Capacity development for Indigenous communities of the Americas region

By Carlos Baca-Feldman and Erick Huerta Velázquez

"One of my big dreams is to fly, to fly like those birds, and go round and round until we land and plan a project that really serves the community. One in which the people say: 'I want it, I need it and it is useful for me'. So, one of those big dreams I have for my community is to be a little more autonomous and independent in terms of media and communication." (Ana María V., Mexico, graduate of the first edition of the ITU training programme).

Introduction

Indigenous communication and telecommunications experiences are based on the idea that the communication process goes beyond a simple exchange of information; they are understood more as ways to articulate and strengthen social relations, allowing indigenous people to fulfil their needs and follow their own dreams and development objectives. Indigenous communication projects are a space of practice of indigenous values, reflected not only in the content they transmit but in the way the operation of the media itself is organized and designed, and how people are trained.

In 2002, the International Telecommunication Union (ITU) adopted a recommendation on indigenous peoples that later became Resolution 46 of the 2017 World Telecommunication Development Conference (WTDC) held in Buenos Aires. This Resolution recognizes: "the necessity of continuing to foster the training of indigenous technicians on the basis of their cultural practices and technological innovation solutions, while at the same time ensuring the availability of resources and spectrum to support the development and sustainability of telecommunication/information and telecommunication (ICT) networks operated by indigenous peoples" (ITU, 2017, p. 421).

Based on these identified needs and mandates, since 2005 the ITU Telecommunication Development Sector, through its Digital Inclusion programme and in collaboration with the Regional Office for the Americas, has implemented a tailored capacity-building programme. This programme aims to empower indigenous people and communities by providing them with the skills to use technology to help them reach their socioeconomic development goals, while respecting their cultural heritage. This tailored programme further aims "to achieve the goal of digital inclusion, enabling universal, sustainable, ubiquitous and affordable access to ICTs for all, including indigenous peoples, and to facilitate accessibility of ICTs for all, in the framework of access to information and knowledge" (as indicated in ITU-related resolutions[1]), thus contributing to the Sustainable Development Goals. The programme also facilitates the training of indigenous communities in essential skills to access and use ICT, including by implementing and operating their own local networks. With various revisions and updates to the content and methodology of the original programmes, two trainings are currently offered in Spanish for indigenous peoples in the Americas region.

Over the years, ITU has sought ways to fully accomplish the mandate of Resolution 46: "to do the trainings according to indigenous

cultural practices". This has been done by engaging indigenous peoples in different stages of training programme design. In 2005, together with the Mexican Government, ITU organized the first indigenous workshop on ICTs. This workshop brought together 150 indigenous people from different nations and communities across America. For three days they discussed capacity-building, content development, self-management of ICT projects and how to better organize their work and collaborate in strengthening their projects (Sandoval Forero & Guerra García, 2010, pp. 151–155).

In its quest to best respond to end-user needs and requirements, ITU looked to identify relevant partner representatives of indigenous communities. Based on advice received from ITU Americas Region, the knowledge development programme for indigenous people was created in collaboration with *Fondo para el Desarrollo de los Pueblos Indigenous de America Latina y Caribe* (FILAC) [Fund for the Development of Indigenous Peoples of Latin America and the Caribbean].[2] FILAC contributed by identifying priorities and topics of interest to be included in the ITU online trainings. The curricula of the trainings were jointly validated by the two institutions. This ensured that this capacity-building programme was not perceived by indigenous people as an obligation to be digitally included but rather as a means of empowerment through technology to support the independent living of their communities, their socioeconomic development and self-sustainability. Developing and maintaining indigenous local (radio) networks and developing indigenous technicians (to ensure technical maintenance of these networks at the community level) are two of the priorities identified in the last few years.

Within this framework, the ITU Telecommunication Development Sector has, since 2017 (the last WTDC), developed two online and blended training courses on these topics to support self-employment and sustainability of the indigenous communities, in accordance with Resolution 46 (WTDC 2017). The ITU Telecommunication Development Sector also supports the fulfilment and

implementation of Article 16 of the *United Nations declaration on the rights of indigenous peoples* (United Nations, 2007), by providing indigenous peoples with the means to own, administer and operate their communication networks, and to ensure creation of local digital content. Since 2019, ITU has delivered two complementary trainings:

- an online training course, 'Innovative communication tools for the strengthening of indigenous communities', with a special focus on how to develop, manage and operate an indigenous radio network.
- a blended training programme (year-long) to develop 'technical promoters in indigenous communities in telecommunications and broadcasting'.

To best respond to indigenous communities' requirements, ITU identified individuals and relevant indigenous organizations with expertise in both indigenous people/communities and their styles of learning, and the proposed course content. ITU then facilitated these individuals' and organizations' participation in this capacity-building programme. This added substantial value to both the training curriculum and the pedagogical processes and learning approach used in delivering these trainings.

