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Cover Page Footnote

The authors would like to thank Michelle Allen and Victoria Douglas, graduate students at the University of Central Arkansas, for their help in the preparation of this manuscript.

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ABSTRACT

The skills related to the use of information and communication technologies (ICT) were examined in this study within the context of eight communities with a high degree of vulnerability and diversity. The objectives of the study were: a) to conduct a diagnosis of thirteen competencies related to the use of ICT in eight Mayan-speaking communities in the state of Yucatan, Mexico, and b) to examine such variables as gender, marital status, and the education level of their parents. in relation to the degree of ICT among these youth.

The findings indicate that there are differences in the use of technology among the eight communities that participated in the study. Specifically, it was found that the greatest social inequality associates to the lowest performance in the thirteen skills related to ICT. Research also discovered that gender and the marital status of the subjects, as well as the schooling of their parents, related to the ICT competencies.

The findings of the study will add more values to ICT related research, especially in the socioeconomic status of the indigenous community and/or some of their

personal backgrounds. It could also be used to design training strategies to overcome the most pressing needs of the subjects in the area of ICT.

KEYWORDS: Information and Communication Technology. ICT, ICT Competencies, Factors Affecting ICT, and ICT and Social Environment.

INTRODUCTION

The term competence comes from the field of linguistics, with the studies from Noam Chomsky between 1965 and 1966 (Chomsky, 1965, 1966). In his studies, Chomsky presented the theory about language and mind. According to specialists, in his eagerness to identify the object of study of the constructed linguistic, Chomsky found that the concept of linguistic competence had the purposes of giving identity to a set of knowledges and laying the foundations on the processes. He would later build his future lines of study based on this theory (Diaz Barriga, 2005). According to Bustamante (2003), Chomsky began the generalization of the use of the term when applied to different areas of competence. For example, term competence is greatly used in the following fields: ideological competence, communicative competence, encyclopedic competence, and discursive competence. After discursive competence, the original meaning of the term becomes ambiguous and lost.

In the late seventies, as a result of his research, David McClelland (1973, 1975) started to use the concept of competency to identify the variables that explain job performance, thus questioning the adequacy of traditional and standardized testing to predict job success. As a result of his studies, he found that in order to better predict job success, it is necessary to directly study people in their actual context of work. He then compared the characteristics of those who are successful workers with those of average workers.

As a product of the globalization and internationalization in the eighties and nineties, the concept of “job success predictors” was applied to the labor markets which influenced the majority of the professionals making up the labor world. This concept values the possibility of improving the conditions of efficiency, relevance, and quality in professional training. The United States, England, France, and Canada are clear examples of this philosophy. This confirms that in today’s globalized world, societies must train people to be competent and communities to be competitive in the global market.

Likewise, Romainville (1996) reminds us that the French word *compétence*, meaning the ability to perform a certain task, was originally used in the scope of professional training. Nowadays, Diaz Barriga (2006) indicates that very diverse formulations and expressions of competencies can be found in the field of education. Among these expressions are training processes, curriculums, and educational initiatives based on the competency approach. Therefore, the competency-based perspective is a goal of education with the promises of better academic training processes.

On the other hand, according to Gimeno, Perez, Martinez, Torres, Angulo, and Alvarez (2009), everything we know about competencies is the product of diagnoses and information about the state of national educational systems from some prestigious foundations. But like many of the concepts we use to try to define human phenomena such as collaborative learning and social participation, competence is a term that is difficult to define in spite of the multiple definitions and academic attempts of consensus from researchers and scholars.

Competence relates to personal attributes, the tasks to be performed, the characteristics of the workplace, and the culture of the organization (personal and cultural attitudes, beliefs, and values). Likewise, Bernal and Teixidó (2012) say that because of its connotations, we are dealing with a polysemic term. They agree that "language is not innocent" and is correlated with the characteristics and context of the society in which it is used (Gimeno, Pérez, Martínez, Torres, Angulo and Álvarez, 2009).

In a first approach to understand the term competence, from the educational literature point of view, it can be observed that the term is usually accompanied by the following adjectives: specific, cross-sectional, professional, educational, emergent, technological, basic, etc. All are competencies but are different shades of the same idea of competence within the framework.

Along the same idea, this project delves into further understanding the impact of technological competencies on the improvement of knowledge, abilities, and attitudes of the people living with a high degree of vulnerability and diversity. The purpose of these studies is to share knowledge and to identify strategies to satisfy some of their more urgent necessities.

In this regard, at the fourth international conference, Björn-Sören (2004) presented a paper on the abilities approach titled: *Including the Excluded- Can ICTs empower poor communities?* In his work, the author discusses the conditions in which information and communication technologies (ICT) can empower poor

communities. The paper focuses on the role of ICT in the promotion of indigenous town development in Latin America by providing these towns with tools for situation analyses and strategic development plans. These tools also include guidance on how to define their own strategies of development. The document analyzes the key factors for which information and knowledge can be instrumental and fundamental for the empowerment of marginalized groups. They argue that better access to information and ICT skills is related to an improvement in the community's writing and reading skills. Furthermore, they claim that better access is also associated with an improvement in strategic decision-making abilities of poor people. These skills help the poor communities make progress toward their desired lifestyles.

