this study acknowledged the difficulties many of them faced when first introduced to the tablets and ICT tools integrated into the program to teach and learn. In the student's case, the vast majority did not have contact with an ICT device before the program. The main constraint, as was stated in the teachers' findings discussion, relates to the students' extremely limited knowledge of the tablets' functioning and the way to use them. Findings show that some students, mainly the older students, encountered many difficulties at the beginning, during, and even, after the program to use the tablets. In fact, many of them asserted that they did not feel confident yet to use the tablets at the time of our interview that was held a few months after the program had finished. It is possible that these students and teachers preferred to use other tools to learn and teach as was stated during our conversations.

The following table summarizes the previously discussed influencing characteristics identified by the program teachers and students in regards to the *motivation* and *attributes of innovation* aspects of the findings, which are related to research question one.

Table 7.1. Findings discussion on research question 1

<table>
<tr><th colspan="4">How do the program teachers and students perceive the role of ICT tools in their teaching and learning process?</th></tr>
<tr><th colspan="2">Motivation / Self-determination theory</th><th colspan="2">Diffusion of innovations</th></tr>
<tr><th>Extrinsic motivation</th><th>Intrinsic motivation</th><th colspan="2">Attributes of innovation</th></tr>
<tr><td>Teachers' and students' views</td><td>Teachers' perception</td><td colspan="2">Teachers' and students' perceptions</td></tr>
<tr><td rowspan="2">❖ To own a tablet
❖ Opportunity to study
❖ Personal goals (education – work)</td><td rowspan="2">❖ Own enjoyment / satisfaction</td><td>Relative advantage</td><td>❖ Improve class environment
❖ Better than traditional
❖ Digital world/ access to information and knowledge</td></tr>
<tr><td>Compatibility</td><td>❖ Contextualization / language</td></tr>
<tr><td>Students' perceptions</td><td>Students' perceptions</td><td>Trialability</td><td>❖ Flexibility</td></tr>
<tr><td rowspan="2">❖ Contextualization and language
❖ Interactive / interesting classes</td><td rowspan="4">❖ No evidence</td><td>Observability</td><td>❖ Compare / share</td></tr>
<tr><td rowspan="3">Complexity</td><td rowspan="3">❖ Challenges
❖ Difficulties to use</td></tr>
<tr><td>Teachers' perception</td></tr>
<tr><td>❖ Tools to teach and
❖ Access to information and knowledge</td></tr>
</table>

7.2 ICT integration in the indigenous communities

The perceptions of teachers and students about the ICT integration into the indigenous communities are examined in the following section in light of Rogers' *diffusion of innovation* theory. Besides the *attributes of innovations* the analysis also included the *consequences* of innovations explained by Rogers as *"the changes that occur to an individual or a social system as a result of the adoption or rejection of an innovation"* (Rogers, 2003:436). The following sections focus on the discussion about research question two: what are the program's teachers' and students' perceptions on the integration of the tablets in the indigenous communities?

7.2.1 Consequences of innovations

According to Rogers (2003), the possible consequences that results from innovations adoption (or rejection) can be classified in three main categories: *desirable* and *undesirable, direct* and *indirect, anticipated* and *unanticipated* consequences. However, it is important to note that consequences of innovations are unpredictable and depend on many variables such as time and society's characteristics. Rogers argues that it is difficult to measure consequences since individuals have different level of awareness of the possible results that the innovation might bring.

Teachers' perceptions

There is strong evidence in the findings that indicates that teachers perceive the program as an innovation on education for indigenous communities in Guainía. This is relevant in all the interviews conducted with teachers and indigenous leaders. Undeniably, the contextualization, the indigenous languages and ICTs integrated in the adult education program is widely regarded as an innovation and beneficial for indigenous vulnerable communities in this highly unequal and poor region.

Consequently, teachers view the tablets that were given to each one of the program participants as technology tools that, together with the internet and the program software, promoted a sense of advance among the community. The mentioned perception by teachers seems to relate to a *desirable consequence* of the innovation, which relates to the functional effects of an innovation for a person or a society (Rogers, 2003). In this study, findings indicate that teachers perceive the tablets use in the communities as functional and beneficial.