In this paper we reflect on how this partnership – in which indigenous peoples participate in all stages of the creation and implementation of the capacity-building programme – has led to improved pedagogical processes and ways of learning that could be useful not only for other indigenous training programmes but also for capacity-building processes of other kinds where community groups should be involved.

In the first part of the article, we explain how indigenous peoples in the Americas have positioned themselves around the incorporation of ICT media in their communities, and the importance of capacity-building to their strategies for building enabling environments in which to develop their own communication media. We also present one of the frameworks indigenous people have developed for training in communications and new technologies.

In the second part, we describe how ITU has developed the training programme for indigenous technicians in the Americas region in close collaboration with some of the organizations, communities and media that were involved in previous experiences of indigenous training, and the results of these partnerships. Finally, we explore the lessons learned from this process and their contribution towards new paths in capacity-building in rural and indigenous communities.

Pathways to indigenous communication and technological autonomy in Latin America

Indigenous communication mediated by ICT is not new, nor does it respond only to the expansion of digital technologies. In fact, to understand it, one must go back to the simplest notion of communication, where a series of actions emanating from the body itself enable collective life in a given territory and time, allowing culture to be transmitted, reproduced and transformed. Therefore, to understand what we mean by indigenous communication, we must start from this more elemental definition of communication, which is not related to technologies but instead to how people inhabit territory, and the way they organize, work, communicate and celebrate (Martínez Luna, 2016).

In this sense, it is also necessary to avoid homogenizing the characteristics of indigenous peoples: each group, tribe or nation has its own ways of living and inhabiting the land, expressed in their language and forms of governance and social organization, among others. Nevertheless, indigenous people around the world tend to share common characteristics, such as a holistic view of communication within the traditional knowledge and practices that maintain links with their territory or land.

For example, due to fog and the ruggedness of their territory, the Mazatec and Chinantec communities in Mexico generated a language of whistles, which contains more than 30 distinctions of accent and tone, allowing complex messages to be transmitted (Sicoli, 2016; Duncan, 2012). In the same country, in the Rarámuri communities of Chihuahua, who live far away from each other in the middle of a very rugged mountain range, messages are passed among people as they walk along mountain paths until they reach the receiver, sometimes days later (G. Palma, personal communication, August 12, 2019).

With the arrival of communication technologies, there has been a process of appropriation within the communities that can be observed in the way they are used, in many cases, to enhance and realize indigenous peoples' dreams and objectives, overcome struggles and share meaning, as well as to link them beyond their territorial limits (Baca-Feldman, 2017). From the diversity of community radios, video and film, print media, local websites and apps we find examples of these technological appropriations of media that reflect the diverse ways of living in communities (Magallanes-Blanco, 2008; Rodriguez, 2005; Wortham, 2013).

More recently, especially since the beginning of this century, there has been a process of technological appropriation by indigenous peoples linked to ICT and telecommunications (Arcilla Calderón et al., 2018). We can find experiences such as the community-owned cellular networks in Oaxaca, Mexico (Srinivasan, 2019; Magallanes-Blanco & Rodriguez-Medina, 2018). We can also find them in the community networks movement in the region (Baca et al., 2018), in which various indigenous communities participate, such as the Jnoptik IntraBach and the Ik'ta ko'op Collective in the Tzetal community of Abasolo, Chiapas, Mexico (*Redes por la Diversidad, Equidad y Sustentabilidad* A.C., 2021); or the Jxa'h Wejxia Casil network in six Nasa communities in Cauca, Colombia.[3] This is in addition to initiatives focused on the generation of applications, websites or even translation of software into their own languages (Morales, 2020), or production of local content and the sharing of digital audiovisual productions (Ginsburg, 2018).

This process has been a collective path traced by indigenous communities. Their

intercommunity links and those with civil society organizations have been the key to building towards technological sovereignty or autonomy. In this process, the Continental Summits of Indigenous Communication of Abya Yala have been key meeting spaces. These meetings have allowed indigenous peoples to articulate and generate the fundamentals from which to use, create

and transform media and communication technologies. The *Declaración final de la Segunda Cumbre de Comunicación Indígena del Abya Yala* [Final Declaration of the Second Continental Summit of Indigenous Communication of Abya Yala] (2013) speaks about autonomy linked to indigenous communication processes in the following terms.

"The autonomy of indigenous communication is based on the principle of life, a fundamental pillar of the worldview of Abya Yala, which is based on the relationship between human beings and Mother Earth, that is learned from the family. This autonomy must be protected by the life plans and organizational processes of our peoples and their legitimate authorities." (*Declaración final de la Segunda Cumbre de Comunicación Indígena del Abya Yala*, 2013).