On the other hand, the United Nations Educational Scientific and Cultural Organization (UNESCO, 2008) published a manual of vocational abilities based on technology for marginalized children and young women who did not attend school. The training program piloted activities of scientific, technical, and professional education in four secondary schools in the Indonesian province of West Nusa Tenggara. The program was implemented with the cooperation of many groups including a non-government organization for the development of women, the University of Mataram's training center for women, the local communities from which the children and young women came from, and some additional companies offering learning courses. The results showed that the pilot program was an effective model for extending the role of the technical and vocational schools to aid the development of short-term, non-formal vocational and technical abilities for marginalized children and young women who do not attend school.

Romero, Dominguez and Guillermo (2010), Domínguez, Cisneros and Cab (2017), and Domínguez, Vázquez, Suaste and Cab (2016), all documented, from different municipalities of the State of Yucatán, that the use of ICT at different levels and educational systems has a significant impact on the development of student learning and the strengthening of their life and work skills. These life and work skills improve the municipalities' knowledge and opportunities. In this study, the authors researched how young people and adults used ICT. The participants had acquired their elementary education by virtual and online modules through the Education for the Life and Work Model (MEVyT) in rural and urban communities of the State of Yucatan (Diario Oficial de la Federación, 2007). This study documented the opinions young persons and adults have regarding their skills in using ICT, the virtual and online modules, and the difficulties they face as users. This module found that, in general, the youngest people are the most likely to continue their basic education. This study also documented that the modality used by the majority of young adults was online for the following reasons: the data manager, the ability to

record the progress of the teaching-learning process in a digital folder, and the more complete modality compared to the virtual modality which used digital materials with the help of a tutor.

In Australia, Boyle and Wallace (2011) state that the potential the e-tools, e-media, and e-learning have to support the objectives of the indigenous peoples, their communities, and their organizations for cultural, social, and economic sustainability is a goal that is not yet realistic, especially in the most remote parts of Australia. In this work, the authors acknowledge the major barriers in the use of ICT and demonstrate the potentially important role in the development of learning spaces, networks, and resources for indigenous peoples. In this study, researchers from the *Desert Knowledge Cooperative Research Center* and the *Social Partnerships in Learning Research Consortium (SPiL)* based at Charles Darwin University explored ways to use emerging technologies (e-portfolios, resource development tools, and networks social) to incorporate and represent the voices of indigenous students in a variety of contexts (Australian Learning & Teaching Council, 2010). The researchers recognize that emerging technologies are powerful tools that can help identify and validate tacit learning, support participation in formal life-long learning, and establish avenues for participation in the labor market. This study provides evidence that the institutions responsible for providing vocational education and training need to take advantage of the potential ICT to offer qualified training and jobs to the indigenous people.

In Rumania, Iancu & Iancu (2017) analyzed the perspective of the elderly in their use of assistive technologies in the digital era. Iancu & Iancu comment that, in the context of an aging population and a greater life expectancy, we can anticipate deterioration of physical condition. A rising life expectancy means a growing need for assistance for longer periods of time, which could become challenging due to limited medical resources. In this context, the assistive technology could operate as a tool for the needs of older adults with health problems. The authors make a theoretical description of the forms in which the elderly can use technology in assistive ways. Starting with the aging of the population and the increase of life expectancy, the paper emphasizes the need to eliminate the pressure on the health system by means of assistive technology usage. Although with this new technology comes anxiety, the elderly can receive significant aid in many different situations- from communication with relatives and friends to monitored health problems.

Finally, in Canada, Hadziristic (2017) published a paper titled: *The state of digital literacy in Canada* through the Brookfield Institute. To strengthen digital competencies, analyses are performed on the digital divide, the dynamics of the genre, and the remote and indigenous rural communities of Canada.

The study uncovers that the first initiatives to approach the digital divide in the remote communities of Canada were centered on finding public Internet access points among the young population of rural communities and strengthening the skills needed to use it effectively (Graham and Hanna, 2011). The authors mentioned that the failures in the digital divide in Canada are caused by its vast land mass and cultural history that documents a strong urban/rural divide. An issue of the urban/rural divide is that has excluded indigenous, low-income families and the French-speaking people. Howard, Busch & Sheets (2010) describe two early governmental policies (*Gathering Strength and Connecting Canadian*) aimed to offer local Internet to the indigenous communities in the libraries and schools, to finance indigenous content, and to finance policy programs that offer French content and online bilingual resources.

In the scores obtained from some indigenous populations and immigrants (in Ontario), the study reveals differences between the urban and rural areas in cognitive, arithmetic, and problem-solving abilities. Similarly, the study shows the clear exclusion of the indigenous populations in ICT degrees such as Sciences, Technology, Engineering and Mathematics (STEM). Furthermore, the study shows that matriculation and graduation rates of the natives are only 3% in ICT and 3.7% in STEM (ICTC, 2016).

Other related studies document the improvement in technological competences in vulnerable communities. For example, McMahon, LaHache & Whiteduck (2015) document how the data management job for the *Mohawk of Kahnawà* community and the digital tools usage endorse autonomy and self-government in education. Similarly, Gibson, Kakekaspan, Kakekaspan, O'Donnell, Walmark & Beaton (2012) found that the native community of *Fort Severn* has used ICT tools efficiently to offer services and to improve jobs and daily life. In another study about the use of ICT in the north of Ontario, Walmark, Gibson, Kakekaspan, O'Donnell, & Beaton (2012) found that the digital divide between the indigenous groups was smaller than between the population in general. These results suggest a more democratic dispersion of technology. On the other hand, Carpenter, Gibson, Kakekaspan, & O'Donnell (2012) found that the women in remote and rural native communities are active users of ICT and mainly use it for social communication and the preservation of their culture and history.