The aforementioned factors belong to the *relative advantage* attribute of innovations and *direct consequence* of innovations. This is because teachers not only identify various benefits of the integration of ICTs in the program, but also relate these benefits directly with the tablet use in the communities, thus perceived as a *direct* consequence of the innovation. Findings reveal that to show and share knowledge about the indigenous communities through the use of the technology was also viewed as an advantage of the ICT tools and a *desirable* consequence, because according to the participants, they could share their cultures and worldviews with others to promote knowledge about their realities and make their needs visible.

Students' perceptions

Findings indicate that the integration of the tablets in the communities prompt families and individuals to interact and cooperate with each other, which is perceived as a *desirable consequence*. When using the tablets at home, program students could join together with their children, relatives and other community members. These reunions facilitated the interaction among families and friends in the process of learning how to use the tablets, the software and the internet. Furthermore, students in the program were able to engage their kids into learning together, forging family cooperation and unions. This is also a *direct consequence* since interactions with families started to occur as soon as the tablets were given to the students, this means that people in the community were highly curious and eager to see the tablet, learn how to use it, see its contents and study with it. Findings also suggest that the fact that older members in the society were trying their best to learn and study was perceived as an example for younger generations on the importance of learning new things and the efforts they were making to study and use technology.

The access to information and communication, as was previously highlighted by the teachers, is also an important characteristic of the integration of the tablets in the community according to students. The possibility to enter the digital world, to be able to communicate with others and share information is definitely a *desirable consequence* perceived by the students. This relates to the *anticipated consequences* since, the programs' objective included to welcome students to the digital and the literacy culture simultaneously. This means that the integration of the tablets and the use of internet were previously expected to enhance participants' opportunities to access information and become aware of the different facilities and connectivity that the people can have with others through the use of ICTs.

7.2.2 **Tensions**

Despite the previous positive perceptions about the ICTs integration in the indigenous communities, findings also show that the participants perceive *undesired, indirect* and non-*compatible consequences* of this integration in the program. These factors specifically relate to the extensive effects that the technologies may have brought to the communities. Teachers tend to illustrate these constraints by mentioning that since young members had more facilities to use the tablets and connect to the internet, their interest to perform other activities, such as food and art craft production, that are relevant for the community's functioning and their cultures lowered.

Findings on students' data show similar perceptions in regards to the extensive influence that the tablets might have brought to the indigenous communities. This is clearly related to the *undesirable* and *indirect* consequences of the integration of the tablets in the communities. According to Rogers *undesirable consequences* are *"dysfunctional effects of an innovation to an individual or to a social system"* (Rogers, 2003:442). Findings suggest that students' main concern relies on the use that many members of the community; especially the young people, have with the tablets in conjunction with other technologies, such as the internet, TV, mobile phones, etc. These perceptions are shared mainly by older program students who are parents and/or leaders in the communities. According to these students extensive influences of technology are a community concern since young people are not following their traditions and do not wish to replicate their culture so their cultural heritage could be endangered.

However, it is important to note that these undesired effects are not exclusive consequences of the ICT tools integrated in the program, but probably to the constant contact of the communities with TV, movies, internet and in general many other interests that the young people may have. Findings do not evidence that the lack of interest to perform these activities and contribute to the communities' chores is closely related to the time spent by the young members using the tablet and navigating the internet. Rather findings certainly show how students shared their concern and critiqued these undesirable and indirect consequences of technology in their communities. Nevertheless, one can argue that the tablets could have contributed to this tension since they were massively integrated in the communities and people could use them frequently.

Regarding this tension, some of the participants consider that the integration of ICTs in their communities should be carefully planned in agreement with their leaders, bearing in mind

their culture and traditions so a proper introduction to the communities can be conducted. Findings show that the students consider the integration of technologies to be beneficial for the communities in various ways. However, they argue that consultation and revision is required so the impacts on the society are minimized and the integration can rather contribute to the communities' survival, visibility and development.

The following table summarizes the aforementioned factors in regards to *consequences of innovations* that are related to research question two.