In other words, there is a clear premise in that Declaration that understands technologies as instruments to strengthen indigenous peoples' communication processes. These tools must be adapted to the principles, values and ways of life of those inhabiting the territory, in contrast to mainstream views, where communities should 'adapt' to what technologies and external societies want to impose (Parra Hinojosa & Baca-Feldman, 2021). The path stretches into the future because the sovereignty or autonomy of communication of indigenous peoples is not something that has an end point or a goal to be achieved; rather, it is a never-ending process of building alternative models of communication in accordance with self-defined contexts, needs and aspirations.

Throughout this process, indigenous peoples have sought political and social advocacy strategies that have allowed them to generate enabling environments to create, operate and manage their own media and telecommunications projects, a right protected by Article 16 of the *United Nations declaration on the rights of indigenous peoples* (United Nations, 2007). These instruments, together with the political advocacy processes of indigenous communities, are gradually generating more favourable conditions for

these communities in the field of ICT and telecommunications. Although there is still a long way to go, there are cases such as Mexico, where the *Ley Federal de Telecomunicaciones y Radiodifusión* [Federal Telecommunications and Broadcasting Law] (2014) has recognized indigenous communities and established a specific licence for telecommunications and access to the radio frequency spectrum.

Although significant progress has been made in achieving this enabling environment from a regulatory perspective, an enabling environment also includes other elements, such as technological development (i.e., affordable, quality tools with which to produce their communication materials) and access to mass media to disseminate their productions (Baca et al., 2018). Among all these elements, probably the most important is the creation and strengthening of local capacities – through programmes designed and directed specifically for and by indigenous peoples – that allow indigenous peoples to develop the technical, social, economic and cultural skills to manage their own telecommunications networks.

Indigenous communities and the development of their capacity-building programmes

In 2010, during the First American Summit on Indigenous Communication in la María Piendamó, Cauca, Colombia, discussions around capacity-building resulted in the following mandate: "To create an itinerant school of indigenous communication, based in indigenous methodologies, that incorporates exchanges and internships within the different communication experiences across the continent" (*Declaración final de la Segunda Cumbre de Comunicación Indígena del Abya Yala*, 2010). From this mandate, several capacity-building processes were developed by indigenous communities, organizations and media around the continent. Some were in the form of indigenous universities (e.g. the Indigenous University of the Regional Indigenous Council of Cauca) and others were associated with indigenous organizations (e.g. Itinerant School of the Latin American Coordinating Committee for Indigenous Peoples' Cinema and Communication).

One of these initiatives was a participatory action research process taken on by some indigenous communities, organizations and media in Mexico in 2012. As a result of using this process, one of the main problems of indigenous media was identified: the lack of technical capacity to develop and maintain radio broadcasting and other telecommunication infrastructure. The research also identified the fundamentals of the methodology to develop capacity-building among indigenous media, based on an ancient agricultural system still in use throughout Mesoamerica called *milpa* (Baca-Feldman et al., 2021).

Milpa is an agricultural system used for growing corn. It is based on diversity, in which various species such as beans, zucchini and other edible plants and vines coexist. It is cultivated collectively by the community and people learn by doing, with children learning by participating in the process from a very young age. It is also a traditional system that strengthens the relationships among

community members and the land, as it is also a celebration. Therefore, the research considered that any training programme for indigenous peoples in the Americas should have as its core this form of collective work (*la milpa*). This translates concretely to diversity of knowledge and experiences, shared responsibilities among all participants, spaces for people to learn by doing, and creating the conditions to foster a community of knowledge and practice that could go beyond the training programme and the strengthening of the relations of the participants to their communities. This methodology was systematized in the book *Haciendo milpa* (Cruz Cárcamo & Huerta Velázquez, 2015).

This workshop collaboratively defined the foundations of the training course for community technicians in telecommunications and broadcasting in Mexico, *Techio Comunitario*. The name of the programme, which was chosen collectively, expresses very well its meaning and form, as it is a combination of the words '*tequio*', a form of collective work that exists in most of the communities in Oaxaca, and 'tech', an abbreviation of technology. The first edition of *Techio Comunitario* had four common core modules (community communication and technologies, electricity, electronics and free software); three specialties (radio broadcasting, wireless networks and community cellular telephony), and a final integration module (legal framework and sustainability). Participants were allowed to choose to study one, two or all three specialty subjects.

From October 2016 to May 2017 the modules were taught face-to-face in various indigenous communities in southern Mexico, with indigenous and non-indigenous groups as part of an Advisory Committee[4] that participated in each of the modules, either coordinating the logistics or teaching the topics. Some 27 participants from six states of Mexico graduated from this edition.

Subsequently, based on the experience gained, some improvements were made to the process in the second edition. The number of modules was reduced to six in total and the number of

Figure 6.1: Drawing of a *milpa* made by the participants in the workshop 'Strategies to support the training of indigenous communicators'

Source: Cruz Cárcamo & Huerta Velázquez (2015)

days of each module was increased. As this edition of the training was still being delivered face-to-face, these changes reduced both the cost of transportation for participants and the amount of time they spent away from their daily responsibilities at home. The technical courses were also redesigned and special workshop facilitators were invited to participate, as it was detected that it was hard for some participants to understand these subjects. In total, 17 participants from six states of Mexico graduated from this second edition.