The studies at the international level show the importance in the use of infrastructure, digital literacy, and education to overcome exclusion barriers, social inequality, and poverty in the indigenous contexts of the world. These studies also show the significance of government financing cooperation in improving the living

conditions of rural communities and developing relevant content to promote their inclusion.

METHOD

Both applied and field methods of research were used in this project. The purpose of this study was to uncover further knowledge and data concerning the use of ICT competencies in participants from eight communities in the southeastern part of Mexico. The populations varied in size, educational services, and language (some spoke Mayan and some were bilingual in Mayan and Spanish). The objectives of the study were: a) to design a diagnosis of thirteen competencies related to the use of ICT in eight Mayan speaking communities in the state of Yucatan, and b) to realize the degree of familiarity with ICT in relation to variables such as sex, civil status, and parental maximum education level. This study was part of a larger project with a purpose of reducing the digital breach among people in vulnerable communities south of the Yucatan by strengthening their digital competencies in the use of Information and Communication Technologies.

This study included 425 participants from eight communities in the state of Yucatan (see Table I). The total numbers of male and female participants were 210 (49%) and 215 (51%), respectively. The age of the participants ranged from 13 to 53 years old, with an average age of 14.87 years old. The maximum level of education of the participants had the following distribution: 159 with a primary level of education (37.4%), 264 with a secondary level (62.1%), and only 2 with a preparatory level (0.5%). The marital status of the participants was as follows: 397 (93.4%) unmarried, 12 (2.8%) married, and 16 (3.8%) in a consensual union.

Table 1. About the participants.

Region	Town	Participants	Men	%	Women	%
II	Acanceh	57	23	40.4	34	59.6
II	Abala	54	30	55.6	24	44.4
III	Homún	44	21	47.7	23	52.3
III	Cuzamá	48	26	54.2	22	45.8
I	Hunucmá	40	16	40	24	60
VII	Ticul	46	24	52.2	22	47.8
II	Tecoh	52	28	53.8	24	46.2
III	Mayapán	84	42	50	42	50
Total		425	210	49%	215	51%

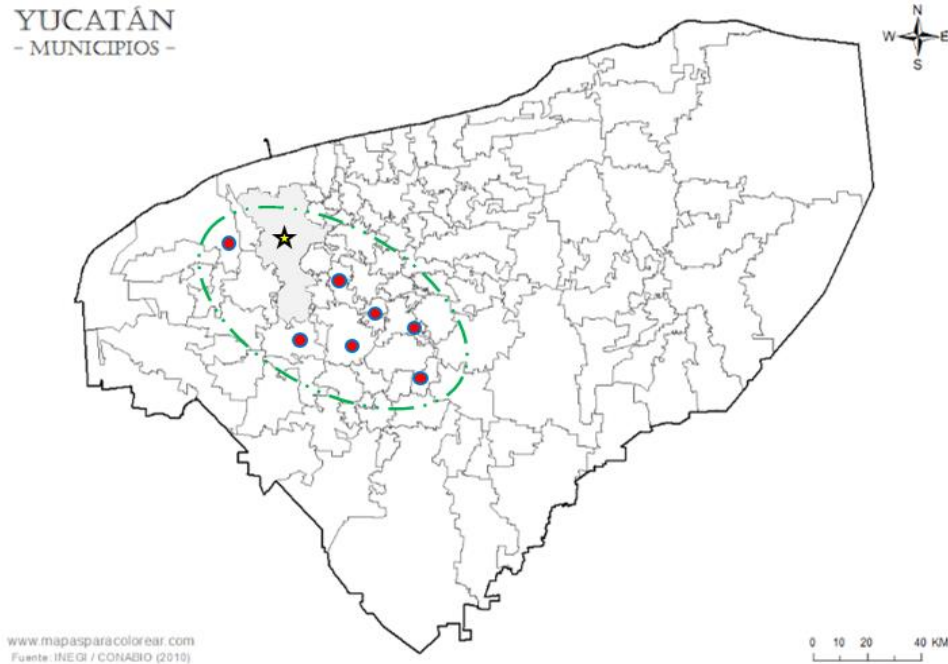
Regarding the level of education of the participants' mothers, 74 (17.4%) declared that their mothers did not have any type of education, 197 (46.4%) said their mothers had a primary level, 127 (29.9%) said their mothers had a secondary level, 22 (5.2%) said their mothers had a high school level, and only 5 (12%) said their mothers had a university level. These responses show that on average, the highest schooling of the participants' mothers reaches a primary level. In contrast, the differing educational levels of fathers were: 76 (17.9%) of fathers did not have any type of education, 154 (36.2%) had a primary level, 150 (35.3%) had a secondary level, 31 (7.3%) had a high school level and 14 (3.3%) of participants said their fathers had a university level of education. This illustrates that, like the mothers, the average schooling of the fathers is at the primary level.