Table 7.2: Findings discussion on research question 2

What are the program teachers' and students' perceptions on the integration of the tablets in the indigenous communities?		
Consequences of innovation		
Positive perspectives (Desirable – direct – unpredictable		Tensions (Undesirable – indirect – unanticipated)
Teachers' perceptions • Innovation • Digital world • Access to knowledge	*Students' perceptions* • *Family interactions* • *Engage in learning environments* • *Example for younger ones* • *Easy access to information and knowledge* • *Digital world* • *Spread knowledge* • *Make the culture visible*	*Teachers' and students' perceptions* • Extensive influence of the technology in the communities • Lack of interest on the traditions • Cultural loss

7.3 Conclusion

From the onset, this study operated on the clear intention to examine and understand how the program teachers and students perceived the role of ICT in their education and communities. However, the fact that the program was suspended few months before the fieldwork considerably limited a direct contact with the classes in order to obtain first-hand information on the interactions students and teachers had with the ICTs in and outside the classroom. This is the reason why findings in this study strongly focus on the perceptions that participants remembered in regards to the use of the tablets in classroom and their overall impact on the class environment. As opposed to a detailed description on how participants viewed the ICTs role to teach and learn concepts, topics and ideas. Nevertheless, this study accounts for the program teachers' and students' conceptualization and ideas about the technology use in the adult education program and its integration in their indigenous communities.

This study found that in both, teachers' and students' understanding the ICTs integration in the program played a very important role on the motivation that drove participants to enroll, study and complete their education. Participants spoke a great deal of the ICT tools direct influence on teachers' and students' motivation to plan, teach, study and participate in the classes within the program. In addition, findings indicate that ICTs improved class environment because participants perceived that classes were more engaging, interactive and dynamic, thus, they felt highly motivated to attend and learn.

On the other hand, findings do not show significant differences on the attributes that teachers and students assigned to the ICTs integration in the program. The factors that influenced participants' perceptions show a predominantly positive view of the integration of tablets, video-beams and the internet in their education. Specifically, findings majorly highlight participants' views on the class environment, the contextualization and language integration, and the tablet's perceived flexibility as positive attributes of the ICTs innovation. These are understood as advantageous, compatible and relevant for the education process within the program. Despite these perceptions, it is important to indicate that the *Transformemos* program in Guainía involves an intricate fusion of factors, for instance, the contextualization and language inclusion, the integration of the ICTs and the program's status as the only opportunity for participants to study at the moment. Therefore, these factors were highly interconnected in a way that is unique for the specific participants in Guainía. Hence, findings do not detach one factor from the other. On the contrary, participants' perceptions on the integration of ICTs in their education seem to merge these mentioned factors.

The other significant thing that emerged from this study was the participants' perceptions on the integration of ICTs in their indigenous communities. Findings show that participants hold positive views in regards to the tablets integration in their communities. Various consequences resulted from the integration of the tablets in the indigenous communities. To have easy access to knowledge and information, the inclusion of the communities in the digital culture and cooperative interactions among family members around the use of the tablets are some of the examples of these consequences. However, this study found that participants perceived several constraints and consequences of the ICTs integration in their communities that are related to the perceived negative extensive effects of the use and/ or misuse of ICTs by members in the community, which might endanger indigenous cultures and worldviews.

This study's findings while neither widely generalizable nor easy to practically apply to other contexts, can provide useful knowledge for program developers, government officials, and policy makers to understand and consider the factors that may be relevant for the integration of ICTs into indigenous adult education and indigenous communities. In general, findings show and overall understanding of the *Transformemos* program and the ICTs integration from participants' voices and interpretations. In order to develop a more holistic understanding of this issue, further research is needed to explore impacts of ICT in the actual cognitive processes of the participants and a detailed and extended approach is required in order to understand wider impacts of ICTs and technology in indigenous communities.

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Appendix I.