After the second edition of the *Techio Comunitario* training programme in Mexico (2018–2019), continuous capacity-building activities were provided to the participants, such as building community Wi-Fi networks in different indigenous communities, in which trainers from different countries came to share their experience. An example is the Abya Yala Community Networking Workshop held in June 2019 in Cherán K'eri, Michoacán, Mexico.

ITU programmes towards strengthening the ICT capacities of indigenous peoples

Actions carried out by ITU since 2005

As mentioned in the introduction, since 2005 ITU has undertaken various actions to strengthen the capacities of people belonging to indigenous communities in the Americas region. To date, ITU has implemented various training courses that have been updated and transformed according to the context and the realities experienced.

From the beginning, ITU focused on ensuring that courses were designed and delivered to best respond to the needs expressed by indigenous peoples by partnering with FILAC. The current knowledge development programme resulting from this partnership is: 'Innovative communication tools for strengthening indigenous communities with a focus on how to develop, manage and operate an indigenous radio network', which has been offered since 2015. This course is delivered entirely online and consists of five two-week modules that address topics such as

website creation, emergency communications systems, tools, elements of indigenous radio networks and the use of digital content. Hundreds of indigenous people from the region have graduated from this course over the years. In 2020, the programme underwent a review aimed particularly at updating and improving the methodology of the module on emergency communications, especially due to the importance of this topic because of the COVID-19 pandemic.

A new step in capacity-building was taken in 2019 when the Mexican civil society association *Redes por la Diversidad, Equidad y Sustentabilidad* A.C. [Networks for Diversity, Equity and Sustainability A.C.], one of the organizations that developed *Techio Comunitario*, was incorporated into the existing partnership between ITU and FILAC to develop the new 'Training programme for technical promoters in indigenous communities in telecommunications and broadcasting', consisting of five online modules and a face-to-face training camp.

The main objectives of the new programme are to equip indigenous technicians with the necessary knowledge to install, maintain, operate and administer their communication and telecommunications projects; and to consolidate a network of indigenous communicators and technicians that support each other to develop community media and technology strategies to meet their needs and pursue their dreams. The programme is aimed at women and men involved in indigenous media in the Americas region. Since its inception, women's participation has been encouraged, as there is a significant gap between women and men in the management of community media and community networks.

Figure 6.2: Participants learning how to install a Wi-Fi network in the fifth module of the first edition of *Techio Comunitario*, developed in Guelatao de Juárez, Oaxaca

Source: Baca-Feldman 2017, unpublished

Figure 6.3: *Semillero de Redes Comunitarias del Abya Yala*, held in Cherán K'eri, Michacán in 2019

Source: Karla Velasco 2019, unpublished

Increased participation of women was achieved because the indigenous and community media organizations in the region were invited to nominate women directly for the programme. As a result, women's participation in *Techio Comunitario* rose from 3.9 per cent in the first edition to 27.8 per cent in the second. However, while the graduates from the first edition of the ITU programme were 60 per cent women, the expected proportion of female graduates from the second edition is 36.8 per cent, so efforts to boost women's participation need to continue.

The new programme is divided into five online courses implemented during a year, with a duration of four weeks each, with close guidance provided to participants. The modules are:

1. Community communication and technologies
2. Basic electricity and electronics
3. Radio frequency and computer networks
4. Regulatory environment for telecommunications and broadcasting

5. Sustainability in telecommunications and broadcasting projects.

Upon completion of the online training, participants who have completed all five courses are invited to participate in a 10-day face-to-face training camp, the objective of which is to generate a network of indigenous technical promoters in the region through an in-person space of integration and knowledge-sharing. It also provides an opportunity to learn about and share successful communication and telecommunication projects developed in indigenous communities in an experiential way. Finally, there are some practical exercises, such as tower climbing or electronics soldering, which must be carried out in a face-to-face context.

Unlike previous online training, this programme focuses on quality rather than quantity. Participants are nominated by their communities or organizations; this ensures that the knowledge will serve a community or group that needs a technician. Only those who graduate from all five online modules have the chance to attend the face-to-face training and obtain the training certificate. The participants form a community of knowledge among their

fellow partners and trainers that continues after the programme has ended. This is why the course has a limited number of graduates but an important impact, as those graduates are linked to an indigenous organization or community with a communication strategy. They are not just individuals wanting to obtain new skills.

In the first edition of the new ITU training programme mentioned above, which took place between May 2019 and February 2020, 20 indigenous communicators from 10 different countries in the region graduated, all of them previously linked to communication and/or telecommunication community projects. Fourteen of the 20 were women.

