Appropriation of Information and Communication Technologies in the indigenous communities of La Guajira, Colombia

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Abstract— **The aim of the research was to analyze the assimilation of information and communications technologies (ICT) in the indigenous communities of La Guajira. This allows establishing aspects and factors that influence the inclusion of ICT in vulnerable communities that are separated from an advanced society, to identify possible strategies that favor their economic, cultural and social. The research was quantitative type with non-experimental, cross-sectional and descriptive design, which applied the survey technique through questionnaires, composed of 31 items type Likert. The results showed that the various indigenous groups have an interest in ICT, with a high use of the Internet but with little interest in other tools that hinders their appropriation.**

Keyword - Assimilation, Ict, Indigenous Communities, Technological Competencies.

I. INTRODUCTION

ICT is the combination of computer technologies, specialized in communication such as computers, laptops, smartphones, internet, chats, email and educational software [1]. In this sense, society implements its characteristics in each sector of the state, because communication systems are aimed at networks and provide personal, group and / or business benefits. These have applications in various fields such as: medicine [2] [3], education [4], tourism [5] [6] and agriculture [7]. They have also been contemplated in alternative uses such as: prospective and industry [8].

Likewise, the adoption of ICTs provides advantages in commerce and communication, for development in economic, social and environmental areas, for which its implementation is fundamental in the growth and its assimilation depends on the characteristics of the city or region where it is applied. The empowerment of these tools is limited in remote communities of advanced societies such as the indigenous, which have policies that discriminate and marginalize people from abroad [9]. In addition, customs limit the inclusion of technological tools and make it difficult to take advantage of the characteristics provided by ICT. This increases the technological gap between the communities, causing inequality of access to these media and exclusion due to technological development [10].

However, there are indigenous communities that are constituted by flexible policies that allow the access and use of ICT. As an example of the foregoing, the study conducted by [11] was reviewed, where a review of the articles that involve the use of ICT by indigenous youth from Australia was conducted, were 22 articles were listed that demonstrated the various applications of these tools. For his part, [12] studies the application of ICT in remote indigenous communities in northern Australia, where the adoption of mobile phones among young people is identified to perform different activities including educational work.

Considering the applications of ICTs in indigenous communities and the benefits it provides for a region, the objective of the research is to analyze the assimilation of these technologies by the indigenous people of La Media Guajira, because they live in rural areas and difficult to access. The implementation and proper use of these technologies could improve the quality of life of indigenous people.

II. METHODOLOGY

The type of the research was quantitative with a non-experimental descriptive cross-sectional design. Quantitative due to the fact those nominal or ordinary measurement variables were used for the study of the observed phenomena [13]. Not experimental, since the values obtained were not manipulated [14]. Cross-sectional due to the fact that a data collection technique was applied in a specific moment [15]. Descriptive given that the phenomena analyzed were examined with the purpose of finding important traits and / or characteristics [16].

A. Population and sample

The population was formed by 200 inhabitants of various centers of indigenous communities located in La Media Guajira, as shown in Table 1.

TABLE I. Communities of La Guajira media

Communities	Nº
Aremasahin	26
La Gloria	25
Shiapana	15
Alto Pino	32
El Colorao	28
La Plazoleta	17
Cucurumana	20
Manzano	12
Los Cerritos	17
Los Ahumao	8
TOTAL	200

For the sample, a population census was carried out, due to the fact that the communities were given access to apply the information collection instrument.

B. Technique and collection instrument

The technique of data collection was a survey applied through a questionnaire consisting of 31 questions, since it allowed the collection of data directly studied, where 3 dimensions were taken into account: Tools used, Activities carried out and Technological skills. Designed with a Likert scale: Always (5), Almost always (4), Sometimes (3), Almost Never (2) and Never (1).

C. Validity and reliability of the instrument

In order to determine the validity of the instrument, it was submitted to a pilot test that was carried out by a group of experts, with the purpose of determining if the questions made allow to fulfill the objective of the investigation.

Regarding the reliability of the collection instrument, a pilot test was applied to 10 teachers from the indigenous communities, and a scale was determined, reflected in Table 2.

TABLE II. Scale for the interpretation of reliability

Ranges	0.81 a 1.00	0.61 a 0.80	0.41 a 0.60	0.21 a 0.40	0.01 a 0.20
Magnitude	Very high	High	Moderated	Low	Very low

Reliability was measured by applying the Cronbach's Alpha coefficient, which yielded 0.84, indicative of a very high veracity, in relation to the scale determined in Table 2.

D. Analysis and data processing

Due to the nature of the research, the use of descriptive statistics was chosen, since it allowed an analysis of the answers provided by the indigenous communities, in order to determine what type of technologies were best adapted and used by them. Therefore, a scale shown in Table 3 was determined.

TABLE III. Scale for the interpretation of the average

Interval	$4.20 \leq \times < 5$	$3.40 \leq \times < 4.20$	$2.60 \leq \times < 3.40$	$1.80 \leq \times < 2.60$	$1 \leq \times < 1.80$
Category	Very high level	High level	Moderated level	Low level	Very low level

This allowed to characterize the averages of the dimensions and indicators, and provided a pertinent and detailed evaluation of the variable.