Interview guide for students

The aim of my research study and this conversation is to get more familiar with your perceptions and experiences in regards to the *Transformemos* adult education program you have followed. *This is not,* in any case, and evaluation of your performance, the program, the school or the school teachers. I am interested in knowing your perspectives about the program, the integration of ICT into it and the influence it has had in the indigenous communities. That is why I kindly ask you to answer the following questions.

1. **Background**

a) Age

b) How do you define your ethnic group?

c) What formal schooling grades have you completed?

d) What cycle have you completed with the *Transformemos* program?

e) What cycle of the *Transformemos* program are you following now?

1. **Aim 1**: Perceptions on ICT in education (RQ 1: **How do the program teachers and students perceive the role of ICT tools in their teaching and learning process?)**

a) What languages do you speak?

b) Did you study before? What grade did you finish? Why did you drop-out?

c) Can you describe in *Transformemos* adult education program you attended and what do you think about it?

d) Can you think back of the time when you were in the program:

- Describe how the communication among you, your classmates and teachers was?
- How did (or did not) the use of the tablet computer enhance your understanding on the topics presented?
- How did (or did not) the use the interactive classes with video beams and the internet enhance the classes?
- What can you say about the classes with the program?
- What did you like the most about the classes? Explain further.
- What did others say/comment about the ICTs in the classroom?

e) Can you describe the ICT tools that were used in the program (tablet-computers, video beams, and Internet)?

f) What did you know (if anything) about a tablet-computer, video beam and the Internet before the program?

g) What can you say about the ICT tools from the program?

h) How did you feel when the ICT tools were introduced to you in the classroom?

i) Could you make use of the ICT tools outside the classroom context? When? Where? How?

j) How did the integration of ICT in the program benefit your learning process and in what way was it challenging?

- If there were challenges, what was the biggest one? Why? How did you overcome it (if so…)?
- How would you describe the role of the ICT tools (tablet-computers, video-beams, Internet) in your learning process?
- What can you say about your learning process during the program?

a) What do you think was the purpose of including ICT as a tool for learning in the program?

- What did you expect from the course?
- What do you think the teachers and the program directors expected from it?

Aim 2: ICT integration in the community. (RQ2: **What are the program teachers' and students' perceptions on the integration of the tablets in the indigenous communities?)**

a) What kind of activities did you do with the tablets outside the school?

b) How can you describe your experience with the tablets?

c) What have been the reactions in the community in regards to the tablets and technology?

d) How do you perceive the integration of the tablets in your family/community?

e) Can you tell me some specific experiences with the tablet (and technology) in the community?

f) Did you take the tablet everywhere? Do you still have the tablet?

g) Do you know how to operate the tablet and the software?

h) Can you connect to the internet at home? If not, where?

i) Explain how you use the tablet. What do you like the most about it?

j) Are there things you don't like about technology? What could those things be?

Appendix II.

Interview guide for teachers

The aim of my research study and this conversation is to get more familiar with your perceptions and experiences in regards to the *Transformemos* program you have worked with. *This is not,* in any case, and evaluation of your performance, the program, the school or the students. I am interested in knowing more about your perceptions on the program, the integration of ICT into it and the influence it has had in the indigenous communities. That is why I kindly ask you to answer the following questions.

1. **Background**

a) Age

b) Job title (role)

c) Ethnic affiliation

Aim 1: Perceptions on ICT in education (RQ 1: **How do the program teachers and students perceive the role of ICT tools in their teaching and learning process?)**

a) What languages do you speak?

b) Can you describe the *Transformemos* adult education program you worked for and what do you think about it?

c) Can you think back of the time when you worked in the program:

- Describe how the communication among you and your students was?
- How did (or did not) the use of the tablet computer enhance your teaching practices?
- How did (or did not) the use the interactive classes with video beams and the internet enhance the classes?
- What can you say about the classes with the program?

- Can you explain how you planned your classes? Did you use the tablets to do?

- What did you like the most about the classes? Explain further.

- What did others teachers say/comment about the ICTs in the classroom?

d) Can you describe the ICT tools that were used in the program (tablet-computers, video beams, and Internet)?

p) What did you know (if anything) about a tablet-computer, video beam and the Internet before the program? Have you use technology to teach?

q) What can you say about the ICT tools from the program?

a) How did you feel when the ICT tools were introduced to you before starting the classes? What kind of training did you receive (if any)?

b) How did you make use of the ICT tools for your classes? Describe one of your classes with the program.