The face-to-face training camp was developed in collaboration with an indigenous cooperative, the *Unión de Cooperativas Tosepan Titataniske* in Cuetzalan del Progreso, Puebla, Mexico. This face-to-face space brought together different organizations and specialists in the technical, organizational and economic issues common to indigenous communication experiences in the region, which reinforced the knowledge gained during online courses through practical exercises done in real contexts. In addition to the ITU training programme students, 19 indigenous Nahua and Tutunaku youth who had completed a training programme in community communication within the cooperative also participated.

The second edition of this training started in October 2020. While there was no face-to-face bootcamp due to the COVID-19 pandemic, an intensive two-week online course was developed instead.

The innovative approach of the new training programme for technical promoters in indigenous communities in telecommunications and broadcasting is an important step towards the goals expressed in WTDC Resolution 46 because it incorporates indigenous peoples in all stages of the capacity-building programme, not only as beneficiaries but also as designers and implementers, enriching and innovating

capacity-building methodologies in addition to incorporating indigenous peoples' knowledge and values.[5]

Graduates have developed different actions linked to the knowledge they acquired. Some examples are listed below.

- A graduate from Carabobo, Venezuela created a community intranet for the residents of his neighbourhood.

- One graduate developed a process to obtain a licence to operate their community radio station in the Yoreme communities of Sonora, Mexico.

- In Zacate Grande, Honduras, a graduate has managed to improve the transmission quality and coverage area of the community radio station where he works.

- In Cuetzalan del Progreso, the activities of the Union of Tosepan Titataniske Cooperatives continue. Among them is the Tlayolchikahualis Initiative, which is a communication strategy to confront the COVID-19 crisis from the perspective of the ways of life and health care of the Nahua and Tutunaku peoples. Also, many of the young people who participated in the 2019 camp are now part of the team that organizes the film club, helped build the communication 'house', supports the community radio, and collaborates on the installation of the mobile phone network and community intranet.

- There has been a lot of participation of graduates in virtual events where they have shared their experience of this training process, such as the series of preparatory roundtables for WTDC 2021, in which a graduate from Oaxaca, Mexico, participated.

The consolidation of an indigenous technicians network has also progressed. This is evidenced, for example, in the frequent sharing of achievements, questions or experiences in the messaging group we have, with the new generation (2020–2021) being joined by people recommended by those who have already graduated.

Figure 6.4: Participants of the training camp in Cuetzalan del Progreso, Puebla, February 2020

Source: Itzel Muñoz 2020, unpublished

Figure 6.5: Working on one of the stages of the Free Software rally in Cuetzalan del Progreso, Puebla, February 2020

Source: Itzel Muñoz 2020, unpublished

Figure 6.6: Participants learning how to climb towers at the training camp in Cuetzalan del Progreso, Puebla, February 2020

Source: Itzel Muñoz 2020, unpublished

Figure 6.7: Participants learning about solar energy at the training camp in Cuetzalan del Progreso, Puebla, February 2020

Source: Itzel Muñoz 2020, unpublished

Figure 6.8: Participants learning how to make bamboo soundproofing panels at the training camp in Cuetzalan del Progreso, Puebla, February 2020

Source: Itzel Muñoz 2020, unpublished

Figure 6.9: Participants learning how to assemble broadcast cables at the training camp in Cuetzalan del Progreso, Puebla, February 2020

Source: Itzel Muñoz 2020, unpublished

Lessons learned

The learnings presented in this section are the result of our experience and constant reflection on the process we have developed among indigenous communities in the Americas region. They include the results of several evaluation exercises, both quantitative and qualitative, carried out at different stages of the ITU training programme for indigenous technicians; in particular, the results of the evaluation we conducted at the end of 2020 with the graduates of the first edition.[6]

Learning by doing

"It has transformed me, because one thing is that they talk to you about telecommunications, open networks or mobile telephony in theory, and another thing is that you see the whole process in practice, everything that is needed to be able to have something like that. This is something that has happened in this course." (Tsitsiki M., Mexico, graduate of the first edition of the ITU training programme).

More than the knowledge gained, it is essential that participants feel confident enough to act and participate. This feeling comes from the experience of doing things. Once they know that they have the ability to perform a certain task, it is easier for them to provide themselves with the means to do so by looking for and obtaining by themselves the knowledge, resources and relationships that allow them to perform the task.

Relevant experience must be gained in the context of rural communities, where many things must be improvised, and not in a laboratory where things are controlled, as people learn best in situations similar to the ones they will face in their communities. Many technology training courses are conducted in a laboratory or in urban contexts that do not always match the reality of the persons who participate in the training.

For this reason, each *Techio Comunitario* module was linked to real projects that are developed in the communities where the training takes place, with participants actively building, installing and evaluating network infrastructure that was and is used by communities.