Another important characteristic of the study comes from the participants' towns. Of the eight contributing communities, most of the participants came from towns with different levels of social inequality including: very low (Ticul), low (Acanceh and Hunucmá), medium (Abala, Homún, Cuzamá, Tecoh), and high social inequality (Mayapán) (Consejo Nacional de Población, 2010). To better illustrate these areas, a map of the state of Yucatan and the municipalities located in the different levels of marginalization is included (see figure 1). The figure below illustrates the municipalities in the state of Yucatan with their different level of social inequality.

Table 2 Community Number, Name, and Level of Inequality in the Study

Number	Name	Level of Inequality
C ₁	Acanceh	Low
C ₂	Abala	Medium
C ₃	Homún	Medium
C ₄	Cuzamá	Medium
C ₅	Hunucmá	Low
C ₆	Ticul	Very Low
C ₇	Tecoh	Medium
C ₈	Mayapán	High

Figure 1. Level of social marginalization by township. Participant towns
 Source: Estimations of Conapo based on the XIII Census of Population and Housing 2010 (INEGI, 2010).



Instrument:

Demographic information, as well as other relevant personal factors, was taken into consideration to help design the instrument. The instrument gathers data using a Likert scale with values ranging from zero to five. In this scale, the participants were instructed to self-assess their personal competency level (CCC) using the ascending 0-5 numeric scale. They were also asked whether they believed employing the competence would aid in getting a job (CICT) and if they would be interested in learning that specific competency (EIA). In the table, CICT and EIA are two dichotomized questions with yes/no answers (see Figure 2).

Figure 2. Example of an item and the type of answer for each domain.

Competencies	CCC					CICT	EIA	
	0	1	2	3	4	5	[] Yes [] No	[] Yes [] No
DOM. 5. Finding information								
I use several search engines (Google, Firefox, Explorer) to browse the Internet	0	1	2	3	4	5	[] Yes [] No	[] Yes [] No

To design the instrument, the reference for the conceptual basis was built from works by Domínguez, Canto, Ortega, McCalman, (2016), Suárez, Almerich, Gargallo, Aliaga, (2010) and Cano (2005). The instrument is composed of three sections: dominions of competence, the importance for employment, and the interest to learn the competencies (Domínguez, Chen, Ortega and McCalman 2014; Chen, Dominguez and Ligon, 2015). The first section was composed of questions constructed using a Likert scale of primary data collection in a single step with six additional levels denoting participants' perceived competence level. Consequently, with a dichotomous scale, the participant rated both the importance of the competence in obtaining employment and if they would be interested in learning it. Table II indicates our instrument. For some questions of the instrument, please check the appendix of Chen, Dominguez, and Ligon (2015).

Table 3. Cronbach Alpha for Different Sections of ICT

Sections of the scale	Cronbach's Alpha
Dominions of Competence	.979
Importance for employment	.985
Interested in learning it	.959

Instrument administration lasted for three months after which a database was constructed for the diagnostic stage. This stage then analyzed each of the 13 competencies included in the instrument. The results show the frequency of each participant's perceived individual competencies. These results were consistent across researches of Dominguez, Chen, Carrillo, and McCalman (2014) and Chen, McCalman, McMurtrey, Dominguez, and Pech (2017).

RESULTS

The general diagnostic result regarding the thirteen competencies in the eight communities is expressed in Table 3. All alphas in all three areas were reasonable high with .09 or higher.

Table 4. Descriptive Statistics of the Thirteen Competences

Competencies					
Descriptive Statistics					
Domain	Domain name	<i>N</i>	\bar{x}	<i>SD</i>	σ
Competence 1	Computer keys	425	2.67	1.15	1.33
Competence 2	Basic document production	425	2.33	1.20	1.45
Competence 3	Copyright knowledge	425	1.70	1.16	1.36
Competence 4	Software applications	425	2.38	1.46	2.15
Competence 5	Location of ODS	425	2.45	1.40	1.97
Competence 6	Information storage	425	2.52	1.44	2.08
Competence 7	Communication	425	2.92	1.30	1.71
Competence 8	Online interaction	425	2.49	1.41	2.00
Competence 9	Care of personal data	425	2.20	1.34	1.80
Competence 10	Security	425	2.41	1.42	2.02
Competence 11	Risks in using the internet	425	2.47	1.50	2.25
Competence 12	Network interaction	425	2.70	1.38	1.93
Competence 13	Consequences of ICTs to health	425	2.45	1.54	2.38

Descriptive results of thirteen competencies are illustrated in Table 4. It is important to compare self-assessed ICT competencies among Mayan-speaking communities

in Mexico to understand and explain the differences. On a scale from 0-5, means of these thirteen competencies range from 1.70 to 2.92. Relatively, they are all lower competence values than others found in the communities in Mexico. Some points need to be specifically pointed out as follows:

First, in the thirteen competencies, 100% of the participants obtained scores below three, indicating that their competence level was between lacking competency and just having sufficient or regular competencies. As shown from the data, there is room for improvement and enhancement in the aboriginal rural communities of Mexico.

Second, the mean value of the thirteen competences in the diagnosis sample revealed that the competence level for copyright knowledge scored the lowest with values below two. This competency is comprised of the knowledge and ability to identify copyrighted symbols in any program or document, detect when content is protected by copyright, and understand the consequences of downloading protected digital Internet content.