- Would you change something from the classes in the program? What? How?

a) How did the integration of ICT in the program benefit the teaching/learning process and in what way was it challenging?

- If there were challenges, what was the biggest one? Why? How did you overcome it / how did your students overcome it (if so…)?

- How would you describe the role of the ICT tools (tablet-computers, video-beams, Internet) in the teaching process?

- What can you say about your teaching experience during the program?

a) What do you think was/were the purpose(s) of including ICT as a tool for teaching/learning in the program?

- What did you expect from the program?

- What do you think the students, parents and the program directors expected from it?

- Do you think those expectations were accomplished? If so, how…?

a) Can you reflect on the outcomes of the course if you had not been able to integrate ICT in the program?

Aim 2: ICT integration in the community. (RQ2: **What are the program teachers' and students' perceptions on the integration of the tablets in the indigenous communities?)**

a) What kind of activities did students do with the tablets outside the school?

b) How can you describe your experience with the tablets? And the students experiences?

c) What do you think have been the reactions in the community in regards to the tablets and technology?

d) How do you perceive the integration of the tablets in your family/community? Have you heard some comments from other members in your community?

e) Can you tell me some specific experiences with the tablet (and technology) in the community/ at home / with others?

f) Did you take the tablet everywhere? Do you still have the tablet? Do you currently use it?

g) Can you connect to the internet at home? If not, where?

h) Explain how you use the tablet. What do you like the most about it?

i) Are there things you don't like about technology? What could those things be?

Appendix III.

Interview guide indigenous leaders

The aim of my research study and this conversation is to get more familiar with your perceptions and experiences in regards to *Transformemos* program in your community. I am interested in knowing more about your perspective and experience in regards to the program, the integration of ICT into it and the influence it has had in the your indigenous group (at the family and community level). That is why I kindly ask you to answer the following questions.

2. **Background**

a) Age

b) Ethnic affiliation

Aim 1: The role of ICT in the program (RQ 1: **How do the program teachers and students perceive the role of ICT tools in their teaching and learning process?)**

a) What did you know (if anything) about a tablet-computer, video beam and the Internet before the program?

b) How did your child/children make use of the tablet-computer at home? Did you ever participate in any activity or homework with your child/children? Can you describe how it was?

c) How did the integration of ICT in the program benefit your child/children learning process and in what way was it challenging?

d) Follow up question if required: How would you describe the role of the ICT tools (tablet-computers, video-beams, Internet) in your child/children learning process?

a) What do you think was/were the purpose(s) of including ICT as a tool for teaching/learning in the program?

e) What did you expect from the program?

- What do you think the students, teachers and the program directors expected from it?
- Do you think those expectations were accomplished? If so, how…?

a) Can you reflect on the outcomes of the course if ICT was not integrated in the program?

Aim 2: ICT integration in the community. (RQ2: **What are the program teachers' and students' perceptions on the integration of the tablets in the indigenous communities?)**

a) What kind of activities did students do with the tablets outside the school?

b) How can you describe your experience with the tablets? And the students experiences?

c) What do you think have been the reactions in the community in regards to the tablets and technology?

d) How do you perceive the integration of the tablets in your family/community? Have you heard some comments from other members in your community?

e) Can you tell me some specific experiences with the tablet (and technology) in the community/ at home / with others?

f) Did you take the tablet everywhere? Do you still have the tablet? Do you currently use it?

g) Can you connect to the internet at home? If not, where?

h) Explain how you use the tablet. What do you like the most about it?

i) Are there things you don't like about technology? What could those things be?

j) Have you had meetings with others leaders in the community where you discuss this topics? If so, can you explain a bit further?

k) How do you perceive the use of technology in your community?

Appendix IV.

Interview guide for local government representative / civil society organization director.