In February 2020, the indigenous community of Cuetzalan del Progreso was chosen as the site for the face-to-face bootcamp of the ITU training programme. One of the reasons for choosing this community was that the Union of Tosepan Titataniske Cooperatives has been developing an integral telecommunication and broadcasting project for the region. This allowed participants to experience first-hand the installation of a community intranet, the installation and grounding of a photovoltaic system, testing of mobile network coverage, and re-siting of an FM radio transmitter.

In addition to the knowledge they generate, these on-site bootcamps make the bonds among participants stronger.

We have learned that after ensuring that people feel confident that they have the ability to do something, it is necessary to provide them with a social network that can help them gain knowledge they may be lacking or provide them with continuous access to experiences. Participants should feel that they belong to a network in which they can get help and help others.

One example is that during the COVID-19 pandemic, this support network has been crucial for the connectivity projects that some of the graduates have undertaken, such as intranets to share educational materials in their communities. The knowledge participants gained from the programme at a technical level was important but so too was the support of the specialists they had the opportunity to meet, such as one of the developers of LiberRouter or the creator of the free package of software components EtherTICs GNU/Linux, which is a turnkey solution for community radio stations.

The social/community networks that were generated in these two editions of the programme continue, with members sharing information and supporting each other to solve breakdowns in their equipment, undertake new projects or invite each other to events, courses or calls for proposals. As mentioned before, the network also continues with activities, including sharing experiences, raising awareness and specific training activities in which *Techio Comunitario* and ITU training programme graduates participate as instructors or speakers.

Use of new metaphors to explain technology

One of the most difficult tasks has been finding a way to explain how electricity and electronics function, as the metaphors generally used for explaining them are not always related to the context in which indigenous people live.

In one of the workshops related to building intranets, the facilitator was finding it hard to explain the parts of the computer but when she started using an analogy of the body to explain the parts of the computer, people began to understand. Similarly, when explaining the transport and access network, it was not until we changed our analogy to that of a rural water network that people got excited and started participating. Additionally, participants generated their own metaphors to understand the technologies from their own worldview.

In the first edition, two Tseltal students said that a community network resembles what they call *mankomun*. This is a collective activity that is done during the most important community festivities, in which a cow is bought to feed everyone, and everyone participates in its preparation. The reason for doing this is to save money but at the same time, it provides the chance to strengthen community ties. Therefore, as explained by Mariano, one of the course participants, a community network is like *mankomun*:

> "We create our own infrastructure and divide it up among the users. Just like someone skins and butchers the cow, someone takes charge of climbing the radio tower, someone else creates the network connections, and someone else takes care of the electrical power. We all do this together, and so this type of project has succeeded in surviving for a long time."[7]

Technological training beyond the technical field

"I found it very important for a better understanding of the integrality of communication, to clearly differentiate our objectives from the tools we have to reach those objectives. The experiences [community radio, intranets, solar energy systems] I saw in Cuetzalan were very interesting to me because they are very enlightening. They helped me to gain more clarity about the community process, the collective process." (Elena C., Argentina, graduate of the first edition of the ITU programme).

As in the *milpa* system we mentioned earlier, concepts cannot be isolated because they are part of a complex system in which life is created and recreated. Therefore, when understanding technology, we cannot separate it from the communications system to which it belongs.

For indigenous people technology is not just a tool that helps them perform some specific task but also a new element that must be incorporated into a community's way of life and that must be understood, adapted, used and transformed under the principles and values of local communities.

Conclusion

The road we have travelled with communities and organizations committed to indigenous communication in Latin America has been full of joys and achievements, but also of challenges and lessons about things to be improved. Among these challenges is achieving greater participation of women, as there are still many barriers that need to be broken so that they are able to participate. These barriers include sharing responsibilities with their partners around the care of children during the time they are away or incorporating budgets for children's activities during the course.

Connectivity issues such as the expense and bad quality of Internet in indigenous communities limit or make difficult participation in some activities such as webinars, but participants are able to access all the content in ITU Academy. However, we need to go beyond this practical solution, so for future editions it will be necessary to think about technological tools that will allow working on the digital platform offline.

Another learning is that we had to consider that for most of the participants, Spanish is their second language. Therefore, it was necessary to avoid restricting evaluations to written reports and allow participants the opportunity to present their homework in a format they feel confident with, such as a podcast, drawings or video. We also incorporated oral instructions at the beginning of the modules so that written instructions for the activities could be better

understood. We chose illustrated materials when available, although this is something we should invest more in.

We also need to rethink the methodologies of developing and delivering the online trainings. While in each course we make an evaluation and try to improve the experience, it is still very difficult to achieve experiential and practical learning online. It is also important to reinforce follow-up programmes aimed at supporting participants to ensure the sustainability of their projects by helping them to access mechanisms to continue learning and sharing.

A crucial element that should be reiterated in the knowledge development process is that it is fundamental to ensure indigenous peoples' and communities' involvement in the whole process, from design to implementation. Another important consideration is to understand that the purpose of capacity-building is not only about how to use this or that technology but rather that connectivity and access to ICT in community contexts is an organizational and social governance issue, where technologies must be adapted to the dreams, needs and development goals of the communities.