Third, the competence with highest scores in the diagnosis was “communication,” which involves the knowledge and skills necessary to send and receive cellular SMS messages, exchange information via email, chat through applications such as WhatsApp, and participate in social media (Facebook, LinkedIn, Instagram, and Twitter). The data illustrates that communication is the most important and popular competency in Mexico, including the remote areas.

To analyze the performance of each community in the thirteen competencies, the results and scores are presented in Table 5. The data indicate that in the eight participating communities, the third competence of copyright knowledge recorded the lowest values with only one location, Homun, scoring above two.

Table 5. Individual results by community for the 13 competencies

Competency	Variables Domain Name	Communities in Yucatán							
		C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	C ₈
		\bar{x}	\bar{x}	\bar{x}	\bar{x}	\bar{x}	\bar{x}	\bar{x}	\bar{x}
Competence 1	Computer knowledge	2.6	3.3	2.9	2.3	2.9	2.8	2.8	2.0
Competence 2	Basic document production	2.3	2.8	2.7	2.2	2.7	2.3	2.4	1.5
		1	4	0	6	8	9	4	7
Competence 3	Copyright knowledge	1,4	1.8	2.6	1.6	1.9	1.7	1.7	1.1
		1	9	2	5	6	7	1	7
Competence 4	Software applications	2.2	2.9	2.6	2.4	2.6	2.3	2.6	1.6
		7	5	1	7	4	6	8	0
Competence 5	Location of information	2.5	3.1	3.1	2.2	2.5	2.4	2.5	1.6
		2	0	5	4	8	4	5	3
Competence 6	Information storage	2.3	2.8	2.8	2.4	3.0	2.6	2.7	1.6
		9	8	9	8	8	9	5	9
Competence 7	Communication	3.0	3.1	3.3	3.0	3.1	2.9	3.1	2.1
		2	3	1	5	6	9	6	0
Competence 8	Online interaction	2.3	2.9	3.2	2.4	2.8	2.6	2.6	1.6
		9	0	2	2	0	9	2	3
Competence 9	Care of personal data	2.3	2.5	3,0	2.0	2.3	2.1	2.3	1.3
		6	9	1	4	5	3	7	7
Competence 10	Security	2.3	2.7	3.1	2.5	2.7	2.3	2.4	1.6
		6	8	1	2	3	5	9	2
Competence 11	Risks in using the internet	2.5	3.0	3.3	2.4	2.5	2.6	2.6	1.4
		9	0	0	4	6	4	2	4
Competence 12	Network interaction	2.5	3.0	3.2	2.7	2.7	2.7	3.0	2.0
		0	3	9	4	3	6	1	2
Competence 13	Consequences of ICTs to health	2.5	3.1	3.3	2.4	2.3	2.7	2.3	1.4
		9	2	2	5	9	3	7	0

Note: C₁: Acanceh; C₂: Abala; C₃: Homún; C₄: Cuzamá; C₅: Hunucmá; C₆: Ticul; C₇: Tecoh; C₈: Mayapán

In all of the participating municipalities, the highest scoring competence is “communication” including the knowledge and ability to send and receive SMS messages, exchange information by email, and converse through applications such as WhatsApp. Table 5 shows that Mayapán had the largest social gap. The low scores in Mayapán may be attributed to the context conditions that are not shared with any of the other seven communities. More research is needed to explain this.

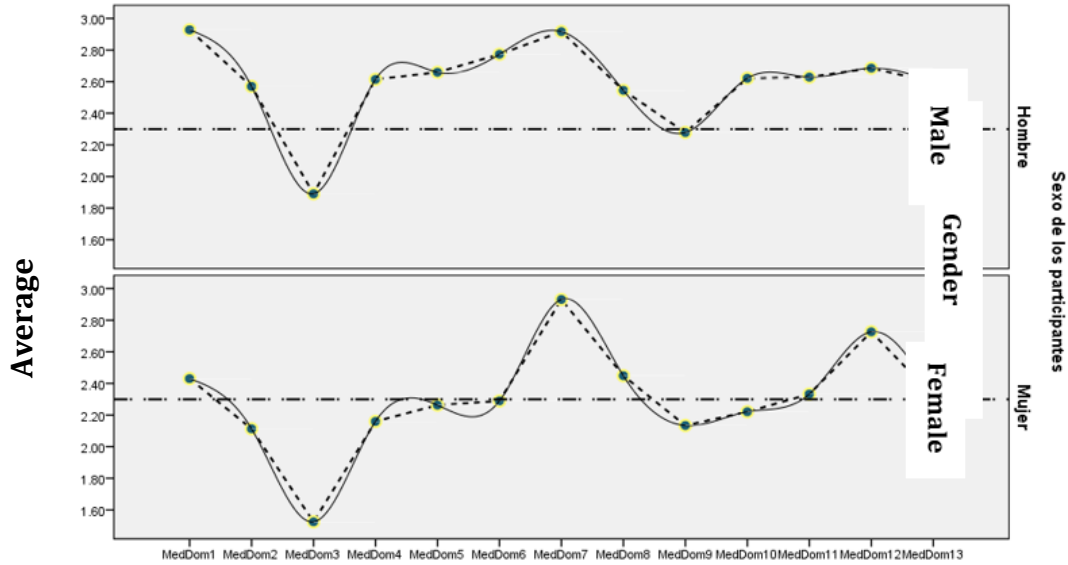
Degree of ICTs Use

Gender

One of the objectives of this study was to find the degree of familiarity with the ICT in relation to variables such as gender, civil status, and parental academic achievement. Each variable is presented independently in Figure 3. Figure 3, shows that the thirteen different competencies differ in the variables between males and females. In the eight communities, the male participants obtained higher scores than their female counterparts. Such behavior is clearly evidenced by the fluctuations of the interpolation lines for both genders.