The aim of my research study and this conversation is to get more familiar with your perceptions and experiences in regards to the *Transformemos* program that has been implemented in Guainía with indigenous youth and adults. *This is not,* in any case, and evaluation of your performance, the program, the school, the teachers or the students. I am interested in knowing more about the program, the integration of ICT into it and the influence it has had in the indigenous communities. That is why I kindly ask you to answer the following questions.

1. **Background (**Real personal names and positions will be displayed only with the participant consent)

Name
Institution
Job title (role)

Aim 1: The role of ICT in the program (RQ 1: **How do the program teachers and students perceive the role of ICT tools in their teaching and learning process?)**

a) Can you describe the ICT tools that were used in the program (tablet-computers, video beams, and Internet)?

b) Can you explain further the training processes that were offered to the teachers and the school directors (if any)?

c) Describe one of the classes with the program.

f) Would you think of something to improve the program? What? How?

a) How did the integration of ICT in the program benefit the teaching/learning process and in what way was it challenging?

g) If there were challenges, what was the biggest one? Why? How were they solved (if so…)?

- How would you describe the role of the ICT tools (tablet-computers, video-beams, Internet) in the teaching/learning process?
- What can you say about the general outcomes of the program so far?

a) What was/were the purpose(s) of including ICT as a tool for teaching/learning in the program?

h) What did you expect from the program? / What did the MoE expect from it?

- What do you think the students, parents, teachers and school directors expected from it?
- Do you think those expectations were accomplished? If so, how…?

a) Can you reflect on the outcomes of the program if ICT was not integrated?

Aim 2: ICT integration in the community. (RQ2: **What are the program teachers' and students' perceptions on the integration of the tablets in the indigenous communities?)**

a) What do you think have been the reactions in the community in regards to the tablets and technology?

b) How do you perceive the integration of the tablets in the indigenous commmunities?

c) Have you heard some comments from members or leaders in the community?

d) How did the *tranformemos* foundation perceive the experience in Guainía?

- What kind of things could have been improved?
- Did the foundation foresee possible constraints of the ICT integration? Which ones? If so, how the foundation tackled them?
- What other programs have the foundation conducted in the country?

Appendix V.

Written consent

Consentimiento informado para participar en el proyecto de investigación

Integración de herramientas TIC (Tecnologías de la Información v comunicación) en el programa interactivo transformemos para comunidades indígenas en Guainía, Colombia,

INTRODUCCION

Para mí, Viviana Daza R. estudiante de maestría en educación de la universidad de Oslo, Noruega es un placer invitarle a participar en el presente proyecto de investigación avalado por la Universidad de Oslo y que hace parte de la Maestría en educación Internacional y Comparada de la facultad de educación de la misma universidad.

El objetivo de este estudio es conocer sus experiencias y percepciones en relación al programa interactivo transformemos. También es de gran importancia para este estudio entender la relación que tiene la integración de herramientas TIC y en las comunidades indígenas de la región.

La decisión de hacer parte o no en este estudio es totalmente suya y podrá en cualquier momento del proceso desistir y no participar más del mismo,

Si usted decide participar de este estudio, usted será invitado a contestar una entrevista con la investigadora. Dicha entrevista puede tomar entre 30 y 45 minutos. Las preguntas están relacionadas con los objetivos de la investigación y buscan ahondar en sus visiones y experiencias con el programa interactivo transformemos

La participación en este estudio no supone ningún tipo de riesgo, El hecho de participar contribuye a la creación de conocimiento y a la propagación de las comunidades indígenas y sus necesidades educativas únicas, plasmadas en la constitución nacional de Colombia y en tratados internacionales.

Sus nombres, identidades y cualquier otro tipo de información personal serán confidenciales y únicamente administrados por la investigadora, lo que prevendrá la promulgación de los mismos.

Si el participante es menor de edad sus padres o representantes legales deberán leer y firmar este consentimiento para que sus hijos puedan ser partícipes de este estudio.

A continuación, yo _____doy consentimiento sobre la información que me ha sido suministrada y voluntariamente deseo participar del proyecto de investigación al que he sido invitado. Entiendo que en cualquier momento del proceso puedo desistir de mi participación,

Firma: _____ Fecha: _____