Therefore, the role of those who facilitate these knowledge development processes is to generate a diverse and contextualized learning environment that allows the appropriation of technologies in each community in accordance with their cultural heritage values and development aspirations.

List of references

Arcilla Calderón, C., Barranquero, A., & González Tanco, E. (2018). From media to buen vivir [good living]: Latin American approaches to indigenous communication. *Communication Theory 28*(2), 180–201. https://doi.org/10.1093/ct/qty004

Baca, C., Belli, L., Huerta, E. & Velasco, K. (2018). *Community networks in Latin America. Challenges, regulations and solutions*. Internet Society. https://www.internetsociety.org/wp-content/uploads/2018/12/2018-Community-Networks-in-LAC-EN.pdf

Baca-Feldman, C. F. (2017). Experiencias resonantes de comunicación en Oaxaca, México: posibilidades, límites y contradicciones del proceso comunicativo en el capitalismo [Resonant experiences of communication in Oaxaca, Mexico: possibilities, limits and contradictions of the communicative process in capitalism] [Doctoral thesis]. Universidad Autónoma de Puebla. https://nube.yanapak .org/index.php/s/xdnF4o8RiNHwXmX

Baca-Feldman, C. F., Bello López, D., Carrillo Olano, A., Parra Hinojosa, D., & Soto Sánchez, A. P. (2021). Technological autonomy as a constellation of experiences. A guide to collective creation and development of training programmes for technical community promoters. Association for Progressive Communications. https://www.apc.org/sites/default/files/FINAL_Technological _autonomy_as_a_constellation_of_experiences_18-03.pdf

Cruz Cárcamo, B. & Huerta Velázquez, E. (2015) *Haciendo milpa: Memoria del taller – Estrategias de apoyo a la formación de comunicadores indígenas* [Doing milpa: Record of the workshop – Strategies to support the training of indigenous communicators]. Redes por la Diversidad, Equidad y Sustentabilidad A.C. [Networks for Diversity, Equity and Sustainability A.C.]. https:// bit.ly/3fn0oVU

Declaración final de la Primera Cumbre de Comunicación Indígena del Abya Yala [Final declaration of the First Continental Summit on Indigenous Communication of Abya Yala] (2010). https://www .cric-colombia.org/portal/declaracion-de-la-cumbre-continental-de-comunicacion-indigena-de -abya-yala/

Declaración final de la Segunda Cumbre de Comunicación Indígena del Abya Yala [Final declaration of the Second Continental Summit on Indigenous Communication of Abya Yala] (2013). http:// indigenasdf.org.mx/declaracion-de-la-ii-cumbre-continental-de-comunicacion-indigena-del-abya -yala/

Duncan, D. (Director & Producer). (2012). Whistles in the mist: Whistled speech in Oaxaca (Season 2, Episode 2010) [TV series episode]. In Duncan, D. (Director & Producer), *In the Americas with David Yetman*. The Southwest Center, University of Arizona; Arizona Board of Regents. https:// vimeo.com/57291304

Ginsburg, F. (2018). Indigenous media from U-Matic to YouTube: Media sovereignty in the digital age. *Sociologia & Antropologia* [Sociology & Anthropology], *6*(3), 581–599. http://dx.doi.org/10 .1590/2238-38752016v632

Huerta Velázquez, E., Cruz Cárcamo, B. H., & Álvarez Malvido, M. (2018). *Comunicaciones de emergencia. Guía rápida para radios comunitarias* [Emergency communications. Quick guide to community radios]. Redes por la Diversidad, Equidad y Sustentabilidad A.C. [Networks for Diversity, Equity and Sustainability A.C.]. https://bit.ly/3ojvl1t

(continued)

International Telecommunication Union. (2017). *Final report: World Telecommunication Development Conference (WTDC–2017) – Buenos Aires, Argentina, 9–20 October 2017.* https://www.itu.int/en/ITU-D/Conferences/WTDC/WTDC17/Documents/WTDC17_final_report_en.pdf

Magallanes-Blanco, C. (2008). The use of video for political consciousness-raising in Mexico: An analysis of independent videos about the Zapatistas. Edwin Mellen Press.