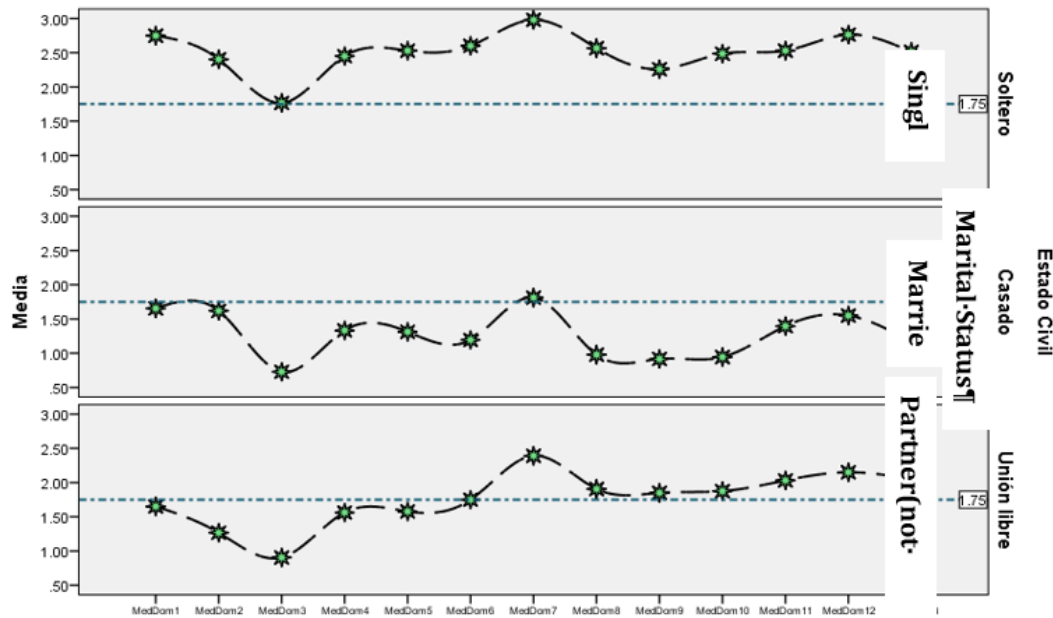
The females have a higher average score than the males in the 12th competency. Interestingly, for competencies 9 (Care of Personal Data), 10 (Security), 11 (Risk), and 13 (Health), males have the higher average competency scores. Similarly, it is also presented that for competencies 4 (Software Application), 5 (Location of Information), and 6 (Information Storage), the males again have higher mean values.

Figure 3. Behavior of all participants in the thirteen competencies by gender



Marital Status

The results of the participants' civil status from the eight communities show the superiority in scoring for single participants as compared to married couples and to those in consensual unions. Considering that individuals from thirteen to fifteen years old represent 83% of the population, it can be said that for the younger generation in Mayan areas, the ICT scores descend as we go from single participants to those living with partners to married participants.

Figure 4. Behavior of participants in the thirteen competencies by civil status

Above, the scores are characterized according to marital status. An important observation comes from the married participants who were only able to score above the mean for one variable. The behavior of this variable can be attributed to the likely responsibilities and commitments (child care, housekeeping, work, cultural roles) of those participants. In contrast, people who are in a consensual union recorded seven competences above the mean value for this variable.

Maximum Degree of Studies of Parents *Maximum school level of the father*

Attention to fathers' educational achievement provided meaningful and relevant analyses for this study. In accordance with the Bandura's statement, environmental incentives can serve as a "set of regulators" in the acquisition of technology (1986). Steinmeyr et al (2010), proved the relation between the schooling level of parents and children's academic success. In this sense, Yu, Yuen & Park (2012) state parents must not be considered only as sole regulators in parental control (a negative control), but also as equipment suppliers and encouragers of home computer usage. The data imply that the higher the level of parental education, the higher the scores of their children's technological usage and ability (see Figure 5).