III. RESULTS

According to the dimensions of the variable Appropriation of ICT, it evaluated mainly Tools for the use of ICTs, which obtained an average of 3.2 as shown in Table 4, where the different indicators evaluated were tabulated.

TABLE IV. Statistics for the Dimension: Tools for the use of ICT

Indicators	Always		Almost always		Sometimes		Almost Never		Never		Average	SD
	af	rf	af	rf	af	rf	af	rf	af	rf		
Internet	14	6%	80	40%	106	54%	0	0%	0	0%	3.5	0.1
Computer	0	0%	46	23%	92	46%	62	31%	0	0%	2.9	0.1
Educational software	0	0%	46	23%	88	44%	58	29%	8	4%	2.9	0.1
Virtual forums	36	18%	34	16%	93	46%	37	20%	0	0%	3.3	0.2
Average	Moderated Level						3.2					0

In the ICT tools, we can see the frequency with which respondents use different technologies such as: Internet, computer, educational software and virtual forums, where it is evident that the use of the internet is present in these communities. In the indicators Computer and Educational Software, in spite of the established for the Internet, they are not used frequently, with the difference that the second some respondents have never used it. While the indicator Virtual Forums show greater utility for the Indians with a moderated average.

In the dimension Activities for the use of ICT, the indicators were evaluated: Multimedia presentation, Web pages, Social software, E-mail, Interactive videos. From which were taken, their absolute and relative frequencies, obtained in the questionnaires, and their averages were calculated, as shown in Table 5.

TABLE V. Statistics for the Dimension: Activities for the use of ICT

Indicators	Always		Almost always		Sometimes		Almost Never		Never		Average	SD
	af	rf	af	rf	af	rf	af	rf	af	rf		
Multimedia presentations	42	21%	118	59%	40	20%	0	0%	0	0%	4	0.1
Websites	15	7%	67	33%	68	34%	50	26%	0	0%	3.2	0.1
Social software	52	26%	78	39%	51	25%	19	10%	0	0%	3.8	0.2
Email	15	8%	89	44%	89	44%	7	4%	0	0%	3.6	0.1
Interactive videos	0	0%	0	0%	83	41%	117	59%	0	0%	2.4	0
Average	High Level						3.4					0.1

From the results it can be seen that the indicator with the highest use is Multimedia presentation with a high average, where respondents' answers focus on the option Almost always. Next, the Social Software indicator obtained an average of 3.8, indicative of the frequency with which the Indians implement these applications. On the other hand, web pages are not used frequently, because the average obtained was moderated. Finally, the interactive videos reached a low level, meaning that they are Almost Never used by the indigenous communities of the middle Guajira of Colombia.

In the Technological competences dimension, the lowest average was obtained, demonstrating how respondents behave when faced with the use of ICT tools and applications. The above due to the frequency of responses obtained in the questionnaire evidenced in Table 6.

TABLE VI. Statistics for the Dimension: Technological competences of ICT

Indicators	Always		Almost always		Sometimes		Almost Never		Never		Average	SD
	af	rf	af	rf	af	rf	af	rf	af	rf		
Use of the computer	12	6%	104	52%	84	42%	0	0%	0	0%	3.6	0.1
Internet management	0	0%	58	28%	118	59%	24	13%	0	0%	3.2	0.1
Learning	0	0%	29	15%	63	31%	85	42%	23	12%	2.5	0.1
Average	Moderated Level										3.1	0

Of the evaluated indicators of the TIC competences dimension, it can be denoted that there is a high level of computers, but a moderated internet management, which agrees with what was mentioned by [17], who determined that by factors of lack of material the improvement in the use of these is minor but in the same way there is an interest in learning to use the internet correctly. Finally, the Learning indicator obtained an average of 2.5, indicating the low level of learning in terms of ICT, which contrasts with that established by [18], who mention that access to the Internet allows to facilitate the learning of the management of these tools, due to the good adaptation of the indigenous communities to the use of the internet and their low level of learning.

On the other hand [19], who conducted a study where they proposed the collection of the history of an indigenous people in an online repository where they could access them, they had a great acceptance of this new way of transmitting their stories and traditions.

Taking into account the analyzes carried out of the dimensions and indicators of the variable Technological appropriation by the natives of La Guajira media, a general average of 3.2 was obtained, which favors the communities in aspects such as: entry into the digital world, innovation, visibility of culture and participation in learning environments [20]. On the other hand, it could be determined that the indigenous people have a moderated appropriation of ICT, where the Internet is mostly used as a means of communication in social networks, in addition to using correspondence and multimedia presentations. However, there is a deficient learning of ICTs by indigenous people. The above allows us to show that despite not having a very high level of ICT, they are willing to use and appropriate the different technologies correctly.

CONCLUSION

Based on the results obtained, it is concluded that: 1) The Indians do have the internet to use it in the community, but do not have the skills to take advantage of it properly. On the other hand do not have many computers, causing the low use of computers, however the indigenous people show a high degree of interest in their learning; 2) the use of multimedia presentations by the respondents was very satisfactory, while the interactive videos were not adequately received by the indigenous people; 3) shows that in terms of the use of ICT tools, the one that was best received by the communities is the Internet, denoting a lack of interest in the other tools, although with a curiosity about their operation.

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