Magallanes-Blanco, C., & Rodriguez-Medina, L. (2016). Give me a mobile and I will raise a community. In L. Robinso, J. Schulz, & H. Dunn (Eds.), *Communication and Information Technologies Annual* (*Studies in Media and Communications, Vol. 12*) (pp. 315–343). Emerald Group Publishing Limited. https://doi.org/10.1108/S2050-206020160000012019

Martínez Luna, J. (2016). Conocimiento y comunalidad [Knowledge and communality]. *Bajo el Volcán* [Under the Volcano]*, 16*(23)*,* 99–112. http://www.apps.buap.mx/ojs3/index.php/bevol/article/view/1289/907

Morales, E. N. (2020). "Para que las lenguas indígenas también puedan tener presencia": Indigenizando el ciberespacio ["So that indigenous languages can also have a presence": Indigenizing cyberspace]. *Canadian Journal of Latin American and Caribbean Studies 45*(1), 122–142. https://doi.org/10.1080/08263663.2019.1662670

Nájera, J., & Salazar, G. (2018, January 22). The first mobile phone network for indigenous communities in Mexico is under threat. *Global Voices Advox.* https://advox.globalvoices.org/2018/01/22/the-first-mobile-phone-network-for-indigenous-communities-in-mexico-is-under-threat/

Parra Hinojosa, D. & Baca-Feldman, C. F. (2021). *Let us rethink communication technologies.* Redes por la Diversidad, Equidad y Sustentabilidad A.C. [Networks for Diversity, Equity and Sustainability A.C.]. https://bit.ly/3hqbxYG

Redes por la Diversidad, Equidad y Sustentabilidad A.C. [Networks for Diversity, Equity and Sustainability A.C.]. (2021). *Intranets comunitarias* [Community intranets]. https://www.redesac.org.mx/intranets

Rodriguez, J. M. R. (2005). Indigenous radio stations in Mexico: A catalyst for social cohesion and cultural strength. *Radio Journal: International Studies in Broadcast & Audio Media, 3*(3), 155–169. https://doi.org/10.1386/rajo.3.3.155_1

Rodríguez, C. (2000). Fissures in the mediascape: An international study of citizens' media. Hampton Press.

Sandoval Forero, E. A., & Guerra García, E. (2010). *Migrantes e indígenas: Acceso a la información en comunidades virtuales interculturales* [Migrants and indigenous people: Access to information in intercultural virtual communities]. Universidad Autónoma del Estado de México & Universidad Autónoma Indígena de México [Autonomous University of the State of Mexico & Indigenous Autonomous University of Mexico]. http://www.rosalux.org.mx/sites/default/files/pdf/migrantes_indigenas.pdf

Sicoli, M. A. (2016). Repair organization in Chinantec whistled speech. *Language 92*(2), 411–432. http://doi.org/10.1353/lan.2016.0028

Srinivasan, R. (2019). Beyond the valley: How innovators around the world are overcoming inequality and creating the technologies of tomorrow. MIT Press.

(continued)

Stringer, E. T. (2007). *Action research*. Sage Publications.

United Nations. (2007). *United Nations declaration on the rights of indigenous peoples*. https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2018/11/UNDRIP_E_web.pdf

Wortham, E. (2013). Indigenous media in Mexico: Culture, community and the state. Duke University Press.

Endnotes

1 WTDC RESOLUTION 11 (Rev. Buenos Aires, 2017):Telecommunication/information and communication technology services in rural, isolated and poorly served areas and indigenous communities. WTDC RESOLUTION 46 (Rev. Buenos Aires, 2017): Assistance to indigenous peoples and communities through information and communication technology. ITU Plenipotentiary Conference RESOLUTION 184 (Guadalajara, 2010): Facilitating digital inclusion initiatives for indigenous peoples.

2 http://www.filac.org/

3 https://comunicares.org/2019/10/30/technological-processes-of-autonomy-in-cauca-colombia/

4 Made up of Altermundi, Centro de Estudios para el Desarrollo Rural, Fundación Comunalidad, Instituto Superior Intercultural Ayuuk, Ojo de Agua Comunicación, Palabra Radio, Radio Nanhdia, Red de Comunicadores Boca de Polen, Red de Radios y Software Libre, Redes por la Diversidad, Equidad y Sustentabilidad A.C., Rhizomatica, Telecomunicaciones Indígenas Comunitarias A.C., Servicios Universitarios y Redes de Conocimiento en Oaxaca A.C., Universidad Autónoma Metropolitana and Universidad Iberoamericana Puebla.

5 Although ITU actions aimed at indigenous peoples from the start, the collaboration with FILAC made it possible to link the courses to the needs of these communities in the Americas region, leading to a greater involvement of these communities with the innovative approach of the new programme. The main difference lies in the fact that indigenous communicators have participated in all phases of the design, implementation and evaluation of the programme, not only in defining the content and training needs to be addressed.

6 This research process took place between August and November 2020 and involved in-depth interviews with various members of the Techio Comunitario advisory committee. Alejandra Carrillo (Red de Comunicadores Boca de Polen), Alma Soto (CIESAS-Pacífico Sur), Daniela Bello and Carlos Baca (Redes por la Diversidad, Equidad y Sustentabilidad A.C.) developed the systematization of this information.

7 As cited in https://globalmedia.mit.edu/2020/02/21/a-participatory-action-research-project-weaving -technology-and-autonomy-with-indigenous-communities-in-mexico/