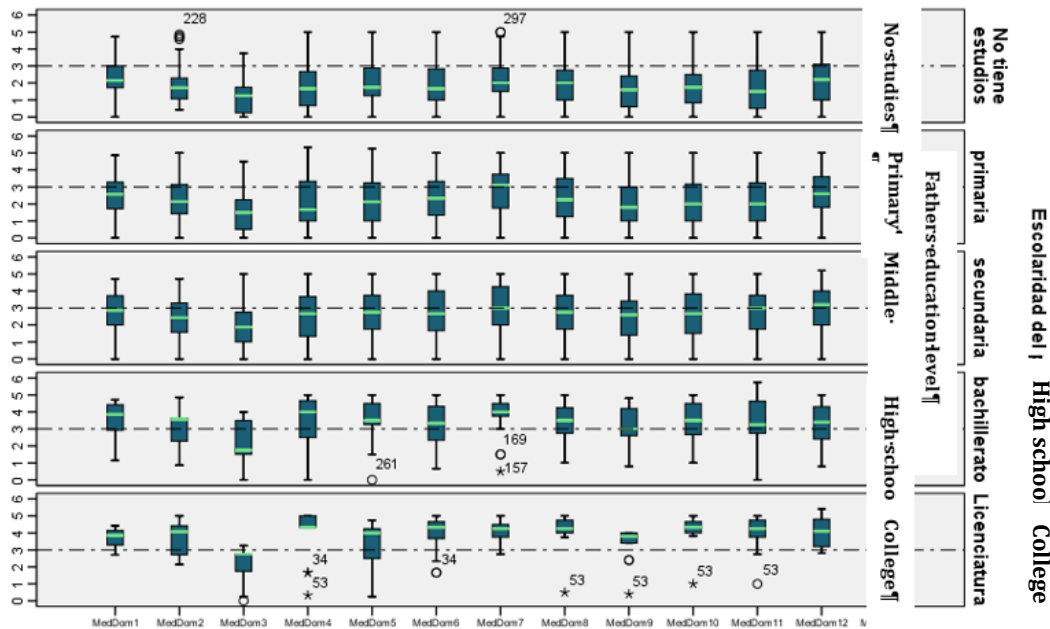
Figure 5. Scattering of scorings by the participants' fathers school level

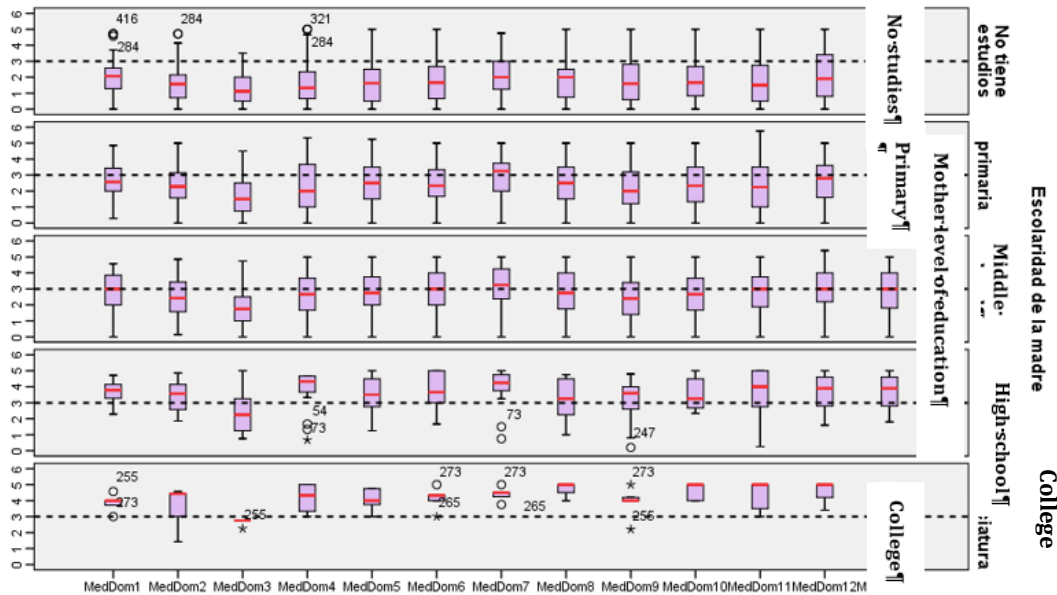
Figure 5 clearly shows that among the 425 participants' behavior, paternal education level plays a big role. Most notably, the scores of the children whose parents lack an educational background do not reach the average levels. Similarly, scores of students whose fathers only have an elementary school level also do not match average scores. Scores begin to improve in mean value for students who have parents with at least secondary school educations. According to Figure 5, when fathers have high school or university degrees, scores are far above the average, indicating superiority with only a few outliers. The positive relationship between paternal education and participant ICT competencies is clearly demonstrated in Figure 5.

Maximum school level of the mother

Because of the absence of research in this influential area, mothers' school level is another relevant variable in this study. This study focused on parental influence on children's technological practices and abilities (Ito, 2010; Yu, Yuen & Park, 2012). This section investigates the relationship between mothers and adolescents; it delves into research in how higher maternal education in use of the Internet, gadgets, smartphones, and tablets can influence adolescents' technological habits.

Gann (2014) mentions this type of study significantly contributes to research on effective relations between parents and adolescents with technology.

Figure 6. Scattering of scorings by the participants' mothers school level



In Figure 6, we see a correlation between higher mother educational background and greater likelihood of children’s technological competence. Children whose parents lack educational backgrounds did not score near the mean in any of the thirteen competencies. When observing the primary school statistic block, one competence reaches the fixed mean (i.e MedDom7). On the other hand, in the third statistic block (secondary) score records indicate that there are five competencies reaching the fixed mean in the population. In the last two statistic blocks of high school and university, the results show at least twelve of the thirteen competency values surpassed the mean with only a few outliers.

CONCLUSIONS

The results of this study showed differences in the technology usages among the participating rural populations. When compared with other populations, communities that identified with higher social inequalities presented lower scores in the thirteen competencies. Similarly, the results display that from the thirteen

analyzed competencies, the competence “copyright knowledge” obtained the lowest scores while “communication” obtained the highest.

Another important aspect of the project was the analysis of the variables: gender, civil status, and parents' education level. With regard to gender, the results showed that males obtained better scores in the diagnosis compared to their female counterparts. However, some coincidences were observed in competencies such as computer knowledge, communication, and interaction in social networks. In essence, the results that were obtained in this section are interesting because they could suggest the presence of a gender digital divide worth addressing. (Dionne-Simard; Galarneau and Larochelle-Coté, 2016; Schinzel, 2017; Powell and Mei Chang, 2016)

Marital status results provided evidence that unmarried individuals have greater familiarity with the use of technology, specifically within the younger generation studied. Since nearly 83% of participants were native youth, the results seem to be predictable and confirmable that civil status can be a factor that influences an individual's use of technology.

Finally, the parents' education level provided predictive information about the participant performance. This study delivered evidence of a positive correlation between higher parent academic performance and improved student technological ability. According to some authors, this study contributed to the research of effective relations between parents and adolescents (Gann, 2014; Yu, Yuen & Park, 2012; Ito, 2010). Lower educational levels of parents and young people in the community also revealed that despite efforts, adequate access to education is still an unaccomplished goal in these populations and therefore an unfulfilled educational right of Mexican citizens living in these conditions.

It is also important to consider additional options for children of parents with low educational achievement and scarce resources. As revealed by studies of the OECD (2012, 2004) the formal education system can offer more options for children than those determined by their social status.

In general, the findings of the study emphasize the importance of the context in the acquisition of digital skills for groups in marginal conditions. Marginalization and social inequality reflect the regional (and national) social disparities and assist researchers in assessing the established criteria of society without considering other forms of cultural and social assets. These findings reveal disparities in the regional society and could unlock paths to both adequate use of cultural capital and competent use of ITC in their specific cultural context.

Various researchers have attempted to analyze the social and cultural capital in relation to higher education and its related competencies (Baumert et al, 2003). Studies have found that within a family's socioeconomic status, the education level and different cultural backgrounds help determine the capacity of consumer goods, and cultural, social and communicative praxis, which are all reflected in the acquisition of competencies.

Extending this model of sociocultural indicators and cognitive biases that lead to decoding competencies and general and specific motivation, disparities appear through accessing the academic formation system and reading comprehension. Previous knowledge and motivation are largely determined by socio-cultural belonging.

Not only do concrete situations and psychological and social skills intervene in skill development, but they are also the options which are visualized in decision making (Baumert et al, 2003: 59). Attempts to define cultural resources include indicators such as a family's daily spoken language and cultural praxis (attaining cultural elements and participating in cultural events). Communicative praxis, another determinant, is defined by children, young people, and adults according to their sociocultural setting.

Although this model is applied to migrants from other cultures in Germany, the sociocultural characteristics are valid when considering the competencies.

"The linking of characteristics of the family's life conditions and the competences acquisition in school is systematically and significantly underestimated if only structural characteristics are taken into account. But only the simultaneous consideration of structural and procedural characteristics of the family situation can provide an adequate idea of the really prevailing disparity/inequality relationships. "(Baumert et al., 2003: 63)

To understand the cultural and social capital of the Mayan-speaking families in their diverse rural or partially urbanized contexts requires a differential analysis in structures and processes. It also requires an assessment of cultural capital and the competencies that are acquired in this socio-cultural environment.

Whether the language is Yucatec Mayan or Castilian, each language corresponds to the cultural capital of different socio-cultural environments and communication systems. It is considered acceptable to use a broad linguistic code according to parents' socio-economic levels, particularly middle to upper class. Younger generations and specialists use specific linguistic codes to distinguish each language system as juvenile idioms, medical terminology, etc. In contrast, the

working and agricultural classes use a more restricted linguistic code that focuses on their unique social group and relationships. Finally, diverse groups can use each language and its correlating code in the education system and in middle and upper classes. Using a restricted code does not imply lack of intelligence; however, it also does not facilitate academic development in a broader code environment (Bernstein 1974, in Gabriel 2015: 84-87).

Scholastic competencies are different-- some are acquired in rural schools, but not in the same form as in an urban and academic setting. This is especially the case for ICT competencies. These disparities arise in the “social gap” diagnosed in rural, bilingual and intercultural environments.

Approaches to research have previously included the effects and flaws generated by globalization such as productive rural disintegration, labor market demands, Ortner's theory of dark anthropology... etc. (Ortner 2016). These effects can eventually cause marginality and social inequality. They are contrasted with Ortner's theory of anthropology of the good or of well-being and options created from marginalized sectors. Anthropology of the good resumes Pierre Bourdieu's research on the formation of social and cultural capital and the theory of social practice for generating other options and possibilities.

The utilization of ICTs in indigenous radio stations is mentioned as an idea to design a web browser in Mayan language (Mozilla Firefox in Maya). Unfortunately, this attempt failed due to a lack of both resources and project confidence.

There is much to accomplish in order to improve education and the livelihoods of communities with high marginalization. In order to develop the formation of digital competencies in communities with these characteristics, it is important to consider general and specific strategies. These general strategies will be able to provide opportunities and access for populations with high marginalization rates. Examples include technology parks, community centers with Internet access, and outreach and development projects, to name a few. Specific strategies should focus on the differences between social subgroups. Specifically, there must be differentiated strategies for women (especially those who work) and married couples and parents so they can develop their digital skills.

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